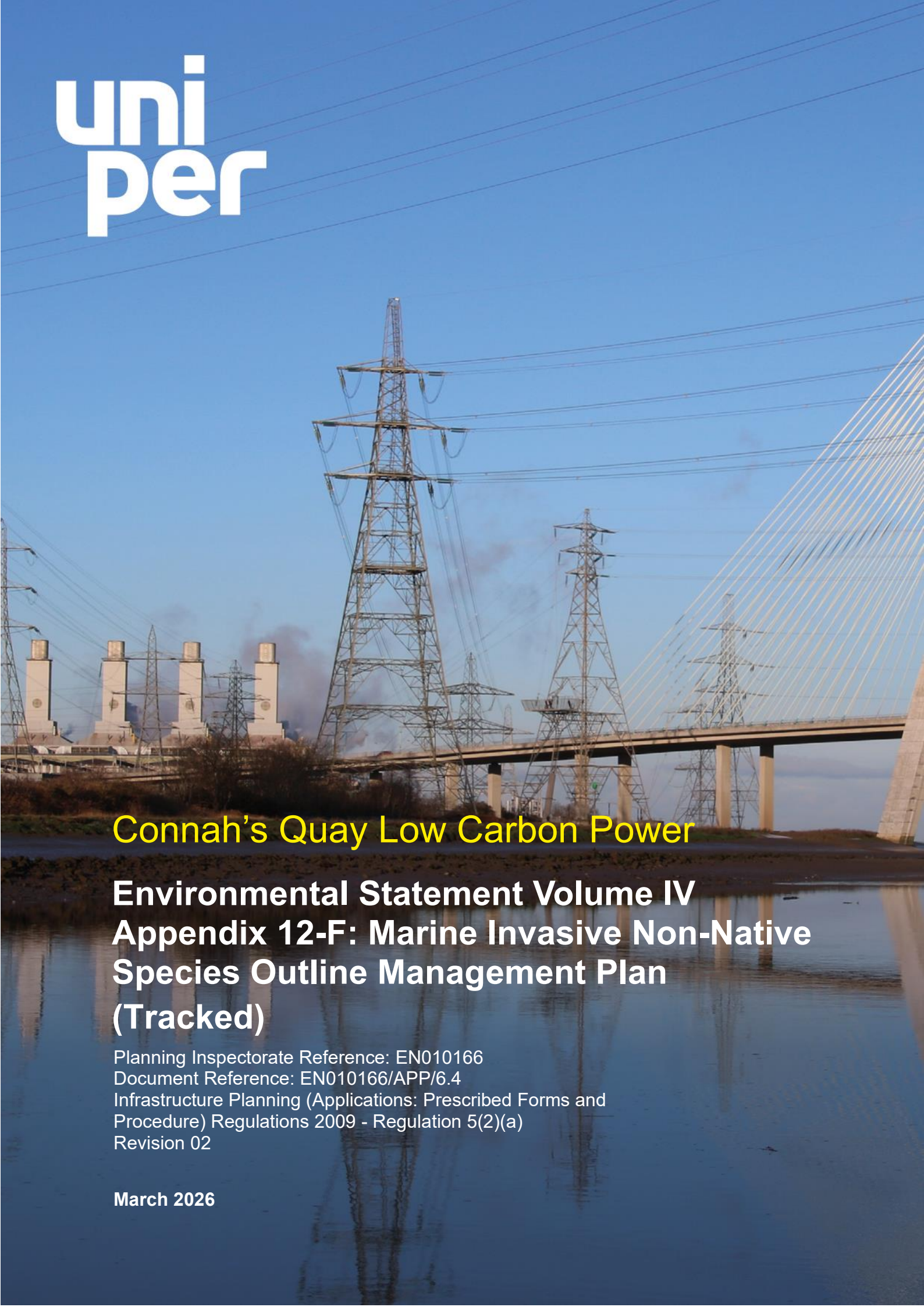

Connah's Quay Low Carbon Power

Environmental Statement Volume IV Appendix 12-F: Marine Invasive Non-Native Species Outline Management Plan (Tracked)

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1. Appendix 12F: Marine Invasive Non-Native Species Outline Management Plan

1.1 Introduction

1.1.1 This Marine Invasive Non-Native Species (INNS) Outline Management Plan forms part of the Environmental Statement (ES) for the Connah's Quay Combined Cycle Gas Turbine (CCGT) with Carbon Capture Plant (CCP) and supporting infrastructure (the 'Proposed Development') at Connah's Quay, Flintshire, Wales.

1.1.2 This Plan relates to marine INNS and therefore only concerns Proposed Development activities occurring below mean high water springs (MHWS). This particularly concerns activities happening within the Water Connection Corridor associated with the Proposed Development in the Dee Estuary. The Proposed Development would require a source of cooling water and process water and would use the existing Connah's Quay Power Station abstraction and discharge infrastructure within the River Dee. The existing infrastructure requires refurbishment to meet current legislative requirements including the Eels (England and Wales) Regulations 2009 ('Eels Regulations') (Ref 1).

1.1.3 The area within which works on the existing abstraction and discharge infrastructure would occur is referred to as the Water Connection Corridor (see **Figure 12-1: Marine Ecology Study Area** (**EN010166/APP/6.3**) in **Chapter 12: Marine Ecology** (**EN010166/APP/6.2.12**)).

1.1.4 This assessment fulfils the requirement for a Biodiversity Risk Assessment and Management Plan as outlined by Natural Resources Wales (NRW) and should be read in conjunction with **Appendix 12-E: Marine Biosecurity Risk Assessment ~~and Management Plan Form~~** (**EN010166/APP/6.4**). These two documents support the Development Consent Order (DCO) for the Proposed Development. This Pplan has been prepared in line with NRW guidance (Ref 2) and is one of a number of plans that form the **Framework Construction Environmental Management Plan** (**CEMP**) (**EN010166/APP/6.5**).

1.2 Legislation, Policy and Guidance

1.2.1 The following sections identify the specific legislation, policy and guidance that are applicable to the assessment of the potential introduction of marine INNS during project activities. Further detail on the wider legislation, policy and guidance relevant to the ES is provided in **Chapter 7: Planning Policy and Need** (**EN010166/APP/6.2.7**) **and Appendix 7-A: Legislation, Policy and Guidance Framework for Technical Topics** (**EN010166/APP/6.4**).

Legislation

1.2.2 The following legislation is applicable to this outline management plan:

- The Wildlife and Countryside Act 1981 (Ref 3);
- MCAA (as amended) (Ref 4);
- The Marine Strategy Regulations 2010 (Ref 5);
- The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (Ref 6);
- EU Regulation 1143/2014 was retained in domestic law under the European Union (Withdrawal) Act 2018 (Ref 7);
- The Invasive Alien Species (Enforcement and Permitting) Order 2019 (Ref 8); and
- The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (Ref 9); and
- The Eels (England and Wales) Regulations 2009 (Ref 1).

Policy

1.2.3 The following local and regional policies have been considered as part of this ~~marine INNS outline management pP~~lan:

- UK Marine Policy Statement, which aims to achieve sustainable development in the UK marine area (Ref 10);
- Welsh National Marine Plan, which sets out a single framework for sustainable development within Wales marine area, including the requirement to maintain seafloor integrity and safeguard benthic ecosystems (Ref 11);
- The Great Britain Invasive Non-native Species Strategy, sets out aims and actions for addressing threats posed by INNS (Ref 12);
- Planning Policy Wales, highlights the importance of biodiversity for natural services, sustainability and the Welsh economy. It includes objectives to achieve efficient use and protection of natural resources and enhancing biodiversity (Ref 13);
- Nature Recovery Action Plan Wales, a strategy for Wales which aims to address declining biodiversity, including marine habitats, ecosystems and fisheries (Ref 14);
- Flintshire County Council (FCC) Local Development Plan (LDP) (Ref 15), which forms part of the local statutory development plan in Flintshire alongside Future Wales: The National Plan 2040 (Ref 16), and is used by the local council to determine the outcome of planning applications and development proposals. The HRA to Inform the Assessment of the FCC LDP (Ref 17) is also used by the local council in conjunction with the LDP; and
- Flintshire County Council Biodiversity Plan 'Supporting Nature in Flintshire 2020-2023', which has been produced in line with Section 6 of the Environment (Wales) Act 2016 which requires public authorities to seek to maintain and enhance local biodiversity and to promote the resilience of ecosystems (Ref 18).

Guidance

1.2.4 In addition to the legislation and policies outlined above, the following guidance was also applicable for the preparation of this marine ~~INNS outline management p~~Plan:

- Marine Biosecurity Planning Guidance for producing site and operation-based plans for preventing the introduction and spread of invasive non-native species in England and Wales (Ref 2);
- RAPID Life Project Marine biosecurity toolkit and guidance documents (Ref 19; Ref 20);
- GB Non-Native Species Secretariat marine biosecurity guidance (Ref 21); and
- International Maritime Organisation (IMO) Guidelines for the control and management of ships' biofouling to minimize the transfer of invasive aquatic species (Biofouling Guidelines) (Ref 32).

1.3 The Study Area

1.3.1 The Proposed Development is located within and adjacent to the Dee Estuary at Connah's Quay. This assessment considers the management of marine INNS below MHWS, including the Water Connection Corridor and surrounding intertidal habitat.

1.3.2 The Study Area for this assessment takes into consideration all areas which could contribute to the introduction of marine INNS and the spread throughout the life cycle of the Proposed Development, using a precautionary basis. However, due to the small scale of the works which would take place within the marine environment the Study Area focuses on the Proposed Development infrastructure located within the Water Connection Corridor, whilst also incorporating the creek and streams which intersect the saltmarsh habitat adjacent to the Water Connection Corridor and intertidal zone. Consideration is also given to the use of nearby ports such as the Port of Mostyn for delivery of materials via vessel.

1.4 Environmental Conditions

1.4.1 Local environmental conditions are an important factor in the spread of marine INNS, as they are the key to whether introduced species can survive and establish themselves. Ideal conditions can vary by species and as such, understanding the local environmental conditions relevant to the Proposed Development and available habitats will provide a better indication of which species are likely to establish if introduced.

1.4.2 The intertidal habitat in the Water Connection Corridor is largely comprised of soft intertidal mud and muddy sand, representative of the European Nature Information System (EUNIS) habitat types 'Intertidal Sandy and Muddy Sand (A2.2)' and 'Intertidal Mud (A2.3) (see **Appendix 12-D: Intertidal Survey Report** (**EN010166/APP/6.4**)). Adjacent to existing intake and outfall infrastructure, there is an area of artificial boulders and mixed sediment creating intertidal pools at low tide, representative of 'Intertidal Mixed Sediments (A2.4)'. A short concrete walkway is also present extending

to the intake and outfall infrastructure (See **Appendix 12-D: Intertidal Survey Report** (**EN010166/APP/6.4**)).

1.4.3 Local tidal movements are also considered to be an important vector for the transportation of marine INNS. Water currents can transport larvae and pelagic species between different locations, and the distance traveled can be influenced by the maximum tidal excursion distance, which is 10 km (**Chapter 16: Physical Processes** (**EN010166/APP/6.2.16**). The mean tidal ellipse (nearshore at the entrance to the Dee Estuary) is approximately 6.2 km.

1.4.4 Water speed can also influence the transportation of marine INNS. In the Study Area, the peak current is in excess of 1.75 m/s which is largely influenced by tidal movement. The tidal currents (and tidal-induced sediment transport, which is also considered to effect transport of marine INNS larvae) are considered to be strong in the coastal region and extending into the mouth of the estuary but become weaker in the upper reaches of the estuary towards where the Water Connection Corridor is located.

Anthropogenic Structures

1.4.5 Anthropogenic activities are a major component in the introduction of marine INNS. In particular, artificial structures introduced into the marine environment, such as breakwaters, artificial reefs, mooring blocks, jetties and cable protection measures, are known to exhibit significantly different community compositions compared to natural substrates including marine INNS, and are reported to act as either a stepping-stone or as a direct vector for their dispersal (Ref 22). Intertidal infrastructure associated with offshore windfarms especially have particularly been observed supporting marine INNS in the North Sea and eastern United States (Ref 23; Ref 24), with the colonisation by marine INNS considered one of the primary ecological risks associated with offshore windfarm development (Ref 25).

1.4.6 As part of the Proposed Development, existing intake and outfall infrastructure in the River Dee would be refurbished. The existing infrastructure comprises hard concrete and metal structures which could serve as suitable habitat for marine INNS to colonise and spread. The new eel screens are expected to have a 2 mm diameter mesh size rather than the current 3 mm diameter mesh, and would be increased in length compared to the existing screens.

1.4.7 An additional structure, the Flintshire Bridge, is also present approximately 500 m east of the Water Connection Corridor with supporting concrete structures present in the intertidal zone.

Marine INNS Already Present in the Region

1.4.8 In Wales, a list of priority marine INNS has been developed by the Welsh Government (Ref 26) with each species ranked according to a risk analysis conducted by the GB Non-Native Species Secretariat (Ref 21). This analysis includes an assessment of over 100 non-native species as well as information about horizon scanning (new non-native species) and risk management to provide a structured, science-based approach to providing rationale for management measures.

1.4.9 However, the only marine INNS considered to be present in the Study Area is the Chinese mitten crab (*Eriocheir sinensis*). The result of the Welsh Government analysis for Chinese mitten crab is provided in **Table 1**.

Table 1: Chinese mitten crab risk assessment scores as defined by the Welsh Government

Scientific name	Common name	Likelihood of presence in Study Area	Risk assessment score (Ref 26)	Description
Eriocheir sinensis	Chinese mitten crab	Possible	High	This species is known to be spreading through the mid and lower catchments of the River Dee (Ref 27).

1.4.10 Chinese mitten crab are known to be present in the Dee Estuary, with records suggesting that the species has been spreading through the mid and lower catchments of the estuary (Ref 27), where the Proposed Development is located, over more than a decade. This includes a single individual recorded approximately 300 m downstream of the Water Connection Corridor in 2012 towards Connah's Quay Nature Reserve (Ref 28). However, this is a record based on human observation by a member of the public and therefore the accuracy of the observation cannot be confirmed. It is also not known if any burrows were identified during the observation.

1.4.11 Chinese mitten crab primarily habituate freshwater habitats (Ref 29). However, individuals migrate downstream to brackish, estuarine and marine environments to reproduce. From mid-November, mating typically takes place in brackish conditions in the upper and middle estuary. Following this, females spawn and retain the eggs until the embryos develop. The highest abundance of larval stages in the Dee Estuary is likely to be found between May and July, as suitable estuary water temperature (>12°C) is crucial for larval survival and development (Ref 28). Due to low survival rates below a water temperature of 12°C, the period of October to May is likely to exclude the presence of mitten crab larvae in the Dee Estuary.

1.4.12 Chinese mitten crab have a preference to burrow in intertidal/riverine mud banks which typically provides a clear visual indication of their presence (Ref 30). The study area for the intertidal walkover and drone survey (conducted for the Proposed Development; see **Appendix 12-D: Intertidal Survey Report** (**EN010166/APP/6.4**)) included several intertidal mud banks with some structural complexity, present in the form of small streams and gullies, which intersected the intertidal mud and saltmarsh habitat. However, during the intertidal walkover and drone survey, there were no obvious indications of the presence of Chinese mitten crab in the Water Connection Corridor or surrounding intertidal survey study area, including a lack of observations of the usually highly visible and obvious burrows (see **Appendix 12-D: Intertidal Survey Report** (**EN010166/APP/6.4**)).

1.5 Risk of Marine INNS introduction

1.5.1 The introduction of new marine INNS could be facilitated by the use of a vessel for the delivery of materials, and through the replacement of hard structures at the existing intake and outfall structures. For example, locally present marine INNS can colonise hard structures introduced to an area or may be present on vessel hulls or in ballast water. These can contribute to increased rate of introductions and spread and act as an 'ecological stepping-stone' for marine INNS to further establish their range (Ref 19).

1.5.2 To determine the risk of marine INNS introduction, each component has been reviewed for its potential to introduce or spread marine INNS to the site. The risk of each component has been rated as **high** (red), **medium** (amber), **low** (green), or **negligible** risk, and has been adapted from guidance provided by Natural England and NRW (Ref 2). The risk assessment is provided in **Table 2**.

Table 2: Risk assessment for Marine INNS introduction associated with the Proposed Development

Component	Location	Type	Details	Risk
Delivery vessel	Within the Study Area	Vessels are anticipated to include: A small number of vessels, potentially equipped with a small barge-mounted crane.	A small number of vessels may be required to deliver additional supplies during the construction works. This would consist of up to 30 two-way vessel movements across a 12-month period per each phase of the Proposed Development (two phases in total). It is assumed that the deliveries would be undertaken by the same small number of vessels. The vessels may also be required for access by site operatives during construction works.	The delivery vessels are expected to originate from a local port nearby, from within the River Dee or the Manchester Shipping Canal for example. One single Chinese mitten crab has previously been reported in Manchester Shipping Canal, but records of other marine INNS are very limited. As such, the risk of marine INNS introduction from the use

Component	Location	Type	Details	Risk
			A vessel may also be required in the operation phase for any required maintenance works, and during decommissioning for removal of structures if required. The vessels are expected to originate from a local port in UK waters.	of local vessels is low.
Replacement of eel screens	Water Connection Corridor	Placement of artificial structures in the Water Connection Corridor.	Direct replacement of existing eel screens (3 mm diameter mesh) with new eel screens (2 mm diameter mesh) and associated baskets. This is to be done at low tide when the existing intake structures are exposed, with one screen replaced at a time. Temporary scaffolding may also be placed to allow access around the intake screens and pipework. All plant to be limited to handheld tools (ideally battery or	The new eel screens would be a direct replacement of the existing infrastructure and therefore, this would not provide any additional suitable hard artificial surfaces beyond those that are already in place. Any scaffolding would be temporary and removed following completion of the works. As a result, the risk of marine INNS introduction associated with the replacement

Component	Location	Type	Details	Risk
			with power supply from boat)	of eel screens is considered negligible and has not been considered further.

1.6 Pathways for Marine INNS Introduction

1.6.1 Due to the limited components of the Proposed Development which risk the introduction of marine INNS to the marine environment (**Table 2**), the pathways for marine INNS introduction are also considered to be limited.

1.6.2 However, to fully understand the pathways present for INNS introduction, a close examination of the main Proposed Development activities is essential, as each activity presents varying degrees of risk for introducing marine INNS.

1.6.3 A list of activities associated with each phase of the proposed Project (Construction, Operational, and Decommissioning) that is considered to carry a potential risk of marine INNS introduction is provided in **Table 3**. These have been collated with consideration given to marine INNS anticipated to be present in the Study Area (Section 1.3) and equipment and vessels likely to be associated with the Proposed Development.

Table 3: Activities associated with the Proposed Development which have the potential to introduce marine INNS

Project phase	Activity	Pathway
Construction	Use of vessels originating from within local area or nearby UK waters	Presence of marine INNS in any released ballast water or on vessel hull
Operation	Use of maintenance vessel originating from within local area or nearby UK waters	Presence of marine INNS in any released ballast water or on vessel hull
	Disposal of biofouling from hard structures due to water movement or natural disturbance	Release of biofouling into water column
Decommissioning	Use of vessels originating from within local area or nearby UK waters to remove material	Presence of marine INNS in any released ballast water or on vessel hull

1.7 Biosecurity Control Measures

1.7.1 Biosecurity control measures are essential for preventing and/or mitigating the spread of marine INNS during ~~proposed Project~~ activities associated with the Proposed Development (Ref 2). For these methods to be effective, they must be clear, realistic, and easy to communicate (Ref 2). It is important that consideration is given to who is responsible for relevant actions, what measures would reduce the risk of introducing marine INNS, and where and when these control measures would be applied (Ref 2).

1.7.2 Guidance produced by Natural England and NRW on marine biosecurity planning recommend a ranking system to help prioritise biodiversity risks during visual inspections of equipment or vessels, with Rank 3 or above recommended to be carried forward for biosecurity measures (**Table 4**; Ref 2). Where significant risks are identified, it is essential that the surfaces are mechanically cleaned or chemically treated to remove all potential marine INNS, with fouling disposed of in line with relevant guidelines to prevent further spread of these organisms to the local environment.

Table 4: Biosecurity risk ranking for visual inspections of project equipment and materials source (Ref 2)

Rank	Description	Visual Estimate of Biofouling Cover
0	No visible fouling	0%
1	Surfaces partially or fully covered in biofilm[1], but absence of any plants or animals	0%
2	Light fouling; surface fully covered in biofilm; 1-2 small patches of one type of animal or plant are present	1% of visual submerged surfaces
3	Considerable fouling; presence of biofilm; fouling still patchy but visible with one or more type of plant or animal	6-15% of visual submerged surfaces
4	Extensive fouling; presence of biofilm; abundant fouling assemblages consisting of more than one type of plant or animal	
5	Very heavy fouling; fouling assemblage comprising many different types of plants and/or animals	

[1] Biofilm is a thin layer of bacteria, algae, detritus, and/or other particulates

1.7.3 Additionally, the GB Non-Native Species Secretariat and RAPID LIFE project have outlined important biosecurity control measures for reducing the spread of INNS in the marine environment (Ref 19; Ref 20; Ref 21). Additional measures related to the Proposed Development include the use of appropriate anti-fouling coatings on the new eel screen replacements. Where elements cannot receive an anti-fouling coating, they would be appropriately visually inspected, thoroughly cleaned, and dried out prior to placement within the marine environment.

1.7.4 Furthermore, although all vessels are expected to originate from within UK waters, and be local to the Proposed Development, all vessels should adhere to the International Convention for the Control and Management of Ships' Ballast Water and Sediments with the aim of preventing the spread of marine INNS (Ref 31) and the International Maritime Organisation (IMO) Guidelines for the control and management of ships' biofouling to minimize the transfer of invasive aquatic species (Biofouling Guidelines) (Ref 32).

1.8 Surveillance, Monitoring and Reporting

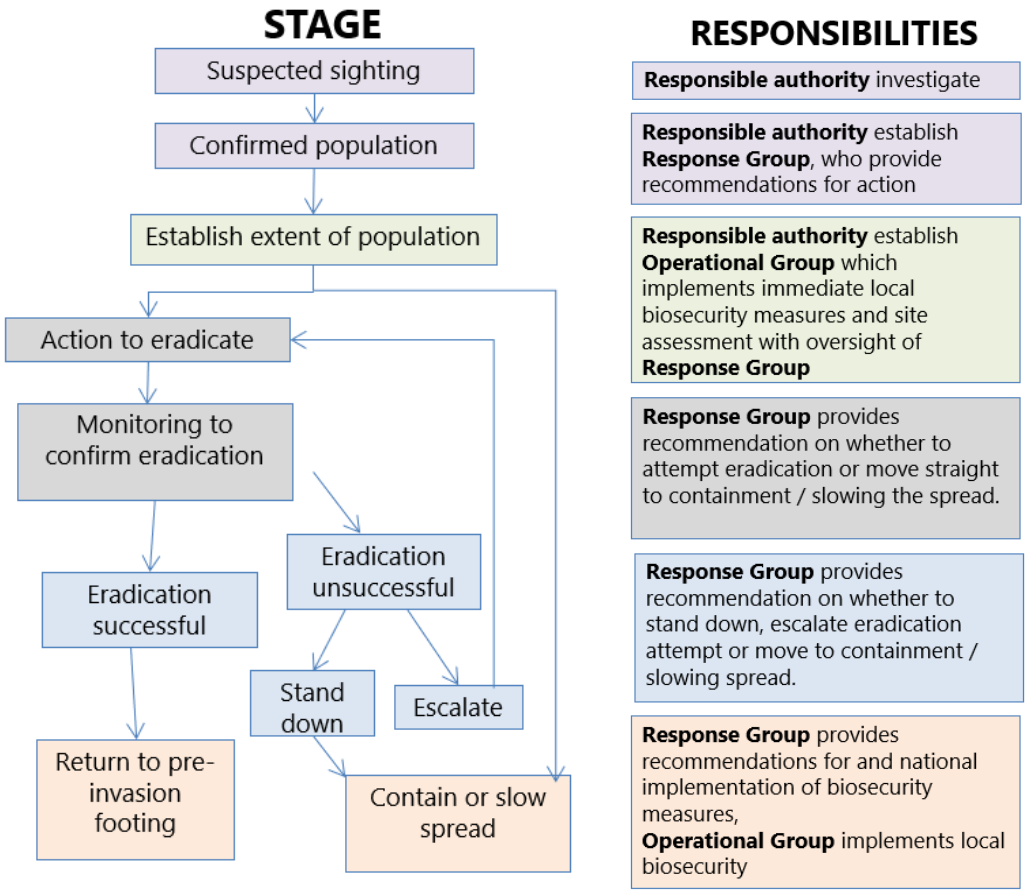
1.8.1 Despite the perceived low risk of marine INNS introduction and spread, early detection of any new marine INNS is key to ensuring the likely success of containment and eradication (Ref 2). The first step is prevention, which can be implemented through visual monitoring of materials, vessels and other equipment to be used for the Proposed Development for any potential marine INNS.

1.8.2 Staff and operatives working on the eel screen upgrades should be trained in the identification of burrow holes for Chinese mitten crab. Any indication of burrows should be reported, however these are unlikely to be present.

1.9 Contingency Plan

1.9.1 Even with the most effective preventative and containment measures in place, introduction of marine INNS can still occur. Additionally, introductions may occur as a result of external activities or processes. This section outlines the appropriate measures which should be taken if biosecurity measures fail to prevent the introduction of marine INNS to the Study Area, as recommended by the Non-Native Species Secretariat and RAPID LIFE project (Ref 19; Ref 20; Ref 21). A flow diagram of relevant steps and associated responsibilities is provided in **Plate 1**.

Plate 1 Flow diagram of contingency plan steps and related responsibilities (Ref 20)



1.9.2 Should Chinese mitten crab be observed within the Water Connection Corridor, the following steps should be taken (Ref 2):

1. **Determine the extent** – determine the extent and distribution of Chinese mitten crab on project infrastructure; and
2. **Inform relevant authorities** – contact authorities such as NRW and/or the Non-Native Species Secretariat to report the observation and obtain guidance on whether action is required.

1.10 Conclusion

1.10.1 This document forms part of an initial assessment of biosecurity risks associated with the Proposed Development and outlines relevant biosecurity measures that could be implemented to prevent and/or control the spread of any marine INNS throughout the lifecycle of the Proposed Development.

1.10.2 Activities associated with the Proposed Development pose a low risk of marine INNS introduction and spread in the marine environment. The primary pathways for introduction from activities associated with the Proposed Development are limited and include the movement of vessels (which may carry marine INNS in ballast water or attached to the hull), and the release of biofouling into the marine environment from hard structures associated with the existing infrastructure. The introduction of hard artificial substrate into the marine environment was not considered further as this

would involve a direct replacement of the existing infrastructure and therefore would not increase the risk of introduction or spread of marine INNS.

1.10.3 The only marine INNS known to occur within the Study Area is the Chinese mitten crab, which is considered to be high risk, based on risk rating by the Welsh Government (Ref 26). However, no records of this species in the Study Area have been recorded since 2014 and no indications of this species, such as the presence of burrows, were observed in the intertidal walkover survey (see **Appendix 12-D: Intertidal Walkover Survey Report (EN010166/APP/6.4)**). Furthermore, there are no Proposed Development activities considered to pose a high risk to the introduction or spread of any INNS, including Chinese mitten crab.

1.10.4 As a result, there is no requirement for monitoring of infrastructure in the Water Connection Corridor. However, staff and operatives should be trained in the identification of Chinese mitten crab and the associated burrow holes. Should any indication of Chinese mitten crab be observed, relevant regulators (e.g. NRW) must be informed, who will guide the undertaker in the next best steps.

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