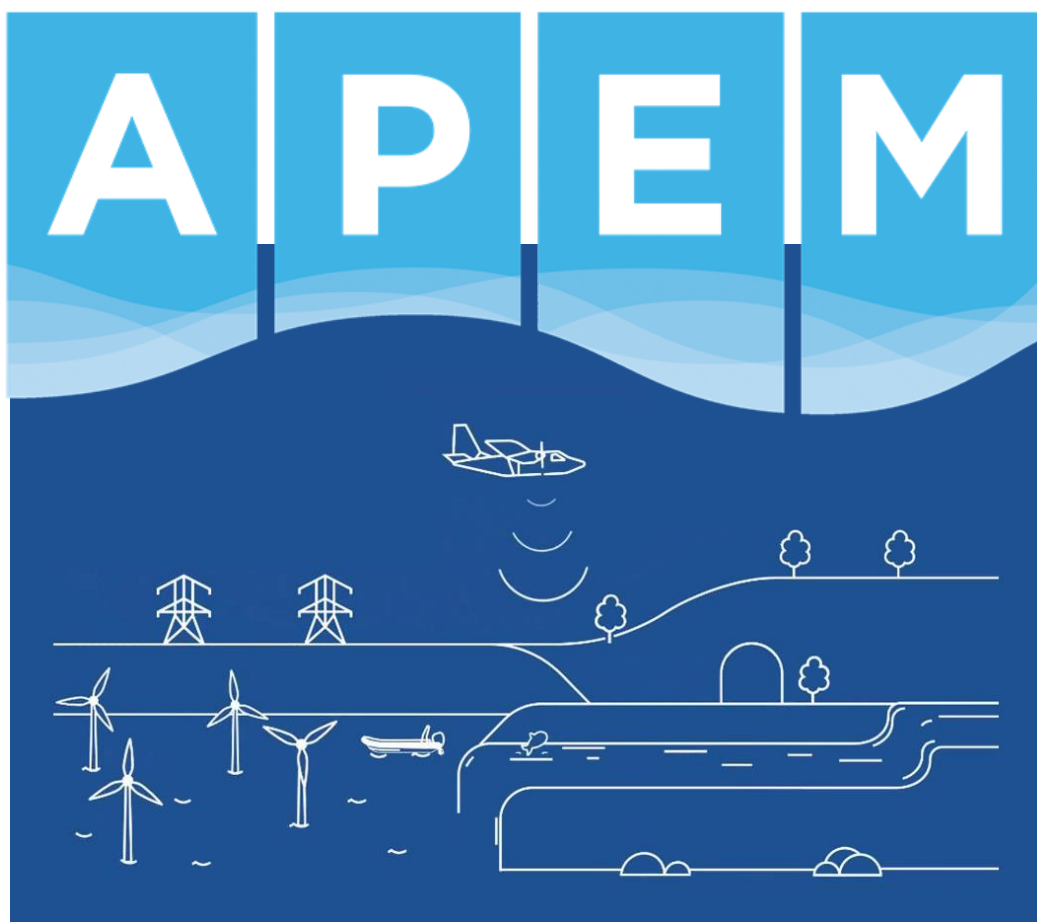




Newport Effluent Pipe Replacement Scheme

Ground Investigation Beach Works

Water Framework Directive Assessment Report

APEM Ref: P00008214a

January 2022

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Date of issue: January 2022

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Revision and Amendment Register

Version Number	Date	Section(s)	Page(s)	Summary of Changes	Approved by
V1	21.01.22	All	All	Draft report	MH
V2	25.01.22	4.3.2, 4.3.4	15, 17	Final following client comments	MH

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Executive Summary

The replacement of an effluent pipe and sea outfall at Newport, S. Wales has been proposed. The pipe crosses the intertidal zone and discharges below mean low water spring. Before the replacement works, ground investigation (GI) works are required adjacent to the existing pipeline involving the excavation of trial pits and boreholes. The GI works will inform the design and replacement of the pipeline and outfall.

The works are within the Severn Lower Water Framework Directive (WFD) transitional water body (ID: GB530905415401).

This WFD Assessment report is required to determine if the GI works could affect the current status/potential (or future objective status/potential) of relevant WFD supporting elements in the Severn Lower WFD water body.

The assessment considered the biological, hydromorphological and chemical quality elements potentially affected by all aspects of the proposed works and has been conducted following the Environment Agency's 'Clearing the Waters for All' guidance, which was developed specifically to assess the effects of activities in transitional and coastal waters in relation to WFD targets.

The assessment approach is based on the following three stages: Screening, Scoping and Impact Assessment. Screening determined that the proposed activities were not classed as low risk activities and as such the assessment proceeded to the Scoping stage. At the Scoping stage the receptors Biology – Lower sensitivity habitats (intertidal soft sediments), Fish, Water Quality (in terms of phytoplankton, release of chemicals to a mixing zone, physico-chemical parameters and harmful algae) and Hydromorphology were scoped out from further assessment following criteria in the 'Clearing the Waters for All' guidance.

The receptors taken forward to the Impact Assessment stage were Biology – Higher sensitivity habitats (Saltmarsh), Water Quality (chemicals on the Environmental Quality Standards Directive (EQSD) and chemicals above CEFAS Action Level 1), WFD protected areas and Invasive non-native species. For these receptors, available evidence was assessed to determine if there could be any effects of the works on the status and potential of the Severn Lower WFD water body.

Various work design measures to lower the risk of adverse effects have been considered in the assessment. This includes the implementation of a Construction Environmental Management Plan (CEMP) to include a range of measures to minimise the chances of accidental pollution from spillage of chemicals, and design of the works to avoid any interaction with the higher sensitivity saltmarsh habitat.

Overall, the assessment concluded that the GI works (either alone or cumulatively) will produce negligible effects on the biological, hydromorphological and chemical quality elements of the Severn Lower WFD water body. It is not expected that the works would cause

deterioration in the WFD status/potential of any of the receptors and the attainment of the water body's target status/potential would not be put at risk.

1. Background Information for the Proposed Works

1.1 Introduction to the WFD assessment

The replacement of an effluent pipe and sea outfall at Newport, S. Wales has been proposed. The pipe crosses the intertidal zone and discharges below mean low water spring. The works are within the Severn Lower Water Framework Directive (WFD) transitional water body (ID: GB530905415401).

Kaymac Marine & Civil Engineering Ltd. have been commissioned by Solutia UK to carry out ground investigation (GI) works adjacent to the existing pipeline involving the excavation of trial pits and boreholes. The GI works will inform the design and replacement of the pipeline and outfall.

This Water Framework Directive (WFD) Assessment Report relates to the GI works only. The WFD Report has been provided to support the works Band 2 marine licence application and is required to determine if the GI works could affect the current status / potential (or future status / potential) of associated WFD supporting elements in the Severn Lower water body.

1.2 Location and context

The location of the GI works within the Severn Lower water body is indicated in Figure 1 below.

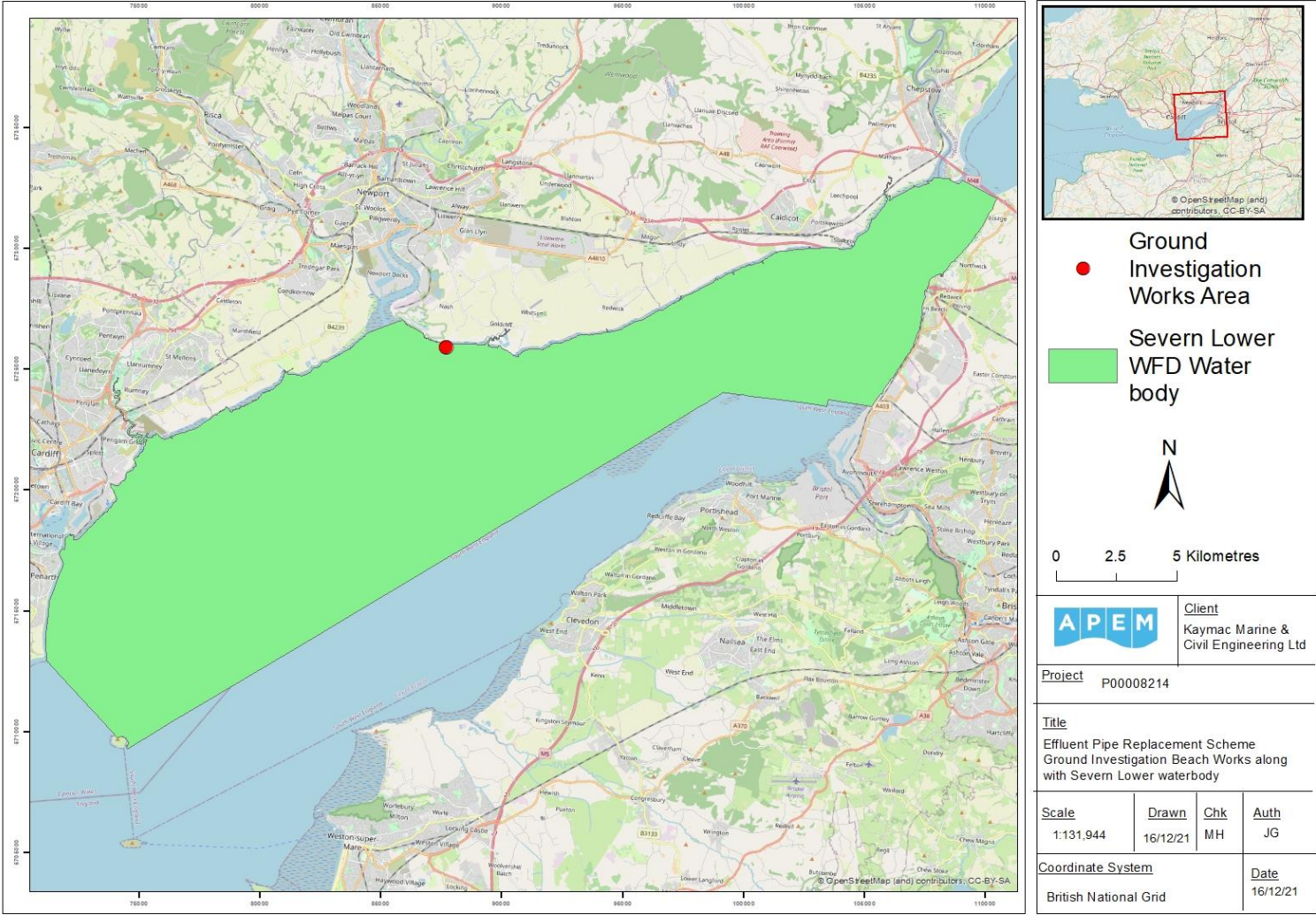


Figure 1: Location of the proposed works within the Severn Lower transitional water body

1.3 WFD assessment objectives

The objective of this assessment is to consider the available data for WFD supporting elements in the Severn Lower water body in accordance with the Environment Agency's (EA) 'Clearing the Waters for All' guidance (EA, 2017), and in this context, consider the potential effects of the GI works on the status / potential of the following WFD parameters:

- Ecological potential
 - Biological supporting elements
 - Physicochemical supporting elements (and Specific Pollutants¹)
 - Hydromorphological considerations
- Chemical status
 - Priority Substances¹
 - Other Pollutants¹
 - Priority hazardous substances¹

1.4 Summary of the Proposed Works

A full description of the activities and methods associated with the GI works is provided in Kaymac (2021). A summary of key aspects of relevance to this assessment is provided below.

The GI works involve the excavation of two trial pits and four boreholes along the length of the existing outfall in the intertidal zone and within a footprint of approximately 500 m by 50 m (0.025 km²) (Figure 2).

The works will be undertaken during spring low tides across two days. All plant will be delivered to site on a landing craft from Cardiff Barrage approximately 10 nm away. The landing craft will be grounded as far up the beach as possible to maximise the available working window before the tide comes back in. The landing craft will then be re-floated as the tide comes back in and all plant demobilised from site.

The primary plant required for the works are:

- Landing craft
- 15 tonne excavator
- Terrier rig (tracked drilling rig).

The GI works are scheduled to take place in Q2 2022.

¹ Limited to chemicals on Environmental Quality Standards Directive (EQSD) list for WFD (as provided in EA 2017). Environmental thresholds are summarised in Defra (2015).

1.4.1 *Excavation of trial pits*

The trial pits will be excavated using the 15 tonne excavator, which will be delivered to site by the landing craft. The pits will be approximately 2 m by 0.6 m and excavated to a depth of approximately 2 m (approximate total area of 2.4 m² for the two pits).

The pits will be excavated in a methodical manner layer by layer. The excavated material will be stored adjacent to the pit in a manner that allows layers to be reinstated in the same order it was removed. The beach profile will be restored to its original state before demobilisation ensuring that the finished level is the same as the surrounding beach area.

The pits will be excavated across two days during spring low tides. As such, each pit will be excavated and reinstated during one spring low tide period with both trial pits being completed across two days.

1.4.2 *Boreholes*

The boreholes will be drilled using a small tracked Terrier rig that will be delivered to site on the landing craft. This rig is small enough to be manoeuvred by on-foot operatives. The rig uses a percussion hammer action at a rate of up to 50 blows per minute to drive the core into the sediment. The boreholes will have a diameter of 150 mm (approximate total area of 0.07 m² for the four boreholes).

At each of the four borehole locations the first core and liner will be driven to a depth of 1 m. Additional cores and liners will be added each metre until the desired depth of approximately 4 m is reached. Holes will be filled to a similar level as the surrounding beach.

Two boreholes will be completed during the first day of the works with the remaining two to be completed the following day.

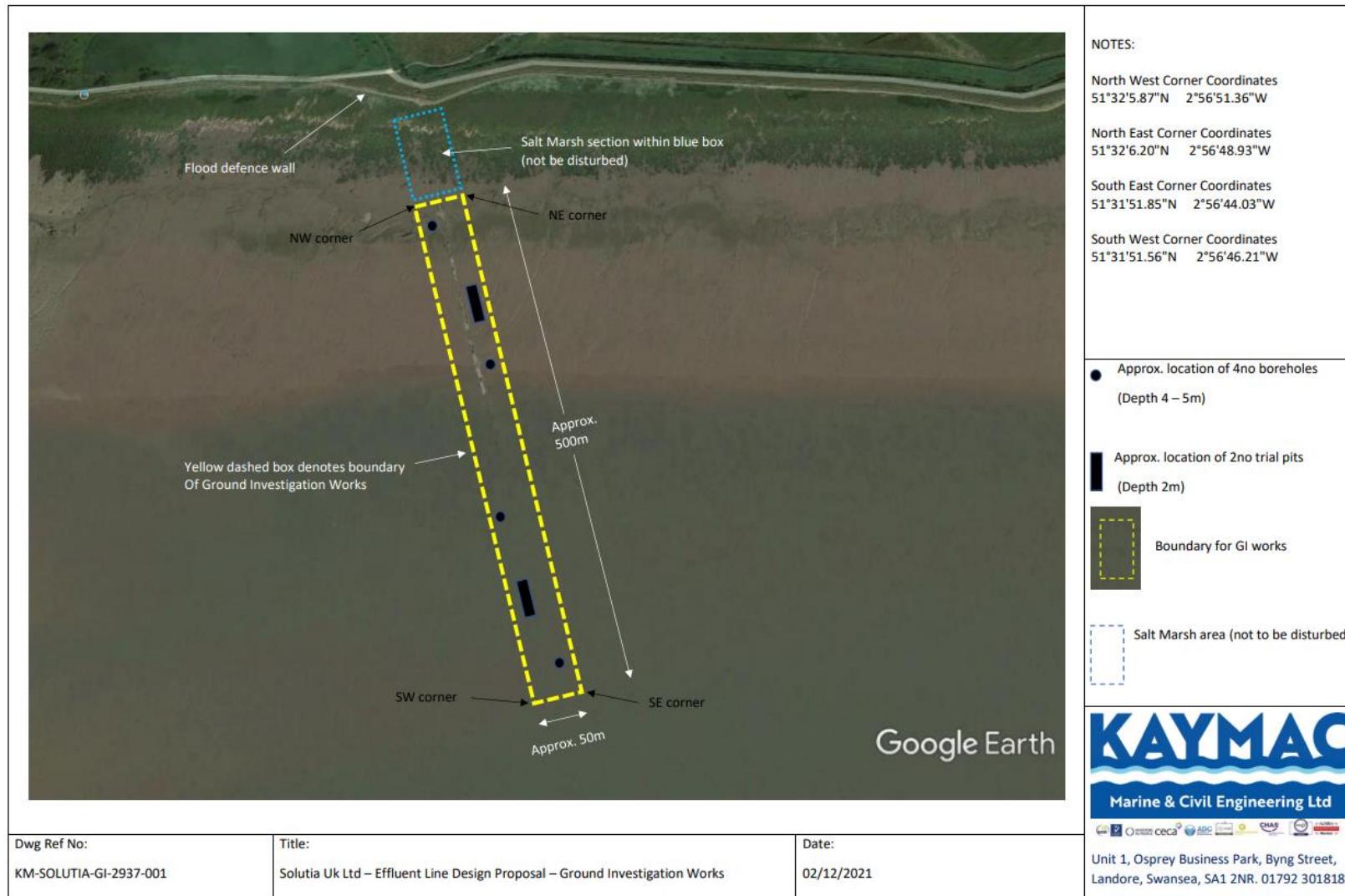


Figure 2: Proposed ground investigation work locations (Image supplied by Kaymac Marine & Civil Engineering Ltd).

2. Water Framework Directive requirements

2.1 Water Framework Directive

2.1.1 Overview

The WFD establishes a framework for the management and protection of Europe's water resources. It is implemented in England and Wales through the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (the Water Framework Regulations)². Central to the WFD is the philosophy to make water bodies better through sustainable development for the joint benefits of aquatic habitats and the human environment.

Ecological status is an expression of the quality of the structure and functioning of surface water ecosystems as indicated by the condition of a number of 'quality elements'. These include biological and chemical indicators. Where a water body is defined as a Heavily Modified Water Body (HMWB), ecological status is replaced by ecological potential.

The development and implementation of strategic long-term River Basin Management Plans (RBMPs) is a key requirement of the WFD. They include a programme of measures outlining the on-going monitoring and management actions required for water bodies to achieve future objectives.

Proposed developments or activities that have the potential to affect the water environment require a WFD Assessment. In this context, compliance with the WFD means prevention of deterioration (of ecological status, chemical status and supporting element status) and avoiding prevention of ability to achieve future targets. However, WFD Article 4.7 provides legislation for exemption conditions that could allow implementation of schemes that cause deterioration in ecological status, for example for reasons of overriding public interest.

The subsequent Priority Substances Directive to the WFD sets out Environmental Quality Standards (EQSs; 2008/105/EC) for priority substances which is known as the EQS Directive and there have been subsequent amendments (2013/39/EU; Defra, 2015 and EA, 2015). The environmental objectives of the WFD and its associated directives include the following:

- to prevent deterioration of aquatic ecosystems;
- to protect, enhance and restore water bodies to 'good' status; based on ecology (with its supporting hydromorphological and physico-chemical factors) and chemical factors for surface waters; and
- to progressively reduce pollution from priority substances and cease or phase out discharges of priority hazardous substances.

The default objective of the WFD is for all rivers, lakes, estuaries, groundwater and coastal water bodies to achieve 'good' status by 2027 at the latest. Where it is not possible to achieve this, alternative objectives can be set. The existing status, and measures required to achieve

² At this stage, following Brexit, existing EU environmental legislation will continue to operate under the policy of "roll-over", however, decisions made by the EU will no longer be binding for courts in the UK.

the 2027 status objective are set out for each water body in the relevant RBMPs. The plans set out the current baseline condition of the water environment at the time of publication and provide details on the measures needed and timescales required to attain their target status.

For the following surface water bodies: rivers, lakes, estuaries and coastal waters, the overall water body status has both an ecological and a chemical component. Good 'ecological status' is defined as a 'slight variation from undisturbed natural conditions, with minimal distortion arising from human activity'. The ecological status of water bodies is determined by examining biological elements (e.g. fish, invertebrates, plants) and a number of supporting elements and conditions, including physico-chemical (e.g. metals and organic compounds), and hydromorphological (e.g. depth, width, flow, and 'structure') factors.

A flow chart illustrating how quality elements are combined (Cycle 2) to provide an overall water body status/potential is provided in Figure 3. The classification hierarchy for surface waters (for Cycle 2) is illustrated in Figure **Error! Reference source not found. 4**. Only biological supporting elements have classification boundaries defined for 'high' through to 'bad' (**Error! Reference source not found. 3**). Chemicals supporting 'chemical status' that do not meet EQS concentrations are classified as 'Failing to achieve Good' (Figure 3).

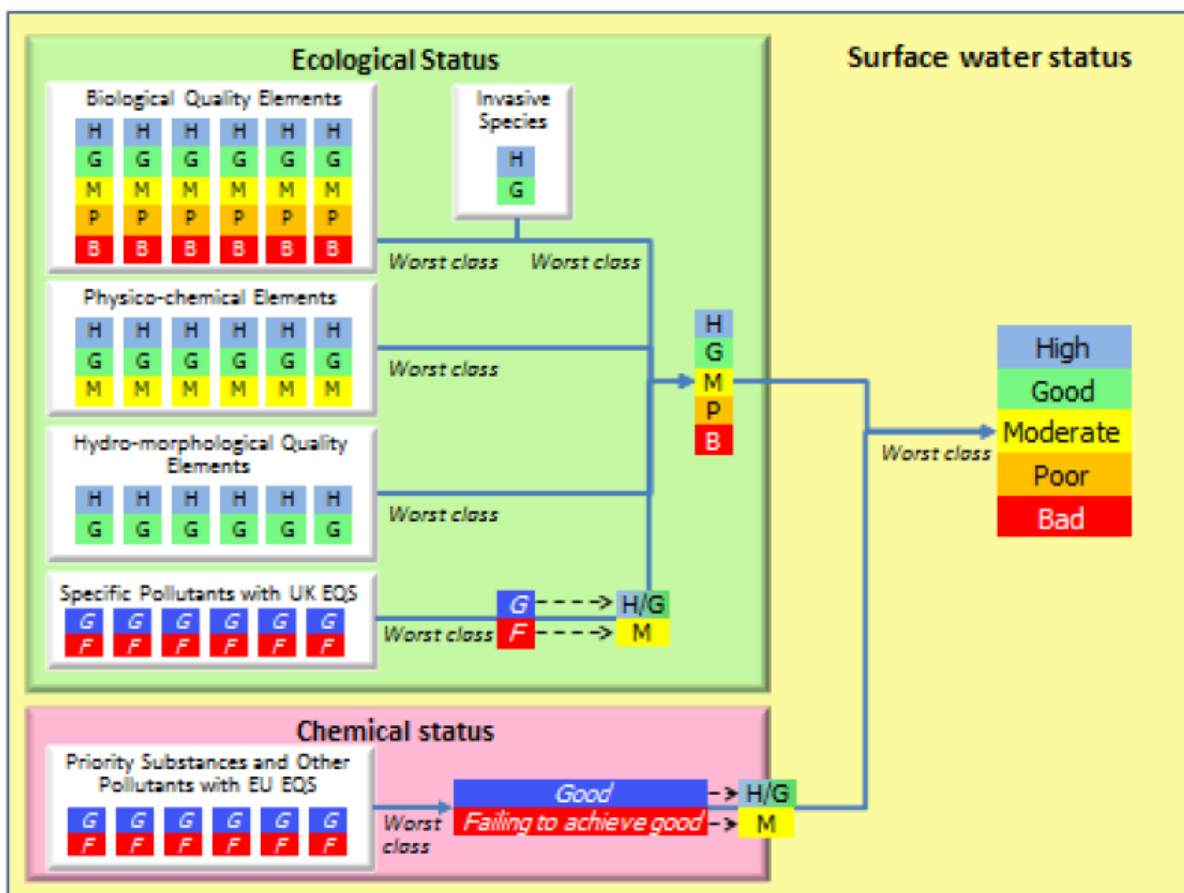


Figure 3: WFD classification elements – Bringing all of the strands of evidence together (Environment Agency 2015).

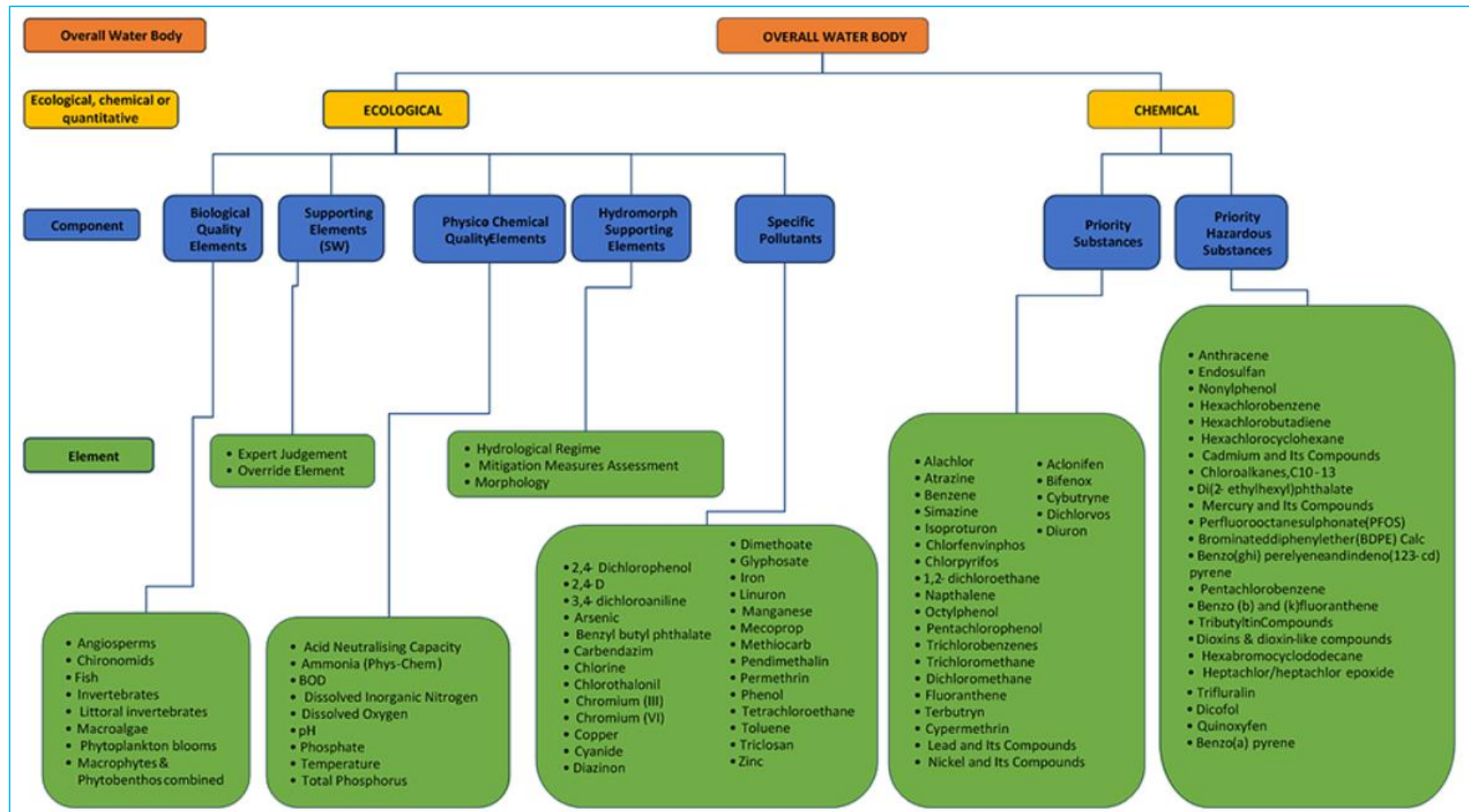


Figure 4: Classification hierarchy for surface waters (extracted from Environment Agency 2018).

2.1.2 Transitional Water Bodies

Transitional water bodies include bodies of surface water in the vicinity of river mouths that typically correspond (in the UK) to estuaries. Therefore, they are influenced by tides and are characterised both by saline water due to their proximity to coastal waters and by freshwater due to inputs of river flows. The GI works are situated within the Severn Lower WFD transitional water body.

The WFD classification elements for transitional WFD water bodies such as the Severn Lower water body are as follows:

- Hydromorphological:
 - tidal regime:
 - freshwater flow; and
 - wave exposure.
 - morphological conditions:
 - depth variation;
 - quantity, structure and substrate of the bed; and
 - structure of the intertidal zone.
- Biological:
 - phytoplankton;
 - other aquatic flora;
 - benthic invertebrates; and
 - fish.
- Physico-chemical and chemical:
 - transparency;
 - thermal conditions;
 - dissolved oxygen;
 - nutrients;
 - salinity; and
 - pollution by substances being discharged (e.g. chemicals, metals, pesticides).

2.1.3 Severn Lower Current WFD Status

The Severn Lower transitional water body is designated as a Heavily Modified Water Body (HMWB) for 'flood protection'. Where a water body is defined as a HMWB, the term 'ecological

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status' (combination of multiple biological, physical and some chemical supporting elements) is replaced by 'ecological potential'. The term 'chemical status' (combination of other chemical supporting elements), however, remains unchanged when considering HMWBs. Table 1 shows the current status of the Severn Lower water body based on Cycle 3 (2021) classification data.

Table 1. Cycle 3 classifications for the Severn Lower water body.

Parameter		Year
		2021
Water Body ID		GB530905415401
Water Body Area		46,597 ha
Water Body Type		Transitional Water
Hydromorphological designation		Heavily Modified
Overall Potential		Moderate
Chemical Status		Moderate
Priority Substances		High
Priority Hazardous Substances		Moderate
Ecological Potential		Moderate
Biological Quality Elements	Angiosperms	Moderate
	Fish	Good
	Invertebrates	Moderate
	Macroalgae	Not assessed
	Phytoplankton	Good
Physico-chemical Quality Elements	Dissolved Inorganic Nitrogen	Good
	Dissolved Oxygen	High
Specific Pollutants	Various	High

3. Methods

The assessment followed the EA's 'Clearing the Waters for All' guidance (EA 2017), which was developed specifically to assess the effects of activities in transitional and coastal waters in relation to WFD targets. The assessment approach is based on the following three stages:

- Screening;
- Scoping; and
- Assessment.

3.1 Screening

The screening stage is used to determine if the activities for the GI works are classed as low risk activities. The EA guidance (EA 2017) identifies the following activities to qualify as low risk activities:

- a self-service marine licence activity or an accelerated marine licence activity that meets specific conditions;
- Maintaining pumps at pumping stations;
- Removing blockages or obstacles like litter or debris within 10 m of an existing structure to maintain flow;
- Replacing or removing existing pipes, cables or services crossing over a water body – but not including any new structure or supports, or new bed or bank reinforcement; and
- ‘Over water’ replacement or repairs to, for example, bridge, pier and jetty surfaces, if you minimise bank or bed disturbance.

Where the proposed works do not fulfil criteria for a low risk activity, the assessment continues to the scoping stage.

3.2 Scoping

The scoping stage is used to determine if the proposed activities pose potential risks to the following receptors based on the quality elements of the water body of concern. The EA guidance (EA 2017) specifies consideration of the following quality elements for transitional water bodies such as the Severn Lower water body:

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

Scoping for transitional water bodies has been undertaken by using the scoping template provided in the EA guidance (EA 2017). The scoping template identifies a range of criteria against which proposed activities can be considered to determine whether they pose potential risks to receptors and, therefore, whether there is a requirement to carry out an impact assessment on those receptors.

3.3 Impact Assessment

The impact assessment stage involve determination of the potential impacts of the proposed activities on the specific parameters that are taken forward from scoping (EA 2017).

The assessment involved consideration of whether the proposed activities will have a non-temporary impact on status/potential of WFD quality elements in the Severn Lower water body (i.e. cause deterioration or compromise the achievement of measures set out in the Severn

River Basin District RBMP programme of measures and therefore future objective status/potential) (EA 2015). The scope of the assessment was determined following the steps in the impact assessment section of EA (2017).

The WFD assessment has also followed principles of EIA guidance where applicable in that the following aspects have been considered when assessing the potential for a change in WFD status/potential due to impacts on WFD quality elements (CIEEM 2018). Although these aspects have been considered, they are not necessarily referred to directly in the assessment text:

- Nature of effect i.e. beneficial / adverse; direct / indirect;
- Extent of the effect (geographical area e.g. site-wide, local, district, regional, and the size of the population affected);
- Likelihood of effect occurring;
- Value and sensitivity of receptor;
- Magnitude of effect;
- Duration:
 - Temporary or permanent effect. If the effect occurs on all of, or a proportion of, a community/population on a continual basis it can be considered to be permanent (e.g. a continual cooling water discharge). If it is not on a continual basis when considering the community/assembly/population or habitat level it can be described as temporary

If it were considered that the activity would not affect the potential/status of a given WFD receptor (taking account of any embedded mitigation measures) then no further evaluation or mitigation was required for the WFD assessment for that receptor (WFD supporting element). If possible, adverse effects were identified, then the next step was to identify suitable mitigation measures to address the potential effect (EA 2017).

4. WFD Assessment

4.1 Screening

The proposed activities were compared to the list of low risk activities identified under the EA guidance (EA 2017) and in consultation with NRW it was concluded that they do not qualify as low risk activities and, accordingly, they were taken forward to the scoping stage.

4.2 Scoping

For the Severn Lower water body the GI works were scoped for potential risks to hydromorphological, biological (habitats and fish), water quality, protected areas and INNS receptors using the Scoping Templates provided in the EA guidance (EA 2017). The completed scoping templates are presented in this document in Appendix 1 and the findings of the scoping summarised below.

The following risks to receptors were scoped into the requirement for more detailed assessment for the GI works:

- Biology – Habitats (higher sensitivity):
 - The Lle Geo-Portal for Wales (Lle 2021) and works information and method statements indicate that the GI works are within 500 m of saltmarsh habitat.
- Water Quality
 - Potential to release chemicals on the Environmental Quality Standards Directive (EQSD) list. As the works would be conducted at low tide the only potential for release of EQSD list chemicals would be through the accidental release of fuel from the landing craft or plant.
 - Potential to release chemicals above CEFAS Action Level 1 due to sediment disturbance during excavation of the trial pits.
- WFD Protected Areas
 - Proposed activities are within the Severn Estuary Special Area of Conservation (SAC) and the Severn Estuary Special Protection Area (SPA).
- Invasive non-native species
 - Potential introduction or spread of INNS via the movements of the landing craft.

A number of risks to receptors were scoped out of the requirement for more detailed assessment for the GI works (see Appendix 1).

- Hydromorphology
 - Hydromorphology was scoped out of further assessment because the works are small-scale, temporary and will be undertaken in the intertidal zone at low tide so do not have the potential to impact on the hydromorphology of the water body. In addition, the works are not related to flood defence for which the water body is classified as heavily modified and as such further assessment is not triggered via this route.
- Biology – Habitats (lower sensitivity)
 - Lower sensitivity habitats were scoped out of further assessment as the footprint of the works within lower sensitivity habitats (intertidal soft sediments) constitutes less than 1% of the extent of this habitat within the Severn Lower water body.
- Biology – Fish
 - Fish were scoped out of further assessment because the works are small-scale, temporary and undertaken in the intertidal zone at low tide. There will be no physical obstruction to fish passage and no pathway to impact on normal fish behaviour.
- Water Quality
 - The potential to 'affect water clarity, temperature, salinity, oxygen levels, nutrients or microbial patterns continuously for longer than a spring neap tidal cycle (about 14 days)' was scoped out because construction works will be completed within 2 days and will be undertaken at low tide.
 - Phytoplankton is only scoped into further assessment if it has a status of Moderate, Poor or Bad in the WFD water body of interest (see Section 3 of the

Scoping Templates in Appendix 1). In the Severn Lower water body it is classed as 'Good' so Phytoplankton was scoped out of further assessment.

- Harmful algae was scoped out as there is no history of harmful algae in the Severn Lower water body (not monitored).
- Release of chemicals in a mixing zone was scoped out as the project does not have a mixing zone.

4.3 Impact Assessment

4.3.1 Biology – Habitats (*higher sensitivity: Saltmarsh*)

Saltmarsh is considered as part of the Angiosperm WFD biological quality element. The current potential for Angiosperms in general, and for saltmarsh specifically, in the Severn Lower water body is Moderate potential (Cycle 3 2021 classification), with a target of Moderate potential for 2027.

The reason for inclusion of higher sensitivity habitats in the impact assessment as outlined in the Scoping Template in Appendix I is that the proposed activities:

- Are within 500 m of the higher sensitivity habitat saltmarsh.

The Lle Geo-Portal for Wales (Lle 2021) shows an area of saltmarsh in the upper intertidal zone extending from Goldcliff, to the east of the site, to the mouth of the River Usk to the west. The northern boundary of the site works area is located within approximately 30 m of this saltmarsh habitat (Figure 2).

Assessment

While the works area boundary is within approximately 30 m of the saltmarsh in the upper intertidal zone, there will be no requirement for works, plant or personnel to be any closer to the saltmarsh than this. The execution of the GI works has been planned to specifically avoid any interaction with the saltmarsh habitat. Plant and personnel will be transported to site on a landing craft that will beach lower down the shore, which means no access will be required across the saltmarsh in the upper intertidal zone. As such, there is no pathway for effects on the saltmarsh and there will be no loss or physical disturbance of the saltmarsh.

Overall, it is concluded that there are not expected to be any effects on the saltmarsh quality element at a local or water body level and the GI works would not prevent the Severn Lower transitional water body from meeting its WFD objectives for saltmarsh (angiosperms).

4.3.2 Water Quality

No direct use of chemicals is required as part of the GI works. Possible routes of release of chemicals include:

- accidental release / spillages of fuels and oils from the landing craft and site plant (excavator and boring rig); and
- release of chemicals from the sediment during excavation of the trial pits.

Assessment

The GI works will be undertaken in the intertidal zone at low tide so any spillages or accidental release of chemicals would be unlikely to be direct to the water body.

Various measures will be implemented to prevent accidental spillages from plant and the landing craft and will be captured in an Environmental Management Plan (EMP) for the works:

- Any plant delivered to site will have been cleaned, properly maintained and will be fit for purpose.
- On arrival at site, the Kaymac Supervisor will inspect all plant for visible signs of fuel / oil leaks before disembarkation from the landing craft.
- All plant will come equipped with spill kits which all site personnel are trained in the use of.
- All plant / equipment will be appropriately banded to prevent the release of any accidental spillages.
- No refuelling of plant or landing craft will be undertaken at sea. All refuelling will take place at Cardiff Harbour.

During excavation of the trial pits there is the potential for chemicals in the sediment to be disturbed and released. Given the size of the two trial pits (2 m x 0.6 m; depth 2 m), very little sediment will be disturbed. The excavated sediment will be temporarily stored adjacent to the pits and the material will be stored in layers as they are removed. This will allow the sediment to be reinstated in the order the layers were removed. The trial pits will be fully reinstated and returned to the original beach level before the tide comes in. As such, there is very little potential for any chemicals within the sediment to be released into the water body.

Given the nature of the works and the above measures to minimise the release of any chemicals, the risk of effects on the Severn Lower water body from the release of chemicals is considered to be very small.

Consequently, it is concluded that there are not expected to be any non-temporary effects on the water quality element at local or water body level and the investigation works would not prevent the WFD chemical status objectives for the Severn Lower water body being met.

4.3.3 Protected Sites

The GI works location is within the WFD protected areas Severn Estuary SAC and Severn Estuary SPA. A Habitats Regulations Assessment (HRA) report has been prepared by APEM (APEM 2022), which assessed the potential for the works to adversely impact these protected areas.

The following potential adverse effects were identified that could impact on species or habitats that are interest features of the designated sites:

- Abrasion / disturbance of the substrate on the surface of the seabed;
- Habitat structure changes – removal of substratum (extraction);

- Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion;
- Introduction of other substances (solid, liquid or gas);
- Smothering and siltation rate changes;
- Above water noise;
- Toxic contamination; and
- Visual disturbance.

Screening of these potential effects, with consideration of sources, pathways and effects on receptors concluded that no adverse impacts are anticipated on the features of the protected sites due to the GI works either alone or in-combination with other plans and projects. As such, the HRA assessment was not taken forward to Stage 2 – Appropriate Assessment.

4.3.4 Invasive non-native species (INNS)

Introduction and transfer of non-native species (NNS) can occur by the transport and discharge of ballast water, transport of fouling organisms on vessel hulls and via the installation of artificial structures (Nall 2017).

Once NNS become established and disperse within a new habitat they can outcompete local species for space and resources, prey directly on local species, or introduce pathogens (Roy *et al.* 2012). Consequently, the introduction of NNS could potentially affect the ecological functioning of estuarine communities, however, it is important to understand that the majority of non-native species are not 'invasive' non-native species (INNS) (i.e. a non-native species that has the ability to spread causing damage to the environment, the economy and our health (GBNNS 2021)).

The GI works do not involve the installation of any permanent structures that may support the establishment of non-native species. The main risk of introducing or spreading INNS during the works comes from the use of the landing craft to deliver plant and equipment to site. The proposed vessel's home port is Penzance and as such it will be sailing from the Penzance WFD water body to the Severn Lower WFD water body. The vessel does not exchange ballast water so the potential pathway of any introduction would be via hull fouling.

INNS that can be transferred via hull fouling and which appear on the Welsh Government's Priority Species List as high and medium risk (Welsh Government 2018) include:

- Compass sea squirt *Asterocarpa humilis* – high risk
- Carpet sea squirt *Didemnum vexillum* – high risk
- Red ripple bryozoan *Watersipora subatra* – high risk
- Leathery sea squirt *Styela clava* – medium risk

The compass and leathery sea squirts are also classed as high impact INNS on the WFD UKTAG classification of alien species list (UKTAG 2021).

None of the above species have been recorded in the Severn Lower water body according to records from the National Biodiversity Network Atlas (NBN Atlas 2022). The compass sea squirt (2 records, last in 2018), leathery sea squirt (4 records, all 2018) and the red ripple

bryozoan (2 records, last in 2018) have all been recorded in the landing craft's home water body (Penzance).

Assessment

The GI works involve limited vessel movements with the landing craft travelling from its home port in Penzance to berth at Cardiff Barrage. The vessel will then sail from Cardiff Barrage to the site location at Newport (approx. 10 nm) each day for the two days duration of the works. The vessel will beach at the site and spend up to 12 hours (one tidal cycle) drying out each day.

Due to the routine operations of the landing craft to be used for the works, it frequently dries out over a tidal cycle. This greatly reduces the potential for INNS to become established on the vessel's hull. The vessel is not slow moving and does not require ballast water exchange, which also reduces the potential for the spread of INNS. In addition, the vessel is subjected to the manufacturer recommended maintenance schedule for reapplication of antifouling paint and the last application was undertaken in a dry dock in 2020.

Given the above, it is considered that there is minimal risk of the introduction or spread of INNS due to the GI works and it is not expected that the works would have any non-temporary effects on the WFD potential of the Severn Lower water body and would not jeopardise the attainment of WFD objectives.

5. Cumulative Effects Assessment

The identification of plans and projects to include in the cumulative effects assessment may include:

- Approved plans;
- Constructed projects;
- Approved but as yet unconstructed projects; and
- Projects for which an application has been made, and currently under consideration and will be consented before the proposed activities begin.

The cumulative effects assessment considers the effects of the proposed activities on the Severn Lower water body supporting elements when combined with the effects of other plans and projects in the area.

To identify the projects and plans, local knowledge, the Lle Geo Portal for Wales and the Newport City Planning Portal were used.

Only projects and plans that have the potential to interact with the water column have been considered further. These are summarised in Table 2 with further details below.

Table 2 Plans, projects or strategies to be assessed in-combination

Planning reference / Site code	Location	Description	Potential cumulative effect on site
DML1950	Newport	Associated British Ports (ABP) marine licence application for dredge and disposal of sediment as part of the Newport maintenance dredging operations.	No
LU140	Newport	Newport dredge disposal site (Bristol Channel).	No

DML1950 – Marine licence renewal for Newport maintenance dredging

ABP applied to renew their marine licence for undertaking maintenance dredging of the approaches to Alexandra Docks at Newport and the River Usk from the Bristol Channel. The dredge areas are approximately 1.6 km from the proposed GI works site. It is assumed that the maintenance dredging operations were subject to WFD assessment at the time of application and that with appropriate mitigation measures the works alone would not have the potential to impact the WFD potential of the Severn Lower water body. Given the nature of the proposed GI works for the effluent pipeline and the limited effects outlined in this report, it is concluded that the cumulative effects would not have any non-temporary effects on the WFD potential and would not prevent the Severn Lower transitional water body from meeting WFD objectives.

Newport dredge disposal site – Site reference LU140

The Newport dredge disposal site is approximately 3.75 km offshore from the proposed GI works site. The dredge disposal site receives dredged sediment from nearby dredging operations. The schedule for dredge disposals is unknown, however, given the nature of the proposed GI works and the temporary and short term duration of the works, it is concluded that there is no potential for the works and activities at the dredge disposal site to have cumulative effects on the Severn Lower water body and would not prevent the water body from meeting WFD objectives.

6. Summary

This assessment has considered the potential effects of the proposed GI works on WFD receptors in the Severn Lower water body. The assessment has considered how the proposed activities may pose potential risks to the hydromorphological, biological and chemical quality elements for this water body.

The Scoping stage identified that the following receptors would not be affected by the works and could be scoped out with no need for further assessment:

- Biology – Fish
- Biology – Habitats (lower sensitivity)
- Water quality – potential to affect physiochemical parameters for longer than 14 days; phytoplankton; harmful algae; and release of chemicals in a mixing zone.
- Hydromorphology

The receptors that could not be scoped out and were taken forward to the Impact Assessment stage were:

- Biology – Habitats (higher sensitivity: Saltmarsh)
- Water quality – Chemicals on the EQSD; Chemicals above Cefas Action Level 1
- WFD Protected Areas
- INNS

The assessment has taken into account the following works design measures and mitigation measures which would be implemented in line with best practice:

- Implementation of an Environmental Management Plan (EMP) to include a range of measures to minimise the chances of accidental pollution incidents from spillage of chemicals and any subsequent effects.
- The execution of the works has been designed to avoid any interaction with the higher sensitivity saltmarsh habitat and to ensure the potential risk of release of chemicals from disturbed sediment is minimal.

For all the receptors taken forward to the Impact Assessment stage it was concluded, with these identified works design and mitigation measures in place, that the GI works are not expected to result in any non-temporary effects on the biological, hydromorphological and chemical quality elements of the Severn Lower water body, and are not expected to prevent the water body from meeting its WFD objectives.

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Appendix I Complex Scoping Template

Your activity	Description, notes or more information
Applicant name	Kaymac Marine & Civil Engineering Ltd
Application reference number (where applicable)	To be confirmed
Name of activity	Newport Outfall Ground Investigation Works
Brief description of activity	Ground investigation works adjacent to the existing outfall pipe at Newport. Works will include the excavation of two trial pits and four boreholes. The works will inform the future design and replacement of the current outfall.
Location of activity (central point XY coordinates or national grid reference)	Lat. 51.536134, Lon. -2.9476176
Footprint of activity (m ²)	25,000 m ²
Timings of activity (including start and finish dates)	Investigation works: 2 days. Anticipated start February 2022.
Extent of activity (for example size, scale frequency, expected volumes of output or discharge)	Works area 0.025 km ² (500 m x 50 m). Trial pits 2 m x 0.6 m. Boreholes 150 mm to a depth of approx. 4 m.
Use or release of chemicals? State which ones	No planned use or release of chemicals, however, there is the potential for pollution events due to leakages from plant.

Water body	Description, notes or more information
WFD water body name	Severn Lower Transitional Water Body
Water body ID	GB530905415401
River basin district name	Severn
Water body type (estuarine or coastal)	Estuarine
Water body total area (ha)	46,597 ha
Overall water body status (2021)	Moderate
Ecological status/potential (2021)	Moderate
Chemical status (2021)	Moderate
Target water body status and deadline	Good, 2021
Hydromorphology status of water body	Not assessed
Heavily modified water body and for what use	Yes – for flood protection
Higher sensitivity habitats present	Yes – saltmarsh, intertidal seagrass, mussel beds, polychaete reef
Lower sensitivity habitats present	Yes – cobbles gravel and shingle, intertidal soft sediment, rocky shore, subtidal rocky reef, subtidal soft sediments
Phytoplankton status (2019)	Good
History of harmful algae	Not monitored
WFD protected areas within 2km	Yes – Severn Estuary SAC, Severn Estuary SPA

Section 1: Hydromorphology

Consider if your activity could:	Yes	No	Hydromorphology risk issue(s)
Severn Lower Water Body			
Could impact on the hydromorphology (for example morphology or tidal patterns) of a water body at high status		✓	Does not apply as the Severn Lower water body status is 'Moderate'. The hydromorphological status of the water body has not been assessed, however, the works are small-scale, temporary and will be undertaken in the intertidal zone at low tide so do not have the potential to impact on the hydromorphology of the water body.
Could significantly impact the hydromorphology of any water body		✓	The works are small-scale, temporary and will be undertaken in the intertidal zone at low tide so do not have the potential to impact on the hydromorphology of the water body.
Is in a water body that is heavily modified for the same use as your activity		✓	The Severn Lower water body is classified as heavily modified for flood protection.

Section 2: Biology

Habitats

Severn Lower - Higher sensitivity habitats ²	Lower sensitivity habitats ³
Saltmarsh (680 ha) Intertidal seagrass (264 ha) Mussel beds (46 ha) Polychaete reef (538 ha)	Intertidal soft sediments (e.g. sand and mud) (16,385 ha) Cobbles, gravels and shingle (31 ha) Rocky shore (2,293 ha) Subtidal rocky reef (8,926 ha) Subtidal soft sediments (15,205 ha)

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.

Severn Lower - Consider if the footprint of your activity is:	Yes	No	Biology habitats risk issue(s)
0.5km ² or larger		✓	Footprint is 0.025km ²
1% or more of the water body's area		✓	Footprint of the construction works is anticipated to be a maximum of 0.025km ² , less than 1% of water body area.
Within 500m of any higher sensitivity habitat	✓		Approximately 30m from saltmarsh habitat
1% or more of any lower sensitivity habitat		✓	Footprint is less than 1% of lower sensitivity habitats

Fish

Severn Lower - Consider if your activity:	Yes	No	Biology fish risk issue(s)
Is in an estuary and could affect fish in the estuary, outside the estuary but could delay or prevent fish entering it or could affect fish migrating through the estuary		✓	Works are temporary and will be undertaken in the intertidal zone during low tide. There will be no physical obstruction to fish passage.
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)		✓	No pathway to impact on normal fish behaviour as the works are temporary and will be undertaken in the intertidal zone at low tide.
Could cause entrainment or impingement of fish		✓	Not applicable

Section 3: Water quality

Severn Lower - Consider if your activity:	Yes	No	Water quality risk issue(s)
Could affect water clarity, temperature, salinity, oxygen levels, nutrients or microbial patterns continuously for longer than a spring neap tidal cycle (about 14 days)		✓	Works are temporary and will be undertaken at low tide over a two day period. Pits and boreholes will be reinstated before the tide comes back in. Therefore, there is no potential to impact on water quality longer than a spring neap tidal cycle.
Is in a water body with a phytoplankton status of moderate, poor or bad		✓	Phytoplankton status is Good
Is in a water body with a history of harmful algae		✓	This has not been monitored
Severn Lower - If your activity uses or releases chemicals (for example through sediment disturbance or building works) consider if:	Yes	No	Water quality risk issue(s)
The chemicals are on the Environmental Quality Directive (EQSD) list	✓		There is no planned use or release of chemicals during the works. Chemicals could potentially be released accidentally although it is anticipated the only chemicals on the EQSD list could be derived from fuel. This has been screened in taking a precautionary approach.
It disturbs sediment with chemicals above Cefas Action Level 1	✓		Works could potentially release some chemicals from Cefas Action Level 1 from the sediment

Severn Lower - If your activity has a mixing zone (like a discharge pipeline or outfall) consider if:	Yes	No	Water quality risk issue(s)
The chemicals released are on the Environmental Quality Directive (EQSD) list		✓	Not applicable (activity does not have a mixing zone)

Section 4: WFD protected areas

Severn Lower - Consider if your activity is:	Yes	No	Protected areas risk issue(s)
Within 2km of any WFD protected area	✓		The works are within the Severn Estuary SAC and Severn Estuary SPA.

Section 5: Invasive non-native species (INNS)

Severn Lower - Consider if your activity could:	Yes	No	INNS risk issue(s)
Introduce or spread INNS	✓		Potential that landing vessel used could introduce or spread INNS.

Section 6: Summary

Receptor	Potential risk to receptor?	Note the risk issue(s) for impact assessment
<i>Hydromorphology</i>	No	Due to the small-scale and temporary nature of the works there will be no impact on the hydromorphology of the water body. The works are not related to activities for which the water body is classed as heavily modified.
<i>Biology: habitats</i>	Yes	Footprint is within approximately 30m of a higher sensitivity habitat (saltmarsh habitat)
<i>Biology: fish</i>	No	The works will be undertaken in the intertidal zone at low tides, they will not inhibit passage of fish and there will not be any physical obstruction in the main channel.
<i>Water quality</i>	Yes	Works could potentially release small amounts of chemical substances into the water column due to accidental releases / spillages.
<i>Protected areas</i>	Yes	The works are within the Severn Estuary / Môr Hafren Special Area of Conservation and Special Protection Area.
<i>Invasive non-native species</i>	Yes	The landing vessel could lead to introduction/spread of INNS