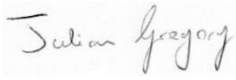


2022

Loughor Sections AtoE Defence Maintenance Water Framework Directive Assessment



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1. INTRODUCTION

- 1.1.1 EcoVigour was instructed by Dyer & Butler – Rail Division to undertake a Water Framework Directive Assessment (WFD) for proposed maintenance works to the Loughor Sections A, B & E sea defences.
- 1.1.2 The purpose of this assessment is to assess the potential impacts of the works associated with the Proposed Scheme and whether these could prevent the Loughor, Burry Inlet, Carmarthen Bay and associated surface and groundwater bodies, achieving their WFD Targets. This assessment includes a summary of the current local conditions and, where appropriate, identifies mitigation measures for any likely significant effects (LSE) that may arise as part of the construction and operation of the Proposed Scheme.
- 1.1.3 The works include the removal of vegetation around defence assets, repointing of masonry, reseating of loose stone material and the infilling of a void in Section E.
- 1.1.4 This WFD Assessment is required to demonstrate that the proposed works will not result in deterioration in the water body status of the Loughor Estuary and adjoining water bodies or prevent them from meeting their Water Framework Directive objectives.
- 1.1.5 The Loughor Estuary discharges into Burry Inlet and Carmarthen Bay, which becomes part of the Bristol Channel Outer North and associated Bathing Waters.

1.2 PROJECT BACKGROUND

- 1.2.1 The Sea Defences are located along both shore of the Loughor Estuary, entering the Burry Inlet below both the Loughor Road & Rail Bridges. The defences stretch to the east and west parallel with the rail corridor. The alignment of the defences intersect with the MHWS at different points, while also demarcating the boundary of the designated sites at several locations.
- 1.2.2 Network Rail have commissioned the principal contractor Dyer & Butler Ltd, to undertake the remedial works.



Figure 1: Section B (west) facing section E (eastern shore in distance).



2. INTRODUCTION TO THE WATER FRAMEWORK DIRECTIVE

2.1 THE WATER FRAMEWORK DIRECTIVE

- 2.1.1 The Water Framework Directive (WFD) (Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000) is a European Union Directive which committed member states to achieve good qualitative and quantitative status of all water bodies by 2015. Under the Directive water bodies are defined as all ground and surface waters, including rivers, lakes, transitional waters and coastal waters (up to one nautical mile from shore).
- 2.1.2 It was not possible to achieve good status of all water bodies by 2015; therefore, outstanding water bodies had objectives set for 2021 or 2027. Interim assessments were undertaken in 2018.
- 2.1.3 The WFD is transposed into law in England and Wales by The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (the 2017 Regulations). These revoke and replace The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003 (subject to transitional provisions in article 38 of the 2017 Regulations).

2.2 SCOPE OF THIS ASSESSMENT

- 2.2.1 All new activities in the water environment need to take account of the requirements of the WFD. For a project or activity to be compliant with the WFD, it should demonstrate that:
- ◆ There is no risk of it causing a deterioration of the status of any element, in addition, for groundwater, it will limit or prevent the input of pollutants;
 - ◆ There is no risk of it preventing WFD protected areas from achieving their objectives;
 - ◆ It will not jeopardise any waterbody from achieving good status/potential; and
 - ◆ It will contribute to the protection, enhancement and restoration of waterbodies.
- 2.2.2 This WFD Assessment considers all activities that will take place as part of the proposed scheme, during both construction and operation, and identifies the potential risks associated with these activities and the WFD receptors that are at risk.
- 2.2.3 The NRW guidance includes detailed screening criteria that can be used to determine whether a proposed activity is not likely to cause a deterioration in the status of a waterbody. This includes a list of activities that in general will not cause a deterioration, such as 'temporary' works that do not normally last more than six months and are not likely to have a residual impact on a waterbody. The guidance also lists other physical works and defines screening thresholds for each; these thresholds help to determine whether any activity presents a risk to a waterbody and any requirements for further assessment. However, these thresholds are for guidance only and expert judgement is required to determine if a proposed activity may have an impact on a waterbody.
- 2.2.4 Published guidance also states that the assessment must consider the potential for impacts on the following:
- ◆ Protected Areas – these are defined under Article 6 of the Directive.
 - ◆ Priority Habitats – these are 'habitats of principal importance for conservation and biodiversity', which are defined under Section 41 of a Natural Environment and Rural Communities (NERC) Act 2006 in England and Section 7 of the Environment (Wales) Act 2016 in Wales.
 - ◆ Invasive non-native species (INNS) – assessment of INNS is required if a development could cause the introduction or spread of INNS to a waterbody.



- 2.2.5 A detailed Compliance Assessment would be required if it cannot be concluded that the scheme would not cause deterioration or inhibit the objective status of a waterbody. Further to this and in line with WFD requirements, there would be a need to apply the Article 4.7 test to seek approval for progression of the scheme if after the full WFD

2.3 DETERMINATION OF GOOD STATUS

- 2.3.1 Good status is determined from the ecological and chemical status of surface waters. These statuses are assessed according to the following criteria:
- ◆ Biological quality (fish, benthic invertebrates, aquatic flora);
 - ◆ Hydromorphological quality (e.g. riverbank structure, river continuity and substrate of the riverbed); and
 - ◆ Physical-chemical quality (e.g. temperature, oxygenation and nutrient conditions).
- 2.3.2 The chemical quality refers to environmental quality standards for river basin specific pollutants. These standards specify maximum concentrations for specific water pollutants. The WFD works on a 'one out, all out' basis, so if one such concentration is exceeded, then the water body will not be classed as having a good status. The chemical status of surface waters is therefore classified as good or fail.
- 2.3.3 The ecological status of surface waters is classified as being high, good, moderate, poor or bad, whilst water bodies that have been modified (e.g. canals or contain significant flood defences) are classed as 'Heavily Modified Water bodies' (HMWB) and have to reach at least good potential by their objective year.



3. ASSESSMENT METHODOLOGY

3.1 METHODOLOGY

3.1.1 This WFD Assessment was completed using the following methodology:

- ◆ The collection of baseline data to identify the current status, as well as future baseline and ability of the water bodies within and in close proximity to the proposed works to meet the WFD objectives;
- ◆ A consultation with relevant authorities;
- ◆ The review of the proposed works and the potential impacts to the identified surface and groundwater bodies; this involves identifying the impacts that could reduce the WFD status and affect the ability of the water bodies to meet the objectives of the WFD;
- ◆ The consideration of mitigation that can be included in the design, and
- ◆ The provision of an assessment of residual risks.



4. SITE CONTEXT AND DESCRIPTION OF THE PROPOSED ACTIVITIES

- 4.1.1 The work site focuses on the areas of wall masonry and raised embankment at and below MHWs on the seaward facing side of the Sea Defences at Loughor sections A, B and E.

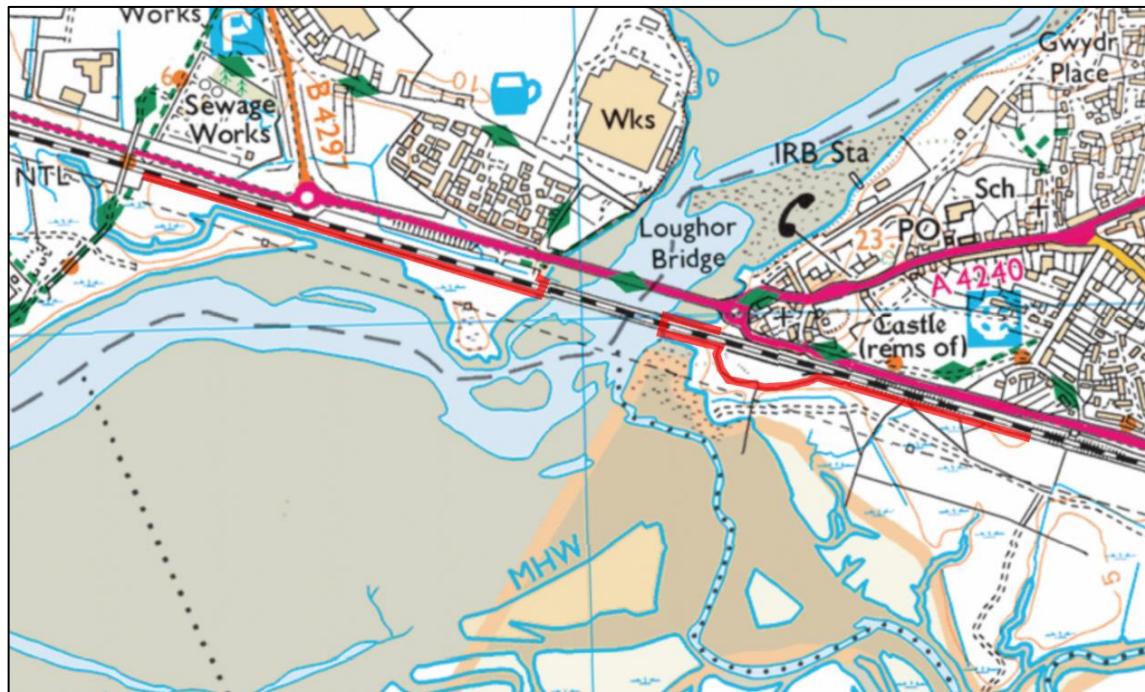


Figure 2: Project survey areas (red boundaries).

- 4.1.2 Dyer & Butler Rail have been instructed to undertake the works outlined in the remit document (See Appendix B).

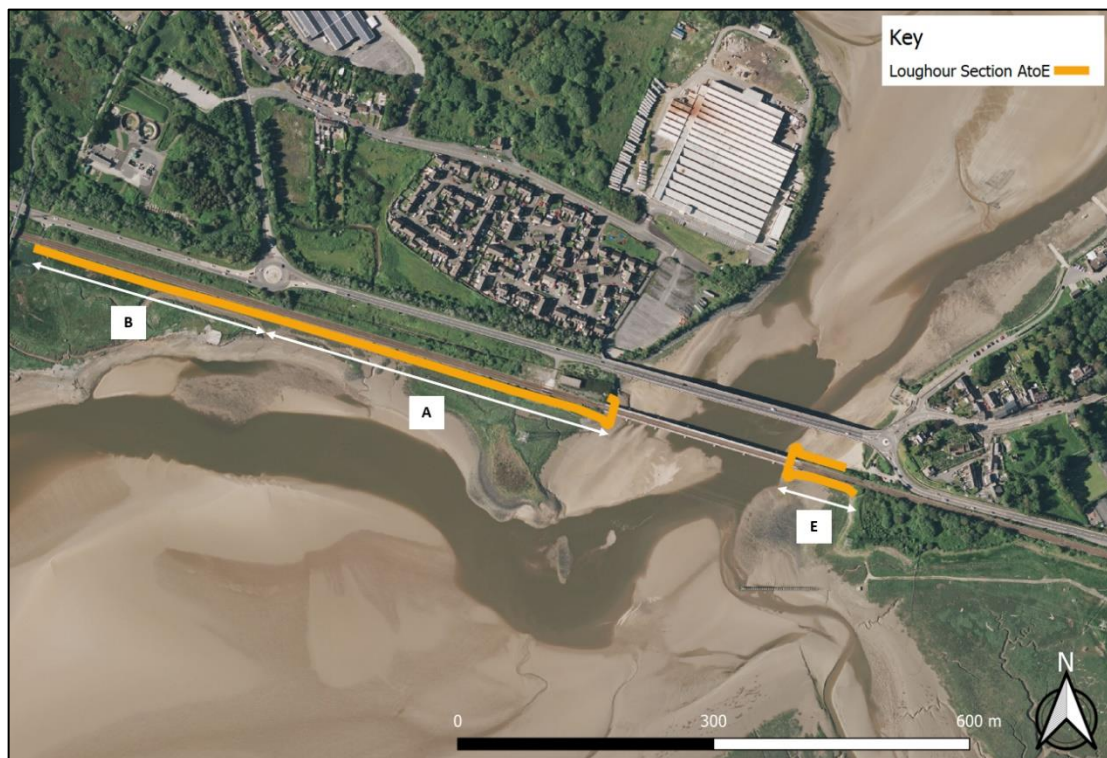


Figure 3: Sea Defence Sections.



5. DESCRIPTION OF THE PROPOSED ACTIVITIES

Please note, Section 5 within the WFD mirrors Section 4 of the HRA.

5.1 SITE CONTEXT



Figure 4: Location of project in relation to wider area.

- 5.1.1 The work site focuses on the areas of wall masonry and raised embankment at and below MHWS on the seaward facing side of the Sea Defences at Loughor sections A, B and E. Access to the defences is provided by existing rail crossings to the west of section B and an underpass at section E, allowing access to the southern shore of section E. Access to section A and B is also possible during low tide, but walking along the edges of the estuary below both the road and rail bridges.
- 5.1.2 Within the rail corridor itself, there is limited safe clearance allowing for day works, which would be constrained by line blocks. Therefore, any material that would need to be brought to site via the rail network would be at night.
- 5.1.3 The underpass at section E is accessed from a parking area connected to the A484. The size of the underpass limits the size of machine to approx. 3 tonnes.
- 5.1.4 The attached Appendix highlights the current scope report for Section E. Sections A & E will be scoped in the near future. The works remit from that scope will be limited to the agreements in this Marine License. More complex works such as rock armour replenishment will require an amended marine license.
- 5.1.5 The maintenance works will consist of the summarised tasks described in the section below.



5.2 METHOD OVERVIEW – MASONARY WALL REPAIRS AND EMBANKMENT MAINTENANCE

- 5.2.1 Works are scheduled to commence October 2022 for approximately 12 months in duration. Work will occur over several weeks and not constantly during the requested license period. The longer license period is requested to account for poor weather conditions and limited available light as the determination of the license will likely take until autumn.
- 5.2.2 Works periods will be scheduled around daytime shifts primarily. However, night shifts will be required when heavy material or equipment needs to be dropped off on the edges of the rail boundary, such as bags of mortar, water containers, mixing equipment etc.
- 5.2.3 Maintenance to the sea walls during night is not envisaged, however some works or demobilisation on a given day may occur close to dusk.
- 5.2.4 The project works will be monitored by an Environmental Clerk of Works (ECoW) to ensure abidance to the HRA conditions, undertaking supervision duties when required and undertaken audits. The ECoW has the authority to abort site operations in the event works are causing disturbance to bird species. E.g., during sensitive early morning foraging periods.
- 5.2.5 Rope access system will be setup in accordance with Specialist Subcontractor RAMS and operatives will access the wall from the top down to the required location of the repair along the sea wall / embankments where required (dependent on slope angle and height).
- 5.2.6 Mixing equipment will consist of a 110v paddle mixer, 3.5kVa generator and mixing buckets. The pieces of equipment can be moved by hand when required.
- 5.2.7 Localised clearance of vegetation growing from some areas sea wall will be removed where necessary to access the wall or prevent root systems from causing further internal damage to the walls structure.
- 5.2.8 Pointing materials will be mixed in accordance with manufacturer's instructions. Where possible, mixing of material will occur within the rail corridor or on stable sections of the defence assets. However, some mixing may need to occur at ground level.
- 5.2.9 PIC (Person in Charge) indicates rope access operatives or engineers may begin work when the tidal conditions allow access to the base of the defences (non-high tide times).
- 5.2.10 Operatives will place polythene protection to base of sea wall/embankments at the areas of works, in order to capture any arisings from the maintenance.
- 5.2.11 Existing loose mortar will be removed using hand tools and collected where possible.
- 5.2.12 Operatives will document each section of works, on completion of pointing rope access operatives collect dropped pointing materials and remove from the working area.
- 5.2.13 The use of the 3t plant machine will be limited to the scour failure of the toe beam, seen in the Scope Report (Appendix B – TM4+ 11). This will require the machine to assist in clearing out the defect, to allow for a casting of new concrete to shore up the failure. The machine will carry heavy material such as block stone to fit into the void caused by the failure. The repair will be like for like and will not increase the footprint of the defence asset.



- 5.2.14 Regarding the embankment, vegetation growth will require removal to better ascertain the condition of these areas. Loose material will be moved by hand and set into position using target use of mortar or securing pins. As with the masonry works, any minor repairs will be like for like. Vegetation clearance will only occur on the sea defences and 30cm from the toe of the defence as to not impact the adjacent designate habitat features.
- 5.2.15 All clearance will be undertaken with hand tools, with no mechanical clearance (e.g. track mounted or robot-flail units).

5.3 SUPPORTING WORKS

Site Welfare - Delivery/Setup

- 5.3.1 No formal compound is required to support the works. Welfare will be provided using mobile welfare vans. These will be moved to suitable locations as the project requires. There are several laybys available along the A484 to support the works.

Vehicle Access

- 5.3.2 The single 3 tonne excavator will be the only heavy machine permitted for use during this project.
- 5.3.3 In terms of agreed routes, the plant machine will be delivered via the A484 to the hard standing ramp north of section E and will use the existing path to pass below the railway and onto the south facing beach.
- 5.3.4 The machine will follow an existing worn path within the saltmarsh to reduce the potential impacts to the habitat.



Figure 5: 3tonne plant machine.

Emergency Plans

- 5.3.5 The contractor will ensure that emergency pollution control plans above standardised spill control plans are prepared prior to the commencement of the project. The contractor will ensure a plan on vehicle extraction from the in-channel environment is available with plant machines or equipment on site capable of retrieving a stranded machine.

Emergency Plan Fundamentals:

- ◆ Any disabled machine within the channel environment will be immediately checked for any potential release of hydrocarbons, and if discovered, spill kits and trays will be used immediately.
- ◆ The on-call emergency plant engineer provider will be requested to attend site in the event that the fault cannot be resolved by the operator.
- ◆ Should the on-call engineer be unable to repair the machine, then it should be attempted to extract the machine using a similar powered machine, using task specific chains or tethers to tow the vehicle to a safe position.
- ◆ Should this fail, then the contractor must drain the machine of all fuel and hydraulic fluid before the tidal waters encroach on the machine. NRW and the on-call Environmental Clerk of Works will be contacted immediately and made aware of the emergency and risk of a pollution event.



5.4 SITE IMAGES AND FIGURES

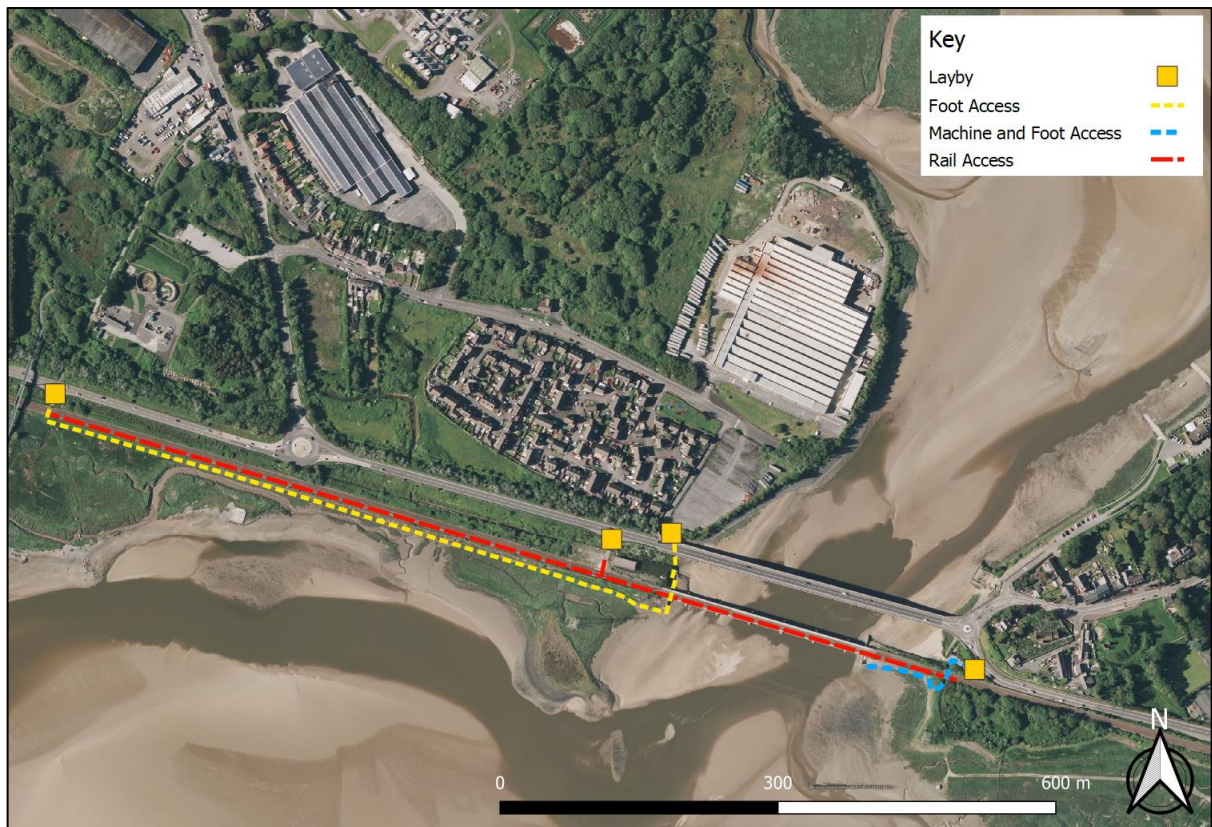


Figure 6: Proposed Access Routes.



Figure 7: Section A embankment facing west.



Figure 8: Section B rock armour and small loose embankment material.



Figure 9: Section E Masonry section (south shore).



Figure 10: Section E (north shore).



Figure 11: Underpass to be used.



6. BASELINE CONDITIONS

6.1 WDF STATUS OF WATERBODIES

- 6.1.1 Data on the location and status of WFD waterbodies and WFD Protected Areas has been obtained from the Water Watch Wales website (Waterwatchwales.naturalresourceswales.gov.uk) and the Multi-Agency Geographic Information for the Countryside (MAGIC) website (magic.defra.gov.uk/MagicMap.aspx)
- 6.1.2 The following WFD surface waterbodies are in proximity of the proposed scheme:
- ◆ Loughor Estuary, comprised of management units, Burry Inlet Inner (GB531005913500) and Burry Inlet Outer (GB641008180000).
 - ◆ Carmarthen Bay (GB611008590002)
- 6.1.3 Table 1 (below) presents summary information on the current WFD status of each of the constituent quality elements of the waterbodies downstream of the works. This information has been obtained from the Water Watch Wales website. Each of the quality elements will be assessed to determine whether the proposed scheme has the potential to adversely affect their status.
- 6.1.4 Only one groundwater waterbody, the Carmarthen Carboniferous Coal Measures (GB41002G200600) is located within the project area. It has a Quantitative Status of Moderate. Potential for the proposed scheme to impact groundwater is considered in Section 15.



Table 1: Summary of the WFD status of the water bodies with potential to be influenced by the proposed works

Waterbody name, ID, Type, Management Catchment, River Basin District.	Hydro-morphological designation	Current overall status & objectives	Biological elements	Physico-chemical elements	Water body Protected Area Links
BURRY INLET INNER (GB531005913500) Type: Transitional (Estuary) Man Catchment: Carmarthen Bay and the Gower TraC Area Name: South West Wales;Marine	Designated as Natural Morphology = Not High Hydrological Regime = Not High Mit Assessment = NA	Current overall status = Poor;	Fish = Not assessed Invertebrates = Good Infaunal Quality Index (IQI) = Good Phytoplankton = Poor Angiosperm = Good Salt Marsh = High Sea Grass = Good Macroalgae = High Opportunistic Macroalgae = High	Dissolved Inorganic Nitrogen (DIN) = Moderate Dissolved oxygen = High Annex 8 Chemicals = High Arsenic = High Copper = High Iron = High Manganese = High Phenol = High Toluene = High UI_NH3 (Un-ionised ammonia) = High Zinc = High Chem_PHZ = High Cadmium = High Nonylphenol = High Benzene = High Dichlo_1_2 = High Dichlometh = High Lead = High Nickel = High Tri_chl_mh = High Carb_tetra = High Tet_chl_ee = High Tri_chl_ee = High	Protected Area = No Bathing Waters = No Special Protection Area = Yes Drinking Water Protected Area = No Special Area of Conservation = Yes Nitrate Vulnerable Zone = No Shellfish Water = Yes



Waterbody name, ID, Type, Management Catchment, River Basin District.	Hydro-morphological designation	Current overall status & objectives	Biological elements	Physico-chemical elements	Water body Protected Area Links
Name: Burry Inlet Outer ID: GB641008180000 Type: Coastal Man Catchment: Carmarthen Bay and the Gower TraC RBD: Western Wales Area Name: Marine; South West Wales	Designated as Natural	Current overall status = Moderate;	Driving_Element = Angiosperm;Phytoplank;DIN Fish = Not assessed Invertebrates = Good Infaunal Quality Index (IQI) = Good Phytoplankton = Moderate Angiosperm = Moderate Salt Marsh = Good Sea Grass = Moderate Macroalgae = High Opportunistic Macroalgae = High	Dissolved Inorganic Nitrogen (DIN) = Moderate Dissolved oxygen = High Annex 8 Chemicals = High Arsenic = High Copper = High Iron = High Toluene = High UI_NH3 (Un-ionised ammonia) = High Zinc = High Chem_PHZ = High Cadmium = High Nonylphenol = High Benzene = High Dichlo_1_2 = High Dichlometh = High Lead = High Nickel = High Tri_chl_mh = High Carb_tetra = High Tet_chl_ee = High Tri_chl_ee = High	Protected Area = Yes Bathing Waters = Yes Special Protection Area = Yes Drinking Water Protected Area = No Special Area of Conservation = Yes Nitrate Vulnerable Zone = No Shellfish Water = Yes



Waterbody name, ID, Type, Management Catchment, River Basin District.	Hydro-morphological designation	Current overall status & objectives	Biological elements	Physico-chemical elements	Water body Protected Area Links
Name: Carmarthen Bay ID: GB611008590002 Type: Coastal Man Catchment: Carmarthen Bay and the Gower TraC RBD: Western Wales Area Name: Marine; South West Wales	Designated as Natural	Current overall status = Moderate;	Driving_Element = Mercury;BDPE Calc;Phytoplank Fish = Not assessed Invertebrates = Good Infaunal Quality Index (IQI) = Good Imposex = Good Phytoplankton = Moderate Angiosperm = No Data Salt Marsh = No Data Sea Grass = No Data Macroalgae = Good Opportunistic Macroalgae = No Data RSMac_Sub = Good	Dissolved Inorganic Nitrogen (DIN) = Good Dissolved oxygen = High Annex 8 Chemicals = High Arsenic = High Copper = High Iron = High Permethrin = High Toluene = High UI_NH3 (Un-ionised ammonia) = High Zinc = High Chem_PHZ = Moderate Anthracene = High BDPE_Calc = Moderate Cadmium = High Dioxins = High Endosulfan = High HBCDD = High Hex_chl_bz = High Hex_chl_cx = High Mercury = Moderate Nonylphenol = High PAH = High Pen_chl_bz = High PerfluSulp = High TBT_annx10 = High Chem_PR = High Benzene = High Cypermeth = High Dichlo_1_2 = High Dichlometh = High Dichlorvos = High Flourthene = High Lead = High Napthalene = High Nickel = High Octylphen = High Tri_chl_bz = High	Protected Area = Yes Bathing Waters = Yes Special Protection Area = Yes Drinking Water Protected Area = No Special Area of Conservation = Yes Nitrate Vulnerable Zone = No Shellfish Water = No



				Tri_chl_mh = High DDT_total = High Drins = High Tet_chl_ee = High	
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Waterbody name, ID, Type, Management Catchment, River Basin District.	Hydro-morphological designation	Current overall status & objectives	Biological elements	Physico-chemical elements	Water body Protected Area Links
Name: Carmarthen Carboniferous Coal Measures ID: GB41002G200600 Type: Groundwater RBD: Western Wales Area Name: WA Southwest	Not Designated A/HMWB	Current overall status = Poor;	Driving_Element: DrWPA;GWSW_chem	GWQn = Good GWDTE_abs = Good GWSW_abs = Good SI_abs = Good WB_abs = Good GWCh = Poor DrWPA = Poor GCT = Good GWDTE_chem = Good GWSW_chem = Poor SI_chem = Good Trend_GW Moderate	Protected Area = Yes Special Protection Area = No Drinking Water Protected Area = Special Area of Conservation = No Nitrate Vulnerable Zone = No



7. WATER FRAMEWORK DIRECTIVE ASSESSMENT: SCOPING FOR ACTIVITIES IN ESTUARINE AND COASTAL WATERS

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

7.1 SECTION 1: HYDROMORPHOLOGY

7.1.1 The first stage is to consider if there is hydromorphology at risk from your activity.

Table 2: Summary table to find out the hydromorphology status of the water body, if it is classed as heavily modified and for what use.

Consider if your activity:	Hydromorphology risk issue(s)
Could impact on the hydromorphology (for example morphology or tidal patterns) of a water body at high status	The River Loughor does not have high hydromorphological status. The river is classed as being heavily natural, the section in which the works are being undertaken is semi-naturalised along the western bank. There will be no changes to the below MHWS sections of the structures. This impact has been assessed as negligible / slight beneficial.
Could significantly impact the hydromorphology of any water body	Please see above - No impacts on any other water bodies.

7.2 SECTION 2: BIOLOGY, HABITAT & FISH



7.2.1 The second stage is to consider if habitats, Biology and Fish Species are at risk from your activity. Loughor Upper and Lower sections have been combined in this assessment. The figures and tables below illustrate and discuss the features present within the relevant units.

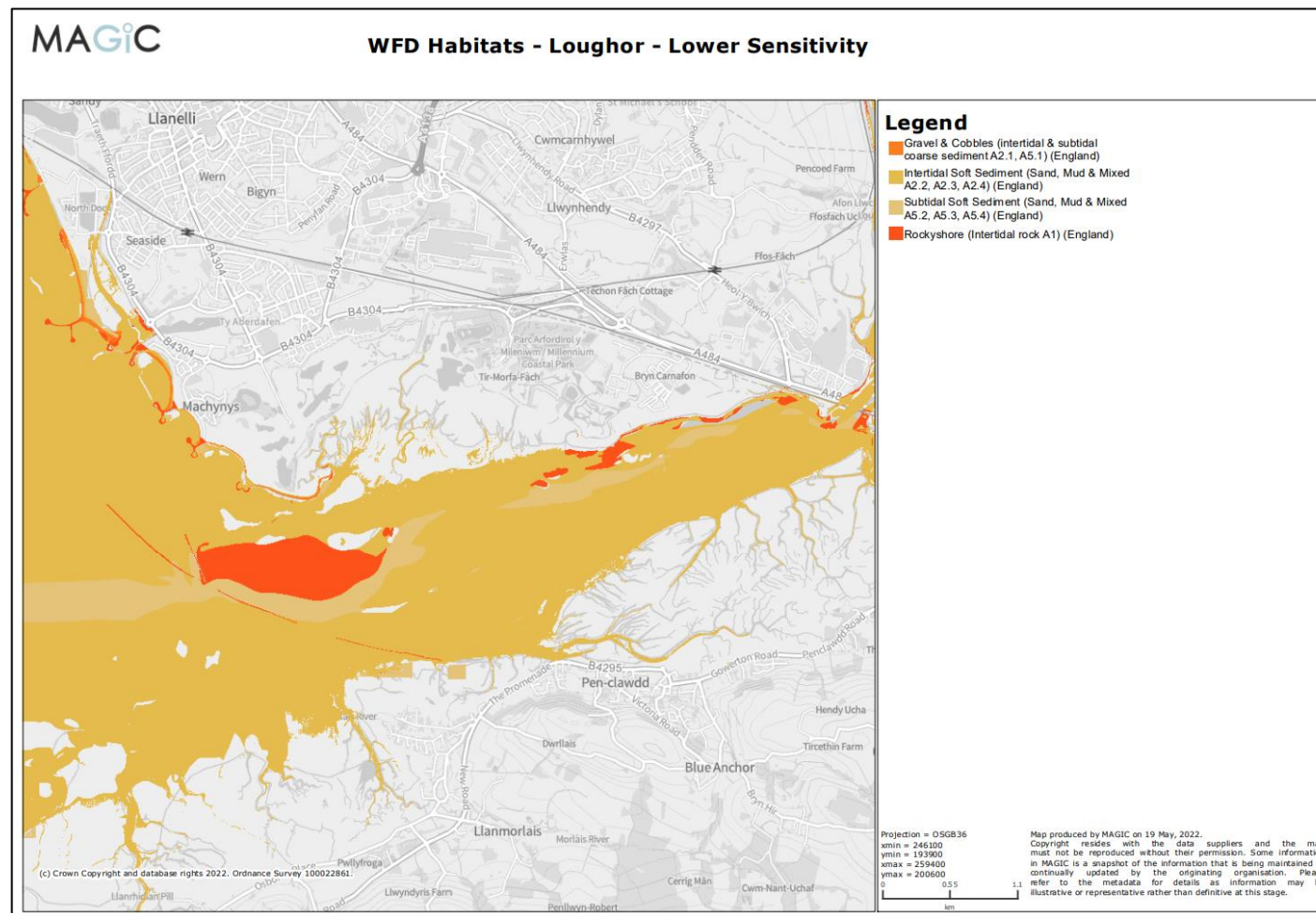


Figure 12: Loughor WFD Habitat Lower Sensitivity (www.magic.gov.uk)

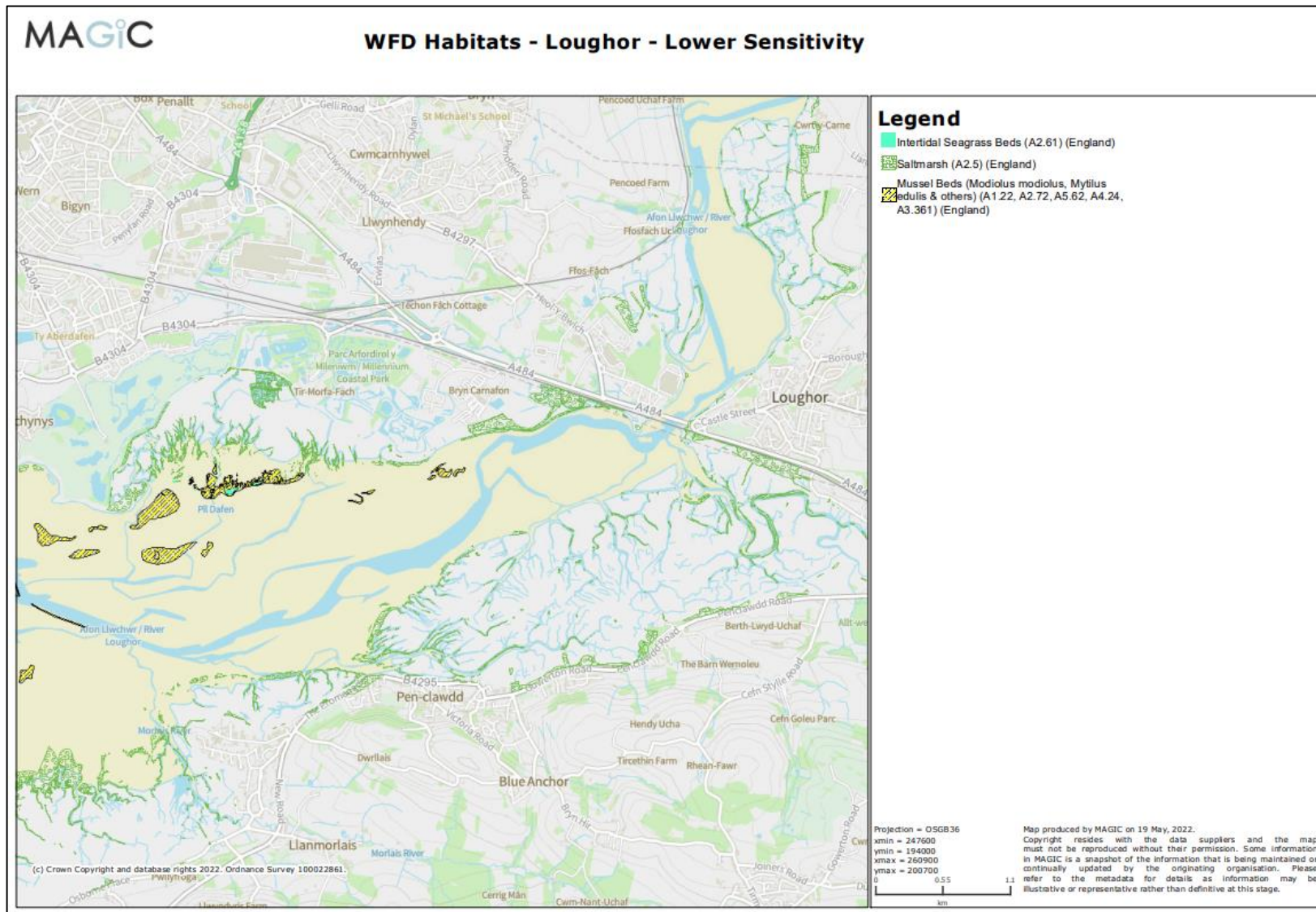


Figure 13: Loughor WFD Habitat Higher Sensitivity (www.magic.gov.uk)



7.2.2 The following tables below outlined the features and potential impact vectors. Note: Higher sensitivity habitats have a low resistance to, and recovery rate, from human pressures. Lower sensitivity habitats have a medium to high resistance to, and recovery rate from, human pressures.

Table 3: Combined Loughor Water body summary table and Magic maps, or other sources of information if available, to find the location and size of these habitats.

Area Name & ID		Burry Inlet Inner (GB531005913500) & Burry Inlet Outer (GB641008180000)	
Higher sensitivity habitats		Lower sensitivity habitats	
Potential Impacts	Habitat Type	Potential Impacts	Potential Impacts
Intertidal Seagrass Beds (A2.61)	Potential for indirect impacts due to chemical and hydrocarbon emissions from the works, if sufficient controls are not put in place.	Gravel & Cobbles (intertidal & subtidal coarse sediment A2.1, A5.1)	Potential for indirect impacts due to chemical and hydrocarbon emissions from the works, if sufficient controls are not put in place.
Saltmarsh (A2.5)	Potential for indirect impacts due to chemical and hydrocarbon emissions from the works, if sufficient controls are not put in place.	Intertidal Soft Sediment (Sand, Mud & Mixed A2.2, A2.3, A2.4)	Direct impact in the form of vehicle movement over this harder substrate to access the structure Potential for indirect impacts due to chemical and hydrocarbon emissions from the works, if sufficient controls are not put in place.
Mussel Beds (Modiolus modiolus, Mytilus edulis & others) (A1.22, A2.72, A5.62, A4.24, A3.361)	Potential for indirect impacts due to chemical and hydrocarbon emissions from the works, if sufficient controls are not put in place.	Subtidal Soft Sediment (Sand, Mud & Mixed A5.2, A5.3, A5.4)	Potential for indirect impacts due to chemical and hydrocarbon emissions from the works, if sufficient controls are not put in place.
		Rockyshore (Intertidal rock A1)	Direct impact in the form of vehicle movement over this harder substrate to access the structure Potential for indirect impacts due to chemical and hydrocarbon emissions from the works, if sufficient controls are not put in place.

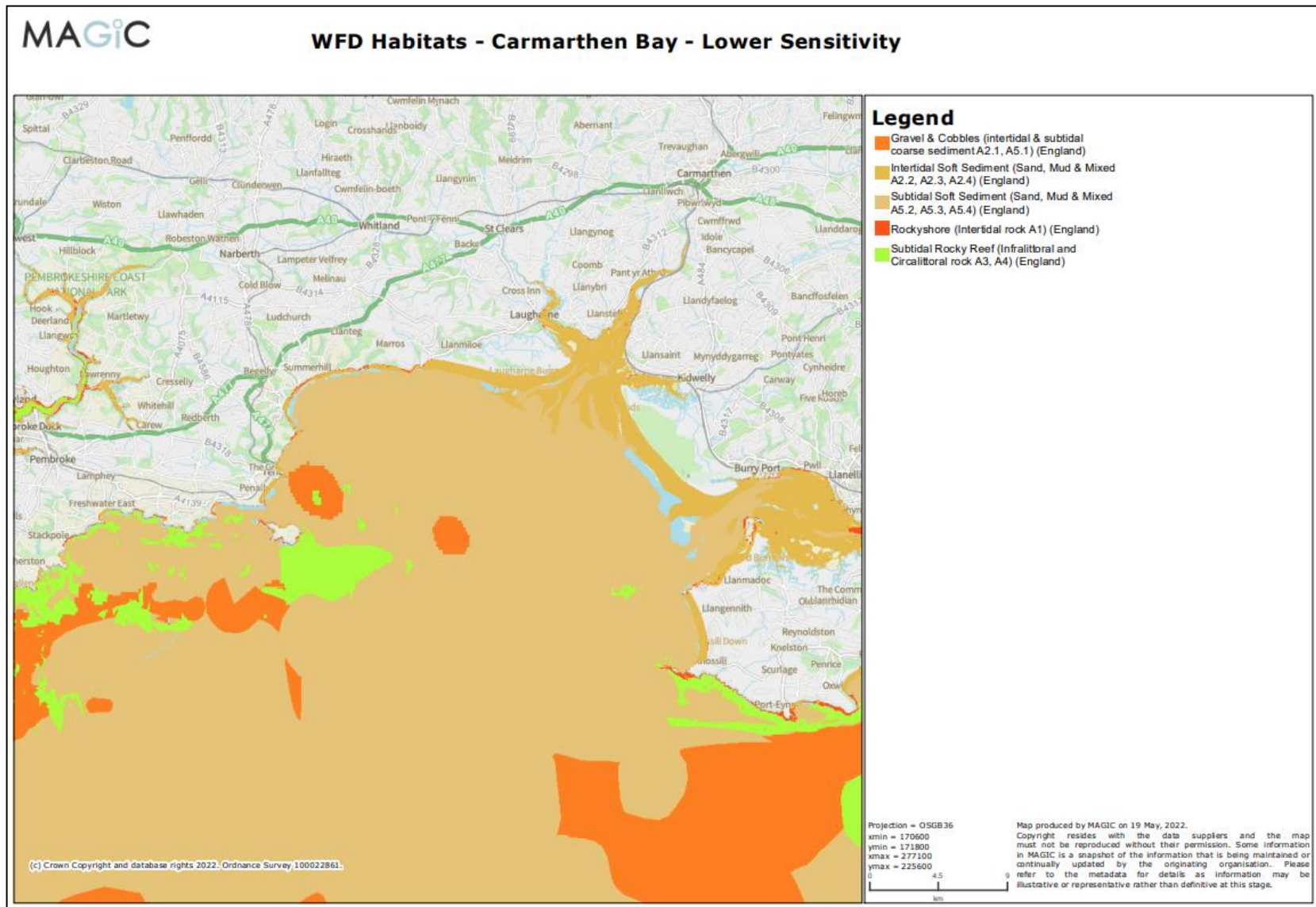


Figure 14: Carmarthen Bay WFD Habitat Lower Sensitivity (www.magic.gov.uk)

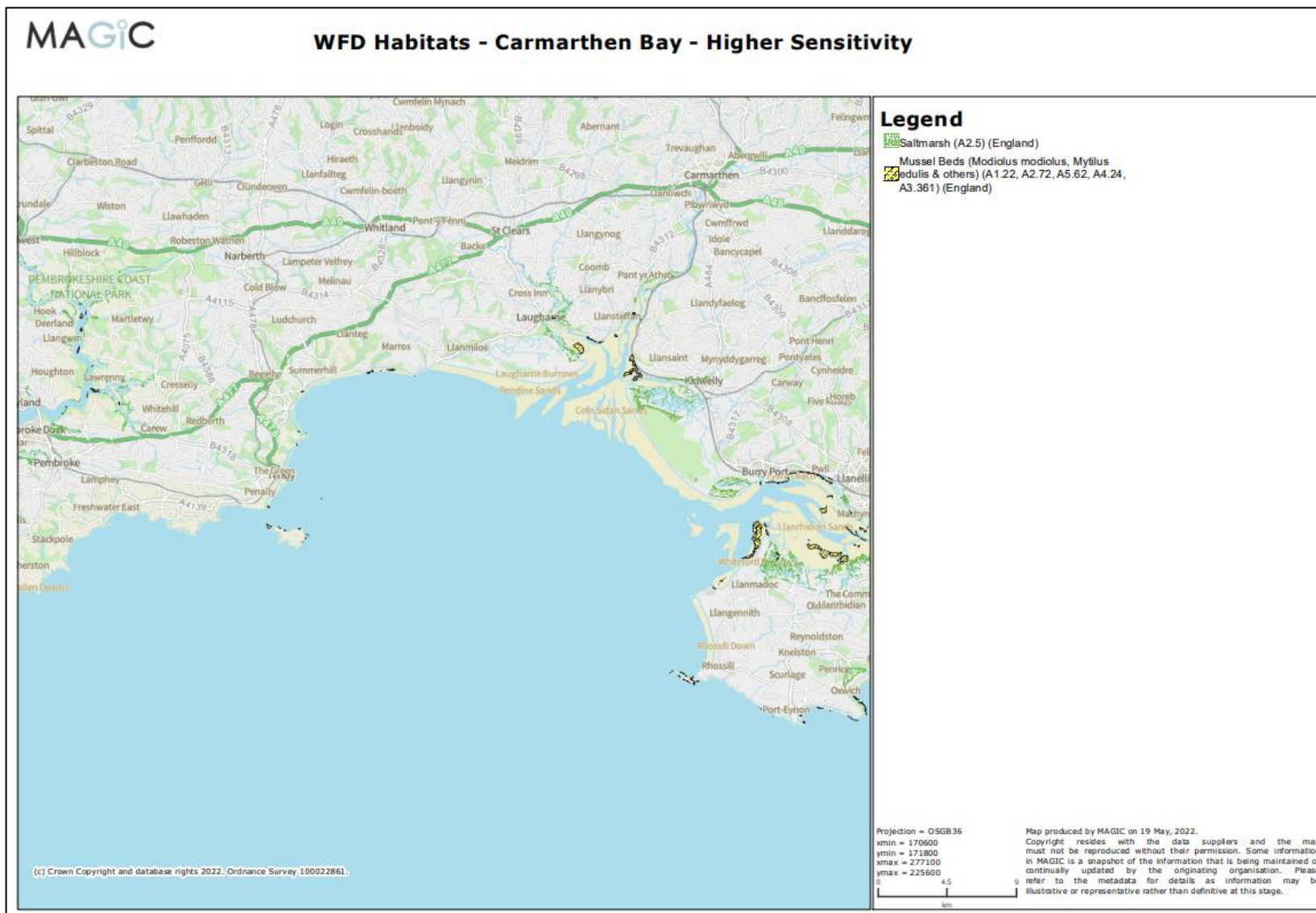


Figure 15: Carmarthen Bay WFD Habitat Higher Sensitivity (www.magic.gov.uk)



Table 4: Carmarthen Bay Water body summary table and Magic maps, or other sources of information if available, to find the location and size of these habitats.

Area Name & ID		Carmarthen Bay (GB611008590002)	
Higher sensitivity habitats		Lower sensitivity habitats	
Potential Impacts	Habitat Type	Potential Impacts	Potential Impacts
Saltmarsh (A2.5)	Potential for indirect impacts due to chemical and hydrocarbon emissions from the works, if sufficient controls are not put in place.	Gravel & Cobbles (intertidal & subtidal coarse sediment A2.1, A5.1)	Potential for indirect impacts due to chemical and hydrocarbon emissions from the works, if sufficient controls are not put in place.
Mussel Beds (Modiolus modiolus, Mytilus edulis & others) (A1.22, A2.72, A5.62, A4.24, A3.361)	Potential for indirect impacts due to chemical and hydrocarbon emissions from the works, if sufficient controls are not put in place.	Intertidal Soft Sediment (Sand, Mud & Mixed A2.2, A2.3, A2.4)	Potential for indirect impacts due to chemical and hydrocarbon emissions from the works, if sufficient controls are not put in place.
		Subtidal Soft Sediment (Sand, Mud & Mixed A5.2, A5.3, A5.4)	Potential for indirect impacts due to chemical and hydrocarbon emissions from the works, if sufficient controls are not put in place.
		Subtidal Rocky Reef (Infralittoral and Circalittoral rock A3, A4)	Potential for indirect impacts due to chemical and hydrocarbon emissions from the works, if sufficient controls are not put in place.



Table 5: Biology.

Consider if the footprint ⁴ of your activity is:	Biology habitats risk issue(s)
0.5km ² or larger	The working footprint of the 334m ²
1% or more of the water body's area	The Loughor Estuary alone covers an area of approximately 1117.6ha. The footprint of the works is therefore less than 1% of the estuaries area.
Within 500m of any higher sensitivity habitat	Works will be undertaken within 500m of the following designated sites: ◆ Carmarthen Bay and Estuaries - Special Area of Conservation (SAC) ◆ Burry Inlet – Special Protection Area (SPA) ◆ Burry Inlet – RAMSAR ◆ Burry Inlet and Loughor Estuary SSSI
1% or more of any lower sensitivity habitat	The works footprint, including temporary works areas is substantially less than 1% of lower sensitivity habitats.

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



7.3 DESIGNATED SITES WITHIN THE INFLUENCE OF THE LOUGHOR ESTUARY

7.3.1 There are 4 statutory designated sites within 3km of the project boundary which are linked to the Loughor Estuary:

- ◆ Carmarthen Bay and Estuaries - Special Area of Conservation (SAC)
- ◆ Burry Inlet – Special Protection Area (SPA)
- ◆ Burry Inlet – RAMSAR
- ◆ Burry Inlet and Loughor Estuary SSSI

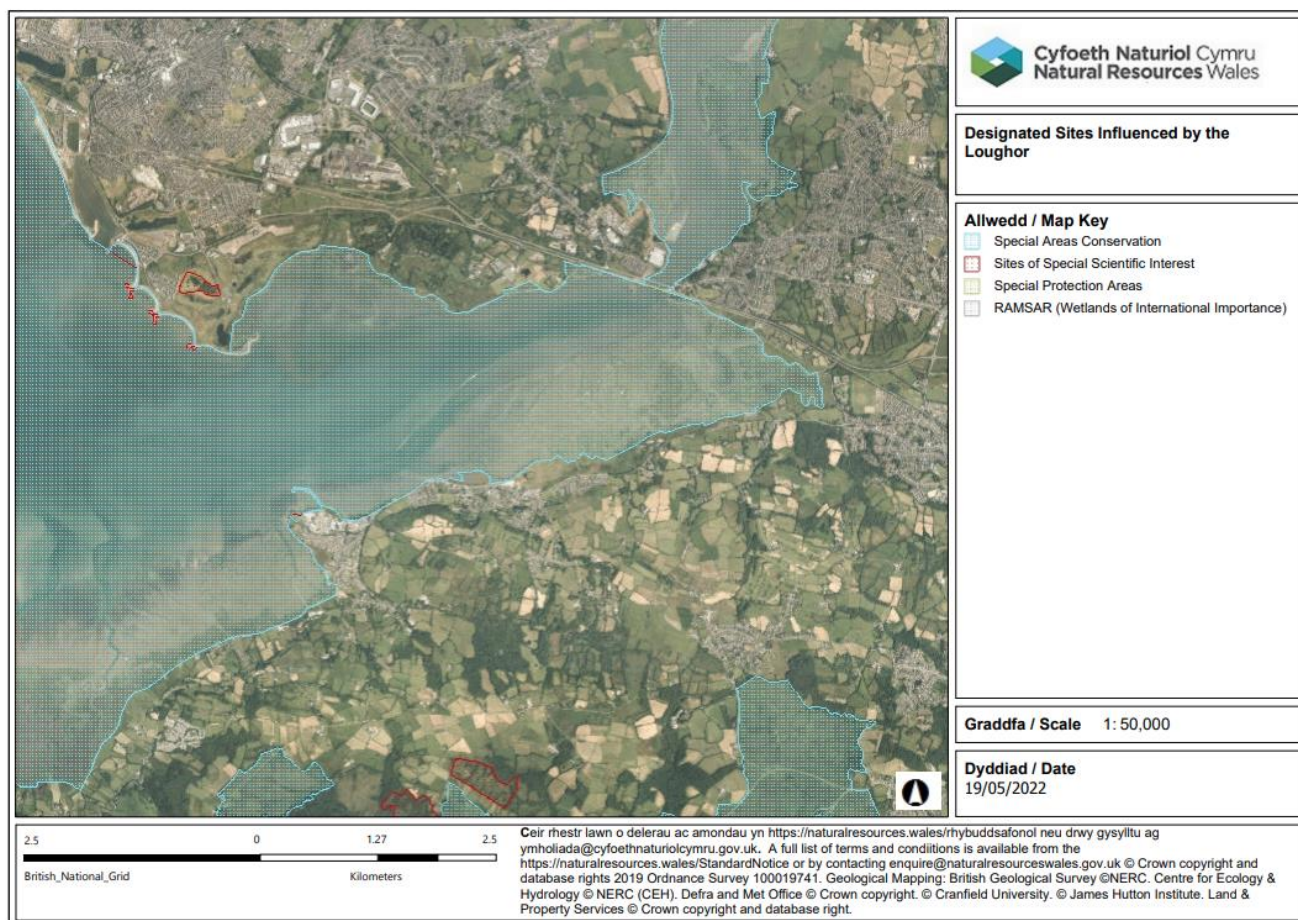


Figure 16: Designated Site Map in relation to Loughor defences.

7.3.2 There additional terrestrial Statutory and Non-statutory sites within proximity to the project, however these are unlikely to be influenced by the projects small footprint and are omitted from this assessment.

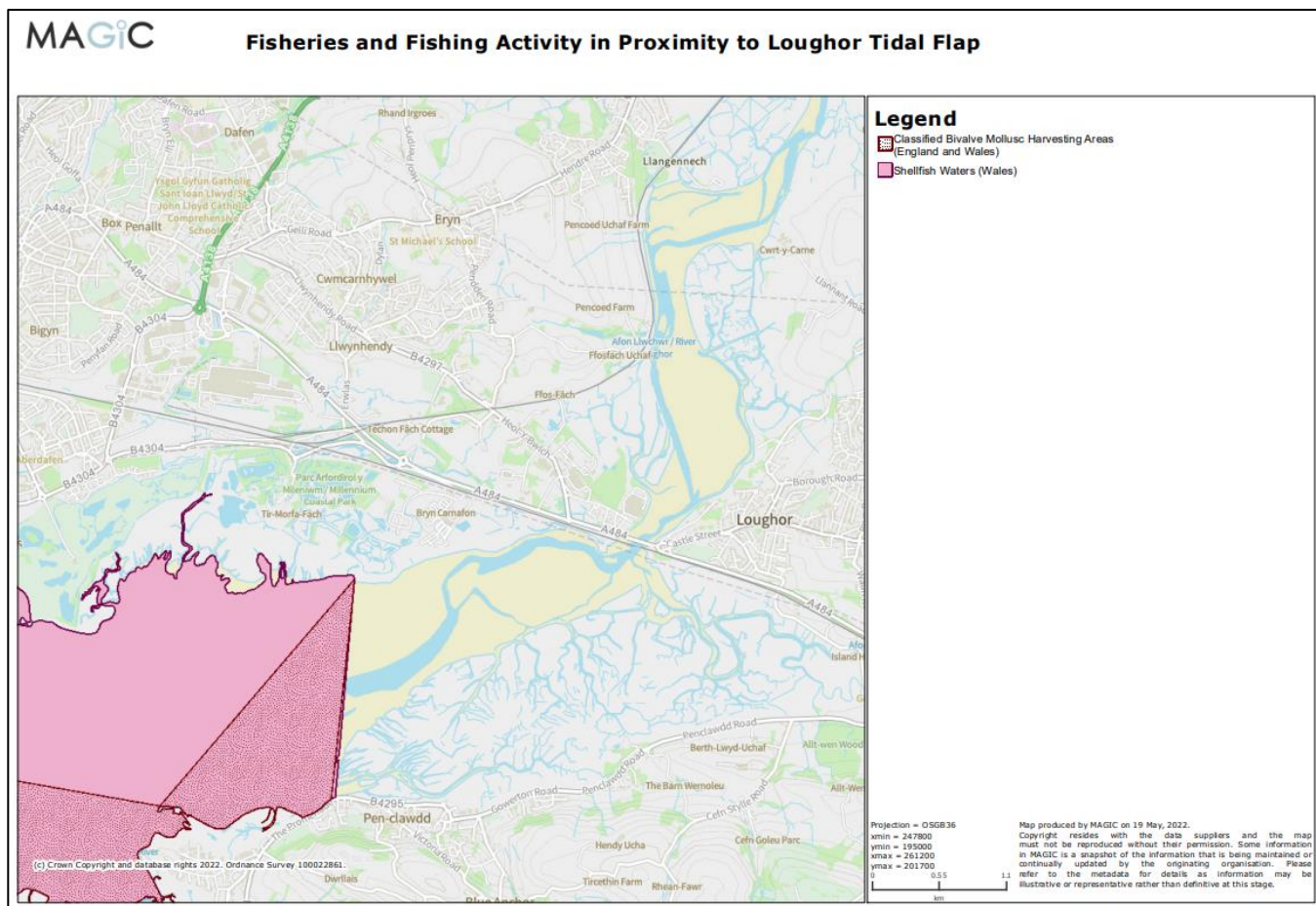


Figure 17: Location of Fisheries and Fishing Activity in proximity to works.



Table 6: Potential fish species at risk from your activity, but only if your activity is in an estuary or could affect fish in or entering an estuary.

Consider if your activity:	Biology fish risk issue(s)
Is in an estuary and could affect fish in the estuary, outside the estuary but could delay or prevent fish entering it or could affect fish migrating through the estuary	Works will be restricted to the defence structures during lower tide conditions, with no physical impediment to fish passage along the estuary. The works are indicated to take a single day to complete and consequently, are unlikely to impact any important seasons.
Could impact on normal fish behaviour like movement, migration or spawning (for example creating a physical barrier, noise, chemical change or a change in depth or flow)	Please refer to information above. Works will not cause a barrier to migrating fish species.
Could cause entrainment or impingement of fish	No identified impact



7.4 SECTION 3: WATER QUALITY

7.4.1 The third stage is to consider if water quality is at risk from your activity.

Table 7: Water body summary table to find information on phytoplankton status and harmful algae.

Consider if your activity:	Water quality risk issue(s)
Could affect water clarity, temperature, salinity, oxygen levels, nutrients or microbial patterns continuously for longer than a spring neap tidal cycle (about 14 days)	The works will include the use of a single tracked excavator during low tide, access the structure along the existing rocky/shingle edge of the estuary. Sediment Release: Excavation will be restricted to the concrete section of the headwall and the area immediately in front of this. Excavated material will be removed from the marine environment. There is potential for a small amount of sediment release from the rising tide and from scour due to water being discharged from the headwall. This would not add any materials to the marine environment but may re-mobilise deposited materials, depending on the nature of the river bed. Use of Hydrocarbons: All plant machinery movement will occur within the confines of the working footprint. No refuelling of plant machinery or equipment will occur within the estuary. All items of static plant will be placed within a plant nappy when not in use. Fuelled equipment will be checked for defects and leaks prior to the start of each shift. Within the compound, a refuelling procedure will be implemented, whereby plant nappies will be placed beneath fuelling apertures during fuelling and refuelling will only be undertaken by designated, trained individuals using equipment specifically designed for that purpose. Network Rail have a spillage plan and specialised contractor in place to respond to and clean up spills. Impact Assessment – To assess the potential impacts of these activities, the following should be considered: Construction plant will be used on the viaduct within the estuary and hence there is a heightened risk of hydrocarbon release due to leaks of fuels and oils. The contractor will refer to guidance from: ◆ GPP 2 - Above ground oil storage tanks, ◆ GPP 5 - Works and maintenance in or near water, ◆ GPP 7 - Safe storage – The safe operation of refuelling facilities, ◆ GPP 21 - Pollution incident response planning, ◆ GPP 22 - Dealing with spills, ◆ GPP26 - Safe storage – drums and intermediate bulk containers.



Consider if your activity:	Water quality risk issue(s)
	This includes controls for the operation of plant using biodegradable hydraulic oil (where this is within the manufacturers permitted specification), the re-fuelling of plant and equipment, inspection and maintenance routines for plant to identify defects which could result in the release of liquids, biosecurity protocols, silt mitigation procedures, waste management procedures. The ESMP also includes details on incident response and reporting, including hydrocarbon spills, remediation and reporting to NRW. Conclusion: Provided detailed mitigation plans are developed as part of the Task Specific Method Statements, in line with the broad guidance above, risks to water clarity, temperature, salinity, oxygen levels, nutrients or microbial patterns have therefore been assessed as low.
Is in a water body with a phytoplankton status of moderate, poor or bad	Phytoplankton within the Inner section of the Burry Inlet where Loughor is found has been reported as Poor.
Is in a water body with a history of harmful algae	No



Table 8: Assessing whether water quality is at risk from your activity through the use, release or disturbance of chemicals.

If your activity uses or releases chemicals (for example through sediment disturbance or building works) consider if:	Water quality risk issue(s)
The chemicals are on the Environmental Quality Standards Directive (EQSD) list	Impact Assessment: Chemicals which will be taken into the estuary as part of the works will be: Hydrocarbons and coolants within plant and machinery. Conclusion: Provided the project complies with the measures set out within the ESMP, which in turn contains guidance from the relevant GPPs, the risk of release of hydrocarbons and cementitious materials is low.
It disturbs sediment with contaminants above Cefas Action Level 1	A sampling regime has not been undertaken, however given the highly limited volume of material which as naturally formed in scour void that requires removal, it is unlikely that contaminants would be in such concentrations to be above Cefas Action Level 1.

Table 9: Assessing whether project falls within mixing zone.

If your activity has a mixing zone (like a discharge pipeline or outfall) consider if:	Water quality risk issue(s) /Assessment of Risk / Mitigation Proposals.
The chemicals released are on the Environmental Quality Standards Directive (EQSD) list	The works are maintaining an existing outfall asset.

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



7.5 SECTION 4: WFD PROTECTED AREAS

7.5.1 The forth stage is to consider if WFD protected areas are at risk from your activity. These include:

- ◆ Special Areas Of Conservation (SAC)
- ◆ Special Protection Areas (SPA)
- ◆ Shellfish Waters
- ◆ Bathing Waters
- ◆ Nutrient Sensitive Areas

Table 10: Location of protected areas in your water body (and adjacent water bodies) within 2km of your activity.

Consider if your activity is: Within 2km of any WFD protected area ⁶	Protected areas risk issue(s)
Carmarthen Bay and Estuaries Special Area of Conservation (SAC)	The project is Carmarthen Bay and Estuaries Special Area of Conservation (SAC), however due to the very small working footprint, impacts are unlikely.
Burry Inlet	Impacts are unlikely due to the scale and relatively low impact of the proposed works. Mitigation will be implemented as described above.

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



7.6 SECTION 5: INVASIVE NON-NATIVE SPECIES (INNS)

7.6.1 The fifth is to consider if there is a risk your activity could introduce or spread INNS.

7.6.2 Risks of introducing or spreading INNS include:

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

Table 11: Risk from INNS.

Consider if your activity could:	INNS risk issue(s)
Introduce or spread INNS	The risk of introducing INNS into the estuary environment will be controlled through Biosecurity Best Practice - Plant and equipment to be used within and adjacent to the estuary will be subject to the Check, Clean, Dry process and will be treated with an aquatic safe disinfectant such as Virkon S. A Biosecurity Management Plan has been prepared for the project, which assesses the risk from INNS and proposes mitigation for this. Please refer to Appendix A.



7.7 SUMMARY OF WFD PRE-ASSESSMENT FINDINGS

Table 12: Summary of Pre-Assessment Stage Findings.

Receptor	Potential risk to receptor?	Note the risk issue(s) for impact assessment
Hydromorphology	The River Loughor does not have high hydromorphological status. The river is classed as being natural, the section in which the works are being undertaken is semi natural, with rock armour and support abutments to both the Loughor Road Bridge upstream and Loughor rail viaduct. Returning the structures to there operational capacity is accessed as a neutral impact on the hydromorphology of the estuary as its an existing structure.	Mitigation to be out in place to minimise impacts – Please refer to section 8.
Biology: habitats	No long term identified impacts on habitats, provided adequate pollution control measures are put in place i.e. sealed crash deck beneath the structure, controls on the storage and use of hydrocarbons.	Mitigation to be out in place to minimise impacts – Please refer to section 8.
Biology: fish	No identified impact. There will be no physical blocks to fish migrating through the estuary/river. Key impacts on fish will therefore be noise and vibration from works and the use of a plant machine near channel. As the works will occur during low tide, noise and vibration will not be transmitted directly into the water column.	Mitigation to be out in place to minimise impacts – Please refer to section 8.
Water quality	No risk to water quality providing adherence to GPP and best practice is maintained.	Mitigation to be out in place to minimise impacts – Please refer to section 8.
Protected areas	Works will be within the SAC and SSSI.	Mitigation to be out in place to minimise impacts – Please refer to section 8.
Invasive non-native species	A Biosecurity Management Plan has been developed for the project, which includes INNS. Please refer to Appendix A.	Please refer to Biosecurity Plan – Appendix A



7.7.1 The WFD guidance stipulates if a pre-assessment has not identified any receptors at risk during scoping, you don't need to continue to the impact assessment stage and your WFD assessment is complete.

7.7.2 However, if the pre-assessment identifies one or more receptors at risk during scoping, you should continue to the impact assessment stage.

Table 13: Water Framework Directive (WFD) Assessment for the **Carmarthen Carboniferous Coal Measures** groundwater waterbody

WFD elements	Assessment
Chemical status	<u>Temporary impacts during construction</u> No identified impacts <u>Permanent effects during operation</u> No predicted impacts. No features of the defence structures will be changed a river bed level. <u>Assessment outcome</u> No adverse effects on the chemical status of the groundwater body have been identified and therefore this is scoped out of further assessment.
Quantitative status	<u>Temporary impacts during construction</u> No anticipated interaction with groundwater during maintenance works. <u>Permanent effects during operation</u> No predicted impacts from the operation of the existing defence structures. <u>Assessment outcome</u> Effects to the quantitative status of the groundwater body have been scoped out of further assessment.



8. PROPOSED PROJECT MITIGATION

8.1 CONSTRUCTION PHASE MITIGATION

8.1.1 In Table 14 below, measures have been set out detailing mitigation to be implemented to minimise the potential project impacts.

Table 14: Proposed Mitigation Matrix

Potential Hazard	Mitigating Circumstances / Mitigation Measures	Likelihood of Impact with Mitigation
Estuarine habitat - Loss of habitat from project activities.	During the project, all welfare, storage, parking and general works will occur within hard standing area of the A484. No Annex I habitat removal is required. Movement of the machine over the harder and more stable rock/ rock/shingle habitat is unlikely to cause lasting impacts due to the single day duration of the works.	Negligible Likelihood of significant for Impacts.
Salt marshes (also part of estuarine habitat)	Salt marsh is present along access areas but not directly within the working locations. Any disturbance to salt marsh habitat from access alone is expected to regenerate readily. Operatives will stick to worn paths created by the public as much as possible to reduce impacts. Furthermore, tarps will be placed at the base of working locations to ensure Annex I habitat is not detrimentally impacted by proposed works. Please see HRA for further detail.	Negligible likelihood of impacts.
Mudflats and sandflats not covered by seawater at low tide – muddy gullies in the Estuary - Loss of habitat from project activities.	No works are proposed within the main bed of the estuary. The works are limited to the defences alone.	Negligible likelihood of impacts.
Release of contaminative chemicals from sediments within the estuary.	Excavation of sediment is not proposed, only clearing out of sea debris from the scour failure is proposed to allow for repairs. Any larger volumes of grout or cement will be pump from a secure source situated from outside of the marine environment.	Negligible likelihood of impacts with mitigation in place.
Contamination of the estuary from spillage of hydrocarbons during refuelling of plant and equipment or due to equipment failure.	No refuelling of plant machinery or equipment will occur within the estuary habitat. All items of static plant will be placed within a plant nappy when in use or being stored. Plant will be checked for defects and leaks prior to the start of each shift. No bulk fuels will be stored on site, the excavator will be delivered to site fuelled and due to the short duration will not need to be re-fuelled. Within the compound, a refuelling procedure will be implemented, whereby plant nappies will be placed beneath fuelling apertures during fuelling and refuelling will only be undertaken by designated, trained individuals using equipment specifically designed for that purpose. Network Rail have a spillage plan and specialised contractor in place to respond to and clean up spills. The Contractor will develop and implement an Emergency Awareness and Response Plan. This will describe how spills will be contained and cleaned up. The emergency plan will appoint an Incident Coordinator, define roles and responsibilities during an incident,	Negligible likelihood of impacts with mitigation in place.



Potential Hazard	Mitigating Circumstances / Mitigation Measures	Likelihood of Impact with Mitigation
	detail response procedures and contain an inventory of response equipment to be maintained on site. Plant will also be available to remove contaminated ballast from site if required. All machinery on site will undergo regular checks. If oil leaks or damage to hydraulic hoses is noted, plant and machinery will be removed from the site and isolated within the site compound with containment measures beneath the leak, until it has been repaired and signed off by a competent fitter. The contractor will develop an emergency response plan in the event a machine becomes stranded in the estuary from mechanical failure and cannot be removed ahead of the rising tide. Equipment will be available to syphon the fuel from the disabled machine in order to reduce the potential release of hydrocarbons into the estuary.	
Contamination of the estuary from release of chemicals.	Please see above. No use of paints or related chemicals is proposed to undertake the works.	Negligible likelihood of impacts with mitigation in place.
Aggregations of bird species Noise disturbance / Visual Disturbance / Habitat Destruction.	Project activities will create a source of visual output and noise over 6-10 hours during the day. Times will vary due to the variation in the tide and season. As working hours are not continuous there will be periods when birds are not disturbed by site activities. However, it is likely that local bird populations are habituated to a level of disturbance from human activities, due to large numbers of pedestrians walking along the coastal path, trains crossing the rail bridge and vehicles crossing the vehicular bridge.	Negligible likelihood of impacts with mitigation in place.
Individual wintering birds - Noise disturbance / Visual Disturbance / Habitat Destruction.	Works within the estuary are programmed to be undertaken between October 2022 to September 2023. Please see HRA for further information regarding consideration to the winter wading assemblage.	Impact on Wintering Birds has been assessed as low.
Otter - Noise disturbance / Visual Disturbance / Habitat Destruction.	Toolbox Talks will inform site personnel on identifying the Annex II Species. No otter holts, resting up area or evidence (e.g. spraint) have been identified within proximity to the structure to date. The project will not represent a hard boundary preventing access to the wider estuary by this species. Otter would be able to move along the river channel and along the tops of the banks at all times during the works. Habitat impact is limited, however there may be a temporary impact to prey species disturbed by ongoing works. It is not anticipated that these works will have an impact on the population. No Night works is permitted as part of the work remit.	Impact Not Likely to be Significant, with appropriate mitigation



Potential Hazard	Mitigating Circumstances / Mitigation Measures	Likelihood of Impact with Mitigation
Fish Assemblage – Pollution and water quality impacts.	Pollution control and Biosecurity measures implemented as described in above will minimise water quality impacts on fish species.	Impact Not Likely to be Significant, with appropriate mitigation
13. Fish Assemblage - Noise disturbance / Visual Disturbance / Habitat Destruction.	There will be no physical blocks to fish migrating through the estuary. There will be no physical blocks to fish migrating through the estuary. Key impacts on fish will therefore be potential noise and vibration from works, however there will be no direct vector as works will be undertaken during low-tide conditions.	Works have potential to cause a Minor Significant impact.
14. Fish Assemblage - Contamination of the estuary from spillage	See comments under estuarine habitat	Impact Not Likely to be Significant
15. Biosecurity	A detailed Biosecurity Plan has been prepared for the project. This includes the following: - All site personnel and site visitors will be informed if any INNS are known to be present on site and that they are jointly responsible for preventing their spread/impacts. They will be made aware of what these species look like so they can avoid it where possible and take appropriate actions. - All site personnel and visitors will be inducted in good biosecurity practices. This will include adoption of the CHECK-CLEAN-DRY campaign (NNSS, 2015). - The CHECK-CLEAN-DRY poster will be displayed in the site office as a reminder of good biosecurity practices: http://www.nonnativespecies.org/checkcleandry/ - All equipment, tools, vehicles and personal protective equipment (PPE) used on site will be checked for seeds originating from any identified INNS before leaving the area. If seeds from identified invasive species are identified, the items will be cleaned and removed seeds will be destroyed. - The spread of waterborne diseases will be limited through the adoption of the CHECK-CLEAN-DRY campaign. This would entail the use of a suitable disinfectant e.g. Virkon® S Aquatic to decontaminate all machinery and PPE prior to it entering site and upon leaving site. Following application of a suitable disinfectant, machinery and PPE will be allowed to fully dry for at least 72 hours before being used on another aquatic site. The Biodiversity Management Plan can be found in Appendix A.	Impact Not Likely to be Significant



9. WFD CONCLUSION

- 9.1.1 Due to the nature and scale of the works to be undertaken during the Loughor Sections A, B & E maintenance project, providing the mitigation outlined within this document and within this document and the supporting Habitat Regulations Assessment (HRA) is implemented, this project will not prevent any of the water bodies associated with the project from meeting their Water Framework Directive objectives.



APPENDIX A - BIOSECURITY MANAGEMENT PLAN & RISK ASSESSMENT
