

CARDIGAN TIDAL FLOOD RISK MANAGEMENT SCHEME

Appendix 10.1 – Detailed Water Framework
Directive Compliance Assessment



Cyfoeth Naturiol Cymru
Natural Resources Wales



FINAL

CARDIGAN TIDAL FLOOD RISK MANAGEMENT SCHEME (TFRMS)

Water Framework Directive Assessment

Project no. 4021883

Prepared for:

Natural Resources Wales

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1. Introduction

1.1 Background

Binnies UK Ltd (BUKL) have been appointed by Natural Resources Wales (NRW) to develop detailed designs and an EIA to support the Cardigan Tidal Flood Risk Management Scheme (TFRMS, hereafter 'the Scheme') to reduce Cardigan's risk of tidal flooding using green-grey estuarine infrastructure to provide a multi-functional Flood and Coastal Erosion Risk Management asset. The Scheme will do so whilst maintaining and enhancing the natural environment and community well-being, thereby fulfilling NRW's Well-Being Objectives and the Environment (Wales) Act.

The Scheme has been devised to address Cardigan's town and community risk of tidal flooding, having historically been affected by such events. These have inflicted a range of social, economic, and environmental impacts, such as in 2014 when 29 properties were flooded by the tide. The Scheme will reduce tidal flood risk for approximately 90 properties in the Strand area, including accounting for the predicted impact of climate change.

1.2 Scope of the report

This report details the Water Framework Directive (WFD) compliance screening, scoping and detailed assessment for the Scheme. The report follows NRW operational guidance note 072 'Complying with the Water Framework Directive Regulations 2017: How to assess and appraise projects and activities'.

2. Stage 1: Screening

2.1 Stage 1, Step 1: proposal details.

Project details where NRW is the project proponent/instigator	
NRW Project reference - CE0587	
Type of scheme	The Scheme is required to reduce the risk of tidal flooding to the town and community of Cardigan, which has historically been subject to flood events. The Scheme is located towards the centre of Cardigan town, Ceredigion, in west Wales. The Scheme is positioned along the right bank (northern bank) of the River Teifi (Afon Teifi), which flows east to west. The Scheme covers an approximate distance of 327m length of the right bank on the Afon Teifi, upstream of Cardigan Bridge. The Scheme is located to the southeast of Cardigan Castle, and the nearest postcode is SA43 1EX. The Scheme is divided into four areas (1-4). The location of the Scheme is shown on the Location Plan provided in Appendix A.
What ongoing maintenance work will be required? All structures will require maintenance	The scheme requires routine visual inspections, vegetation management and periodic repairs to ensure long-term performance. The engineered riverbank, including wet-side habitats, scour protection (rip rap), rock rolls, geotextiles and granular sub-bases, would require occasional vegetation removal, debris clearance and monitoring for erosion or profile changes, with inspection frequencies ranging from monthly to annually, depending on the asset types. Landscaping features such as riverside planting, grassed areas and hard landscaping elements require routine vegetation control and grass cutting usually every 12 weeks or 6 months. These activities, together with management of the wall and flood gate components of the design, would form a structured maintenance regime.
Breakdown of physical works involved (e.g. new weir, bank reinforcement, riparian vegetation management)	Scheme Overview The Scheme would comprise a continuous flood defence structure designed to fit within the various constraints along the Afon Teifi frontage between Cardigan

Bridge (Castle Street) and Gloster Row car park. The flood defences need to achieve a consistent level of 4.95mAOD to provide the scheme design standard of 1 in 200 annual exceedance probability (AEP) with allowance for climate change, which would make the structures up to approximately 2m tall above general ground level (though lower in some sections). The Scheme would have a design life of 100 years.

The proposed flood defence would be composed of sheet piles, with a reinforced concrete wall for a section in Area 1. The sheet piles would be supported on the riverside by an engineered riverbank. Within the central area there is a proposed boat ramp to enable canoe/kayak access to the water for the Sea Scouts and other permitted organisations. The existing slipway/river access points at (SN179459) and Gloster Row car park would be removed. Towards Cardigan Bridge (Castle Street) there would be further improvements to the street scene.

The Scheme has been split into Areas 1, 2, 3 and 4. The construction of the flood defence wall in Areas 1-3 would lead to the permanent loss of approximately 489m² of intertidal habitat as the wall must encroach into the river channel to avoid existing buildings. This would be mitigated through the setting back of flood defences in Area 4 to create an equal area for the establishment of intertidal habitats. The construction of the new riverbank would lead to an adaptation of approximately 1,946m² of existing habitats.

The Scheme elements associated with each area are outlined within the following sections.

Area 1

Area 1 is located on the north bank of the Afon Teifi and is immediately upstream of Cardigan Bridge, and adjacent to Strand. This is a walled-off roadside area extending between the bridge and an existing bathroom centre showroom.

Existing structures within Area 1 include a Welsh Water (DCWW) (The Mart SPS) discharge chamber at the east end, adjacent the bathroom centre, masonry walls and access steps, roadside and plateau area.

The Scheme elements within Area 1 would include a new flood defence wall section which would be on average approximately 1.4m in height relative to the existing ground level on the dry side of the wall and 76m in length. The alignment of this would start from approximately 10m east of the bridge parapet where the wall

	would be approximately 1.1m high, continuing between the existing roadside wall and the river side wall. Where the existing river side wall curves inland the proposed flood wall would cross to the river side and continue through to the river side of the existing bathroom centre retaining wall where the wall will have risen to approximately 2m high. The first 34m of flood defence wall east of the bridge parapet, between the existing roadside wall and the river side wall, would comprise a reinforced concrete wall and foundation. The flood defence wall would be clad with stone (approximately 150mm on each side). The remaining 42m of flood defence wall in Area 1 would be formed out of steel sheet piles (approximately 5.5m long) sunk into the riverbed by approximately 0.55m. The flood defence wall would be capped and clad with stone (approximately 150mm on each side) and would be in keeping with the materials used within the nearby Cardigan Bridge Scheduled Monument. To support the 42m long sheet pile wall an engineered riverbank would be constructed on the riverside of the proposed flood defence wall within Area 1. The engineered riverbank has been designed to achieve a consistent profile, helping to reduce sheet pile requirements along the Scheme. The engineered riverbank also provides the opportunity for a range of intertidal habitats to establish on the banks. Further detail of the design development and reasoning is described in Chapter 2: Project Development. The riverbank across the majority of the Scheme is a uniform profile with a 1m wide crest at a height of approximately 2.95mAOD and a gradient of 1V in 2H down to the riverbed, extending approximately 10m into the estuary. The new riverbank would be formed through building up the height with granular fill and overlaying the bank with a combination of rip rap toe (large durable stones to prevent erosion and scouring), geotextiles and rock rolls (to prevent erosion and scouring) and topsoil, which are discussed further below. The existing riverbank wall would be removed or buried to enable the construction of the new flood defence. The new engineered riverbank would involve the use of granular fill, a permeable geo-textile membrane and rip rap at the bottom of the engineered riverbank slope. Rock rolls would be placed on the lower slope to approximately two thirds of the height, this section of the new riverbank would be
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regularly inundated by the tide and accrete with sediment with intertidal habitats establishing over time. The remaining upper third of the slope and crest of the engineered riverbank would incorporate a seed mix and imported soil to promote a more natural finish as this section of the new riverbank would be inundated by the tide infrequently. This seeded soil would be placed over the rock rolls which would extend up the upper third of the slope and crest providing the required engineered scour protection to protect the new riverbank. As vegetation develops on the rock rolls this would further enhance the scour protection. To hold soil in a place while the seeded vegetation establishes on the upper slope a single line of coir rolls would be installed, this coir roll would not be planted.

Area 2

Area 2 extends along the riverside from east of the bathroom centre showroom to the slipway adjacent to Cardigan Bay Active. A number of commercial units are located directly north of Area 2 which are directly adjacent to Strand.

Within Area 2, existing structures include masonry river walls retaining the raised ground in which the bathroom centre showroom, offices and warehouse are located.

The Scheme elements within Area 2 would include a new section of flood defence wall which continues from Area 1. This would be approximately 1.6m in height relative to the existing ground level on the dry side of the wall and approximately 70m in length. This would be offset from the riverside of the existing wall. The proposed flood defence wall would be capped and the exposed faces would be stone clad (approximately 150mm on each side). The space behind the flood defence wall would be backfilled, burying the existing wall, and would provide an access corridor (approximately 0.5-1.66m wide) to enable future access to the neighbouring commercial properties.

The flood defence wall would be formed out of steel sheet piles (approximately 5.5m long) sunk into the riverbed by approximately 0.55m. The lower 3m of the sheet pile above the riverbed would be supported and buried by a new engineered riverbank section (extending approximately 10m into the estuary at a gradient of 1V in 2H) and the rip rap toe extending a further 2-3m, however these figures are subject to vary depending on riverbed levels, which would replace the existing

riverbed profile. The new riverbank would involve the use of granular fill, a permeable geo-textile membrane and rip rap at the toe of the engineered riverbank slope. Rock rolls would be placed on the lower slope to approximately two thirds of the height. The remaining upper third of the slope and crest of the engineered riverbank would incorporate a seed mix and growing medium to promote a more natural finish, and an engineered scour protection to protect the engineered riverbank.

Area 3

Area 3 is located between the slipway adjacent to Cardigan Bay Active and the slipway at Gloster Row car park. This area spans the Old Forge Crafts, Cardigan Bay Active, Scout field/ the old foundry site, the Scout hut, Teifi House, garage/office building, and the Gloster Row slipway, which are all located along Strand.

Similar to Area 2, there is a masonry river wall retaining the ground which includes the properties above. The Scheme elements within Area 3 would include a new section of flood defence wall which continues from Area 2, approximately 106m long and varying between approximately 1.7-1.9m high relative to the existing ground level on the dry side of the wall. The flood defence wall would be formed out of steel sheet piles (approximately 5.5-12.5m long) sunk into the riverbed by approximately 0.55-7.5m. The lower 3m of the sheet pile above the riverbed would be supported and buried by a new engineered riverbank section (extending approximately 10-13m into the estuary at a gradient of 1V in 2H) which would replace the existing riverbed profile. The new riverbank would involve the use of granular fill, a permeable geo-textile membrane and rip rap at the toe of the engineered riverbank slope. Rock rolls would be placed on the lower slope to approximately two thirds of the height. The remaining upper third of the slope and crest of the engineered riverbank would incorporate a seed mix and growing medium to promote a more natural finish, and an engineered scour protection to protect the engineered riverbank. The engineered riverbank would tie into the regraded ground at the existing Gloster Row car park where the defence is set back inland from the water's edge.

The alignment of the wall would be offset towards the riverside of the existing walls to minimise damage to existing structures in the area. This may temporarily affect the existing Scout hut. Further east there is a structure that overhangs the existing

river wall which is understood not to have proper planning permission, and a planning enforcement notice has not been issued for the removal of this structure. The potential demolition and associated dust management mitigation measures for this structure are outlined within Chapter 5: Population and Human Health. Towards the Gloster Row slipway Teifi house is further set back from the defence works.

Due to the alignment of the proposed flood defence wall, the existing slipway used by the Sea Scouts and other permitted organisations need to be closed. To ensure that access to the Afon Teifi would be retained for these groups, the Scheme would provide a new up and over canoe/kayak access ramp to the south of the Old Foundry site. The existing public slipway at Gloster Row car park would also be permanently closed, however it is understood that this is not regularly used and is not required for emergency services to access the river.

Area 4

Area 4 extends between the Gloster Row slipway and the property boundary wall at the eastern end of the Gloster Row car park. Area 4 includes the car park and a small area of grassland to the east of the car park.

Existing structures within Area 4 include a two-level gabion wall retaining ground at Gloster Row car park, the Gloster Row slipway and the existing DCWW pumping station (Cardigan No. 2) infrastructure.

The Scheme elements within Area 4 would include a new set back flood defence wall section (approximately 1.3m high and 75m in length). The wall would be formed out of steel sheet piles (between approximately 5.5m and 13m long) sunk into the riverbed by between 0.55m and 7.95m. Exposed faces of the flood defence wall would be clad with stone (approximately 150mm on each side).

It is necessary to set this section back to mitigate the loss of intertidal habitat within Areas 1-3. To facilitate the establishment of intertidal habitat the existing upper gabion wall would be removed and the ground levels lowered to levels suitable for regular tidal inundation with swales, shallow ditches and low mounds incorporated to further enhance habitat diversity. This lowered area would include scour protection to ensure that it continues to provide support to the piles. The lower section of gabion wall would be retained with existing habitat that has formed on them.

A portion of the Gloster Row car park would be lost through the setting back of defences. The remaining car park area has been redesigned to reduce the number of car parking spaces lost to a minimum. The car park currently consists of 22 spaces and one disabled space, this would reduce to 16 spaces and one disabled space, a loss of 6 car parking spaces.

It is anticipated that setting back the proposed flood defence wall would allow for the creation of approximately 489m² of new intertidal habitat within Area 4, mitigating for the losses within Areas 1-3 where the wall alignment encroaches out into the estuary.

Construction Compounds and Access

As shown on the Location Plan provided within Appendix A, there are two proposed temporary compound areas which would be used for plant/material storage and housing welfare units during construction works.

The proposed northern compound would be located on the northern side of the Afon Teifi, just to the north of the Pont-y-Cleifion Road (SN 18239 46106). This compound area would be used as the main compound and laydown area for the works on the northern bank of the Afon Teifi. This area has been proposed as it is close to the A487 turn off, which would allow access for large vehicles. This site has previously been used as a construction compound for other infrastructure projects in Cardigan and therefore comprises an existing hard standing area.

The proposed southern compound would be located on the southern side of the Afon Teifi (SN 17973 45829), adjacent to an existing slipway which could be used to access the river.

The proposed access route to the northern side of the Afon Teifi would follow Pont-y-Cleifion and down Morgan Street and Carrier's Lane to reach Strand. This route has been selected as it passes the northern compound area and allows for transit towards a laydown area located in Area 1. Construction traffic bound for the southern compound area would continue across Cardigan Bridge onto the B4546 before turning onto Station Road. Alternatively, instead of entering the town centre via Pont-y-Cleifion, construction traffic bound for the southern compound area can continue along the A487 before turning off on the B4546.

Temporary traffic management measures would be in place during the works to ensure safe access. Measures will include:

- Temporary lane closures on Strand during key delivery or mobilisation activities.
- Suspension of on-street parking to allow the safe passage and turning of delivery vehicles.
- Use of banksmen and traffic marshals to manage vehicle movements and pedestrian safety.
- Time-restricted deliveries to avoid peak pedestrian and traffic periods.
- Advance notification to local residents and businesses to inform of potential disruption.
- A construction delivery management system will be necessary to coordinate vehicle movements and ensure that access conflicts are avoided in the town centre. This may involve the use of a remote holding area outside of Cardigan to manage arrival timings and reduce queuing on approach roads.

Construction Methodology

The construction methodology for each component of the proposed works is outlined below in the proposed order of construction. All works components below would be constructed once compounds have been established.

Installation of Temporary Haul Roads / Temporary Piling Platform

Engineered granular fill haul routes on the river side of the existing walls in Areas 1–4 would be constructed to provide access to the construction area for the proposed flood defences. The haul road would allow for access to the narrow working area without the need to transport materials and plant across the Afon Teifi, which would reduce the potential risk of disturbance and pollution to the river. Materials and plant would be transported directly to the installation locations using this methodology which would simplify the construction logistics.

Compacted granular fill would be used to create a haul road and working platform along the foreshore, providing access for construction and forming part of the permanent works. A geotextile separator would first be laid over the foreshore to protect underlying soft materials and reduce migration of fine sediment. The granular material would be placed in compacted layers by a 13–20 t tracked excavator, beginning in Area 1 and progressing upstream to Area 4. Compaction will be subject to vibration monitoring. The working width of the platform would generally be 7m wide to accommodate piling rigs and material transport vehicles and the full width of the platform at around 9-10m. The working platform would act as the primary haul route for plant and materials during construction and would later be incorporated into the engineered riverbank.

Key considerations for implementing granular fill on the foreshore and haul routes include:

- Detailed temporary works design, confirming platform stability under tidal inundation, bearing capacity for haulage vehicles, and integration with obstruction removal and piling operations.
- Flood risk management planning, maintaining existing masonry walls as flood protection during haul route construction and sequencing wall removal with immediate pile installation supported by temporary barriers or cofferdams.
- Environmental approvals and marine licensing, demonstrating no adverse impacts on river hydraulics, sediment dynamics, water quality, or ecology.

These works are expected to be tide-dependent and would need to be scheduled around low-tide windows for safe placement. Whilst the intent is to construct the piling platform in the dry, there may be localised sections where it is necessary to place stone into the wet part of the channel. This is because there may be certain areas where the toe of the piling platform is in the wet at low tide. However, this will only occur in highly localised areas and works will solely involve placing the stone into the channel and not excavating the channel prior to placement.

Sheet Pile Installation

To facilitate the construction of the Scheme elements, the existing river walls in Areas 1-2 would need to be removed where they conflict with the new pile line. The

removal of existing stone filled gabions would also be required. The existing wall would be removed using excavators with hydraulic breakers from the granular fill platform. These proposed works would occur immediately ahead of piling in small sections to maintain stability. Fill and retained ground behind the walls would be trimmed back or battered locally to enable access to the pile face and subsequent cladding. Removed materials would be either stockpiled for reuse (if suitable) or loaded directly into wagons for off-site disposal.

Ground investigation data for the Scheme indicates that the made ground along the north bank of the Afon Teifi is highly variable and contains sandy/silty gravels, frequent cobbles and boulders and occasional buried construction debris / fill materials.

This variability poses a high risk of pile refusal, misalignment, or damage during installation if obstructions are not adequately identified and managed. Effective obstruction management is therefore a critical enabler for successful piling installation.

To undertake piling within the Scheme area, proof digging and pre-augering may need to take place in accordance with the contractors' Obstruction Management Strategy. Proof digging would involve excavation along the proposed pile line to expose and remove obstructions before piling works can commence. Pre-augering would involve drilling along the pile line to loosen dense soil strata, penetrate cobbles, and reduce pile driving resistance. This Obstruction Management Strategy would:

- Reduce refusal risk for hydraulic driving.
- Maintain pile alignment and clutch integrity, critical for seepage cut-off performance.
- Improve construction safety and programme certainty by minimising unforeseen refusal delays.

This Obstruction Management Strategy was provided as advisory guidance to support detailed construction planning, risk assessments, and contractor method development during the next design stage. Final approaches should be confirmed through contractor input, temporary works design, and environmental approvals.

	Piling would be undertaken starting within Area 4, working back towards Area 1 to retain access. A combination of a Movax side-grip rig and leader rig would be utilised depending on the ground conditions encountered on site. For example, if a side grip rig proves to not have sufficient power or counterweight to push piles into the ground, a leader rig would be required. During 1 March to 31 December inclusive, augering and piling are only permitted during periods when the tidal level is below the level of the piling works area. <u>Movax Vibro-driving (Side-grip Rig)</u> A Movax side grip piling rig uses a hydraulic hammer mounted on an excavator to drive sheet piles into the ground. Vibro-driving using Movax side-grip piling rigs mounted on excavators could be feasible in the following areas due to access restrictions and limited working space: • The castle slipway and public car park, where open working platforms and haul routes are available. • Locations where vibration impacts are acceptable and structural receptors are less sensitive. <u>Movax Vibro-driving (Leader Rig)</u> Vibro-driving uses a vibratory hammer to install sheet piles by reducing friction along the pile shaft, allowing penetration under self-weight and vibration-induced settlement. Movax side-grip rigs mount the vibro hammer on an excavator arm, providing a compact, flexible setup suitable for constrained sites. A Movax vibro piling rig is considered to be the most practical installation method for the Scheme Area due to the following reasons: • Flexibility to install piles individually, without needing reaction piles, enabling installation along complex alignments with bends or split lines. • Suitability for operation in restricted working widths typical of Strand frontage, supporting efficient installation in narrow riverbank areas. • Faster installation rates, improving programme certainty and reducing the duration of works in sensitive public and heritage environments.
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Concrete Pours

Following installation of the sheet piles and prior to cladding works, a reinforced concrete toe would be cast at the base of the new wall to provide structural support and protection against scour. The toe would also form the foundation for the stone cladding and would improve durability at the tidal interface.

The concrete toe would be pumped in sequential sections, typically 6–8 m in length, to suit tidal working windows and formwork logistics. Localised excavation would be required at the toe of the pile wall, particularly where the toe would be recessed into the foreshore or behind the removed river wall (e.g. in Areas 1 and 3).

These works are expected to be tide-dependent and would need to be scheduled around low-tide windows.

Stone

The cladding would be installed following completion of the concrete toe. Each cladding panel or unit would be fixed to the pile face using brackets, ties, or adhesive systems.

Copings

Coping stones would form the uppermost element of the wall, capping the new sheet piles and providing a durable and visually appropriate edge finish. These would be pre-cast concrete, installed with mechanical dowels or fixings and bedded on mortar or high-strength adhesive. The installation would be carried out from the temporary foreshore haul route rather than the landside, due to access constraints.

As the wall spans approximately 323m, coping works would progress in sections following cladding completion and full cure of the concrete toe. Interface with hard landscaping or fencing would be completed afterward from the landside, where access permits.

Remove / Regrade Piling Platform

The piling platform and haul road will be re-profiled to form the base of the engineered riverbank. Excess granular fill would be removed and recycled or re-used elsewhere within the Scheme.

These works are expected to be tide-dependent and would need to be scheduled around low-tide windows. Whilst the intent is to construct the piling platform in the

dry, there may be localised sections where it is necessary to remove / regrade stone in the wet part of the channel. This is because there may be certain areas where the toe of the piling platform is in the wet at low tide. However, this will only occur in highly localised areas and works will solely involve removing / regrading the stone in the channel and no excavations within the channel.

Embankment Finish

A permeable geotextile membrane would be placed onto the graded granular fill. Rip rap would be placed at the toe of the new riverbank slope. Rock rolls would be placed on the slope and crest of the new riverbank. Imported soil would be placed on the upper third of the slope and crest of the new riverbank and the seed mix for an estuarine/salt-tolerant environment would be sown to aid vegetation growth on these upper areas which are inundated less frequently by the tides. To hold the soil in a place on the upper slope a single line of coir rolls would be installed, this coir roll would not be planted.

The seed mix for an estuarine/salt-tolerant environment would comprise of grasses (*Festuca rubra* (Red fescue), *Puccinellia maritima* (Common saltmarsh-grass), *Agrostis stolonifera* (Creeping bent) and *Artemisia maritima* (Sea wormwood)) and flowering plants (*Atriplex portulacoides* (Sea-purslane), *Limonium vulgare* (common sea lavender), *Armeria maritima* (thrift), *Tripolium pannonicum* (Sea aster), *Juncus gerardii* (saltmarsh rush), *Suaeda vera* (shrubby sea-blite), *Plantago coronopus* (Buck's-horn plantain), *Cochlearia officinalis* (Common scurvygrass), *Juncus maritimus* (sea rush), *Carex flacca* (glaucous sedge), *Oenanthe lachenalii* (Parsley water-dropwort) and *Vicia cracca* (Tufted vetch)).

These works are expected to be tide-dependent and would need to be scheduled around low-tide windows for safe placement. Whilst the intent is to construct the piling platform in the dry, there may be localised sections where it is necessary to place stone into the wet part of the channel. This is because there may be certain areas where the toe of the piling platform is in the wet at low tide. However, this will only occur in highly localised areas and works will solely involve placing the stone into the channel and not excavating the channel prior to placement.

Various Reinstatements

Upon completion of construction reinstatement, landscaping works for Area 1 and the redesign of Gloster Row car park would take place. Reinstatement of temporary

	works areas would return the site to the same or better condition than before construction and would be completed in accordance with landowner agreement. The landscaping works at Area 1 would be an improvement on existing conditions. Embankment Regrading (Area 4) At Area 4, the upper row of gabion baskets would be removed and the ground, including a portion of the car park, reprofiled to create an area for tidal inundation, allowing for intertidal habitats to establish. The lower gabions would be retained as they contain saltmarsh species. Stripping of topsoil would occur first, followed by excavation to formation level using an excavator working from the land side. Rock rolls would be placed to form a mattress across the area which would then be covered by approximately 0.5m of imported soil. Localised changes in topography across the area would be created to facilitate the establishment of intertidal habitat. Selected materials may be reused as fill in other areas or spread on site subject to environmental approval.
Location of activity	The Scheme is located towards the centre of Cardigan town in west Wales. The permanent works are proposed to be located on the north bank of the Afon Teifi. The Scheme is bound to the west by Castle Street (SN177458) and to the east by Gloster Row car park (SN180459). The location of the Scheme is shown in Appendix A.
Length / size of works (m)	Approximately 323m in length.
Estimated extent of footprint/impact of the works	Total Scheme area: ~2,931m² Temporary compound areas: ~4,003.5m² Combined: 6,934.5m²
Timing of works	It is expected that the proposed construction works would start in early 2027, once all approvals have been attained, and take approximately 18 months to complete. Construction durations are estimates and are dependent on the appointed contractor and their detailed construction method statement.

	The proposed construction working hours would be governed by Ceredigion County Council (CCC) and are typically expected to be limited to daytime on weekdays between 0730 and 1800 during the summer and 0800 and 1630 during winter months due to decreased daylight hours. If weekend working is permitted, this would likely take place on Saturdays between 0730 and 1300. Activities within the compounds may continue outside of the main construction activity hours. Riverside works would have to take place during suitable tide conditions for the specific task and so may need to be programmed for outside of normal working hours. No piling would take place outside of normal working hours. Out of hours works, if required, would be agreed in advance with the Local Authority Environmental Health Officer. A summary of the main works components in consecutive order and their approximate durations is detailed below. Construction activities would overlap, for example completion of sheet pile installation in one area would be followed by concrete pours and stonework cladding while sheet pile installation continues in subsequent areas. It is anticipated that the flood defence/new riverbank works would begin within Area 4, working back towards Area 1 to allow for access along the haul route throughout the works. Works components and their approximate durations element/duration: • Mobilisation / demobilisation – 2 weeks • Installation of haul roads / temporary piling platform – 6 months • Sheet pile installation – 2 months • Concrete pours – 2 months • Stonework cladding – 4 months • Copings – 1 month • Remove/regrade piling platform – 3 months • Rip rap – 1 month • Landscaping - 1 month • Various reinstatements - 2 weeks
Map of site included and scaled plan	Location Plan: 4021883-BUK-ZZ-00-DR-EN-00005

	Indicative Layout Plan: 4021883-BUK-ZZ-00-DR-EN-00008
Project documents	• Location Plan: 4021883-BUK-ZZ-00-DR-EN-00005 • Indicative Layout Plan: 4021883-BUK-ZZ-00-DR-EN-00008 • WFD Water body Map: 4021883-BUK-ZZ-00-DR-EN-00013 • WFD Water body Map 200K Scale: 4021883-BUK-ZZ-00-DR-EN-00014 • Cardigan Tidal FRMS Baseline Geomorphology Processes: 4021883-BUK-ZZ-00-RP-EN-00011 • Geomorphological Walkover Survey: 4021883-BUK-ZZ-00-DR-EN-00015 • Cardigan Hydraulic Modelling Report: 123666-BUK-ZZ-00-RP-HY-00003 • Cardigan Tidal Flood Risk Management Scheme - Habitats Regulations Assessment, APEM 2025 • Cardigan Tidal Flood Risk Management Scheme – Environmental Statement (Binnies) 2026 • Phase 1 Habitat Survey: 4021883-BUK-ZZ-00-DR-EN-00002 • Contaminated Land Interpretation Report: 4021883-BUK-ZZ-00-RP-GE-00001 • Sediment Survey – Technical Note: 4021883-BUK-ZZ-00-RP-GE-00002
NRW team	Cardigan Tidal FRMS Project Team (assessment completed by Binnies UK Ltd)
Lead officer	Bethan Hill
Date of assessment	March 2026

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

Identify relevant water bodies in the project area

- (a) Include relevant (hydrologically linked) surface water (including lakes, coastal and transitional etc) and ground water bodies. Relevant water bodies will depend on the type of activity and its potential to impact on other water bodies for example - the construction of a barrage in the mouth of the river can impact on fish species (among other species and habitats) in the estuary as well as those in the upstream water bodies. For those water bodies that are hydrologically linked then these can be screened out at this stage where there is unlikely to be any risk of causing deterioration or preventing the water body from meeting it's objectives. These can always be brought back in at a later stage if required.
- (b) You also need to consider small non reportable water bodies. These are still legally protected from pollution, modification and abstraction and where an environmental issue is identified, it can still be improved where local actions and assessments deem it a priority.

Date of classification information: Cycle 3 2021

Water body ID	Water body name	Water body type	HMWB	Overall water body status	Morphology status*	Relevance to the proposal
GB511006206900	Teifi Estuary	Transitional	No	Moderate	High	Proposed works are within the transitional water body.
GB110062039070	Piliau- headwaters to the confluence with Teifi	River	No	Moderate	Not High	Proposed works are downstream of this water body.
GB110062043563 ¹	Teifi – Afon Ceri to estuary	River	No	Moderate	Not Detailed	Proposed works are downstream of this water body.
GB41002G203300	Teifi and Coastal Ceredigion	Groundwater	No	Poor	Not High	Proposed works are located above this groundwater body.
GB621009580000	Cardigan Bay South	Coastal	No	Good	Not High	Proposed works are located approximately 5km upstream of this water body.

¹ All upstream water bodies hydraulically connected to the Teifi - Afon Ceri to estuary water body (See Appendix C) will be screened and scoped as per the Teifi - Afon Ceri to estuary. They are not referenced in Stage 1, Step 3 and Stage 2, Step 1 due to the number of water bodies and the mechanism of potential impact and scoping decision being the same.

*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 body was also initially considered, but can be ruled out without further consideration:

- (a) Mwldan – Water body ID GB110062039160 (See Appendix C) – This water body is a tributary of the Teifi Estuary, approximately 300m downstream of the proposed works. Any pollution resulting from the proposed works can only be transported to the Mwldan through tidal currents. The tidal extent of this water body is minimal, and as such, the water body will not be affected. The proposed works are not on a migration route for fisheries for this water body.

2.3 Stage 1, Step 3: Risk Screening - complete for each water body listed above that is either in the water body or hydrologically linked with potential risk

Water body name: Teifi Estuary Water body ID: GB511006206900			
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?	All	Yes water body is at high status for morphology – complete detailed assessment for Teifi Estuary.
Q1.2	Is the activity listed in Annex D as a green activity? Complete new row for each activity	N/A	N/A (screened into detailed assessment in Q1.1)
Q1.3	Are there any potential cumulative/in combination impacts? Or is there Local Expert Override*?	N/A	N/A (screened into detailed assessment in Q1.1)
Q1.4	Is the water body at Good overall status?	N/A	N/A (screened into detailed assessment in Q1.1)
Q1.5	Record best practice measures that the works include to help achieve the objectives of the water body.	All works will be undertaken by a contractor who will implement best practice techniques to control pollution and siltation. The contractor will be required to prepare and comply with a Pollution Prevention Plan, including spill response plans, and a Biosecurity Risk Assessment. Works method statements will be agreed by NRW before works start. Best-practice guidelines (e.g. GPP5: Works and maintenance in or near water, Version 1.2, 2018 and Pollution Prevention Guidelines, CIRIA 2015) will be followed as a minimum to prevent potential adverse effects from pollution and the spread of Invasive Non-Native Species (INNS). A Construction Environmental Management Plan (CEMP) would be produced for the works by the chosen contractor. This is expected to include measures such as:	

Water body name: Teifi Estuary Water body ID: GB511006206900			
Question number	Risk screening questions	Name of activity	Screening decision – delete as appropriate
		- Intervention methods (e.g., silt curtains) to minimise sediments entering the waterbody. - Appropriate PPE and good hygiene practise to reduce the risk from contaminated soil or water. - A list of standard best practise measures in line with current guidance.	

Water body name: Piliau – headwaters to the confluence with Teifi Water body ID: GB110062039070			
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 activity listed in Annex D as a green activity? Complete new row for each activity	Operation of temporary compounds during the construction phase to store plant & machinery, materials, and fuel & oils.	No (not listed in Annex D) – complete scoping assessment for each water body
		Construction of a temporary access ramp to the foreshore and a permanent replacement slipway	No (Bed reinforcement is classed as Red and in Annex D) – complete scoping assessment for each water body
		Pre-augering and installation of sheet piles from a temporary piling platform formed from clean riprap stone.	No (Bank reinforcement over 100m is classed as Red and in Annex D) – complete scoping assessment for each water body

Water body name: Piliau – headwaters to the confluence with Teifi Water body ID: GB110062039070			
Question number	Risk screening questions	Name of activity	Screening decision – delete as appropriate
		Reprofiling of piling platform and haul road to form the engineered riverbank.	No (bank reprofiling > 10m but <= 100m is classed as Amber in Annex D) – seek expert advice
		Reprofiling of existing embankment and adjacent ground excavated to create tidal saltmarsh habitat.	No (bank reprofiling > 10m but <= 100m is classed as Amber in Annex D) – seek expert advice
Q1.3	Are there any potential cumulative/in combination impacts? Or is there Local Expert Override*?	N/A	N/A (screened into detailed assessment in Q1.2)
Q1.4	Is the water body at Good overall status?	N/A	N/A (screened into detailed assessment in Q1.2)
Q1.5	Record best practice measures that the works include to help achieve the objectives of the water body.	All works will be undertaken by a contractor who will implement best practice techniques to control pollution and siltation. The contractor will be required to prepare and comply with a Pollution Prevention Plan, including spill response plans, and a Biosecurity Risk Assessment. Works method statements will be agreed by NRW before works start. Best-practice guidelines (e.g. GPP5: Works and maintenance in or near water, Version 1.2, 2018 and Pollution Prevention Guidelines, CIRIA 2015) will be followed as a minimum to prevent potential adverse effects from pollution and the spread of Invasive Non-Native Species (INNS).	

Water body name: Teifi – Afon Ceri to estuary Water body ID: GB110062043563			
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 activity listed in Annex D as a green activity? Complete new row for each activity	Operation of temporary compounds during the construction phase to store plant & machinery, materials, and fuel & oils.	No (not listed in Annex D) – complete scoping assessment for each water body
		Construction of a temporary access ramp to the foreshore and a permanent replacement slipway	No (Bed reinforcement is classed as Red and in Annex D) – complete scoping assessment for each water body
		Pre-augering and installation of sheet piles from a temporary piling platform formed from clean riprap stone.	No (Bank reinforcement over 100m is classed as Red and in Annex D) – complete scoping assessment for each water body
		Reprofiling of piling platform and haul road to form the engineered riverbank.	No (bank reprofiling > 10m but <= 100m is classed as Amber in Annex D) – seek expert advice
		Reprofiling of existing embankment and adjacent ground excavated to create tidal saltmarsh habitat.	No (bank reprofiling > 10m but <= 100m is classed as Amber in Annex D) – seek expert advice
Q1.3	Are there any potential cumulative/in combination impacts? Or is there Local Expert Override*?	N/A	N/A screened in at Q1.2

Water body name: Teifi – Afon Ceri to estuary Water body ID: GB110062043563			
Question number	Risk screening questions	Name of activity	Screening decision – delete as appropriate
Q1.4	Is the water body at Good overall status?	N/A	N/A screened in at Q1.2
Q1.5	Record best practice measures that the works include to help achieve the objectives of the water body.	All works will be undertaken by a contractor who will implement best practice techniques to control pollution and siltation. The contractor will be required to prepare and comply with a Pollution Prevention Plan, including spill response plans, and a Biosecurity Risk Assessment. Works method statements will be agreed by NRW before works start. Best-practice guidelines (e.g. GPP5: Works and maintenance in or near water, Version 1.2, 2018 and Pollution Prevention Guidelines, CIRIA 2015) will be followed as a minimum to prevent potential adverse effects from pollution and the spread of Invasive Non-Native Species (INNS).	

Water body name: Teifi and Coastal Ceredigion Water body ID: GB41002G203300			
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 activity listed in Annex D as a green activity? Complete new row for each activity	Operation of temporary compounds during the construction phase to store plant & machinery, materials, and fuel & oils.	No (not listed in Annex D) – complete scoping assessment for each water body

Water body name: Teifi and Coastal Ceredigion Water body ID: GB41002G203300			
Question number	Risk screening questions	Name of activity	Screening decision – delete as appropriate
		Construction of a temporary access ramp to the foreshore and a permanent replacement slipway.	No (Bed reinforcement is classed as Red and in Annex D) – complete scoping assessment for each water body
		Pre-augering and installation of sheet piles from a temporary piling platform formed from clean riprap stone.	No (Bank reinforcement over 100m is classed as Red and in Annex D) – complete scoping assessment for each water body
		Reprofiling of piling platform and haul road to form the engineered riverbank	No (bank reprofiling > 10m but <= 100m is classed as Amber in Annex D) – seek expert advice
		Reprofiling of existing embankment and adjacent ground excavated to create tidal saltmarsh habitat.	No (bank reprofiling > 10m but <= 100m is classed as Amber in Annex D) – seek expert advice
Q1.3	Are there any potential cumulative/in combination impacts? Or is there Local Expert Override*?	N/A	N/A – screened in at Q1.2
Q1.4	Is the water body at Good overall status?	N/A	N/A – screened in at Q1.2
Q1.5	Record best practice measures that the works include to help achieve the objectives of the water body.	All works will be undertaken by a contractor who will implement best practice techniques to control pollution and siltation. The contractor will be required to prepare and comply with a Pollution Prevention Plan, including spill response plans, and a Biosecurity Risk Assessment. Works method statements will be agreed by NRW before works start. Best-practice guidelines (e.g. GPP5: Works and maintenance in or near water, Version 1.2, 2018 and Pollution Prevention	

Water body name: Teifi and Coastal Ceredigion Water body ID: GB41002G203300			
Question number	Risk screening questions	Name of activity	Screening decision – delete as appropriate
		Guidelines, CIRIA 2015) will be followed as a minimum to prevent potential adverse effects from pollution and the spread of Invasive Non-Native Species (INNS). A piling risk assessment will be completed to avoid preferential pathways to the groundwater body.	

Water body name: Cardigan Bay South Water body ID: GB621009580000			
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?	All	No – go to Q1.2
Q1.2	Is the activity listed in Annex D as a green activity? Complete new row for each activity	Operation of temporary compounds during the construction phase to store plant & machinery, materials, and fuel & oils.	No (not listed in Annex D) – complete scoping assessment for each water body
		Construction of a temporary access ramp to the foreshore and a permanent replacement slipway.	No (Bed reinforcement is classed as Red and in Annex D) – complete scoping assessment for each water body
		Pre-augering and installation of sheet piles from a temporary piling platform formed from clean riprap stone.	No (Bank reinforcement over 100m is classed as Red and in Annex D) – complete scoping assessment for each water body

Water body name: Cardigan Bay South Water body ID: GB621009580000			
Question number	Risk screening questions	Name of activity	Screening decision – delete as appropriate
		Reprofiling of piling platform and haul road to form the engineered riverbank.	No (bank reprofiling > 10m but ≤ 100m is classed as Amber in Annex D) – seek expert advice
		Reprofiling of existing embankment and adjacent ground excavated to create tidal saltmarsh habitat.	No (bank reprofiling > 10m but ≤ 100m is classed as Amber in Annex D) – seek expert advice
Q1.3	Are there any potential cumulative/in combination impacts? Or is there Local Expert Override*?	N/A	N/A (screened into detailed assessment in Q1.1)
Q1.4	Is the water body at Good overall status?	N/A	Yes , no further WFD assessment needed.
Q1.5	Record best practice measures that the works include to help achieve the objectives of the water body.	All works will be undertaken by a contractor who will implement best practice techniques to control pollution and siltation. The contractor will be required to prepare and comply with a Pollution Prevention Plan, including spill response plans, and a Biosecurity Risk Assessment. Works method statements will be agreed by NRW before works start. Best-practice guidelines (e.g. GPP5: Works and maintenance in or near water, Version 1.2, 2018 and Pollution Prevention Guidelines, CIRIA 2015) will be followed as a minimum to prevent potential adverse effects from pollution and the spread of Invasive Non-Native Species (INNS). A Construction Environmental Management Plan (CEMP) would be produced for the works by the chosen contractor. This is expected to include measures such as: Intervention methods (e.g., silt curtains) to minimise sediments entering the waterbody.	

Water body name: Cardigan Bay South Water body ID: GB621009580000			
Question number	Risk screening questions	Name of activity	Screening decision – delete as appropriate
		• Appropriate PPE and good hygiene practise to reduce the risk from contaminated soil or water. • A list of standard best practise measures in line with current guidance.	

*Expert judgement may be required i.e. for complex or cumulative interactions; or a particularly sensitive site/activity (including target water bodies).

3. Stage 2: Scoping Assessment

3.1 Stage 2, Step 1: Relate activity to water body quality elements

Each component of the works should be included, for example: a hydropower scheme may include in-channel impoundment, creation of depleted reach, and bank reinforcement for turbine house. Include vegetation removal/management as a scheme component. Where there is a lack of confidence on whether there is potential risk to an element then these should be scoped in for further assessment.

Information on elements including definitions and what we are concerned (from legacy EA guidance) with included in OGN 72 Appendix 1.

(a) Water body name: Teifi Estuary

Scoping table for Transitional and Coastal water bodies			
Water body name: Teifi Estuary Water body ID: GB511006206900			
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 N/A – other – include additional text to explain	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
Hydromorphology – hydromorphology constitutes both 'hydrology' and 'geomorphology' and describes the physical characteristics and processes of a water body. Could the proposal lead to changes in:			

Scoping table for Transitional and Coastal water bodies			
Water body name: Teifi Estuary Water body ID: GB511006206900			
Elements	Applicable	Potential Impact (include direct and indirect potential impacts)	Avoidance measures included in the proposal
- morphological conditions, for example depth variation, the seabed and intertidal zone structure - tidal patterns, for example, dominant currents - freshwater flow - wave exposure	Direct	The water body is at High status for Morphology. Minor reprofiling works are planned including embankment regrading in Area 4.	A detailed/further assessment is required. Scoped In (Stage 1, step 3)
Is the proposal in a HMWB?	No	N/A	N/A
Water quality 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. Include water quality in the detailed assessment if the activity could affect:			

Scoping table for Transitional and Coastal water bodies			
Water body name: Teifi Estuary Water body ID: GB511006206900			
Elements	Applicable	Potential Impact (include direct and indirect potential impacts)	Avoidance measures included in the proposal
- 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 and indirect	Baseline data: Dissolved Inorganic Nitrogen (DIN): Moderate Dissolved Oxygen (DO): High Specific pollutants: High Construction During construction, temporary compounds are used for the storage of plant and machinery, construction materials and fuel and oil. They must be operated in a manner which prevents the loss of chemicals and sediments directly into the environment. These substances can be washed into the water body, introducing specific pollutants and nutrients bound to sediments. The clarity of the water can be compromised, and oxygen levels can	Construction See Q1.5: Stage 1, Step 3 for avoidance measures. The works are within an estuary which may naturally be turbid due to the changing tidal movements. A small release of sediment is not likely to be noticeable and conditions will return to baseline relatively quickly. The potential impact is therefore considered negligible if suitable avoidance measures are adopted.

Scoping table for Transitional and Coastal water bodies			
Water body name: Teifi Estuary Water body ID: GB511006206900			
Elements	Applicable	Potential Impact (include direct and indirect potential impacts)	Avoidance measures included in the proposal
		decrease, leading to negative impacts on biota. Similarly, construction activities on the foreshore can mobilise sediments resulting in increased turbidity and the indirect release of nutrients and chemicals which may have accumulated; other contaminants may include concrete washings. These can have a negative impact on biota. Operational There are no mechanisms identified which can result in a negative impact during the operation of the flood defence.	See Q1.5: Stage 1, Step 3 for avoidance measures. Scoped Out. Operational Scoped Out.
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:			

Scoping table for Transitional and Coastal water bodies			
Water body name: Teifi Estuary Water body ID: GB511006206900			
Elements	Applicable	Potential Impact (include direct and indirect potential impacts)	Avoidance measures included in the proposal
- chemicals are on the Environmental Quality Standards Directive (EQSD) list - activity disturbs sediment with contaminants (for estuarine and coastal above Cefas Action Level 1). - 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.	Direct	Baseline data: Priority hazardous substances: High Priority substances: High Construction There are no chemicals to be released into the Teifi as part of the proposed Scheme. Materials to be used in construction are not on the EQSD list. Sediment materials imported to create the engineered riverbank should be tested by the contractor to monitor for EQSD substances. Construction activities can increase the risk of the release of chemicals, either directly from compounds where materials are stored or spills and leaks from machinery or disturbance of sediments with contaminants above Cefas Action Level 1. The implementation of best practices during construction activities will	Construction See Q1.5: Stage 1, Step 3 for avoidance measures. Method statements to be prepared by the contractor and agreed by NRW. Fully stocked spill kits should be available, and staff should be trained on how to use them. A detailed/further assessment is required to confirm contamination of existing sediments by conducting sediment and soil samples along the construction area. Scoped In.

Scoping table for Transitional and Coastal water bodies			
Water body name: Teifi Estuary Water body ID: GB511006206900			
Elements	Applicable	Potential Impact (include direct and indirect potential impacts)	Avoidance measures included in the proposal
		reduce the risk from compounds and spills. Operational There are no mechanisms identified which can result in a negative impact during the operation of the flood defence	Operational Scoped Out.
Biology Identify if the activity or project could impact on the abundance or composition of the biological elements listed below: Biological elements for transitional (T) and coastal (C) waters under the directive are: - Benthic invertebrates (T, C) - Fish (T) - Phytoplankton (T, C) - Macroalgae (T, C) - Angiosperms (T, C) Could the proposal lead to:			
- changes to the composition and abundance of aquatic flora - changes to the composition and abundance of benthic invertebrate fauna	Direct and indirect	Baseline data: Invertebrates: Good Phytoplankton: High Angiosperm: Good Macroalgae: Good	

Scoping table for Transitional and Coastal water bodies			
Water body name: Teifi Estuary Water body ID: GB511006206900			
Elements	Applicable	Potential Impact (include direct and indirect potential impacts)	Avoidance measures included in the proposal
		Opportunistic macroalgae: Good Fuciod extent: High Construction There is the potential for the killing and/or injury of aquatic flora and invertebrates, including angiosperms, resulting directly from the installation of the piling platform, tracking of machinery on the foreshore, and riverbank regrading. Also, there is potential for indirect impacts on aquatic flora and fauna communities including saltmarsh habitat (angiosperms) resulting from increased siltation. However, any such impacts will be temporary and affect only a very small area of the waterbody where the construction activities are carried out and is therefore unlikely to affect the composition and abundance of aquatic and invertebrate fauna at a water body scale.	Construction See Q1.5: Stage 1, Step 3 for avoidance measures. The scale of change at the site compared to the size of the water body is small and so no negative impact at the water body scale is anticipated. Due to the loss of saltmarsh, a sub-element of the Angiosperm Biological Quality Element, this Scoped in. Scoped In.

Scoping table for Transitional and Coastal water bodies			
Water body name: Teifi Estuary Water body ID: GB511006206900			
Elements	Applicable	Potential Impact (include direct and indirect potential impacts)	Avoidance measures included in the proposal
		Operational Construction of the flood defence wall and engineered riverbank will encroach in some parts towards the channel of the river. This is seen in Areas 1-3 (see Appendix B). Encroachment will result in the permanent adaptation of some habitat, and possible changes to other habitats as a result of modified hydromorphology. This includes the loss of some area of saltmarsh habitat (angiosperms).	Operational The scale of change of the flood defence alignment from existing compared to the size of the water body is small and so no negative impact at the water body scale is anticipated. Loss of salt marsh habitat is to be compensated by the creation of salt marsh in Area 4, resulting a net increase in salt marsh in the Scheme Area. Scoped Out.
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:			
- 0.5km² or larger - 1% or more of the water body's area - Within 500m of any higher sensitivity habitat (see table below) - 1% or more of any lower sensitivity habitat (see table below)	Direct	The working site contains and lies within 500m of the higher sensitivity habitat <i>saltmarsh</i> and the lower sensitivity habitat <i>intertidal soft sediments like sand and mud</i>. This is seen across all areas of the Scheme, but primarily Areas 3 and 4 (see Appendix B). Area 3, which consists mainly of intertidal sand and mud, will be impacted by the new engineered riverbank and is	Any temporary works and the final alignment of defences will impact sensitive habitats. Scoped In for further assessment.

Scoping table for Transitional and Coastal water bodies			
Water body name: Teifi Estuary Water body ID: GB511006206900			
Elements	Applicable	Potential Impact (include direct and indirect potential impacts)	Avoidance measures included in the proposal
		encroached by the flood defence wall alignment. Area 4, which consists of dense/continuous salt marsh, will be encroached by some of the engineered riverbank and the flood defence wall alignment. The wall has been set back to conserve this habitat.	
Fish fauna (Transitional water bodies only): could the proposal lead to:			
- changes to the composition, abundance and age structure of fish fauna - 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) - entrainment or impingement of fish - refuge/predation areas - 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	Direct	Baseline data: Fish: Good Construction There is the potential for disturbance of fish due to noise resulting from the movement of plant and machinery on the foreshore and from the installation of the sheet piles. Migrating fish could experience masking and behavioural effects from piling works due to the presence of another overriding sound. Such an effect may result in individuals not responding to potentially threatening situations such as collision with vessel propellers. Behavioural effects could result in individuals being at greater	Construction Pre-augering prior to the installation of sheet piles will assist in avoiding unnecessary vibration. The channel width of the Teifi is approximately 50m, indicating fish can not avoid the noise and vibration emitted based on width of the channel. Good construction practices, such as controls on the machinery used and seasonal/ tidal timing constraints, will limit negative impacts, as will construction only taking place during daytime hours. Scoped In for further assessment to confirm construction periods (seasonality

Scoping table for Transitional and Coastal water bodies			
Water body name: Teifi Estuary Water body ID: GB511006206900			
Elements	Applicable	Potential Impact (include direct and indirect potential impacts)	Avoidance measures included in the proposal
		risk of predation or having a lower chance of successfully completing migrations. Therefore, there is the potential for the indirect injury or mortality of some individuals. Operational There is the potential for narrowing of the channel leading to hydromorphological changes following the completion of the works. This could impact the hydromorphology and river bed resulting in impacts on fish.	and tide cycle) and suitability of mitigation measures. Operational The scale of potential change to fish habitat, from the new alignment compared to the size of the water body is small and so no negative impact at the water body scale is anticipated. Scoped Out.

Info for TraC water bodies

Extract from EA Clearing the water for All

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.

(b) Water body name: Piliau – headwaters to the confluence with Teifi**Scoping table for River and Lake water bodies****Water body name: Piliau – headwaters to the confluence with Teifi****Water body ID: GB110062039070**

Elements	Applicable	Potential Impact (include direct and indirect potential impacts)	Avoidance measures included in the proposal
Rivers and Lake water bodies	Choose one of the following: Direct – risk of direct impact Indirect – risk of indirect impact N/A – no impact pathway N/A – other – include additional text to explain	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
Hydromorphology – hydromorphology constitutes both 'hydrology' and 'geomorphology' and describes the physical characteristics and processes of a water body. Could the proposal lead to:			
changes to flows, for example, changes to wetted width or depth profile, abstraction of water (changes to quality and dynamics of water flow), changes the physical form including structure and substrate of the river/lake bed or connection to groundwater, or alter the process of sediment transport (erosion, deposition or transfer)?	Indirect	Construction Construction activities on the foreshore can mobilise sediments resulting in increased turbidity. This can have a negative impact on biota. Operational There are no mechanisms identified which can result in a	Construction This water body is a tributary of the Teifi Estuary and is approximately 250m upstream of the proposed works. Any hydromorphological impacts resulting from the proposed works will be minimal as the tidal extent of this water body is minimal. Scoped Out. Operational Scoped Out.

Scoping table for River and Lake water bodies Water body name: Piliau – headwaters to the confluence with Teifi Water body ID: GB110062039070			
Elements	Applicable	Potential Impact (include direct and indirect potential impacts)	Avoidance measures included in the proposal
		negative impact during the operation of the flood defence.	
Is the proposal in a HMWB?	No	N/A	N/A
Water quality 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. Include water quality in the detailed assessment if the activity could affect:			
- water clarity (turbidity or suspended particulate matter concentration) - temperature - oxygen levels - nutrients: total phosphorus concentration (Lakes); soluble reactive phosphorus concentration (Rivers). - salinity/conductivity - acidification status	Indirect	Baseline data: Ammonia: High DO: High pH: High Phosphate: Moderate Temperature: High Construction See Teifi Estuary.	Construction See Q1.5: Stage 1, Step 3 for avoidance measures. This water body is a tributary of the Teifi Estuary and is approximately 250m upstream of the proposed works. Any water quality impacts resulting from the proposed works will be minimal as the tidal extent of this water body is minimal. However, the

Scoping table for River and Lake water bodies Water body name: Piliau – headwaters to the confluence with Teifi Water body ID: GB110062039070			
Elements	Applicable	Potential Impact (include direct and indirect potential impacts)	Avoidance measures included in the proposal
		Operational There are no mechanisms identified which can result in a negative impact during the operation of the flood defence.	works are within an estuary which is naturally turbid due to the changing tidal movements. A small release of sediment is not likely to be noticeable and conditions will return to baseline relatively quickly. Therefore, despite the risk being low and there being appropriate avoidance measures in place, it cannot be entirely ruled out that pollution or resuspension of sediment will have no potential impact on this waterbody, and so it is Scoped In . Operational Scoped Out.
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:			
- chemicals are on the Environmental Quality Standards Directive (EQSD) list - 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	Indirect	Baseline data: Not Assessed Construction See Teifi Estuary.	Construction See Q1.5: Stage 1, Step 3 for avoidance measures.

Scoping table for River and Lake water bodies Water body name: Piliau – headwaters to the confluence with Teifi Water body ID: GB110062039070			
Elements	Applicable	Potential Impact (include direct and indirect potential impacts)	Avoidance measures included in the proposal
guidance. This is part of the Environmental Permitting Regulations guidance.		Operational There are no mechanisms identified which can result in a negative impact during the operation of the flood defence.	This water body is a tributary of the Teifi Estuary and is approximately 250m upstream of the proposed works. Method statements to be prepared by the contractor and agreed by NRW. Fully stocked spill kits should be available and staff trained on how to use them. Any chemical impacts resulting from the proposed works will be minimal as the tidal extent of this water body is minimal. Although the risk is low and appropriate avoidance measures are in place, it cannot be entirely ruled out that pollution or resuspension of sediment will have no potential impact on this waterbody, and therefore it is Scoped In. Operational Scoped Out.
Biology Expert judgement will be required to consider whether any changes to the hydromorphology or water quality brought about by the project will potentially impact upon the Biological Quality Elements (BQEs) and may cause deterioration in status.			

Scoping table for River and Lake water bodies Water body name: Piliau – headwaters to the confluence with Teifi Water body ID: GB110062039070			
Elements	Applicable	Potential Impact (include direct and indirect potential impacts)	Avoidance measures included in the proposal
- Identify if the activity or project could impact on the abundance or composition of the following biological elements: benthic invertebrates, phytoplankton, acrophytes and phytobenthos or fish. <i>Could the proposal lead to:</i>			
- changes to the composition and abundance of aquatic flora, and or; - changes to the composition and abundance of benthic invertebrate fauna?		Baseline Macroinvertebrates: High Construction There are no mechanisms identified which can result in a negative impact during the construction of the flood defence. Operational There are no mechanisms identified which can result in a negative impact during the operation of the flood defence	Construction Scoped Out. Operational Scoped Out.
Fish fauna: could the proposal lead to:			

Scoping table for River and Lake water bodies Water body name: Piliau – headwaters to the confluence with Teifi Water body ID: GB110062039070			
Elements	Applicable	Potential Impact (include direct and indirect potential impacts)	Avoidance measures included in the proposal
- changes to the composition, abundance and age structure of fish fauna, - 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), - entrainment or impingement of fish, - refuge/predation areas?		Baseline Fish: Moderate Construction There is the potential for disturbance of fish due to noise resulting from the movement of plant and machinery on the foreshore and from the installation of the sheet piles, preventing species migrating through the estuary and into the Piliau - headwaters to confluence with Teifi waterbody. Migrating fish could experience masking and behavioural effects from piling works due to the presence of another overriding sound. Such an effect may result in individuals not responding to potentially threatening situations such as collision with vessel propellers. Behavioural effects could result in individuals being at greater risk of predation or having a lower chance of successfully	Construction Pre-augering prior to the installation of sheet piles will assist in avoiding unnecessary vibration. The channel width of the Teifi is approximately 70m, indicating fish can not avoid the noise and vibration emitted based on the width of the channel. Good construction practices, such as controls on the machinery used and seasonal/tidal timing constraints, will limit negative impacts; as will construction only taking place during daytime hours. Works should avoid the fish migration periods. Consultation with the Fisheries Team at NRW will be required if this is deemed not possible. Scoped In for further assessment to confirm construction periods and the suitability of mitigation measures.

Scoping table for River and Lake water bodies Water body name: Piliau – headwaters to the confluence with Teifi Water body ID: GB110062039070			
Elements	Applicable	Potential Impact (include direct and indirect potential impacts)	Avoidance measures included in the proposal
		completing migrations. Therefore, there is the potential for the indirect injury or mortality of some individuals. Operational There are no mechanisms identified which can result in a negative impact during the operation of the flood defence.	Operational Scoped Out.

(c) Water body name: Teifi – Afon Ceri to estuary

Scoping table for River and Lake water bodies Water body name: Teifi – Afon Ceri to estuary Water body ID: GB110062043563			
Elements	Applicable	Potential Impact (include direct and indirect potential impacts)	Avoidance measures included in the proposal
Rivers and Lake water bodies	Choose one of the following: Direct – risk of direct impact Indirect – risk of indirect impact N/A – no impact pathway N/A – other – include additional text to explain	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
Hydromorphology – hydromorphology constitutes both 'hydrology' and 'geomorphology' and describes the physical characteristics and processes of a water body. Could the proposal lead to:			
changes to flows, for example, changes to wetted width or depth profile, abstraction of water (changes to quality and dynamics of water flow), changes the physical form including structure and substrate of the river/lake bed or connection to groundwater, or alter the process of sediment transport (erosion, deposition or transfer)?	Indirect	Construction Construction activities on the foreshore can mobilise sediments, resulting in increased turbidity. This can have a negative impact on biota.	Construction This water body is a tributary of the Teifi Estuary and is approximately 3.km upstream of the proposed works. Any hydromorphological impacts resulting from the proposed works will be minimal, as the tidal extent of this water body is minimal. Scoped Out .

Scoping table for River and Lake water bodies Water body name: Teifi – Afon Ceri to estuary Water body ID: GB110062043563			
Elements	Applicable	Potential Impact (include direct and indirect potential impacts)	Avoidance measures included in the proposal
		Operational There are no mechanisms identified which can result in a negative impact during the operation of the flood defence.	Operational Scoped Out.
Is the proposal in a HMWB?	No	N/A	N/A
Water quality 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. Include water quality in the detailed assessment if the activity could affect:			
- water clarity (turbidity or suspended particulate matter concentration) - temperature - oxygen levels - nutrients: total phosphorus concentration (Lakes); soluble reactive phosphorus concentration (Rivers). - salinity/conductivity - acidification status	Indirect	Baseline data: Ammonia: High DO: High pH: High Phosphate: Moderate Temperature: High Construction See Teifi Estuary.	Construction This water body is a tributary of the Teifi Estuary and is approximately 3.5km upstream of the proposed works. Any water quality impacts resulting from the proposed works will be minimal as the tidal extent of this water body is minimal.

Scoping table for River and Lake water bodies Water body name: Teifi – Afon Ceri to estuary Water body ID: GB110062043563			
Elements	Applicable	Potential Impact (include direct and indirect potential impacts)	Avoidance measures included in the proposal
		Operational There are no mechanisms identified which can result in a negative impact during the operation of the flood defence.	Scoped Out. Operational Scoped Out.
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:			
- chemicals are on the Environmental Quality Standards Directive (EQSD) list - 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.	Indirect	Baseline data: Not Assessed Construction See Teifi Estuary.	Construction See Q1.5: Stage 1, Step 3 for avoidance measures. This water body is a tributary of the Teifi Estuary and is approximately 3.5km upstream of the proposed works. Method statements to be prepared by the contractor and agreed by NRW. Fully stocked spill kits should be available, and staff should be trained on how to use them. Any chemical impacts resulting from the proposed works will be minimal as the tidal

Scoping table for River and Lake water bodies Water body name: Teifi – Afon Ceri to estuary Water body ID: GB110062043563			
Elements	Applicable	Potential Impact (include direct and indirect potential impacts)	Avoidance measures included in the proposal
		Operational There are no mechanisms identified which can result in a negative impact during the operation of the flood defence.	extent of this water body is minimal. Scoped Out. Operational Scoped Out.
Biology Expert judgement will be required to consider whether any changes to the hydromorphology or water quality brought about by the project will potentially impact upon the Biological Quality Elements (BQEs) and may cause deterioration in status. - Identify if the activity or project could impact on the abundance or composition of the following biological elements: benthic invertebrates, phytoplankton, acrophytes and phytobenthos or fish. Could the proposal lead to:			
- changes to the composition and abundance of aquatic flora, and or; - changes to the composition and abundance of benthic invertebrate fauna?		Baseline Macroinvertebrates: High Construction There are no mechanisms identified which can result in a negative impact during the	Construction Scoped Out.

Scoping table for River and Lake water bodies Water body name: Teifi – Afon Ceri to estuary Water body ID: GB110062043563			
Elements	Applicable	Potential Impact (include direct and indirect potential impacts)	Avoidance measures included in the proposal
		construction of the flood defence. Operational There are no mechanisms identified which can result in a negative impact during the operation of the flood defence.	Operational Scoped Out.
Fish fauna: could the proposal lead to:			
- changes to the composition, abundance and age structure of fish fauna, - 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), - entrainment or impingement of fish, - refuge/predation areas?		Baseline Fish: Moderate Construction There is the potential for disturbance of fish due to noise resulting from the movement of plant and machinery on the foreshore and from the installation of the sheet piles, preventing species migrating through the estuary and into the Teifi – Afon Ceri to estuary waterbody. Migrating fish could experience masking and	Construction Pre-augering prior to the installation of sheet piles will assist in avoiding unnecessary vibration. The channel width of the Teifi is approximately 70m, indicating fish can not avoid the noise and vibration emitted based on width of the channel. Good construction practices, such as controls on the machinery used and seasonal/tidal timing constraints, will limit negative impacts; as will construction only taking place during daytime hours. Works should avoid the fish migration periods.

Scoping table for River and Lake water bodies Water body name: Teifi – Afon Ceri to estuary Water body ID: GB110062043563			
Elements	Applicable	Potential Impact (include direct and indirect potential impacts)	Avoidance measures included in the proposal
		behavioural effects from piling works due to the presence of another overriding sound. Such an effect may result in individuals not responding to potentially threatening situations, such as collision with vessel propellers. Behavioural effects could result in individuals being at greater risk of predation or having a lower chance of successfully completing migrations. Therefore, there is the potential for the indirect injury or mortality of some individuals. Operational There are no mechanisms identified which can result in a negative impact during the operation of the flood defence.	Consultation with the Fisheries Team at NRW will be required if this is deemed not possible. Scoped In for further assessment to confirm construction periods and the suitability of mitigation measures. Operational Scoped Out.

(d) Water body name: Teifi and Coastal Ceredigion

Scoping table for Groundwater bodies			
Water body name: Teifi and Coastal Ceredigion Water body ID: GB41002G203300			
Elements	Applicable	Potential Impact (include direct and indirect potential impacts)	Avoidance measures already included in the proposal
Groundwater	Choose one of the following: Direct – risk of direct impact Indirect – risk of indirect impact N/A – no impact pathway N/A – other – include additional text to explain	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
Identify if the activity/project has the potential to impact on the quality or quantity of groundwater. Hydrogeological regime: Could the proposal lead to:			
- a significant change to groundwater flows, for example, below ground structures which restricts or alters baseflow to dependent surface water or wetlands - abstraction of groundwater in large volumes or near sensitive locations	N/A – no impact pathway	Baseline data: Overall water body: Poor Groundwater quantitative tests: Good Quantitative Groundwater Dependent Terrestrial Ecosystems test: Good Quantitative Dependent Surface Water Body Status: Good Quantitative Saline Intrusion: Good Quantitative Water Balance: Good Chemical Groundwater tests: Poor	

Scoping table for Groundwater bodies			
Water body name: Teifi and Coastal Ceredigion Water body ID: GB41002G203300			
Elements	Applicable	Potential Impact (include direct and indirect potential impacts)	Avoidance measures already included in the proposal
- a significant change to groundwater chemistry due to inputs of pollutants to the ground over a large area - potential impact on ground water dependant terrestrial ecosystems e.g. wetlands		Chemical Drinking Water Protected Area General Chemical test: Good Chemical Groundwater Dependent Terrestrial Ecosystems test: Good Chemical Dependent Surface Water Body Status: Poor Chemical Saline Intrusion: Good Trend Assessment – Groundwater supporting element: High Construction The working site is located over this groundwater body. Due to the scale and nature of the works and no groundwater abstraction, good construction practices will make any potential groundwater impacts negligible. Operational There is not thought to be a mechanism by which operating the flood defence can impact groundwater.	Construction See Q1.5: Stage 1, Step 3 for avoidance measures. Scoped Out. Operational Scoped Out.

(e) Water body name: Cardigan Bay South

Scoping table for Transitional and Coastal water bodies			
Water body name: Cardigan Bay South Water body ID: GB621009580000			
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 N/A – other – include additional text to explain	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
Hydromorphology – hydromorphology constitutes both ‘hydrology’ and ‘geomorphology’ and describes the physical characteristics and processes of a water body. Could the proposal lead to changes in:			
- morphological conditions, for example depth variation, the seabed and intertidal zone structure - tidal patterns, for example, dominant currents - freshwater flow - wave exposure	Indirect	The water body is not at High status for morphology. Whilst works are not being undertaken directly within this waterbody, there is potential for the upstream works to influence morphology (including flows), the 5km distance and minor scale of the works supports that such effects will be minor, considered negligible.	Scoped Out.
Is the proposal in a HMWB?	No	N/A	N/A
Water quality			

Scoping table for Transitional and Coastal water bodies			
Water body name: Cardigan Bay South Water body ID: GB621009580000			
Elements	Applicable	Potential Impact (include direct and indirect potential impacts)	Avoidance measures included in the proposal
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.			
Include water quality in the detailed assessment if the activity could affect:			
- 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 and indirect	Baseline data: Dissolved Inorganic Nitrogen (DIN): High Dissolved Oxygen (DO): High Specific pollutants: High Phytoplankton: Not detailed Opportunistic macroalgae: Not detailed Construction Due to the direct hydrological connection between this waterbody and the upstream waterbody which the works will take place in, there is a minor underlying risk for impacts to water quality, for example through accidental spills or sediment mobilisation. However, following best practise measures and pollution prevention guidance as detailed in Q1.5 will	Construction See Q1.5: Stage 1, Step 3 for avoidance measures. The works are within an estuary which is naturally turbid due to the changing tidal movements. A small release of sediment is not likely to be noticeable and conditions will return to baseline relatively quickly. However, despite the risk being low and there being appropriate avoidance measures in place, it cannot be entirely ruled out that pollution or resuspension of sediment will have no potential impact on

Scoping table for Transitional and Coastal water bodies			
Water body name: Cardigan Bay South Water body ID: GB621009580000			
Elements	Applicable	Potential Impact (include direct and indirect potential impacts)	Avoidance measures included in the proposal
		mitigate the risk of such incidents and as such they would be minor in scale. Furthermore, as this water body is located 5km downstream, any such spills would likely dissipate between the two large water bodies and therefore be unlikely to impact overall water quality. Operational There are no mechanisms identified which can result in a negative impact during the operation of the flood defence.	this waterbody, and therefore it is Scoped In. Operational Scoped Out.
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:			
- chemicals are on the Environmental Quality Standards Directive (EQSD) list - activity disturbs sediment with contaminants (for estuarine and coastal above Cefas Action Level 1). - or, if the activity releases chemicals on the EQSD list and has a mixing zone, like a discharge pipeline or outfall, follow the	Direct	Baseline data: Priority hazardous substances: Not assessed Priority substances: Not assessed Construction There are no chemicals to be released into the Teifi and therefore this water body as part of the	Construction See Q1.5: Stage 1, Step 3 for avoidance measures. Although the risk is low and

Scoping table for Transitional and Coastal water bodies			
Water body name: Cardigan Bay South Water body ID: GB621009580000			
Elements	Applicable	Potential Impact (include direct and indirect potential impacts)	Avoidance measures included in the proposal
Environment Agency's surface water pollution risk assessment guidance . This is part of the Environmental Permitting Regulations guidance .		proposed Scheme. Materials to be used in construction are not on the EQSD list. Sediment materials imported to create the engineered riverbank should be tested by the contractor to monitor for EQSD substances. Construction activities can increase the risk of the release of chemicals, either directly from compounds where materials are stored or spills and leaks from machinery or disturbance of sediments with contaminants above Cefas Action Level 1. The implementation of best practices during construction activities will reduce the risk from compounds and spills. Operational There are no mechanisms identified which can result in a negative impact during the operation of the flood defence.	appropriate avoidance measures are in place, it cannot be entirely ruled out that pollution or resuspension of sediment will have no potential impact on this waterbody, and therefore it is Scoped In. Operational Scoped out.
Biology Identify if the activity or project could impact on the abundance or composition of the biological elements listed below:			

Scoping table for Transitional and Coastal water bodies			
Water body name: Cardigan Bay South Water body ID: GB621009580000			
Elements	Applicable	Potential Impact (include direct and indirect potential impacts)	Avoidance measures included in the proposal
Biological elements for transitional (T) and coastal (C) waters under the directive are: - Benthic invertebrates (T, C) - Fish (T) - Phytoplankton (T, C) - Macroalgae (T, C) - Angiosperms (T, C) Could the proposal lead to:			
- changes to the composition and abundance of aquatic flora - changes to the composition and abundance of benthic invertebrate fauna	Direct and indirect	Baseline data: Invertebrates: Good Phytoplankton: Not detailed Angiosperm: Not detailed Macroalgae: Not detailed Opportunistic macroalgae: Not detailed Construction As no construction is to take place within this water body, there are no mechanisms identified which can	Construction See Q1.5: Stage 1, Step 3 for avoidance measures used at the construction location. Scoped Out.

Scoping table for Transitional and Coastal water bodies			
Water body name: Cardigan Bay South Water body ID: GB621009580000			
Elements	Applicable	Potential Impact (include direct and indirect potential impacts)	Avoidance measures included in the proposal
		result in a negative impact during the operation of the flood defence. Operational There are no mechanisms identified which can result in a negative impact during the operation of the flood defence.	Operational Scoped Out.
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:			
- 0.5km² or larger - 1% or more of the water body's area - Within 500m of any higher sensitivity habitat (see table below) - 1% or more of any lower sensitivity habitat (see table below)	N/A	Neither construction nor operational activities occur within this water body.	Scoped Out.
Fish fauna (Transitional water bodies only): could the proposal lead to:			

Scoping table for Transitional and Coastal water bodies			
Water body name: Cardigan Bay South Water body ID: GB621009580000			
Elements	Applicable	Potential Impact (include direct and indirect potential impacts)	Avoidance measures included in the proposal
- changes to the composition, abundance and age structure of fish fauna - 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) - entrainment or impingement of fish - refuge/predation areas - 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	Direct	Baseline data: Fish: Good Construction There is the potential for disturbance of fish due to noise resulting from the upstream construction activities due to the hydrological connection between this water body and the location of the works, and the migratory nature of fish. Sources include from the movement of plant and machinery on the foreshore and from the installation of the sheet piles. Migrating fish could experience masking and behavioural effects from piling works due to the presence of another overriding sound. Such an effect may result in individuals not responding to potentially threatening situations such as collision with vessel propellers. Behavioural effects could result in individuals being at greater risk of predation or having a lower chance of successfully completing migrations. Therefore, there is the	Construction Good construction practices, such as controls on the machinery used and seasonal/ tidal timing constraints, will limit negative impacts, as will construction only taking place during daytime hours. Scoped Out.

Scoping table for Transitional and Coastal water bodies			
Water body name: Cardigan Bay South Water body ID: GB621009580000			
Elements	Applicable	Potential Impact (include direct and indirect potential impacts)	Avoidance measures included in the proposal
		potential for the indirect injury or mortality of some individuals. However, it is noted that due to the distance between this water body and the location of the works (~5km), this is expected to be negligible. Operational There is the potential for narrowing of the channel leading to hydromorphological changes following the completion of the works. This could impact the hydromorphology and river bed resulting in impacts on fish. However, it is noted that due to the distance between this water body and the location of the works (~5km), this is expected to be negligible.	Operational The scale of potential change to fish habitat, from the new alignment compared to the size of the water body is small and so no negative impact at the water body scale is anticipated. Scoped Out.

(f) Invasive Non-Native Species**Invasive Non-Native Species**

Refer to the [Check Clean Dry](#) campaign to help prevent the spread of invasive plants and animals in British waters. You can find out more about INNS and biosecurity on [the GB Non-native Species Secretariat website](#) and on the INNS and Biosecurity section of the [NRW Intranet](#).

For additional information about INNS distribution check the following: [NBN Atlas Wales INNS Portal](#)

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 to other water bodies.

Each project should have a biosecurity risk assessment/plan as a matter of course. [NRW Draft Biosecurity Risk Assessment/Plan Template](#). For complex large scale projects it may be necessary to develop a more in-depth biosecurity plan using guidance on the [GBNNS website](#).

Does the proposal have the potential to introduce or spread INNS?

Yes – the introduction of plant and machinery onto the foreshore could lead to INNS spread without control. A Biosecurity Risk Assessment will need to be carried out.

(g) WFD Protected Areas

Protected Areas and Critical sensitive habitats/species		
Consider if Protected Areas are at risk from the proposal. These include:	Applicable	How have you considered the potential impacts?
Protected Areas:		
SACs	Yes	A Habitats Regulation Assessment has been conducted to assess potential impacts on Afon Teifi SAC, Cardigan Bay SAC and West Wales Marine SAC.
SPAs	No	
RAMSAR	No	
Bathing Waters	Yes	BW ID 38630 – Poppit West is of Excellent quality and lies approximately 5km downstream. Although low, due to the scale of the works, there is a risk of deterioration due to construction within the 18-month timeframe, as both the tidal and fluvial nature means that any pollution or sediment mobilisation could affect this Bathing Water Area within a short time frame if adequate mitigation is not implemented.
Shellfish Waters	No	
Surface Water Drinking Water Protected Areas	No	
Ground Water Drinking Water Protected Areas	No	
Urban Waste Water Treatment Directive: designated Nutrient Sensitive Area	No	
Nitrate Vulnerable Zones	No	
Other Protected and Priority habitats and species.		

Protected Areas and Critical sensitive habitats/species		
Consider if Protected Areas are at risk from the proposal. These include:	Applicable	How have you considered the potential impacts?
Nationally or locally protected areas e.g. SSSI, NNR etc	Yes	There are three designated sites within 2km of the Scheme, with one of these partially within the Scheme and one hydraulically linked to the site. These are discussed further below. The Scheme lies within the Afon Teifi SSSI. SSSI Assent will be required for any operations within the Afon Teifi SSSI. Teifi Estuary Woodlands & Marshes SSSI is located 1.1km upstream of the Scheme and is hydrologically linked. No impacts are anticipated due to the scoped out elements of water quality and chemistry discussed previously. Coedmor National Nature Reserve lies approximately 2.25km upstream and has been screened out for further assessment due to the distance from the works.
Section 6 Biodiversity and resilience of ecosystems duty (Environment (Wales) Act 2016) here - other Protected and Priority habitats and species. The S6 duty requires that public authorities must seek to maintain and enhance biodiversity so far as consistent with the proper exercise of their functions and in so doing promote the resilience of ecosystems. Identify if there is a risk that the activity/project could impact on a water dependant priority habitat and or species which are either critical to the ecological health of the water body or sensitive to changes proposed on the water body.		
- Section 7 list of priority habitats e.g. wetlands	Yes	• Intertidal mudflats and saltmarsh already covered above in Stage 2 Step 1 of this assessment. • Rivers and streams.
- Section 7 list of priority species e.g. water voles	Yes	• Birds including kingfisher, merlin, osprey, barn owl and reed bunting have been recorded within 1km

Protected Areas and Critical sensitive habitats/species		
Consider if Protected Areas are at risk from the proposal. These include:	Applicable	How have you considered the potential impacts?
		of the proposed working area. Birds may be temporarily disturbed by the works. No vegetation is to be removed for the proposed work. Works should avoid breeding bird season (March to September, inclusive), subject to consents and permissions. If works extend into the breeding bird season and distressed waterbirds are noted by the supervising Engineer, activities should be stopped immediately. If this is not possible then an Ecologist should be consulted to specify appropriate methods of working and breeding bird surveys undertaken. • Brown hairstreak has been recorded within 1km of the proposed works. However, there is limited suitable habitat for this species within the working area so it is assumed not present. • Atlantic salmon, sea lamprey, European eel and brown/sea trout have been recorded within the Teifi. Effects on fish have been considered with mitigation and scoped in at Stage 2, Step 1. • Slow-worm and common lizard have been recorded within 1km of the proposed Scheme. Terrestrial and aquatic invertebrate surveys will be undertaken and the recommendations followed. • Bats are likely to be present within the Scheme area. Further surveys are required to define the mitigation; initially, this will comprise of a preliminary bat roost assessment.

Protected Areas and Critical sensitive habitats/species		
Consider if Protected Areas are at risk from the proposal. These include:	Applicable	How have you considered the potential impacts?
		• Otters are known to use the Afon Teifi and are a feature of the Afon Teifi SAC. A pre-construction check for otter field signs should be undertaken approximately 8 weeks prior to works commencing. If any field signs are observed, then a licence from Natural Resources Wales may be required. A pre-works check to verify that no otter holts are present within any working areas should be conducted immediately prior to any works being undertaken. Piling works should be undertaken during daylight hours to prevent any impact to feeding/ foraging otter. Any open excavations or trenches should be covered at night to avoid mammals becoming trapped. • Bottlenose dolphin are known to frequent the lower reaches of the river and there exists the potential for the species to be present and impacted by the works. A pre-construction check should be conducted to verify that bottlenose dolphins or harbour porpoise are not present within any working area and should be conducted immediately prior to any works being conducted. If areas of habitat suitable for bottlenose dolphin are to be disturbed as part of the Scheme, then a Precautionary Method of Working Statement would need to be implemented and works carried out under the supervision of an Ecological Clerk of Works.

Protected Areas and Critical sensitive habitats/species		
Consider if Protected Areas are at risk from the proposal. These include:	Applicable	How have you considered the potential impacts?
Ecosystem Resilience The Environment (Wales) Act 2016, Section 3 states that the objective of the sustainable management of natural resources is to maintain and enhance the resilience of ecosystems and the benefits they provide now and for future generations		
Consideration of ecosystem resilience – diversity, extent, condition, connectivity.	Yes	- Habitats will be impacted and reduced in extent, locally impacting ecosystem resilience. - Opportunities for saltmarsh creation to mitigate should be investigated.

3.2 Summary of Step 1 scoping

Q2.1 Is there a risk that a component of the proposal may cause deterioration of any element that makes up water body status?	Yes - all potential impacts have been assessed considering the avoidance measures already included in the proposal and there is still a potential risk to a water body quality element or risk of deterioration.
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3.3 Stage 2, Step 2: Summary of scoping decision of the project 'alone'

Q2.2 Is there a risk that a component of the proposal may prevent the water body or Protected Area from achieving its objectives in the future?	Yes - all potential impacts have been assessed considering the avoidance measures already included in the proposal and there is a potential risk any water body or protected area from achieving its objectives in the future.
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3.4 Stage 2, Step 3: Assessing potential in combination and/or cumulative impacts

Are there any activities or projects which may act in combination and/or cumulative? <i>If none, put 'N/A'</i>	Nature of the in-combination/cumulative effect (if any)	Avoidance measures Include details of how measures already included in the proposal would be applied, and who would be responsible for applying them.	Can the risk of deterioration or prevention of achieving water body objectives from in combination/ cumulative effects be ruled out? 'YES' (or N/A) or 'NO' (where there is any uncertainty then add 'Don't know/uncertain')
N/A	N/A	N/A	N/A

Scoping decision of the project cumulatively or 'in combination'		Potential cumulative/in combination impacts conclusion
Q2.3 Can the risk of deterioration or prevention of achieving water body objectives from in combination and or cumulative effects be ruled out?	(a) If the right-hand column is 'YES' or 'N/A' in all cases	It can be concluded that potential deterioration or prevention of achieving water body objectives from in combination / cumulative effects can be ruled out.

3.5 Stage 2, Step 4: Overall scoping decision

Overall scoping decision Q2.4 Is there a potential risk that the proposal may cause deterioration or prevent a water body from meeting its objectives either alone or in combination? (choose one of the following suggested options and delete the other)	There is a potential risk that the proposal may cause deterioration or prevent the water body from meeting its objectives, and therefore, a detailed compliance assessment is required.
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4. Stage 3: Detailed Assessment

4.1 Proposed Scope of Detailed Assessment

The proposed scope of the detailed assessments scoped into the WFD assessment are set out below.

(a) Fish (construction)

Impacted water bodies:

- (i) 'Teifi Estuary' (GB511006206900)
- (ii) 'Piliau – headwaters to the confluence with Teifi' (GB110062039070)
- (iii) 'Teifi – Afon Ceri to estuary' and all other upstream water bodies hydraulically connected to the Teifi - Afon Ceri to estuary (See drawing 123666-BUK-ZZ-00-DR-EN-00054.P01 in Appendix D).

Risk to WFD Compliance:

Underwater noise and vibration from piling and pre-augering pose a risk of physiological effects, masking (impairment of the ability to detect sounds), and effects on behaviour and migration.

Scope of detailed assessment:

- (i) Review of HRA mitigation for lamprey, salmon and Ecological Impact Assessment (EcIA) mitigation for fish populations. An EcIA will be completed for the EIA for the Scheme.
- (ii) Review NRW fisheries survey data for 'Teifi Estuary' and 'Piliau – headwaters to the confluence with Teifi' only.
- (iii) Desk-based assessment to determine if the HRA (see report reference 123666-BUK-ZZ-00-RP-EN-00012) and EcIA mitigation is adequate for wider fish species present in surveys (e.g. eel and trout) that are not covered within the HRA.
- (iv) Detail what further mitigation is required, if any.

(b) Biology (construction)**Impacted water bodies:**

- (v) 'Teifi Estuary' (GB511006206900)

Risk to WFD Compliance:

Direct loss of Saltmarsh, a sub-element of the Angiosperm Quality Element.

Scope of detailed assessment:

- (vi) Review loss of Saltmarsh within the scheme against water body status.

(c) Higher sensitivity habitats and lower sensitivity habitats (construction and operation)**Impacted water bodies:**

- 'Teifi Estuary' (GB511006206900).

Risk to WFD Compliance:

- Loss and/or deterioration of saltmarsh and intertidal soft sediments like sand and mud.

Scope of detailed assessment:

- An EcIA will be completed for the Scheme, detailing appropriate mitigation for the impact saltmarsh and intertidal soft sediments to reduce effects.
- The results of the EcIA will be used to support the detailed assessment of effects on saltmarsh and intertidal soft sediments for the WFD Assessment. Mitigation identified for the EcIA will be included in the detailed assessment and further measures will be included if necessary.

(d) Morphology (construction and operation)**Impacted water bodies:**

- 'Teifi Estuary' (GB511006206900).

Risk to WFD Compliance:

- Effect on the hydro-morphological supporting elements of:
 - Quantity, structure and substrate of the bed;
 - Structure of the intertidal zone;
 - Depth variation;
 - Tidal regime; and
 - Freshwater flow.
- The following hydro-morphological supporting elements are not proposed for detailed assessment due to the location of the proposed works in the upper estuary and the nature of the proposed works:
 - Wave exposure.

Scope of detailed assessment:

- Geomorphological walkover of the Scheme Area by a geomorphologist, using field-based GIS mapping software to detail physical biotopes at low tide and capture georeferenced photo. The survey will focus on a visual assessment of the quantity, structure and substrate of the bed and the structure of the intertidal zone. This is expected to be carried out alongside the updated Phase 1 habitat survey.
- Complete a baseline physical processes assessment as per Guidance Note 41, including:
 - A description of the proposed project and baseline physical characteristics for the area that your project could affect (this area is termed the 'zone of influence').
 - Conceptual understanding of the behaviours and interactions of the physical systems within the zone of influence of the proposed project.

- The 1D hydraulic model will require additional scenarios to be run including:
 - Fluvial inflows of Q50, Q1 and 1 in 2-year events; and
 - Tidal boundary conditions of highest astronomical tide, lowest astronomical tide, mean high water springs and mean low water springs.
- Review geomorphological survey data against the 1D model hydraulic outputs and provide an interpretation of how the Scheme will impact the quantity, structure and substrate of the bed based on bed shear stress calculations.
- Review the geomorphological survey and baseline understanding of hydrodynamics in the Zone of Impact against the proposed works and modelling outputs. Provide an evidence-based interpretation of how the Scheme will impact the hydrodynamics.
- Review the geomorphological survey data against the proposed works and modelling outputs. Provide an evidence-based interpretation of how the Scheme will impact the structure of the intertidal zone.

(e) Chemical (construction)

Impacted water bodies:

- 'Teifi Estuary' (GB511006206900).
- 'Piliau – headwaters to confluence with Teifi' (GB110062039070)
- 'Cardigan Bay South' (GB621009580000)

Risk to WFD Compliance:

- Effect on the Chemical status due to the potential mobilisation of contaminated sediments.

Scope of detailed assessment:

- Review outcomes from the Land Use and Soils chapter regarding risks of mobilising historically contaminated sediments.
- Confirm if any further sediment sampling is required to cover the full or partial WFD suite.
- Detail requirements for the EAP to ensure adequate mitigation for WFD compliance based on the conclusions of the Land Use and Soils chapter.

4.2 Assessing for Deterioration

(a) Fish (construction)

Underwater noise and vibration from piling and pre-augering pose a risk of physiological effects, masking (impairment of the ability to detect sounds), and effects on behaviour and migration to the scoped on water bodies. The scoped in water bodies includes 'Piliau – headwaters to the confluence with Teifi', 'Teifi Estuary', 'Teifi – Afon Ceri to estuary', and all other upstream water bodies hydraulically connected to the Teifi – Afon Ceri to estuary.

Vibropiling and augering works associated with the construction of the flood defence have the potential to generate and propagate underwater noise (as sound pressure motion) and vibration (as particle motion) and, as a result, have the potential to cause a range of effects on fish.

Underwater noise may cause physical, physiological and behavioural effects on fish, as follows:

- Behavioural effects (e.g. changes in swimming behaviour and orientation, communication between individuals of the same species, and detection of predators/prey);
- Masking effects (i.e. the reduction in the detectability of a given sound as a result of the simultaneous occurrence of another sound);
- Temporary threshold shift (TTS) in hearing (i.e. short- or long-term changes in hearing sensitivity that may or may not reduce fitness);
- Recoverable tissue injury (e.g. hair cell damage or minor internal or external hematoma);
- Mortality and potential mortal injury (i.e. immediate or delayed death).

The most recent and relevant guidelines for the purposes of the assessment of the impacts of underwater noise associated on fish are the Acoustical Society of America (ASA) Sound Exposure Guidelines for Fishes and Sea Turtles (Popper, 2014). These guidelines provide directions and recommendations for setting criteria (including injury and behavioural criteria) for fish.

The sound exposure guidelines (Popper, 2014) broadly group fish into the following categories based on their anatomy and the available information on the hearing of other fish species with comparable anatomies:

- Group 1: Fish lacking swim bladders that are sensitive only to sound particle motion and show sensitivity to a narrow band of frequencies (e.g. lampreys, gobies);
- Group 2: Fish with a swim bladder, where the organ does not appear to play a role in hearing. These fish are sensitive only to particle motion and show sensitivity to a narrow band of frequencies (e.g. Atlantic salmon); and

- Group 3: Fish that have special structures mechanically linking the swim bladder to the ear. These fish are sensitive primarily to sound pressure, although they also detect particle motion (e.g. European eel). These species have a wider frequency range, and generally show higher sensitivity to sound pressure than fishes in Groups 1 and 2.

The following receptor fish species within the Scheme zone of influence and detailed the group each species falls within and is displayed in Table 1.

Table 1: Key fish receptors

Grouping	Receptor / Species	Hearing group (Popper, 2014)
Diadromous Fish	Atlantic salmon	Group 2
	Brown / sea trout	Group 2
	European eel	Group 3
	River lamprey	Group 1
	Sea lamprey	Group 1
Marine and Estuarine Fish	Thick-lipped grey mullet	Group 2
	Thin-lipped grey mullet	Group 2
	European seabass	Group 3
	Common Goby	Group 1
	Sand Goby	Group 1
	Atlantic herring	Group 3
	Sprat	Group 3
	Lesser sand-eel	Group 1
	Greater sand-eel	Group 1
	Flounder	Group 1
	Plaice	Group 1

Fish species with an absence of a swim bladder (Group 1) or that have a swim bladder which is not involved in hearing (Group 2), are understood to be insensitive to sound pressure and are most likely to detect particle motion. Group 3 fish (those fish with a swim bladder that is involved in hearing) are understood to be able to detect both particle motion and sound pressure, and are more sensitive to sound than Group 1 and 2 fish species.

Most Group 1, 2 and 3 fish species are expected to be able to avoid noise sources before mortality and potential mortal injuries could occur. However, there might be some temporary physiological effects and behavioural responses. In relation to underwater noise produced during vibro-piling and augering, Popper *et al.* (2014) indicate that there is a low risk of mortality and potential mortal injuries and recoverable injuries within the near (tens of metres), intermediate (hundreds of metres) and far (thousands of metres) fields for Groups 1, 2 and 3. For behavioural effects, there is a moderate risk

in the near and intermediate fields, and low risk in the far fields for Groups 1 and 2, and a high risk in the near fields, moderate risk in the intermediate fields and low risk in the far fields for Group 3.

Atlantic salmon, sea trout, European eels, river lampreys and sea lampreys are likely to migrate past the Scheme and therefore underwater noise may impede or delay their migration. The piling and augering works are scheduled to have a duration of approximately 32 days; however, the time at which these activities will take place is currently unknown, and therefore, it is assumed, for the purposes of this assessment, that there will be temporal overlap with key migratory periods for these species. They have been deemed to be of medium vulnerability (can avoid injurious effects but migration may be delayed), high recoverability (migration may resume upon cessation of activities), and are of high to moderate importance. They have been assessed as high sensitivity. The piling and augering works are scheduled to have a duration of approximately 32 days and are anticipated to be restricted to within the Afon Teifi.

All other Group 1, 2 and 3 fish receptors are expected to be able to avoid the impact before potential mortal injuries could occur, occupy nearby suitable habitats of the estuary or adjacent coastal waters and return upon cessation of the activities. They have been deemed to be of low vulnerability (reasonable capacity to avoid), high recoverability (return upon cessation of activities) and are of very low to moderate importance. They have been assessed as low sensitivity, which results in a negligible effect, which is considered to be not significant.

Proposed Mitigation

No in-water augering or piling activities shall be undertaken between 1 March and 31 December (inclusive), except where such activities are undertaken from a dry working platform in dry conditions, such that no augering or piling plant or equipment operates within the water column. For the avoidance of doubt, incidental contact between installed piles and groundwater or tidal water within the substrate shall not constitute in-water working.

Between 1 January and 28 February (inclusive), when these seasonal restrictions do not apply, any in-water augering or piling activities shall be limited to daylight hours (defined as the period between sunrise and sunset minus any specific working time restrictions as specified within the project Environmental Action Plan).

In addition to the seasonal in water restrictions above, it is recommended that soft starts are used for piling activities. This involves the gradual and incremental increase in piling power until full operational power is reached and provides fish the opportunity to move away from the noise source before the onset of full power.

Residual Effects

The mitigation measures above for in water augering and piling, avoid the main migratory periods for Atlantic salmon, river lamprey (downstream migration), sea lamprey (upstream migration), European eel (upstream migration) and sea trout.

The European eel downstream migration occurs in late summer to early winter (April to December), the river lamprey upstream migration occurs between October and December and the sea lamprey downstream migration occurs between October and June, partially overlapping with the December to February period, in water activities may occur. However, such activities will be undertaken in daylight hours, and the migration of European eel, river lamprey and sea lamprey occurs primarily at nighttime.

Considering the mitigation measures, the construction effects of the Scheme from underwater noise and vibration from piling and pre-augering do not pose a risk of deterioration in WFD status to the 'Piliau – headwaters to the confluence with Teifi', 'Teifi Estuary', 'Teifi – Afon Ceri to estuary' and all other upstream water bodies hydraulically connected to the Teifi - Afon Ceri to estuary.

(b) Biology (construction)

Angiosperm

Within the project boundary the saltmarsh habitat is fragmented and semi natural, having formed on top of rock gabions that form a flood defence to the Gloster Row car park and areas raised of imported stone (likely abandoned boat ballast) at the base of two slipways. This is likely typical for the habitat type within the estuary with salt tolerant plants exploiting niche's where the river gradient, tidal inundation, salt content and soil type are suitable. The saltmarsh strip is at its largest in the area east of the site adjacent to the Gloster Row car park where a strip of habitat on the gabions (approx. 10m wide) extends into the natural saltmarsh (outside of the project area). The saltmarsh habitat on the gabions varies, likely as result of relative levels of inundation from pioneering saltmarsh to a grass dominant habitat by the existing retaining wall. This grass dominated strip contains saltmarsh species also, with sea aster being constant and other species such as sea couch *Elytrigia atherica* and sea milkwort *Lysimachia maritima* present but occasional. Tall fescue *Festuca arundinacea* and red fescue *Festuca rubra* are also present and frequent. The habitat within the site is confirmed as semi-natural (saltmarsh species on a non-natural substrate) and is outside areas where saltmarsh habitat forms extensive or continuous habitats, as detailed within the Chapter 6: Biodiversity and Nature Conservation of the Environment Statement.

For saltmarsh there will be temporary loss (for duration of construction and until establishment of Area 4 estimated at 5 years) of 34m² semi-natural saltmarsh intertidal habitat within the Scheme Area to the footprint of the new flood wall. The establishment of new saltmarsh habitat within Area 4 will be left to the natural expansion of the existing retained semi-natural and natural saltmarsh habitat within the project area and immediate surrounds.

Residual Effects

Considering the small scale of the temporary loss of saltmarsh habitat, and the common nature of saltmarsh within the waterbody, effects on Angiosperm Quality Element do not pose a risk of deterioration in WFD status to the 'Teifi Estuary' at a water body scale.

(c) Morphology (construction and operation)

Quantity, structure and substrate of the bed

The Baseline Geomorphology Technical Note (Binnies Ltd, 2026) details that the existing substrate of the Teifi Estuary at the Scheme location is dominated by fine sediments with locations of rubble, possibly historic barge ballast, along the margins. During construction, there will be temporary impacts to both the structure and substrate of the bed due to direct modification of the habitat. Direct impacts and changes will occur during the construction phase as the haul road is constructed and used along the foreshore. The haul road will be modified to form the engineered riverbank and as such the loss of existing habitats remains through operation. The permanent loss through operation is mitigated by the design of the engineered riverbank to be formed of rock rolls, allowing intertidal habitat to develop and support biodiversity. The impacts are localised and minor in scale when compared to the size of the Teifi Estuary water body.

Changes to the cross-sectional geometry also have the potential to affect hydrodynamics. One-dimensional (1D) hydraulic modelling was undertaken, as detailed in Appendix E.

Table 3 details the modelled velocities at Node TE01_0755 (see Appendix E Figure 2). This node is located at an existing narrow point in the channel within the Scheme, and where the engineered riverbank is proposed, and as such is expected to show the most significant changes in velocities. Velocities were not calculated for the Lowest Astronomical Tide (LAT), as the Mean Low Water Spring (MLWS) was considered sufficient. All velocities for Q50 and Q1 have a minor increase in velocities due to the Scheme. Observed sediments consist of silts and rubble, as detailed in the Baseline Geomorphology Technical Note (Binnies, 2026). Comparing these sediment sizes and modelled maximum velocities to the Hjulston-Sundborg diagram (1939) details no change to the erosion and transportation of silts (0.0039 to 0.0625 mm sediment) and transportation and deposition of cobbles (64 to 256 mm sediments).

Modelled results are also shown for Node TE01_0544 (upstream) and Node TE01_0870 (downstream), adjacent to the Scheme. As the geomorphic survey identified that sediments locally are dominated by fines, and the modelling demonstrated minimal changes to velocity and subsequently no predicted changes to sediment dynamics.

Modelled results are also shown for Node TE01_0997 (approximately 140 m upstream of the Scheme) and Node TE01_0310 (approximately 245 m downstream of the Scheme). The modelling demonstrated no changes to velocity at the downstream node, negligible changes at the upstream node and subsequently no predicted changes to sediment dynamics. The modelling indicates a very low risk of changes to the quality, structure and substrate due to hydrodynamic changes based on alterations of the cross-sectional geometry due to the Scheme.

The intertidal habitat creation within Area 4 is designed to mitigate the loss of intertidal habitat within Areas 1-3. To facilitate the establishment of intertidal habitat, the existing upper gabion wall would be removed, and the ground levels lowered to levels suitable for regular tidal inundation with swales, shallow ditches and low mounds incorporated to further enhance habitat diversity. It is anticipated that setting back the proposed flood defence wall would allow for the creation of approximately 489m² of new intertidal habitat within Area 4, mitigating for the losses within Areas 1-3 where the wall alignment encroaches out into the estuary. This new area of intertidal habitat is expected to be a sediment sink for fine sediments. Due to the fine sediment load within the waterbody in comparison to the area of created intertidal habitat, this is not expected to impact the quality, structure and substrate of the waterbody beyond its footprint.

Table 2, Baseline Maximum Velocities adjacent to Scheme at Node TE01_0544

Fluvial Inflow	Tide	Baseline Velocity (m/s)	Scheme Velocity (m/s)	Difference (m/s)
Q50	High Astronomical Tide (HAT)	1.149	1.138	-0.010
	Mean High Water Spring (MHWS)	1.128	1.119	-0.009
	Mean Low Water Spring (MLWS)	1.128	1.119	-0.009
Q1	High Astronomical Tide (HAT)	1.433	1.433	0
	Mean High Water Spring (MHWS)	1.433	1.433	0
	Mean Low Water Spring (MLWS)	1.433	1.433	0
QMED	High Astronomical Tide (HAT)	1.626	1.626	0
	Mean High Water Spring (MHWS)	1.626	1.626	0
	Mean Low Water Spring (MLWS)	1.626	1.626	0

Table 3, Baseline Maximum Velocities adjacent to Scheme at Node TE01_0755

Fluvial Inflow	Tide	Baseline Velocity (m/s)	Scheme Velocity (m/s)	Difference (m/s)
Q50	High Astronomical Tide (HAT)	0.989	1.003	0.014
	Mean High Water Spring (MHWS)	0.969	0.973	0.004
	Mean Low Water Spring (MLWS)	0.969	0.973	0.004
Q1	High Astronomical Tide (HAT)	1.417	1.446	0.029
	Mean High Water Spring (MHWS)	1.416	1.445	0.029
	Mean Low Water Spring (MLWS)	1.416	1.445	0.029
QMED	High Astronomical Tide (HAT)	1.639	1.680	0.041
	Mean High Water Spring (MHWS)	1.639	1.680	0.041
	Mean Low Water Spring (MLWS)	1.639	1.680	0.041

Table 4, Baseline Maximum Velocities adjacent to Scheme at Node TE01_0870

Fluvial Inflow	Tide	Baseline Velocity (m/s)	Scheme Velocity (m/s)	Difference (m/s)
Q50	High Astronomical Tide (HAT)	0.830	0.826	-0.004
	Mean High Water Spring (MHWS)	0.800	0.796	-0.004
	Mean Low Water Spring (MLWS)	0.800	0.796	-0.004
Q1	High Astronomical Tide (HAT)	1.228	1.217	-0.011
	Mean High Water Spring (MHWS)	1.227	1.217	-0.011
	Mean Low Water Spring (MLWS)	1.227	1.217	-0.011
QMED	High Astronomical Tide (HAT)	1.450	1.438	-0.013
	Mean High Water Spring (MHWS)	1.450	1.437	-0.013
	Mean Low Water Spring (MLWS)	1.450	1.437	-0.013

Table 5, Baseline Maximum Velocities downstream of Scheme at Node TE01_0310

Fluvial Inflow	Tide	Baseline Velocity (m/s)	Scheme Velocity (m/s)	Difference (m/s)
Q50	High Astronomical Tide (HAT)	0.686	0.686	0
	Mean High Water Spring (MHWS)	0.686	0.686	0
	Mean Low Water Spring (MLWS)	0.686	0.686	0
Q1	High Astronomical Tide (HAT)	1.237	1.237	0
	Mean High Water Spring (MHWS)	1.237	1.237	0
	Mean Low Water Spring (MLWS)	1.237	1.237	0
QMED	High Astronomical Tide (HAT)	1.496	1.496	0
	Mean High Water Spring (MHWS)	1.496	1.496	0
	Mean Low Water Spring (MLWS)	1.496	1.496	0

Table 6, Baseline Maximum Velocities upstream of Scheme at Node TE01_0997

Fluvial Inflow	Tide	Baseline Velocity (m/s)	Scheme Velocity (m/s)	Difference (m/s)
Q50	High Astronomical Tide (HAT)	0.461	0.459	-0.002
	Mean High Water Spring (MHWS)	0.445	0.443	-0.002
	Mean Low Water Spring (MLWS)	0.445	0.443	-0.002
Q1	High Astronomical Tide (HAT)	0.690	0.684	-0.006
	Mean High Water Spring (MHWS)	0.690	0.684	-0.006
	Mean Low Water Spring (MLWS)	0.690	0.684	-0.006
QMED	High Astronomical Tide (HAT)	0.816	0.809	-0.004
	Mean High Water Spring (MHWS)	0.816	0.809	-0.004
	Mean Low Water Spring (MLWS)	0.816	0.809	-0.004

Structure of the intertidal zone

The Baseline Geomorphology Technical Note (Binnies Ltd, 2026) details that the existing structure of the intertidal zone of the Teifi Estuary at the Scheme location is dominated by fine sediments with locations of rubble, possibly historic barge ballast, along the margins, hard engineered banks and small sections of intertidal vegetation. During construction, there will be temporary impacts to the structure of the intertidal zone due to direct modification of the habitat. Direct impacts and changes will occur during the construction phase as the haul road is constructed and used along the foreshore, along with construction of the new flood defence wall. The haul road will be modified to form the engineered riverbank, and as such, the loss of existing habitats remains through operation, as will the presence of the new flood defence wall. The permanent loss through operation is mitigated by the design of the engineered riverbank to be formed of rock rolls, allowing intertidal habitat to develop and support biodiversity. Additionally, Area 4 will set back flood defences, allowing a new area of intertidal habitat to develop. The impacts are localised and minor in scale when compared to the size

of the Teifi Estuary water body. The results of the 1D hydraulic modelling identify that the minor increases in velocities would not be sufficient to have detrimental effects on the structure of the intertidal zone such as through erosional effects on fine sediments. Therefore, the only impacts to the structure of the intertidal zone found by the geomorphological baseline and the 1D hydraulic modelling are due to the construction phase and the operational loss of intertidal habitat, which is offset through the generation of new habitat.

Depth variation

The Scheme's proposed engineered riverbank will alter the cross-section geometry for the length of the channel where it is proposed. This will alter water depths locally due to the raised intertidal levels for the engineered riverbank footprint. Additionally, the altered cross-section geometry has the potential to change hydrodynamics, affecting water levels. Unsteady-state 1D hydraulic modelling, as detailed in Appendix E, detailed only minor changes to water levels at the model nodes adjacent to the Scheme. Node TEI01_0755 detailed maximum changes to water levels of 23 mm compared to the levels identified in the Baseline Geomorphology Technical Note (Binnies, 2024), which occurred during the simulation for Q50 fluvial flows with a MLWS tidal boundary. All other scenarios used in this assessment for Node TEI01_0870 have 10 mm or less difference in modelled water levels.

The intertidal habitat creation within Area 4 is designed to enhance depth variation via the creation of new intertidal habitats.

Tidal regime

The Baseline Geomorphology Technical Note identified that the Scheme is located in the upper estuary, where the tidal prism is relatively small. A minor reduction in tidal prism can be expected in the ZOI due to the Scheme from the new flood defence wall alignment, increased wall height and engineered riverbank at the toe of the flood defence wall. Additionally, the creation of new intertidal habitat in Area 4 will result in a minor increase in tidal prism. Minor changes are expected to the tidal prism due to the relatively small volume lost by the engineered riverbank and flood defence wall alignment, alongside the created intertidal habitat in Area 4. Changes in flood defence wall height are above the modelled water levels under the QMED and HAT scenarios, and as such, only impact the tidal prism during significant flood events. The area of created intertidal habitat will mitigate the loss of tidal prism by the engineered riverbank and new flood defence wall alignment. Based on this, there are no anticipated impacts to the tidal regime associated with the Scheme in both construction and operation.

Freshwater flow

The Baseline Geomorphology Technical Note found that the Scheme area and ZOI receives its supply of freshwater from the wider Afon Teifi and its tributaries, none of which will be impeded by the Scheme. Encroachment from the Scheme during both construction and operational phases as well as the creation of intertidal habitat, will not affect freshwater discharges but will result in minor changes to local hydraulics, as detailed in section 'Quantity,

structure and substrate of the bed'. As previously mentioned, the expected changes in velocity are minor and localised based on steady-state one-dimensional hydraulic modelling.

Residual Effects

Considering the detailed assessment results, the construction and operational effects of the Scheme on morphology do not pose a risk of deterioration in WFD status to the 'Teifi Estuary'.

(d) Chemical (construction)

Stage 2 Scoping assessment highlighted the potential risk to the Chemical status from the mobilisation of contaminated sediments. The construction activities to form and then remove the proposed construction platform will disturb intertidal sediments. This leads to the potential for metals or hydrocarbons to enter the 'Teifi Estuary', 'Cardigan Bay South', and 'Piliau headwaters to the confluence with Teifi' waterbodies from river sediments.

Seven hand auger trial pits were excavated, with contamination screening samples collected from four of them at depths of 0.5m and 1m, respectively, as detailed in the Sediment Sampling Technical Note (Binnies Ltd, 2025). The sample locations are displayed within Figure 1. HATP01 was cancelled because, even at low tide, there was no safe access to conduct the hand pit. Sampling was carried out in general accordance with BS 10175:2011+A2:2017 to prevent potential cross-contamination. The selected locations correspond to the proposed sheet pile wall, and the sampling depths were chosen to target the silt layers likely to be disturbed during construction.

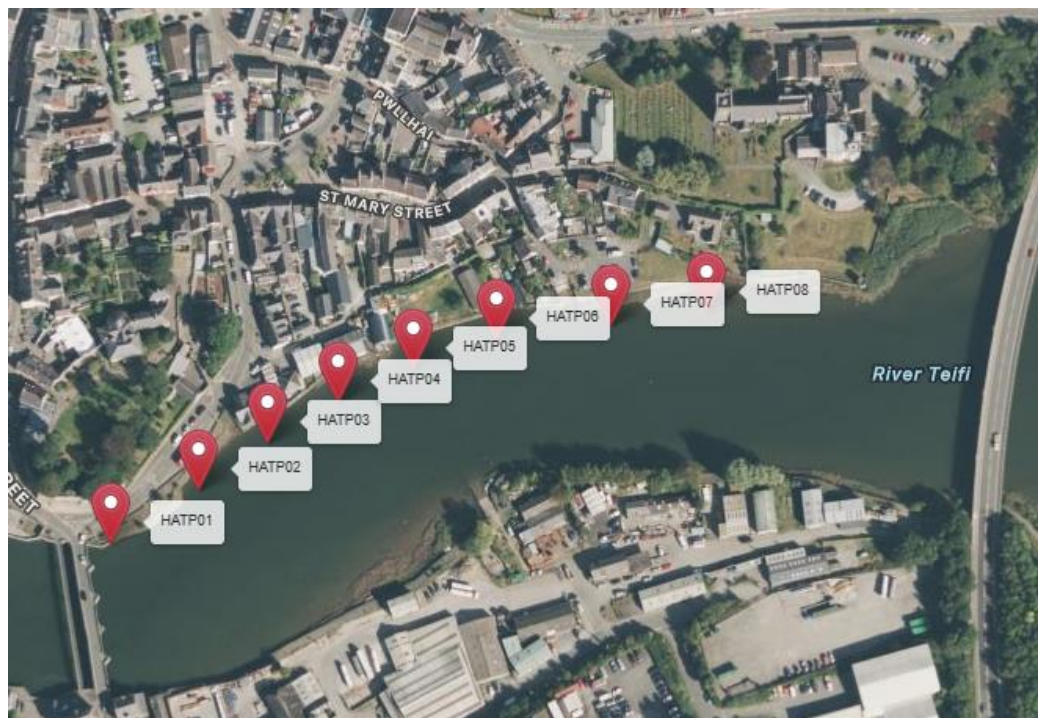


Figure 1 – Hand Auger Trial Pit locations

No visual or olfactory indication of contamination was reported in the logs. Photo-ionisation detector (PID) monitoring was carried out in all trial pits at 0.5 m depth, with readings taken at 1.0 m at four locations (HATP03, HATP05, HATP06, and HATP08). All readings were 0 ppm, indicating no detectable concentrations of volatile organic compounds (VOCs).

Soil samples collected from HATP02, HATP04, HATP06, and HATP08 were transported to Eurofins Chemtest Ltd, a United Kingdom Accreditation Service (UKAS)-accredited laboratory compliant with International Standards Organisation (ISO) 17025 and Monitoring Certification Scheme (MCERTS) standards, for analysis. Organotins were subcontracted to the UKAS-accredited laboratory Tetra Tech and Organochlorine Pesticides to Eurofins Analytico (which has ISO/IEC 17025 accreditation).

The following contaminants and parameters were assessed for the soil and leachate:

- (i) Metals and metalloids;
- (ii) Total Petroleum Hydrocarbons (TPH, banded);
- (iii) Pesticides;
- (iv) Organotins;
- (v) Polychlorinated biphenyls (PCBs);
- (vi) Asbestos;
- (vii) Polycyclic Aromatic Hydrocarbons (PAHs); and
- (viii) pH and loss on ignition (as an indicator of organic matter).

The suite chosen was designed to cover the Centre for Environment, Fisheries and Aquaculture Science (CEFAS) requirements and to understand contamination, based on the conceptual site model developed in the Contaminated Land Interpretation Report (Binnies Ltd, 2025). Leachate analysis was compared against WFD environmental quality standards (EQS) to identify risks. As only one sample was collected from each site, a RAG assessment was used to highlight any samples that could pose a potential risk of deterioration for WFD. A summary of leachate results is detailed in Table 7, including the RAG assessment.

Table 7, Surface Water Leachate test result summary

Determinand	units	Minimum result	Maximum result	EQS long term (Mean) threshold	EQS short-term (95) threshold	RAG Assessment	Justification
Copper (Dissolved)	µg/l	<0.5	3.6	3.76		Green	Precautionary approach used 3.76 short-term EQS without DOC data available. Below EQS threshold.
Mercury (Dissolved)	µg/l	<0.05	<0.05		0.07	Green	Below EQS maximum available concentration threshold
Zinc (Dissolved)	µg/l	<2.5	9.4	9.3		Amber	Marginal over long-term EQS. As sediment resuspension will be temporary and given the dilution of the water column, this is not considered a risk.
Total Phenols	mg/l	<0.030	<0.030	0.007	0.0046	Green	Below EQS thresholds.

For the leachate, all samples had concentrations of core parameters that were below the respective EQS's and so no significant water quality risks were identified. Whilst this is not a full suite of EQS's tested for, it provides an appropriate level of confidence in the likely contamination risk from sediment resuspension. Please also see Section 4 of the Sediment Sampling Technical Note (Appendix 11.3 of the Environmental Statement) for consolidated data.

Proposed Mitigation

Mitigation measures to be employed during the Scheme development are as follows:

- (i) In accordance with Chapter 11 Land use and Soils of the Environmental Statement, establish baseline groundwater and surface water quality on and around the Scheme Area, and upstream and downstream of the Scheme in the Afon Teifi by controlled water sampling and laboratory testing. This should be conducted several months before construction commences to have a baseline data set to compare to post construction.
- (ii) In accordance with Chapter 11 Land use and Soils of the Environmental Statement, during construction, monitoring surface water quality should be undertaken as best practice. This could include the use of automated river water quality instruments (measuring several parameters at short intervals such as turbidity, dissolved oxygen, and temperature) both upstream and downstream of the works area with trigger limit alerts to determine whether construction activities are negatively impacting the Afon Teifi estuary ('Teifi Estuary' waterbody), which would in turn provide pre-emptive warning for both upstream and downstream waterbodies ('Piliau – headwaters to the confluence with Teifi', and 'Cardigan Bay South'). If limits are exceeded then works in the river should be suspended until conditions recover. It is anticipated that acceptable limits will be provided in the Flood Risk Activity Permit (FRAP) from the EA Fisheries team to understand trigger action limits.
- (iii) The use of silt curtains (installed to the manufacturer's recommendations) to minimise sediments entering the Teifi Estuary (standard practice).
- (iv) Any visual or olfactory evidence of contamination encountered during construction works should be further investigated to determine spatial extents and concentrations (it is possible that works will need to be stopped during this investigation into unexpected contamination);
- (v) Appropriate management strategies should be in place to deal with potentially contaminated soils if they are encountered during construction. These should include measures to ensure the safety of construction workers, to prevent further contamination of the environment, and an appropriate storage, testing and disposal strategy if contaminated soils are to be removed from site.
- (vi) Should any of the above encounter contamination in soil or groundwater, a remediation strategy and design would be developed, agreed with Cardigan Council, and implemented with a verification strategy.

The above should be included in the Pollution Prevention Plan for the Scheme and construction undertaken under supervision of an Environmental Clerk of Works.

Residual Effects

Considering the mitigation measures, the construction effects of the Scheme from the release of potentially contaminated sediments do not pose a risk of deterioration in WFD status to the 'Teifi Estuary', 'Cardigan Bay South', and 'Piliau headwaters to the confluence with Teifi' waterbodies

4.3 Protected Areas

Based on the project specification or information provided in the application, it is considered that the following Natura 2000 sites have features which could be affected by the Scheme:

- (i) Afon Teifi Special Area of Conservation (SAC) (partially within the Scheme);
- (ii) Cardigan Bay SAC (3.5 km downstream from the Scheme);
- (iii) West Wales Marine SAC (3.5 km downstream from the Scheme); and
- (iv) North Pembrokeshire Woodlands SAC located 7.8 km to the southwest of the works. This site is designated for its old sessile wood habitats and barbastelle bats. The works will not involve any loss of barbastelle foraging habitat. There is no pathway for effects on this site.

In addition, in line with NRW's position on the use of Marine Mammal Management Units (MMMU) in HRA, the following SACs with marine mammal features in Welsh waters could also be affected by the Scheme:

- (i) North Anglesey Marine SAC (harbour porpoise);
- (ii) Bristol Channel Approaches (harbour porpoise);
- (iii) Llyn Peninsular and the Sarnau SAC (bottlenose dolphin and grey seal); and
- (iv) Pembrokeshire Marine SAC (grey seal).

Impacts to protected areas are assessed and detailed within the Habitats Regulation Assessment (APEM, 2026b). The HRA confirmed the Scheme will not adversely affect the integrity of any Natura 2000 sites based on the below mitigation measures detailed in Section 4.2 of this report.

4.4 Protected Habitats

Chapter 6: Biodiversity and Nature Conservation, of the Scheme's Environmental Statement, considered the following habitats, identified via a Phase 1 Habitat survey:

- (a) Broadleaved scattered trees (A3.1)
- (b) Running water (G2)
- (c) Intertidal mudflats (H1.1)
- (d) Saltmarsh (H2.6)
- (e) Amenity grassland (J1.2)
- (f) Poor semi-improved grassland (B6).

The WFD scoping Stage 2 detailed a risk of loss and/or deterioration of saltmarsh and intertidal soft sediments like sand and mud within the 'Teifi Estuary' water body.

The construction of the flood defence wall in Areas 1-3 will lead to the permanent loss of approximately 489m² of intertidal habitat. The installation of sheet piling and construction of the flood defence wall and engineered riverbank will result in the permanent modification of 1347m² of intertidal mud habitat through the creation of the engineered riverbank for the flood defence. The Scheme includes 489m² of intertidal habitat creation in Area 4, between the retained saltmarsh on top of the existing rock gabions and new flood defence. This area will be landscaped to include a natural channel, pools, and a raised bank, all within the expected natural tidal range, to create semi-natural niches for the establishment of intertidal habitats, similar to a natural backwater or cove. Once created, the habitats will be left to recolonise with plants naturally, and the river will be allowed to naturally deposit and regrade the silt with tidal action.

For saltmarsh there will be a temporary loss of saltmarsh intertidal habitat within the Scheme area. This habitat in its current condition (moderate) is considered to be common within the Afon Teifi estuary, and therefore this loss is considered of negligible negative magnitude within Chapter 6: Biodiversity and Nature Conservation of the Environmental Statement.

For intertidal mudflats, the creation of the new flood defence wall will result in the temporary (for the duration of construction and until establishment of Area 4 estimated at 3 years) loss of intertidal muds. However, this impact is mitigated by the creation of the new habitat in Area 4. This will mean that the Scheme results in no net loss of intertidal habitat overall.

Chapter 6: Biodiversity and Nature Conservation of the Environmental Statement detailed no significant effect on intertidal mudflats or saltmarsh during both construction and operational phases.

4.5 Assessment of Invasive and Non-native Species (INNS)

A biosecurity risk assessment will be required alongside a pre-site walkover to confirm the presence of any INNS during the construction phase and approved by NRW before construction commences. Japanese Knotweed has been identified within the northern compound area. This will be included within the biosecurity risk assessment.

4.6 Jeopardising Good Status

The Stage 3 detailed assessment has considered the potential effects of the Scheme on the future achievement of their status objectives. Potential effects on the future achievement of water body status objectives have been considered by assessing the likely effects of the Scheme on the latest available Reasons for Not Achieving Good (RNAGs), 'Programme of measures' (PoM), and 'A/HMWB Mitigation Measure' datasets identified by NRW for the relevant water bodies. Here, the assessment considered the potential for the Scheme to exacerbate existing pressures on water body status and/or to hinder the future implementation of catchment and water body-level measures identified to address existing pressures and support the

achievement of status objectives. Upstream water bodies of the Teifi - Afon Ceri to estuary were not assessed, as it was considered that there is no mechanism for preventing delivery of actions in the upper catchment based on the proposed mitigation for fish as detailed in Section 4.2 of this report.

(a) National PoM

River Basin Management Plan measures and objectives for each screened in water body, as detailed on (Natural Resources Wales, 2024), were reviewed. It was determined there was no mechanism for the Scheme to jeopardise the delivery of the national PoM. Below details the local actions for each water body.

(b) Local PoM

Teifi Estuary

Location action (local action ID LA24) 'Cardigan Tidal Defences' will be delivered by the Scheme, which seeks to deliver the identified Flood Risk Management capital investment in tidal defences at Cardigan. There are no other local actions identified on the Teifi Estuary water body.

Teifi - Afon Ceri to estuary

No local measures were identified on the Teifi - Afon Ceri to estuary water body.

Piliau - headwaters to confluence with Teifi

No local measures were identified on the Piliau - headwaters to confluence with Teifi water body.

(c) Future PoM

River Basin Management Plan future measures for the Teifi operational catchment, as detailed on (Natural Resources Wales, 2024), were reviewed. It was determined that there was no mechanism for the Scheme to jeopardise the delivery of the potential future local actions. Table 8 details the future local actions for the operational catchment.

Table 8, Future Aims (possible future local actions) for the Teifi Optional Catchment (Natural Resources Wales, 2024)

Future Aims (Potential Local Action) ID	Future Aims (Potential Local Action)	Environmental Objective this is relevant to	Challenge/ Pressure it addresses	Sector who could potentially implement	Impacts from Scheme and mechanism for impact
FA42	Construction of footbridges crossing the Teifi linking Ceredigion and Carmarthenshire and create circular walking routes. This may include identifying funding to secure and protect the riverbank from further erosion.	Well-being duty; Environment (Wales) Act (SMNR/Biodiversity and resilience of ecosystems)	Nature Emergency; Barriers to Well-being	NRW/Local authority/NGO/Landowners/Others	No mechanism for the Scheme to impact measure delivery.
FA43	Action plan/feasibility to alleviate the effects of flooding incidents on communities (Llanybydder, Newcastle Emlyn, Lampeter, Cernarth and Llandysul).	Environment (Wales) Act (SMNR/Biodiversity and resilience of ecosystems); Well-being duty; Climate change;	Barriers to Well-being; Flood and Coastal Resilience; Climate emergency	NRW/Others	No mechanism for the Scheme to impact measure delivery.
FA44	Establish a Tir Coed woodland for community use and inclusion in the area.	Well-being duty; Environment (Wales) Act (SMNR/Biodiversity and resilience of ecosystems)	Nature Emergency; Barriers to Well-being	NRW/NGO/Local community/Others	No mechanism for the Scheme to impact measure delivery.
FA45	Management of Teifi Marshes SSSI, SAC and Wildlife Trust reserve. Collaborative action to control nutrient and sediment inputs into the marsh, invasive species	Good Ecological Status/Potential; WFD Regulations Protected Area Objective; Environment (Wales) Act (SMNR/Biodiversity and resilience of ecosystems)	Pollution from rural areas; Nature Emergency; Pollution from wastewater; Negative effects of INNS;	NRW/NGO/Others	The Scheme has a potential mechanism to disturb and release fine sediments during the construction phase. It is predicted that activities associated with the Scheme will produce temporary and short-lived increases in suspended sediment concentrations, which would quickly be diluted by the river flow and tidal cycles. Suspended sediment

Future Aims (Potential Local Action) ID	Future Aims (Potential Local Action)	Environmental Objective this is relevant to	Challenge/ Pressure it addresses	Sector who could potentially implement	Impacts from Scheme and mechanism for impact
	control and bank erosion from the River Teifi.		European site protected area		concentration levels are not anticipated to exceed those naturally experienced in estuarine and riverine environments, and any associated sediment deposition is anticipated to be minimal.
FA46	Establish a walking or biking track using the old railway line that runs from Llandysul to Newcastle Emlyn.	Well-being duty;	Barriers to Well- being	NRW/NGO/Local authority/Others	No mechanism for the Scheme to impact measure delivery.
FA47	Control of trees that fall into the river as a result of ash dieback to prevent flooding and other hazards	Environment (Wales) Act (SMNR/Biodiversity and resilience of ecosystems);	Flood and Coastal Resilience	NRW/Local authority/Others	No mechanism for the Scheme to impact measure delivery.
FA48	Improvement of river ecosystem on watercourses running through NRW land and the Caron Estate. This could include wildlife corridors and natural flood risk management opportunities across the Caron Estate	Environment (Wales) Act (SMNR/Biodiversity and resilience of ecosystems); Climate change;	Flood and Coastal Resilience; Nature Emergency; Climate emergency	NRW/NGO/Land owner/Other	No mechanism for the Scheme to impact measure delivery.
FA49	Targeted catchment visits to address nutrients and other WFD failures (Teifi)	Good Chemical Status; Good Ecological Status/Potential; WFD Regulations Protected Area Objective;	Pollution from rural areas; Pollution from wastewater; European site protected area	NRW/Agriculture/Water Industry/Landowner/Other	No mechanism for the Scheme to impact measure delivery.

Future Aims (Potential Local Action) ID	Future Aims (Potential Local Action)	Environmental Objective this is relevant to	Challenge/ Pressure it addresses	Sector who could potentially implement	Impacts from Scheme and mechanism for impact
FA50	Tackling INNS within the Teifi catchment	WFD Regulations Protected Area Objective; Environment (Wales) Act (SMNR/Biodiversity and resilience of ecosystems);	Nature Emergency; Negative effects of INNS; European site protected area	NRW/Others	No mechanism for the Scheme to impact measure delivery.
FA51	Access and recreation opportunities in the Teifi catchment	Well-being duty;	Barriers to Well-being	NRW/Local authority/Others	No mechanism for the Scheme to impact measure delivery.

(d) Reasons For Not Achieving Good

The RNAGs, as detailed on (Natural Resources Wales, 2024), were assessed for the scoped in water bodies.

Teifi Estuary

The RNAGs for this waterbody all concern dissolved nitrogen; the two confirmed sources are related to agriculture and rural land management sources, and the three “probable” sources all relate to sewage discharge. There are no mechanisms for the Scheme to impact these RNAGs. There are six reasons for risk attributed to angiosperms, one of which relates to physical modifications due to coastal erosion protection and control and the remainder related to point and diffuse pollution. There are no mechanisms for the Scheme to impact these point source or diffuse risks for angiosperms. Whilst the Scheme is delivering new physical modifications, the Scheme location is already heavily modified through bank protection and modified rubble substrates. As such, the Scheme is not considered to worsen this suspected risk for angiosperms.

Teifi - Afon Ceri to estuary

There are no identified Reasons for Not Achieving Good for this waterbody. There are four reasons for deterioration, all of which are attributed to biochemical oxygen demand. Whilst most sources are not relevant to the Scheme, one is attributed to incidents stemming from industry, manufacturing,

and other businesses. The Scheme adheres to appropriate mitigation measures (detailed in Stage 2 Step 1) to prevent further deterioration. Macrophytes and phytobenthos are listed as a reason for risk due to organic pollution, which will not be impacted by the Scheme.

Piliau - headwaters to confluence with Teifi

This waterbody has three identified reasons for not achieving good, two of which relate to fish. It is confirmed that physical modifications have created barriers to fish migration, and it is suspected that natural barriers also exist. The Scheme is unlikely to exacerbate this, as suitable mitigation measures are in place to support fish migration during the construction phase. Furthermore, the Scheme's operation will not present any barriers to migration. Phosphates are also an RNAG, resulting from diffuse sources attributed to agriculture and rural management. There are no mechanisms for the Scheme to impact this RNAG.

4.7 HMWBs – Jeopardising Mitigation Measures

The Teifi Estuary and all waterbodies within the Teifi catchment are not A/HMWB and, as such, do not have mitigation measures. There is no mechanism to jeopardise mitigation measures.

4.8 Avoidance measures

There is a risk that the Scheme may cause deterioration or prevent the water body from meeting its objectives; however, the following legally binding avoidance measures, as detailed in Table 9, will be included within the Scheme design at this point to ensure the potential effects are avoided.

Table 9, Legally binding avoidance measures

List legally binding avoidance measures	How will the measure be applied	Who will be responsible for applying them?	Will this remove the risk of deterioration or prevent the achievement of water body objectives.
All works will be undertaken by a contractor who will implement best practice techniques to control pollution and siltation. The contractor will be required to prepare and comply with a Pollution Prevention Plan, including spill response plans, and a Biosecurity Risk Assessment. Works method statements will be agreed by NRW before works start. Best-practice guidelines (e.g. GPP5: Works and maintenance in or near water, Version 1.2, 2018 and Pollution Prevention Guidelines, CIRIA 2015) will be followed as a minimum to prevent potential adverse effects from pollution and the spread of Invasive Non-Native Species (INNS). A Construction Environmental Management Plan (CEMP) would be produced for the works. A Piling Risk Assessment will be completed to avoid preferential pathways to the groundwater body.	Measures will be incorporated into the EAP which is expected to be conditioned as part of the Planning Permission and Marine License.	Contractor; NRW	Yes
No in-water augering or piling activities shall be undertaken between 1 March and 31 December (inclusive), except where such activities are undertaken from a dry working platform in dry conditions, such that no augering or piling plant or equipment operates within the water column. For the avoidance of doubt, incidental contact between installed piles and groundwater or tidal water within the substrate shall not constitute in-water working. Between 1 January and 28 February (inclusive), when these seasonal restrictions do not apply, any in-water	Measures will be incorporated into the EAP which is expected to be conditioned as part of the Planning Permission and Marine License.	Contractor; NRW	Yes

augering or piling activities shall be limited to daylight hours (defined as the period between sunrise and sunset minus any specific working time restrictions as specified within the project Environmental Action Plan). In addition to the seasonal in water restrictions above, it is recommended that soft starts are used for piling activities. This involves the gradual and incremental increase in piling power until full operational power is reached and provides fish the opportunity to move away from the noise source before the onset of full power.			
The use of silt curtains (installed to the manufacturer's recommendations) to minimise sediments entering Teifi Estuary (standard practice). Any visual or olfactory evidence of contamination encountered during construction works should be further investigated to determine spatial extents and concentrations (it is possible that works will need to be stopped during this investigation into unexpected contamination). Establish baseline groundwater and surface water quality on and around the Scheme Area, and upstream and downstream of the Scheme in the Afon Teifi by controlled water sampling and laboratory testing. This should be conducted several months before construction commences to have a baseline data set to compare to post construction. During construction, monitoring surface water quality should be undertaken as best practice. This could include the use of automated river water quality instruments (measuring several parameters at short intervals such as turbidity, dissolved oxygen, and temperature) both upstream and downstream of the works area with trigger limit alerts to determine whether construction activities are	Measures will be incorporated into the EAP which is expected to be conditioned as part of the Planning Permission and Marine License.	Contractor; NRW	Yes

negatively impacting the Afon Teifi estuary. If limits are exceeded, then works in the river should be suspended until conditions recover. Appropriate management strategies should be in place to deal with potentially contaminated soils if they are encountered during construction. These should include measures to ensure the safety of construction workers, to prevent further contamination of the environment, and an appropriate storage, testing and disposal strategy if contaminated soils are to be removed from site. Should any of the above encounter contamination in soil or groundwater, a remediation strategy and design would be developed, agreed with Ceredigion County Council, and implemented with a verification strategy. The above should be included in the Pollution Prevention Plan for the Scheme.			
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4.9 Stage 3, decision summary

Water body name & ID	WFD element/s scoped in	Description of impacts; include a list of all evidence documents to inform the detailed assessment	Is there a risk the proposal may cause deterioration?* 'YES' or 'NO'	Is there risk of the activity preventing the water body/ PA from meeting its objectives?* 'YES' or 'NO'
'Piliau – headwaters to confluence with Teifi' - GB110062039070 'Teifi Estuary' - GB511006206900 'Teifi – Afon Ceri to estuary' - GB110062043563 All other upstream water bodies hydraulically connected to the Teifi - Afon Ceri to estuary (See drawing WFD Water body Map 200K Scale: 4021883-BUK-ZZ-	Fish (construction)	Risk and impacts Underwater noise and vibration from piling and pre-augering pose a risk of behavioural, masking effects, temporary threshold shift (TTS) in hearing, recoverable tissue injury, and potential mortal injury. As detailed in Section 4.2 of this report, considering the mitigation measures, the construction effects of the Scheme from underwater noise and vibration from piling and pre-augering do not pose a risk of deterioration in WFD status to the 'Piliau – headwaters to the confluence with Teifi', 'Teifi Estuary', 'Teifi – Afon Ceri to estuary' and all other upstream water bodies hydraulically connected to the Teifi - Afon Ceri to estuary. As detailed in Section 4.6 of this report, there is no risk of the Scheme preventing the waterbodies from meeting their objectives.	NO	NO

00-DR-EN-00014 in Appendix D)				
'Teifi Estuary' - GB511006206900	Higher sensitivity habitats and lower sensitivity habitats (construction and operation)	Risk and impacts Loss and/or deterioration of saltmarsh and intertidal soft sediments like sand and mud. As detailed in Section 4.4 of this report, the loss and modification of intertidal habitats do not pose a risk of deterioration in WFD status to the 'Teifi Estuary', due to the creation of new intertidal habitat. As detailed in Section 4.6 of this report, there is no risk of the Scheme preventing the water body from meeting its objective.	NO	NO
'Teifi Estuary' - GB511006206900	Morphology (construction and operation)	Risk and impacts Effects on the hydro-morphological supporting elements of: - quantity, structure and substrate of the bed; - structure of the intertidal zone; - depth variation; tidal regime; and - freshwater flow As detailed in Section 4.2 of this report, the construction and operational effects of the Scheme do not pose a risk of deterioration in morphological WFD status to the 'Teifi Estuary'. As detailed in Section 4.6 of this report, there is no risk of the Scheme preventing the water body from meeting its objective.	NO	NO

'Teifi Estuary' - GB511006206900	Chemical (construction)	Risk impacts Effect on the Chemical status due to the potential mobilisation of contaminated sediments. As detailed in Section 4.2 of this report, considering the mitigation measures, the construction effects of the Scheme from potential mobilisation of contaminated sediments do not pose a risk of deterioration in WFD status to the 'Teifi Estuary'. As detailed in Section 4.6 of this report, there is no risk of the Scheme preventing the water body from meeting its objectives.	NO	NO
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5. Conclusion of WFD Regulations 2017 Compliance Assessment & Authorisation

In light of the conclusions of a detailed compliance assessment (Stage 3), and taking account of the advice received from technical specialist advisors, it has been established that the activity/project has **no potential to cause deterioration of any water body or prevent a water body or WFD Protected Area from meeting its objectives**, taking into account any legally binding avoidance measures or restrictions as applicable, either alone or in-combination with other activities.

Name of authorising officer	
Job title and date	
Technical specialist comments	Provided below
Name, job title and date	Provided below (various responses)

6. Consultation with technical advisors/specialists

Table 10 details the key consultation that has occurred on the WFD compliance assessment with technical advisors/specialists.

Table 10, Summary of key consultation with technical advisors/specialists

Relevant section of the WFD compliance assessment	Date(s) of correspondence* and any meeting(s) with technical advisor(s) and include the name of the technical advisor	Description of how the comments from technical advisors have been considered
Stage 1, Step 3	NRW Consultee Responses Oct 2023. Jason Jones (Fisheries Specialist) 'It doesn't appear to assess the potential impacts on water bodies further upstream that are linked to the estuary. The migratory fish passing through the estuary will contribute to the fish populations of the water bodies upstream. If migration patterns are impacted by disturbance from (e.g. from piling activities) this may influence the distribution of migratory species through the catchment and so impact the WFD status of water bodies elsewhere in the catchment, potentially leading to deterioration and failure to meet WFD objectives. Do these other water bodies need to be assessed?'	'Page 4 of the WFD assessment states 'All upstream water bodies hydrologically connected to the Teifi - Afon Ceri to estuary water bodies (See Appendix D) will be screened in and scoped in as per the Teifi - Afon Ceri to estuary. They are not referenced in Stage 1, Step 3 and Stage 2, Step 1 due to the number of water bodies and the scoping decision being the same.'
	Rowland Sharpe (Marine Specialist) A screening and scoping exercise has been undertaken by NRW for WFD. For TraC waters, I can agree that hydromorphology, biology (habitats, composition and abundance) and fish are scoped in for detailed assessment. I agree that the downstream Bathing Water and coastal WFD water body Cardigan Bay South do not need further assessment.	'GPP5 is referred to in response to Q1.5, reference to a CEMP will be provided in this location also. Detailed Assessment Scope included in version P02.'

	I would recommend use of a Construction Environment Management Plan for avoidance measures such as those for fish and pollution prevention. The applicant should take note of the guidance in the Guidance for Pollution Prevention documents, particularly GPP5 Works and Maintenance in or near water. The applicant will need to calculate the footprint of their development as per the metrics on pg 18 and include this in their detailed assessment. A detailed assessment has not been provided at this stage; we look forward to seeing this. Fish comments I agree that a detailed assessment is needed for fish quality elements.'	
All Stages	Ceredigion Environment Team (Bethan) Both Heidi and I have taken a look at the WFD screening/scoping paper. We are both quite happy with the contents and don't have any comments to make.	Noted, no action required.
All Stages	Dale Cox (Geomorphology) I've reviewed the sections of the screening and scoping which apply to the 'river' water bodies and have no further comments regarding the screening that has been undertaken. The works are being undertaken on the Teifi estuary water body, which I note you have also consulted with the marine team on.	Noted, no action required.

All Stages	Cyngor Sir Ceredigion County Council LPA's Scoping Opinion, 16th October 2025: WFD compliance assessment to be informed by a robust evidence-based physical processes assessment. This must include: Impact on hydromorphology, freshwater flow, tidal patterns and morphology. Assessment to hydrodynamic changes due to channel narrowing. A clear baseline description and conceptual understanding of physical systems. Land use and Soil (construction) A detailed contaminated land assessment should be included in the ES, covering: Preliminary risk assessment and site investigation Remediation strategy and verification plan Long-term monitoring or risks to controlled waters. NRW also recommends sediment sampling via hand-dug trial pits prior to construction. The ES must assess potential impacts on migratory fish species, including Atlantic salmon, lamprey, eel, and trout. Piling impacts should be considered, and timing/tidal restrictions may be required to avoid disturbance during migration periods. The WFD Compliance Assessment should include all upstream water bodies supporting migratory fish.	Detailed assessment scope adjusted to include a robust, evidence-based assessment of physical processes. This includes: Impact on hydromorphology, freshwater flow, tidal patterns and morphology. Assessment to hydrodynamic changes due to channel narrowing. A clear baseline description and conceptual understanding of physical systems. Chemical scoped in for Teifi Estuary water body to align with comments on Land use and Soil (construction). Detailed impact assessment will confirm impacts from piling on migratory fish species, including Atlantic salmon, lamprey, eel, and trout.
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7. References

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