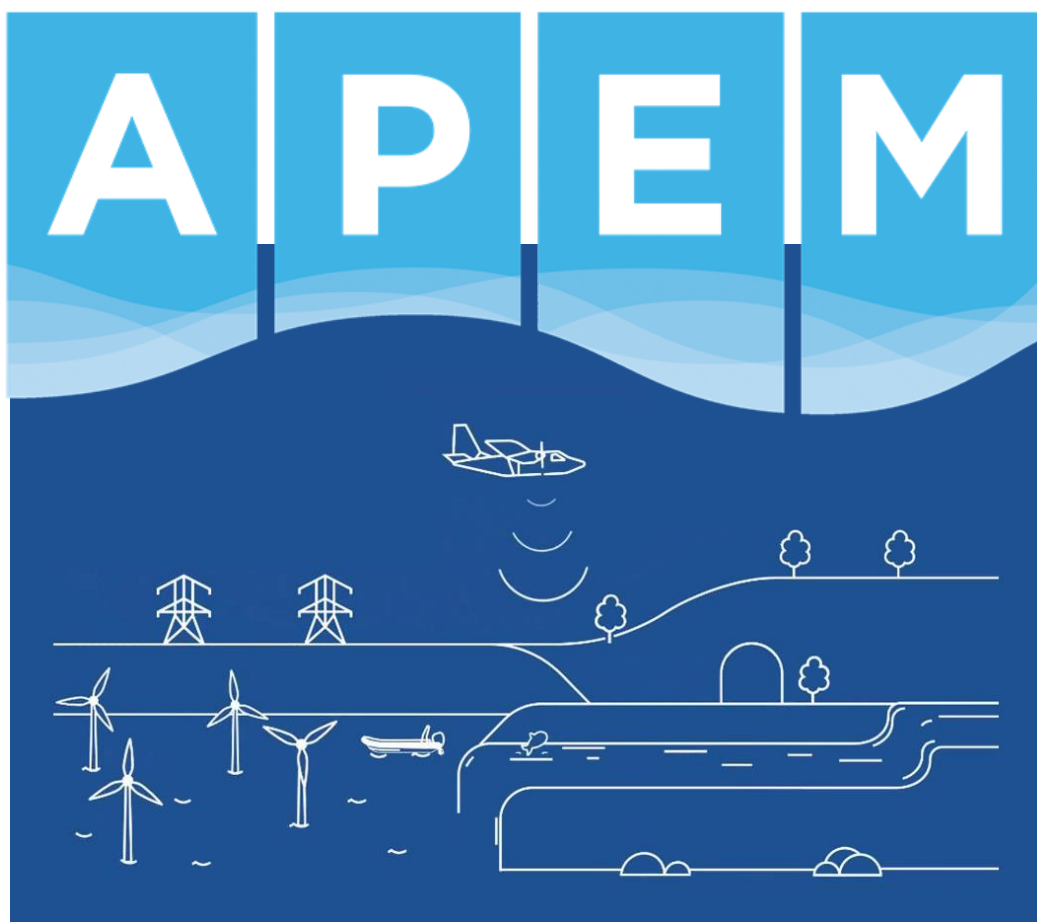




Newport Effluent Pipe Replacement Scheme
Water Framework Directive Assessment Report

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Nick O'Brien, Connor Markham

Client: Kaymac Marine & Civil Engineering Ltd

Address: Unit 1 Osprey Business Park,
Byng Street,
Landore,
Swansea
SA1 2NR

Project reference: P00008585a

Date of issue: March 2022

Project Director: Marc Hubble

Project Manager: Nick O'Brien

APEM Ltd
Riverview
A17 Embankment Business Park
Heaton Mersey
Stockport
SK4 3GN

Tel: 0161 442 8938
Fax: 0161 432 6083

Registered in England No. 02530851

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Executive Summary

The replacement of an effluent pipe and sea outfall at Newport, South Wales has been proposed. The pipe crosses the intertidal zone and discharges below mean low water spring. The works involve the excavation of a trench adjacent to the existing pipeline in which the new pipe will be installed.

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 proposed 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 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), chemicals above CEFAS Action Level 1, and physico-chemical parameters), 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 and mitigation measures to lower the risk of adverse effects were considered in the assessment. This included 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 the implementation of a Biosecurity Plan to reduce the potential for the introduction or spread of invasive non-native species. The design of the works has also been optimised to avoid any interaction with the higher sensitivity saltmarsh habitat present at the site.

Overall, the assessment concluded that the proposed works (either alone or in-combination with other projects/plans) 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

A pipeline, approximately 1,360 m long, is currently in place to safely discharge effluent from Eastman Chemicals in Newport, South Wales, into the Severn Estuary and it has reached the end of its operational lifecycle. The pipeline crosses the intertidal zone and discharges below mean low water spring (MLWS). To continue to safely discharge effluent into the Severn Estuary the current pipeline needs to be replaced to reduce risks associated with the structure's integrity and to reduce the likelihood of any future leaks. Therefore, Solutia UK propose to replace the current effluent pipeline and sea outfall to ensure that effluent continues to discharge safely into the estuary.

Kaymac Marine & Civil Engineering Ltd. (hereafter referred to as Kaymac) have been commissioned by Solutia UK to carry out the pipeline and sea outfall replacement works, which will involve the placement of the new effluent pipe adjacent to the existing pipe.

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

This Water Framework Directive (WFD) Assessment Report has been provided to support the Band 3 marine licence application for the works and is required to determine if the proposed 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 proposed works within the Severn Lower water body is indicated in Figure 1 below.

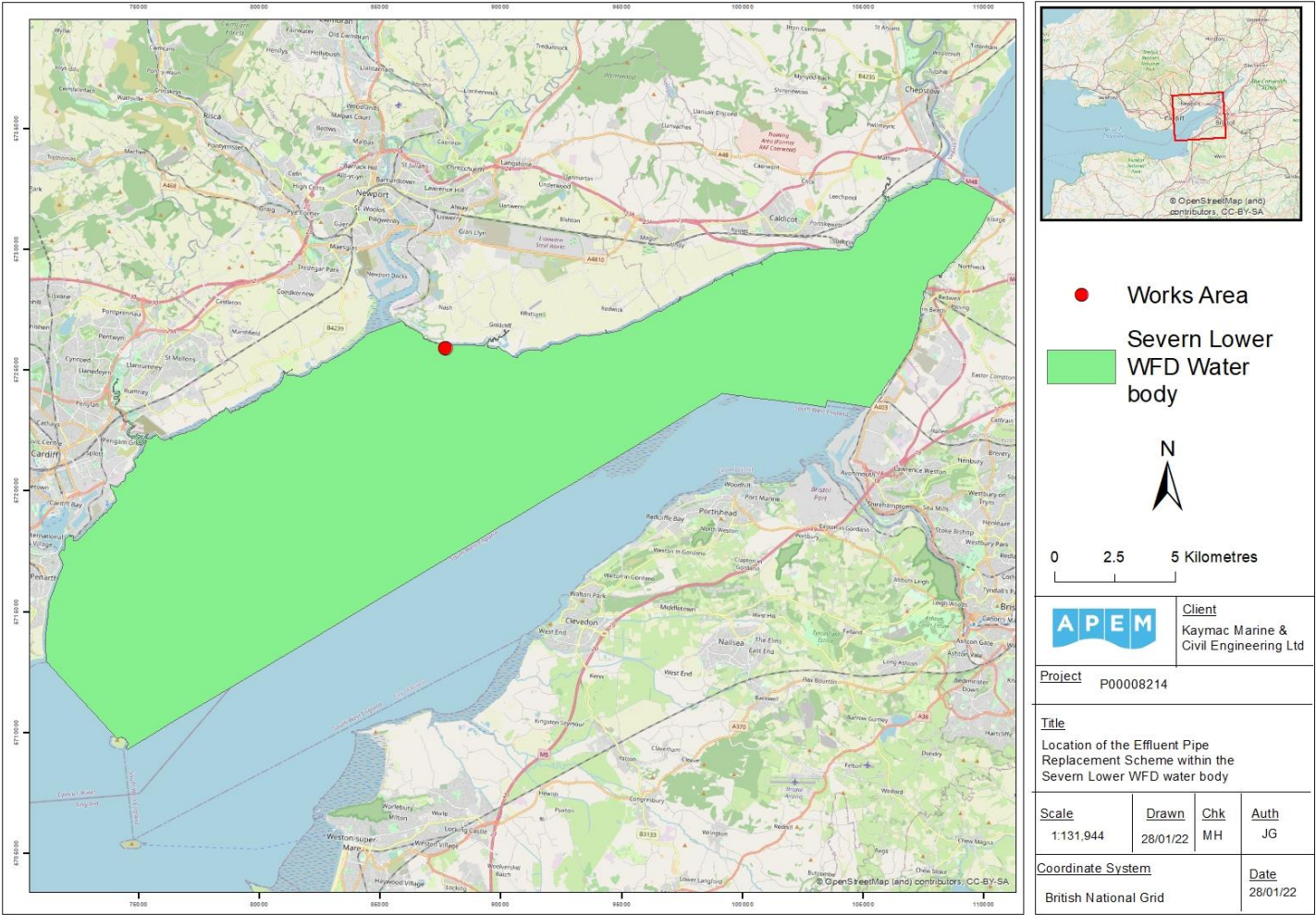


Figure 1: Location of the proposed works within the Severn Lower transitional water body

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 proposed 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 proposed works is provided in Kaymac (2022). A summary of key aspects of relevance to this assessment is provided below.

The proposed works involve the placement of the new effluent pipe adjacent to the existing pipe and outfall. The works will be contained within a footprint of approximately 1,360 m by 50 m (0.068 km²) (Figure 2) and involve activities in the intertidal zone and landward of the sea defence wall. The volume of excavated material will total circa 7,344 m³.

Works will be completed in two stages; Stage 1 being completed between the end of July 2022 through the end of September 2022 and Stage 2 being completed from the end of April 2023 through the end of September 2023.

The primary activities within each stage will include:

Stage 1

- Works landward of the sea defence;
 - Establishment of site compound; and
 - Land-based works (excavation, cutting out section of existing pipe, installation of chamber to house return valves).

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).

- Works within the upper intertidal;
 - Cutting out section of existing pipe; and
 - Slip lining of new pipe through the existing pipe.

Stage 2

- Works within the intertidal;
 - Excavation of trench;
 - Pipe laying and installation of diffuser;
 - Laying of concrete mattresses and backfilling;

The primary plant required for the works are:

- Landing craft;
- Floating barge with excavator;
- 2 x support vessels;
- 2 x small dory support vessels;
- 15 tonne excavator; and
- Dumper

The excavation of the trench works will largely be undertaken on the flood tide by an excavator mounted on the floating barge, which will be maintained in position by the vessels' spud legs. Approximately 900 m of the trench will be excavated in this way with the remainder of the trench in the upper intertidal excavated in the dry.

2.2.1 Phase 1

Works landward of the sea defence

Establish site compound

A site compound for the storage of equipment and materials will be established landward of the sea defence wall. The footprint of the temporary compound will be circa 20 m x 10 m (approximately 200 m²) and secured using fencing to prevent unauthorised access. The compound will be in place for approximately 2 months.

Land based works

The excavator will undertake excavation works around the existing pipeline on the landward side of the sea defence wall. A section of the existing pipe will then be cut out in order to slip-line the new pipe through the existing pipe.

Once the new pipe has been slip-lined through to the landward connection point, a bespoke 'swan neck' section will be lifted into place using the excavator to make the connection between the new and existing pipe. A concrete access chamber will be installed to allow future access to the valves. Once these works are completed, the pipe will be commissioned and

Kaymac will remove the site compound, reinstate the landward works area and demobilise from site.

Works in the upper intertidal zone

Cut out section of existing pipe

Where the new trench meets the existing pipe, a section of this pipe will be cut out in order to slip-line the new pipe through the existing pipe.

The cutting of the existing pipe and slip-lining will be undertaken during a 96-hour shutdown. Effluent in the pipe will be drawn back before shutdown and any remaining effluent will be safely dewatered by a specialist contractor prior to removal of the section of pipe. Any dewatered effluent will then be disposed of at a licensed facility.

Slip-lining

The new pipe will be slip-lined through the existing pipe from the intertidal connection point through to the connection point on the landward side of the sea defence wall. Pulling the pipe through in this way avoids the need to work in the area of saltmarsh habitat in the upper intertidal zone, which will be avoided during the works.

A winch cable will be fed through the existing pipe from the landward connection point and the new pipe pulled through underneath the saltmarsh habitat and the sea defence wall.

2.2.1 Phase 2

Works in the intertidal zone

The excavation works in the intertidal zone will primarily be undertaken from a self-propelled floating barge. The landing craft will be used to deliver plant, equipment and the new pipe sections from a satellite compound at the Associated British Ports port of Newport (Newport ABP) circa 2.5 nm away from the site.

Excavation of trench

The primary activity of the intertidal works is the excavation of the trench for the new pipe. The trench will be adjacent to the existing pipe, offset by circa 10 m and will be excavated in 150 m sections.

When the works area is submerged, the trench will be excavated by a traditional land-based excavator mounted on a floating barge. Onboard GPS, depth sounder and surveying equipment will be used to position the barge such that the excavator can dig the trench accurately to the required line and depth. The excavated bed material will be side-cast adjacent to the trench to avoid the need for material to be transported to and from the site and allow easy backfilling of the trench once the pipe is in position.

It is estimated that the lowest 900 m of the trench, from approximately chainage 1,470 m to chainage 570 m, will be excavated on the flood tide. The trench will be excavated to a depth

of approximately 1.5 m with a cross section of circa 5.4 m². As such, if circa 900 m of the trench is excavated on the flood tide, the total volume of excavated material in this area will be circa 4,860 m³.

The trench in the upper intertidal zone is expected to be excavated when the tide is on ebb. In this case, the excavator will be delivered to the beach by the landing craft and excavation will occur in the dry. The landing craft will deliver plant to site and land as high up the beach as possible to maximise the available working window as the tide falls.

The trench in this area will be excavated along a length of circa 460 m and to a depth of approximately 1.5 m with a cross section of circa 5.4 m². The total volume of excavated material in the upper intertidal area will be circa 2,484 m³. The excavated material will be side-cast and later used to backfill the trench.

The excavation will continue up the intertidal zone until the trench has reached a chainage of approximately 140 m. At this point, the trench will be angled towards the existing pipe in order to make a connection and to slip-line the new pipe through the existing pipe.

Pipe laying and installation of outfall

The pipe sections will be transported to site by the landing craft. The pipe laying technique will depend on the state of tide and the tidal level at the time the pipe is ready to be laid. It will either be sunk into the trench with the falling tide, or the sinking valve will be opened, and the pipe allowed to fill with water to aid sinking into position. The outfall section at the terminus of the pipe will be lowered from the landing craft using the excavator and installed by a dive team.

Laying of concrete mattresses and backfilling

Once in the trench, the pipe sections will be maintained in position using concrete mattresses. Once the pipe is in position the concrete mattresses will be placed on top of the pipe using the excavator. Once the mattresses are in position, the trench will be backfilled using the side-cast material.

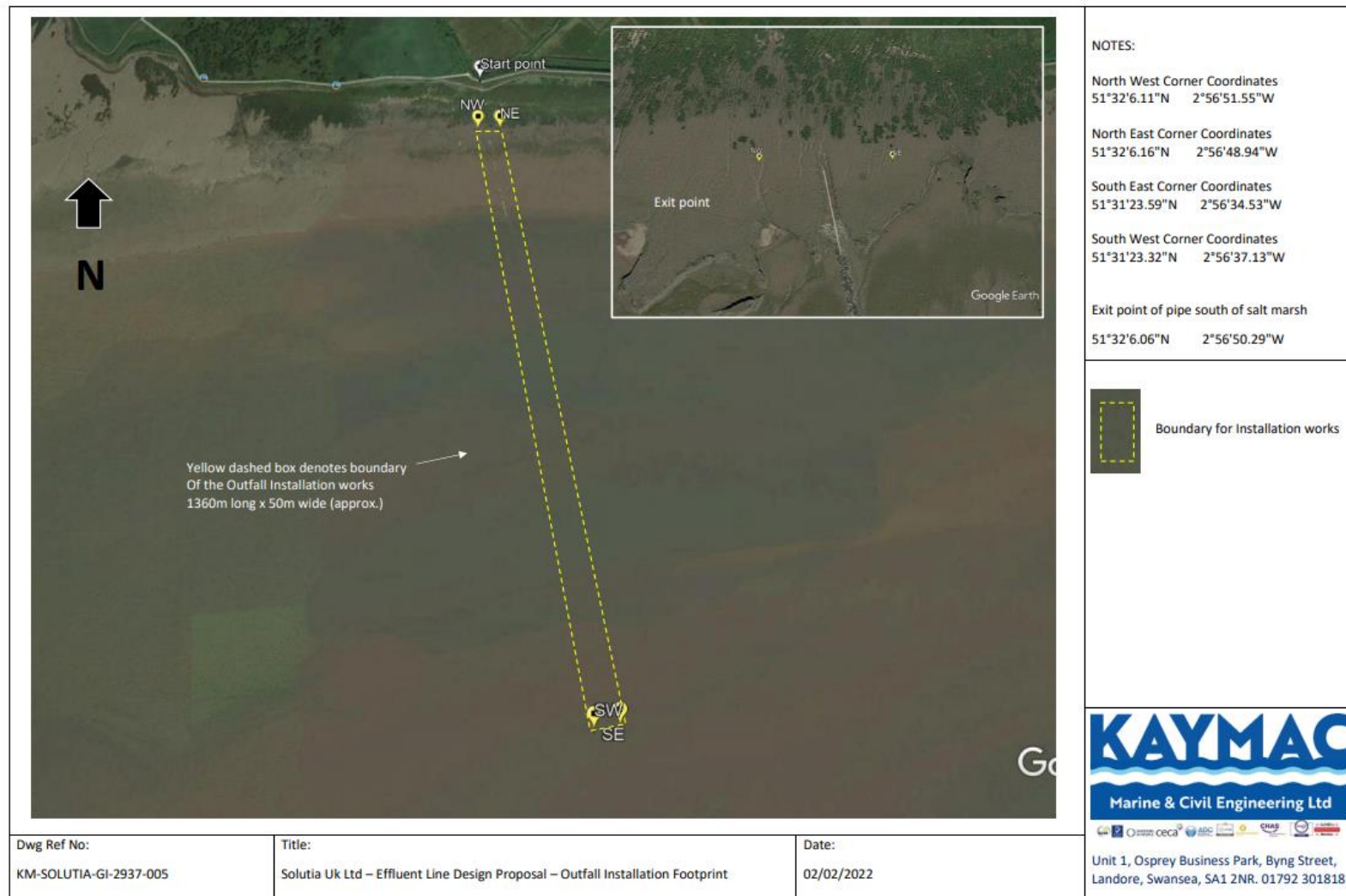


Figure 2: Footprint of the proposed work area (Image supplied by Kaymac Marine & Civil Engineering Ltd).

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).

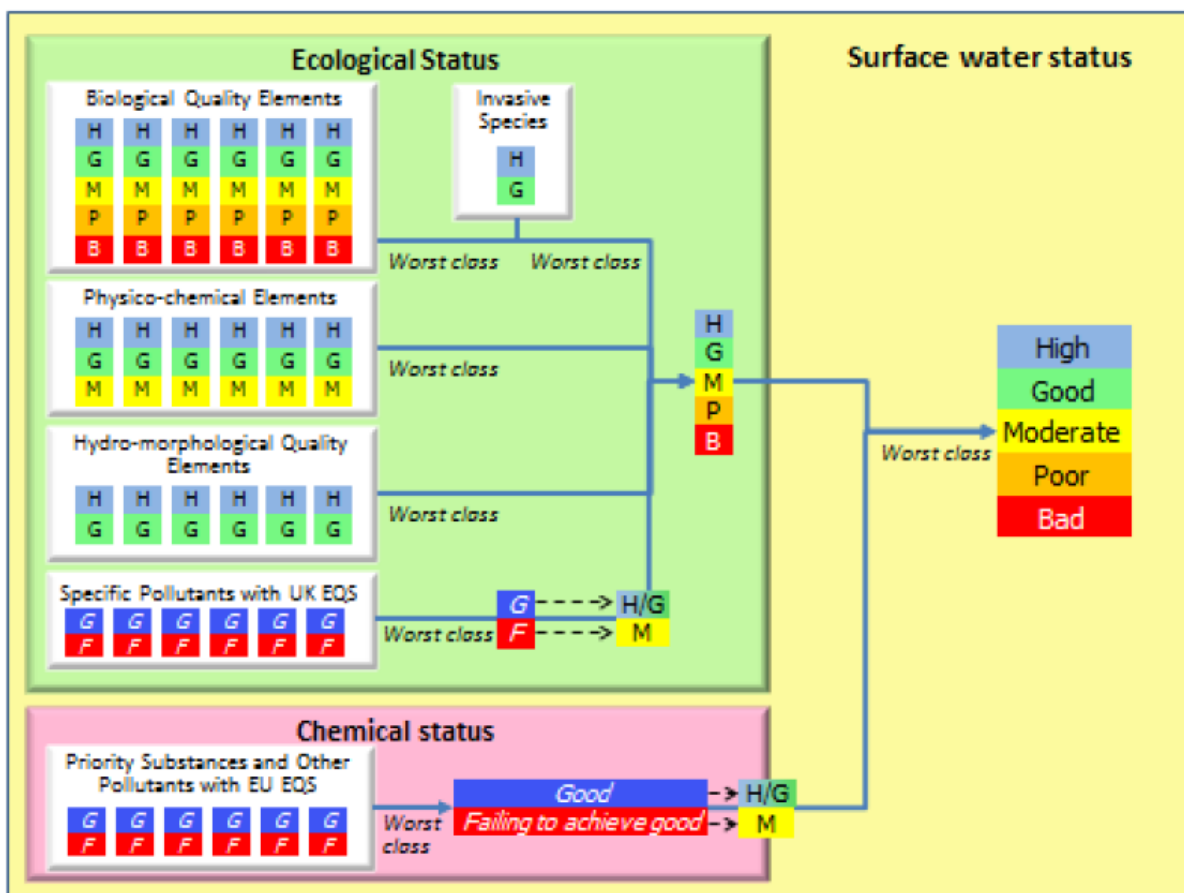


Figure 3: WFD classification elements – Bringing all of the strands of evidence together (Environment Agency 2015).

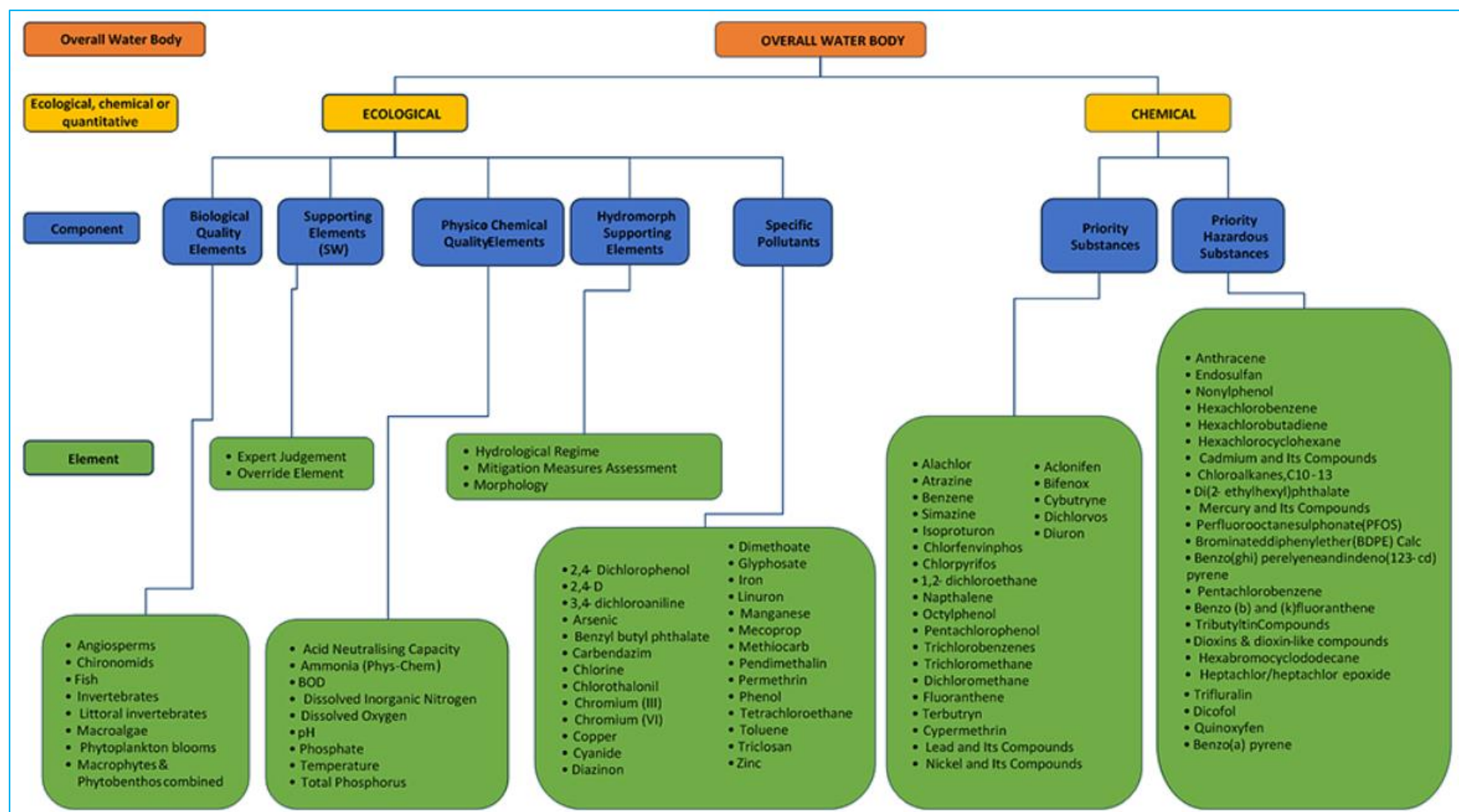


Figure 4: Classification hierarchy for surface waters (extracted from Environment Agency 2018).

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 proposed 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 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 Name		Severn Lower
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 proposed 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 involves determination of the potential impacts of the proposed activities on the specific parameters that are taken forward from scoping (EA 2017).

The assessment involves 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 / assemblage / 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 potential 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 proposed 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 receptors were scoped into the requirement for more detailed assessment of the potential effects of the proposed works:

- Biology – Habitats (higher sensitivity):
 - The Lle Geo-Portal for Wales (Lle 2022) and works information and method statements indicate that the works are within 500 m of saltmarsh habitat.
- 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)’ has been scoped in taking a precautionary approach. There is potential for water clarity to be affected during the trench excavation works.
 - Potential to release chemicals on the Environmental Quality Standards Directive (EQSD) list. The only potential for release of EQSD list chemicals would be through the accidental release of fuel from the marine vessels or plant.
 - Potential to release chemicals above CEFAS Action Level 1 due to sediment disturbance during excavation of the trenches.
- WFD Protected Areas
 - Proposed activities are within the Severn Estuary / Môr Hafren Special Area of Conservation (SAC) and the Severn Estuary / Môr Hafren Special Protection Area (SPA).
- Invasive non-native species
 - Potential introduction or spread of INNS via the movements of marine vessels.

The following receptors were scoped out of the requirement for more detailed assessment for the proposed works (see Appendix 1):

- Hydromorphology
 - Hydromorphology was scoped out of further assessment because the works are small-scale and will be undertaken primarily 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 (actual percentage is 0.04% of this habitat).
- Biology – Fish
 - Fish were scoped out of further assessment because the works are small-scale and undertaken primarily 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
 - 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 although the project includes a mixing zone (outfall discharge), there will be no change to the nature or volume of the current licensed discharge. The only change will be that the current effluent will be discharged from the new pipe and outfall. As such, this has been scoped out of further assessment.

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 2022) 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 proposed works has been planned to specifically avoid any interaction with the saltmarsh habitat. Construction plant and personnel will be transported to site on a landing craft that will beach lower down the shore, or via the access roads north of the sea defence wall. This means no access will be required across the saltmarsh in the upper intertidal zone.

The new pipe will be slip-lined through the existing pipe and below ground so there will be no requirement to interact with the saltmarsh. To achieve this the existing pipe will be cut seaward of the saltmarsh and the new section of pipe pulled through the existing pipe to the connection point on the north side of the sea defence wall. As such, there is no pathway for effects on the saltmarsh and there will be no physical disturbance of the saltmarsh or loss of saltmarsh habitat.

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 proposed works would not prevent the Severn Lower transitional water body from meeting its WFD objectives for saltmarsh (angiosperms).

4.3.2 Water Quality

Release of chemicals

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

- accidental release / spillages of fuels and oils from marine vessels and site plant (excavator and dumper); and
- release of chemicals from the sediment during excavation of the trench.

Assessment

The proposed excavation works will be undertaken by the excavator in the intertidal zone at low tide and from the floating barge when the tide is in flood and the current work section is covered by seawater. As such, any spillages or accidental release of chemicals have the potential to be direct to the water body.

Various measures will be implemented to prevent accidental spillages from plant and the marine vessels used in construction and will be captured in a Construction Environmental Management Plan (CEMP) for the works. Examples of measures include:

- 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 will be trained in the use of;
- All plant / equipment will be appropriately banded to prevent the release of any accidental spillages; and
- No refuelling of plant or marine vessels will be undertaken at sea. All refuelling will take place at the satellite compound at Newport ABP.

During excavation of the trench there is the potential for chemicals in the sediment to be disturbed and released. The lower 900 m of the trench will be excavated on the flood tide with the excavator mounted on the floating barge. The remaining circa 460 m of trench in the upper intertidal will be excavated in the dry. The excavated sediment will be temporarily stored adjacent to the section of trench being excavated for ease of backfilling once the pipeline has been installed.

The trench will be excavated in 150 m sections. The excavation, pipe laying and laying of concrete mattresses will take up to three days for each 150 m section. If the excavation is undertaken on the flood tide then there may be some release of any contaminants present within the sediment into the water column. Whether excavated on a flood tide or during low tide, the excavated sediment side-cast adjacent to the trench would be subject to tidal movements for up to three days, which has the potential to mobilise some of this material and any associated contaminants.

The total volume of sediment to be excavated is circa 7,344 m³. Each 150 m section of trench will require the excavation of circa 810 m³ of sediment. There will be ten 150 m sections of trench excavated over a period of approximately 38 days.

No data are available for concentrations of chemicals in the sediments potentially disturbed by the works. Given the relatively small overall total volume of sediment to be excavated and the fact the excavation will progress in sections, there is limited potential for the release of significant amounts of contaminants with concentrations above CEFAS Action Level 1. Any such contaminants would be subject to extensive dilution at the time of excavation and / or by tidal movements.

Given the nature of the works, the relatively small volume of sediment to be excavated and the above measures to minimise the release of any chemicals from construction plant, 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 in terms of release of chemicals at local or water body level, and the proposed works would not prevent the Severn Lower transitional water body from meeting its WFD objectives for chemical status.

Effect on physico-chemical parameters

The scoping assessment considered whether the works could affect water clarity, temperature, salinity, oxygen levels, nutrients or microbial patterns continuously for longer than a spring neap tidal cycle (about 14 days). Some of these physico-chemical parameters could be affected during the trench excavation works, which are scheduled to last approximately 38 days. As such, following the precautionary principle, this potential impact was scoped into further assessment.

Assessment

The lower 900 m of the trench will be excavated on the flood tide with the excavator mounted on the floating barge. The remaining circa 460 m of trench in the upper intertidal will be excavated in the dry. During excavation on the flood tide there is the potential for a localised increase in suspended sediment and associated reduction in water clarity. The disturbance of sediment during excavation may also release nutrients into the water column. Excavated sediment will be side-cast adjacent to the trench and may remain there for up to three days before being used to backfill the trench once the pipe is installed. During this time, tidal movements may also mobilise some of this sediment and cause a localised reduction in water clarity.

Given the total volume of sediment to be excavated, and the fact the trench will be excavated in 150 m sections, any increase in suspended sediment concentrations will be highly localised, temporary and likely to quickly return to the normal background range experienced at this location. In addition, any suspended sediment in the water column will be rapidly diluted by tidal movements. Any increase in nutrient concentrations would also be localised and temporary and subject to extensive tidal dilution in the water column. The risk of effects on the Severn Lower water body from an increase in suspended sediment concentrations and a potential release of nutrients 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 in terms of effects on physico-chemical parameters at local or water body level, and the proposed works would not prevent the Severn Lower transitional water body from meeting its WFD objectives for chemical status.

4.3.3 Protected Sites

The works location is within the WFD protected areas Severn Estuary / Môr Hafren SAC and Severn Estuary / Môr Hafren SPA. A Habitats Regulations Assessment (HRA) Screening Report has been prepared by APEM (APEM 2022b), 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:

- Above water noise;
- Abrasion / disturbance of the substrate on the surface of the seabed;
- Changes in suspended solids (water clarity)
- Habitat structure changes – removal of substratum (extraction);
- Penetration and / or disturbance of the substratum below the surface of the seabed, including abrasion;
- Physical loss;
- Smothering and siltation rate change (light);
- Visual disturbance;
- Underwater noise; and
- Introduction of light.

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 proposed 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.

Consequently, it is concluded that there are not expected to be any non-temporary effects on the Protected Sites at water body level, and the proposed works would not prevent the Severn Lower transitional water body from meeting its WFD objectives for Protected Sites.

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 proposed works involve the installation of a new effluent pipe and diffuser. The pipe will largely be buried in the intertidal zone so will not provide new structure that INNS can colonise. The diffuser will discharge the effluent in the lower intertidal zone. In this area, the outfall structure will not be buried so may provide a small amount of new surface area for the potential colonisation by INNS.

The main risk of introducing or spreading INNS during the works comes from the use of the marine vessels during construction. The following proposed vessels and their roles are detailed in Table 2 below.

Table 2 Proposed vessels to be used during construction

Proposed vessel	Home port	Role
MTS Terramare 1 – landing craft	Penzance, Cornwall	Delivery of plant, equipment and pipe sections from Newport ABP to project site
Doreen Dorward – floating barge	Poole, Dorset	Excavation of trench
Heather D – fishing boat	Swansea Marina	General support
Sea Venture – work boat	Swansea Marina	General support
2 x tugboats	Norway	Deliver pipe sections from Norway to Newport ABP
2 x Kaymac owned dory	Kept out of water at Kaymac facilities	General support

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).

Assessment

The area of new outfall structure that will not be buried is minimal in size and extent so it is considered that this poses very little risk and will not have any non-temporary effects on the WFD potential of the Severn Lower water body and would not jeopardise the attainment of WFD objectives.

The proposed works involve a number of vessels as indicated in Table 2. The vessels carry different levels of risk in terms of the potential to introduce or spread INNS.

MTS Terramare 1

The Terramare 1 is a landing craft and its homeport is Penzance, Cornwall. The landing craft will sail from Penzance and be based at Newport ABP for the duration of the works. This vessel will be used to deliver plant, equipment and pipe sections to the site from the compound at Newport ABP. For the trench excavation in the upper intertidal, the landing craft will beach itself allowing the excavator to disembark and dig the trench while the tide is on ebb and spend up to 12 hours (one tidal cycle) drying out.

Due to the routine operations of landing craft, these vessels frequently dry out for up to 12 hours over a tidal cycle. This greatly reduces the potential for INNS to become established on the vessel's hull. These vessels are not slow moving and do not require ballast water exchange, which also significantly reduces the potential for the spread of INNS.

Doreen Dorward

The Doreen Dorward is a self-propelled spud leg utility vessel. Similar to the Terramare 1, it can be grounded on the beach to load and unload equipment and plant. For this project, it will be used to excavate the trench on the flood tide with the excavator operating from the deck. The Doreen Dorward will sail from its home port of Poole in Dorset and be based at Newport ABP for the duration of the works.

This vessel is not slow moving and does not require ballast water exchange.

Heather D & Sea Venture

The Heather D and Sea Venture are general purpose workboats that will be used as support vessels during the works. Both are based at Swansea Marina within the same WFD water body as the works site (Severn Lower WFD water body).

Kaymac owned dory

Two Kaymac Ltd. owned flat bottomed dorys will be used as general support boats during the works. These are small support vessels that are kept out of water when not in use.

Norway based tug boats

Two tug boats will deliver the pipe sections from the manufacturer in Norway. These vessels are not slow moving but will be sailing from an origin outside of the UK.

The nature of the type of vessels proposed for the works means that exchange of ballast water would not be required so the potential pathway of any introduction of INNS would most likely be via hull fouling. It is considered that the primary risk of introduction and therefore spread of INNS is associated with vessel movements between similar biogeographic regions with potential transfer of species adapted to growth and survival in similar water temperatures (e.g. in general the likelihood of colonisation is greater for a species being transported from temperate waters to temperate waters, as opposed to being transported from tropical waters

to temperate waters). As such, the highest risk vessels associated with the works are those that will deliver the pipe sections from Norway.

A project-specific Biosecurity Plan with a Biosecurity Risk Assessment has been produced that outlines measures that will be incorporated into construction methods to limit the risk of introduction of non-native species (see Appendix II). In addition, measures taken will include consideration of the following:

- Conforming to guidelines on marine biosecurity planning as advised by NRW, including production of a Biosecurity Plan following best practice guidance as set out in the Natural England and Natural Resources Wales Biosecurity Planning guidance (Payne *et al.* 2015).
- Ports and Harbour protocol:
 - Adherence to legislative guidance for specific port and harbour authorities
- Conforming to industry guidelines:
 - Follow best practice guidance, apply Best Available Technology (BAT)

With the above mitigation measures in place, it is considered that there is minimal risk of the introduction or spread of INNS due to the proposed works.

Consequently, it is concluded that there are not expected to be any non-temporary effects in relation to INNS at water body level, and the proposed works would not prevent the Severn Lower transitional water body from meeting its WFD objectives for INNS.

5. In-combination Effects Assessment

The identification of plans and projects to include in the in-combination 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 in-combination 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 and combination of local knowledge, the Lle Geo Portal for Wales, the NRW Public Register and the Newport City Planning Portal was used.

Only projects and plans that have the potential to interact with the water column have been considered further. These are summarised in Table 3 with further details below.

Table 3 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
CML2165	Newport	Scour protection works at St Julian's viaduct on the River Usk.	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 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 works for the effluent pipeline and the limited effects outlined in this report, it is concluded that the in-combination 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 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 effluent pipeline replacement works and their short term duration, it is concluded that there is no potential for the works and activities at the dredge disposal site to have in-combination effects on the Severn Lower water body and would not prevent the water body from meeting WFD objectives.

CML2165 – St Julian's viaduct scour protection works

St Julian's Viaduct is located 8.2 km in a straight line from the proposed works site and approximately 12.5 km along the River Usk. The proposed scour protection works include the installation of a layer of rock armour to four piers and are anticipated to be undertaken from April 2022 to October 2022.

A WFD assessment conducted for the St Julian's project concluded that the project would not prevent the associated water bodies from meeting their WFD objectives. Taking this into consideration along with the distance to the proposed effluent pipeline replacement works site,

it is concluded there is no potential for the effluent pipeline works and scour work activities to have in-combination 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 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 as well as considering potential effects on WFD Protected Areas and the potential for the introduction and spread of INNS.

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 –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; potential to affect physiochemical parameters for longer than 14 days
- WFD Protected Areas
- INNS

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

- Implementation of a Construction Environmental Management Plan (CEMP) 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

- Implementation of a Biosecurity Plan.

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

7. References

APEM Ltd 2022. Effluent Pipe Replacement Scheme – Ground Investigation Beach Works. Habitats Regulations Assessment Screening Report.

CIEEM 2018. Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Chartered Institute of Ecology and Environmental Management, Winchester.

Defra and EA. 2015. The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015.

Environment Agency 2015. Severn River Basin Management Plan 2015-2021. Available online

at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/718336/Severn_RBD_Part_1_river_basin_management_plan.pdf

Environment Agency 2017. Water Framework Directive: Estuarine and Coastal Waters 'Clearing the waters for all' <https://www.gov.uk/guidance/water-framework-directive-assessment-estuarine-and-coastal-waters>

GBNNSS. 2022. GBNNSS. Accessed Feb 2022 from <http://www.nonnativespecies.org>.

Kaymac. 2022. Method Statement and Risk Assessments. Effluent Pipe Replacement Scheme, Newport.

Lle 2022. Lle Geo-Portal. Available at: <https://lle.gov.wales/home>

Nall C. 2017. Power from the sea: stepping stones for non-native species? Available: <https://www.mba.ac.uk/power-sea-stepping-stones-non-native-species>. Last accessed Dec 2021.

National Biodiversity Network Atlas. 2022. Available: <https://nbnatlas.org/>. Last accessed Jan 2022.

Cook, E. J., Macleod, A. Payne, R. D. and Brown, S. 2015. Ed. by Natural England and Natural Resources Wales. Marine Biosecurity Planning – Identification of best practice: A Literature Review. Report by SRSL Ltd. in conjunction with Robin Payne to the Firth of Clyde Forum and Scottish Natural Heritage Commissioned Report No. 748 - 45 pp.

Roy H. E., Bacon J., Beckmann B., Harrower C. A., Hill M. O., Isaac N. J. B., Preston C. D., Rathod B., Rorke S. L., Marchant J. H., Musgrove A. J., Noble D. G., Sewell J., Seeley B., Sweet N., Adams L., Bishop J., Jukes A. R., Walker K. J., Pearman D. A. 2012. Non-native species in Great Britain: establishment, detection and reporting to inform effective decision making. Report to Defra, NERC Centre for Ecology & Hydrology.

UKTAG 2021. Alien Species Classification According to Level of Impact. Available: <https://www.wfduk.org/resources/alien-species-classification-according-to-level-of-impact>. Last accessed Jan 2022.

Welsh Government 2018. Marine Invasive Non-Native Species Priority Monitoring and Surveillance List for Wales. Available: <https://gov.wales/invasive-aquatic-species-priority-marine-species>. Last accessed Jan 2022.

Appendix I 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 Replacement Scheme
Brief description of activity	Installation of new effluent pipe and outfall adjacent to the existing pipe. Activities include excavation of trench in the intertidal zone, pipe laying, backfilling of the trench, slip-lining of the new pipe through the existing pipe to avoid saltmarsh habitat.
Location of activity (central point XY coordinates or national grid reference)	Lat. 51.536134, Lon. -2.9476176
Footprint of activity (m ²)	68,000 m ²
Timings of activity (including start and finish dates)	Construction start date: Phase 1 end of July 2022 to September 2022. Phase 2 end of April 2023 to September 2023.
Extent of activity (for example size, scale frequency, expected volumes of output or discharge)	Intertidal works area 0.068 km ² (1,360 m x 50 m). Trench for new pipe in the intertidal zone will be 1,360 m in length, approx. 1.5 m deep with a cross section of 5.4 m ² . Total volume of material to be excavated approximately 7,344 m ³ .
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 fuel leakages from plant. Potential mobilisation of chemicals due to excavation of sediment.

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, will be primarily undertaken in the intertidal zone at low tide and 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 and will be undertaken primarily 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 which is a different use to the proposed works.

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)
0.5 km ² or larger		✓	Footprint is 0.068 km ²
1% or more of the water body's area		✓	Footprint of the construction works is anticipated to be a maximum of 0.068 km ² , less than 1% of water body area.
Within 500 m of any higher sensitivity habitat	✓		Approximately 30 m from saltmarsh habitat

1% or more of any lower sensitivity habitat		✓	Footprint is less than 1% of lower sensitivity habitats in the surrounding area (0.04% of intertidal soft sediment habitat)
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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 small scale and will be undertaken primarily 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 small scale and temporary. The project activities are anticipated to produce low levels of noise and vessel noise will be within the range routinely experienced in the water body.
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 small scale and will be undertaken primarily at low tide. Any works undertaken sub-tidally will be of short duration (approx. 4 days). There is potential for excavated sediment in the intertidal zone to be mobilised during tidal movements, which may affect water clarity. This may occur for each excavated section of the trench for a limited number of days (approx. 3 days). The trench works are scheduled to last for approx. 38 days. Therefore, there is potential for water clarity to be affected during this period. Although this is unlikely to be continuously during this period, this has been scoped in taking a precautionary approach.
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 for example through accidental fuel spillages. Any chemicals in the sediment may be mobilised during the trench excavation works.
It disturbs sediment with chemicals above Cefas Action Level 1	✓		Works could potentially disturb sediment with chemicals above Cefas Action Level 1 during the trench excavation.
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		✓	The project includes a mixing zone (outfall discharge), however, there will be no change to the nature or volume of the current licensed discharge. The only change will be that the current effluent will be discharged from the new pipe and outfall. As such, this has been scoped out of further assessment.

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 / Môr Hafren SAC and Severn Estuary / Môr Hafren 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 construction vessels used could introduce or spread INNS.

Section 6: Summary

<i>Receptor</i>	Potential risk to receptor?	Note the risk issue(s) for impact assessment
<i>Hydromorphology</i>	No	Due to the small-scale 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 primarily 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. CEFAS Action Level 1 chemicals may be mobilised during sediment excavation works.
<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 construction vessels could lead to introduction / spread of INNS

Appendix II Biosecurity Plan

This has been provided as a separate document.