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LIVERPOOL BAY CCS PROJECT

POINT OF AYR GAS PLANT Point of Ayr Terminal

CEMP #1: Activity 1 – Cable laying and protection. Horizontal Direction Drilling (HDD) and conduit pipe installation

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REVISION LIST

00	For planning application submission
01	Updated following comments from NRW.

HOLD RECORD

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1.0 INTRODUCTION

1.1 Scope of Document

This document is the Construction Environmental Management Plan (CEMP) for the installation of a **Horizontal Directional Drilling (HDD) Exit Pit** on Talacre Beach and provides information to fulfil the requirements of **Condition 3.25** of Marine Licence **CML2365**.

These HDD Exit Pit works, to be carried out in February and March 2026, will represent **Phase 1** of **Licensed Activity 1** (cable installation and protection). **Activity 1** has sub-activities that will be carried out in sequence, which are set out in **Table 1.1** and highlighted by blue shading.

This document is **CEMP #1** and is the first in a sequence of required CEMPs phased in line with the planned programme of works for **CML2365 Activities 1–5**, as follows:

- **Activity 1 (Cable laying and protection)** will require three separate CEMPs reflecting its delivery in three phases.
 - **CEMP #1** is due in **October 2025**, ahead of the **Phase 1** works (HDD exit pit cofferdam on Talacre Beach, and the conduit pipe installation), scheduled for February and March 2026. These works form the Offshore element of an Onshore HDD under Gronant Dunes.
 - **CEMP #2** will follow in **December 2025**, in advance of the **Phase 2** works, which comprise laying the third-Party crossing protection in April 2026, in advance of the Phase 3 (**CEMP #3**) cable laying works in mid-2026, and mid-2027.
 - **CEMP #3** will follow in **February 2026**, in advance of the **Phase 3** works, which comprise re-opening of the HDD exit pit cofferdam and beach preparation planned for June–July 2026, and the subsequent cable-lay and protection campaigns from PoA to New Douglas in mid-2026, and New Douglas to satellites in mid-2027.
- **Activity 2 (Pipeline spool laying and protection)** requires **CEMP #3**, to be submitted in **February 2027**, ahead of the offshore pipeline spool installation window in June–August 2027.
- **Activity 3 (Clearance of unexploded ordnance)** is unlikely to be required and would not currently require a CEMP. This is because survey results indicate no UXO clearance is needed prior to installation of any of the activities covered by **CML2365**.
- **Activity 4 (Installation of the New Douglas CCS Platform and pipeline repurposing)** will be supported by **CEMP #3**, due in March 2026, six months before the scheduled September 2026 installation.
- **Activity 5 (Removal of dropped objects)** does not require a CEMP, as it will be managed in accordance with the Liverpool Bay CCS Limited Dropped Objects Plan (DOP), which applies to all five licenced activities throughout the 25-year project duration. The DOP will be included as an Appendix to each CEMP, and a summary of its key requirements will be presented within the main text.

In summary, **Table 1.1** shows that five CEMPs (**CEMPs #1–#3**) will be prepared and submitted in advance of key construction stages for the Marine Licensable Activities in Welsh Waters, ensuring alignment between environmental management and the staged programme of offshore works.

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Table 1.1 Proposed timetable for phased submission of CEMPs for CML2365 Condition 3.25

Licence Activity	Sub-activity	Installation Dates	CEMP submission date
Activity 1 – Cable laying and protection (Phase 1)	• HDD under Gronant Dunes and conduit pipe installation.	February and March 2026	CEMP #1 – October 2025
	• HDD Exit pit cofferdam, conduit sump, and conduit pipe bonding/welding.		
Activity 1 – Cable laying and protection (Phase 2)	• Pre-lay grapnel run for all cables. • Pre-laying third-party crossing protection for PoA to New Douglas cable. • Pre-laying third-party crossing protection for New Douglas to satellites cables.	April 2026	CEMP #2 – December 2025
Activity 1 – Cable laying and protection (Phase 3)	• Re-opening of HDD Exit pit cofferdam, beach preparation, and cable shore pull.	June-July 2026	CEMP #3 – February 2026
	• PoA to New Douglas cable lay and post-lay protection.		
	• New Douglas to satellites inter-platform cable lay and post-lay protection.	July 2027	
Activity 2 – Pipeline spool laying and protection	• Installation of new sections of pipeline spools to connect the new Douglas CCS platform to the existing subsea natural gas pipelines. • Installation of concrete mattresses and external rock protection on sections of pipeline.	June-August 2027	CEMP #3 – February 2027
Activity 3 – Clearance of Unexploded Ordnance (UXO)	• Clearance of a maximum of twelve UXOs within the Licensed Area. The UXO clearance will be undertaken during daylight hours only.	Survey results currently indicate that UXO clearance will not be required prior to installation of any LB CCS infrastructure.	No CEMP required
Activity 4 - Installation of the New Douglas Carbon Capture and Storage (CCS) Platform and connecting to/repurposing existing pipelines	• Installation of a new Douglas CCS Platform to the northwest of the exiting Douglas complex platform. • The installation of the new Douglas CCS platform will include up to eight driven piles. • Repurposing of the existing subsea natural gas pipelines for their change of use from hydrocarbon to CO₂ service.	September 2026	CEMP #3 – March 2026
Activity 5 - Removal of accidentally dropped objects pursuant to condition 3.7	• As approved by the Licensing Authority under condition 3.7	Across 25-year project life-time.	No CEMP – Activity addressed in Dropped Objects Plan (DOP) relevant to the activities within each of the 5 CEMPs.

Alongside **Condition 3.25**, other conditions are addressed within different sections of this **CEMP #1**. **Table 1.2** indicates where information required by each condition can be found in this **CEMP #1**.

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Table 1.2 Marine Licence CML2365 Requirements

Reference	Requirement	Location
Condition 3.10 Notified Contractors, Vessels and/or Vehicles only to Carry out Licensed Activities	Only those agent(s), contractor(s), sub-contractor(s), vessels and/or vehicles whose details have been notified to the Licensing Authority may operate under the terms of this Licence. Any changes must be notified to and be approved by the Licensing Authority in writing prior to any such agent, contractor, subcontractors or vehicles carrying out any Licensed Activities pursuant to or otherwise operating under this Licence.	Section 8.1: Roles, Responsibility and Authority
Condition 3.11 Refuelling of Plant and Equipment	The Licence Holder must ensure that plant, vehicles and machinery are not refuelled on the foreshore or in the sea.	Section 6.6.1: Fuel Storage and Refuelling
Condition 3.12 Equipment, Structures and Access	The Licence Holder must ensure that all equipment, temporary structures, access tracks, waste and/or debris associated with the Licensed Activities are removed on completion of the Licensed activities.	Section 6.7: Waste Management Plan
Condition 3.14 Pollution Prevention	The Licence Holder must ensure that pollution prevention best practice is adhered to at all times. Any incidents must be reported to the Licensing Authority as soon as possible using the hotline number 0300 065 3000 .	Section 6: Environmental Management Procedures Section 7: Emergency Preparedness and Response
Condition 3.15 Spillage of Pollutants	The Licence Holder must employ bunding, storage facilities and spill kits to contain and prevent the release of fuel, oils and chemicals associated with the plant, refuelling and construction equipment into the marine environment. Secondary containment must be used with a capacity of no less than 110% of the container's storage capacity	Section 6.6: Resource Use and Management. Section 7.0: Emergency Preparedness and Response. Appendix D: Breakout Management Plan.
Condition 3.16 Prevention of Disposal of Man-made Debris	The Licence Holder must ensure that all reasonable precautions are taken to prevent the disposal of man-made debris to the marine environment. Such material must be removed immediately and be disposed of appropriately. If it is not possible to prevent manmade debris from entering the marine environment during the Licensed Activities, the Licensed Activities must cease immediately.	Section 6.7: Waste Management Plan
Condition 3.17 Cleanliness of Equipment	The Licence Holder must ensure that equipment, machinery and PPE are washed with freshwater and/or thoroughly airdried before deployment and before moving between locations.	Section 6.2.5: Invasive Non-Native Species. Appendix B: Invasive Non-Native Species Management Plan.
Condition 3.23 Unexploded Ordnance (UXO) Method Statement	The Licence Holder must submit an UXO Method Statement to the Licensing Authority for written approval at least 4 months prior to commencement of Licensed Activity 3. No Licensed Activities relating to Licensed Activity 3 may be undertaken prior to written approval from the Licensing Authority.	Section 5.5.3 : Unexploded ordnance (UXO).
Condition 3.24 Marine Archaeology	The Licence Holder must submit a Written Scheme of Investigation (WSI) which shall be in accordance with the outline WSI (CML2365-LBA CCS Ltd OFFSHORE ES_Appendix U WSI_NRW_FINAL) to the Licensing Authority for written approval at least 4 months prior to commencement	Section 6.1: Archaeology. Appendix C: Written Scheme of Investigation – WSI.

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Reference	Requirement	Location
	of the Licensed Activities. No Licensed Activities may be undertaken prior to written approval from the Licensing Authority. The Licence Holder must submit a Protocol for Archaeological Discoveries (PAD) to the Licensing Authority for written approval at least 4 months prior to commencement of the Licensed Activities. No Licensed Activities may be undertaken prior to written approval from the Licensing Authority.	
Condition 3.25 Construction Environmental Management Plan (CEMP)	The Licence Holder must submit a CEMP to the Licensing Authority for written approval at least 4 months prior to commencement of the Licensed Activities. No Licensed Activities may be undertaken prior to written approval from the Licensing Authority. The CEMP must:	This document: CEMP #1: Activity 1 – Cable laying and protection. Horizontal Direction Drilling (HDD) and conduit pipe installation.
	3.25 (i) be in accordance with the Outline Environmental Management Plan (CML2365-LBA CCS Ltd_OFFSHORE ES_Appendix R EMP_NRW_FINAL)	
	3.25 (ii) be in accordance with the Outline Invasive Non-Native Species Management Plan (INNSMP) (CML2365-LBA CCS Ltd_OFFSHORE ES_Appendix T INNS_NRW_FINAL)	Section 6.2.5: Invasive Non-Native Species. Appendix A: Invasive Non-Native Species Management Plan.
	3.25 (iii) include a Marine Pollution Contingency Plan containing planning for accidental spills, address all potential contaminant releases and include key emergency contact details	Section 6.6: Resource Use and Management. Section 7.0: Emergency Preparedness and Response. Appendix D: Breakout Management Plan.
	3.25 (iv) include measures to reduce vehicle disturbance to benthic habitats while working in the intertidal area, and	Section 6.5: Soil and Land.
	3.25 (v) include measures to minimise disturbance to birds while working in or near the intertidal area	Section 6.2.1: Birds.
Condition 3.33 Post Construction As-Built Report	The Licence Holder must provide to the Licensing Authority the following information within 4 months of completion of the Licensed activity for written approval: (i) Confirmation of construction completion date; (ii) As built plans, and (iii) Latitude and longitude coordinates of the New Douglas Carbon Capture and Storage (CCS) Platform provided as Geographical Information System data referenced to WGS84 datum.	The preparation and submission for approval of the required 'As-Built' information will be phased in line with the planned programme of works for Licenced Activities 1–5, as set out in Table 1.1. Therefore, on completion of the HDD conduit infrastructure under Gronant Dunes and on Talacre Beach, the relevant 'as-built' information for Activity 1, covered by CEMP #1, will be provided to the Licensing Authority.

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1.2 Aim and Objectives

The aim of this **CEMP #1** is to ensure that the works outlined in this document do not result in unacceptable environmental effects. It will set out how the works will be managed to reduce, avoid and mitigate adverse effects. In particular, the **CEMP #1** shall:

- Provide a mechanism for ensuring that measures to mitigate potentially adverse environmental effects are implemented;
- Provide assurance to third parties that their requirements with respect to environmental performance will be met; and
- Provide a framework for compliance auditing and inspection to enable the Project to be assured that its aims with respect to environmental performance are being met.

1.3 Statutory Guidance and Best Practice

Access to this **CEMP #1** will be provided to each person working on behalf of the Contractor. The Contractor will maintain a copy of the **CEMP #1** at all work site offices for reference by the entire workforce. It will be accessible to all site personnel and representatives of the relevant enforcement Authority, and all Subcontractors. All site works shall be undertaken in compliance with this **CEMP #1** and with all applicable legal and regulatory requirements. The Contractor will take responsibility that their works do not contravene legal requirements, and adherence to this **CEMP #1** alone cannot be a full defence regarding legal action against the Contractor.

The Contractor shall comply as necessary with the Construction (Design and Management) Regulations 2015 (CDM) and shall comply with all the applicable pollution control regulations in which case the Contractor shall obtain and keep current any necessary consent, authorisation, approval or permission.

The Contractor shall, where relevant, undertake all site works in accordance with current guidance and best practice.

1.4 Environmental Management System

This document has been produced in accordance with principals outlined in BS EN ISO14001:2015. The Contractor will mirror the Liverpool Bay CCS Limited environmental values and standards including the promotion of these values and standards among their staff, subcontractors, and suppliers engaged on the works. The Contractor appointed to the works can demonstrate the principles of BS EN ISO 14001:2015 and has an Environmental Management System (EMS) certified to the standard.

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2.0 DEFINITIONS

Term	Definition
Company	The party that initiates the project and ultimately pays for its design and construction i.e. ENI UK Ltd will generally specify technical requirements. The term "COMPANY" also includes agents or consultants authorized to act for, and on behalf of, COMPANY.
Contract	An acceptance of legal relations between two or more parties for the transfer of goods or services for value.
Contractor	A person or organization that undertakes responsibility for the execution of a contract.
Subcontractor	Any person to whom performance of any part of the Works, including engineering works or supply of any Equipment, is subcontracted directly or indirectly by the Contractor and including Approved Subcontractors and legal successors or permitted assigns.
Supplier	The party (Manufacturer or Vendor) that manufactures or supplies equipment or services to perform the duties specified by the Company or Contractor

3.0 REFERENCES

This **CEMP #1** refers to, and should be read in conjunction with the following documents:

3.1 International Codes and Standards

[Ref 1]	ISO 45001	Occupational health and safety management systems, Requirements with Guidance for Use
[Ref 2]	ISO 14001	Environmental Management Systems - Requirements with Guidance for Use

3.2 Project Documents

[Ref 3]	Marine Licence CML2365 – 22 May 2025	LBA CCS Ltd Offshore ES – February 2024
[Ref 4]	TCPA [Ref. FUL/000246/23] – March 2023	T.5.3 Register of Environmental Actions and Commitments

3.3 Legislation references

- Clean Neighbourhoods and Environment Act 2005
- Conservation of Habitats and Species Regulations 2017
- Construction (Design and Management) Regulations 2015
- Control of Asbestos Regulations 2012
- Control of Noise at Work Regulations 2005
- Control of Pollution (Oil Storage) (England) Regulations 2001
- Control of Pollution Act 1974
- Control of Substances Hazardous to Health (COSHH) Regulations 2002
- Control of Vibration at Work Regulations 2005
- Countryside and Rights of Way Act 2000

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- Countryside and Rights of Way Act 2000
- Environment Act 1995
- Environmental Damage (Prevention and Remediation) Regulations 2015
- Environmental Permitting (England and Wales) Regulations 2016
- Environmental Protection Act 1990
- Floods and Water (Amendment, etc.) (EU Exit) Regulations 2019
- Hazardous Waste (England and Wales) Regulations 2005
- Local Biodiversity Action Plans (LBAPs)
- Noise and Statutory Nuisance Act 1993
- Noise Emission in the Environment by Equipment for Use Outdoors Regulations 2001 and (as amended) 2005.
- Personal Protective Equipment at Work Regulations 1992
- Planning (Listed Buildings and Conservation Areas) Act 1990
- The Town and Country Planning (Environmental Impact Assessment) Regulations 2017
- Town and Country Planning Act 1990
- Town and Country Planning Act 1990
- Waste (Circular Economy) (Amendment) Regulations 2020
- Waste (England and Wales) Regulations 2011
- Waste Batteries and Accumulators Regulations 2009
- Water Act 2014
- Water Industries Act 1991
- Water Resources Act 1991
- Weeds Act 1959
- Wildlife and Countryside Act 1981
- Wildlife and Countryside Act 1981 (Prohibition on Sale etc of Invasive Non-native Plants) (England) Order 2014

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4.0 CONSTRUCTION ACTIVITIES AND PROGRAMME

4.1 Activity Location and Description

The HDD Exit Pit is located around the Mean High Water Spring (MHWS) line on Talacre Beach. It represents **Phase 1** of a larger programme of Marine Licensable works (**Activity 1**), consented under Marine Licence **CML2365**, to install a combined fibre-optic and electrical cable from Talacre Beach to a new Douglas offshore platform in Liverpool Bay (See **Section 1.1**).

The HDD Exit Pit is the terminus for a cable conduit that will be constructed under Gronant Dunes, originating from an HDD Entry Pit in Warren Farm, consented under planning permission **FUL/000246/23**. The construction of the cable conduit

Figure 4.1 shows the location of the HDD Exit Pit in relation to the other elements of the HDD and cable installation works also consented through Planning Permissions **FUL/000246/23**, and **FUL/000705/25**.

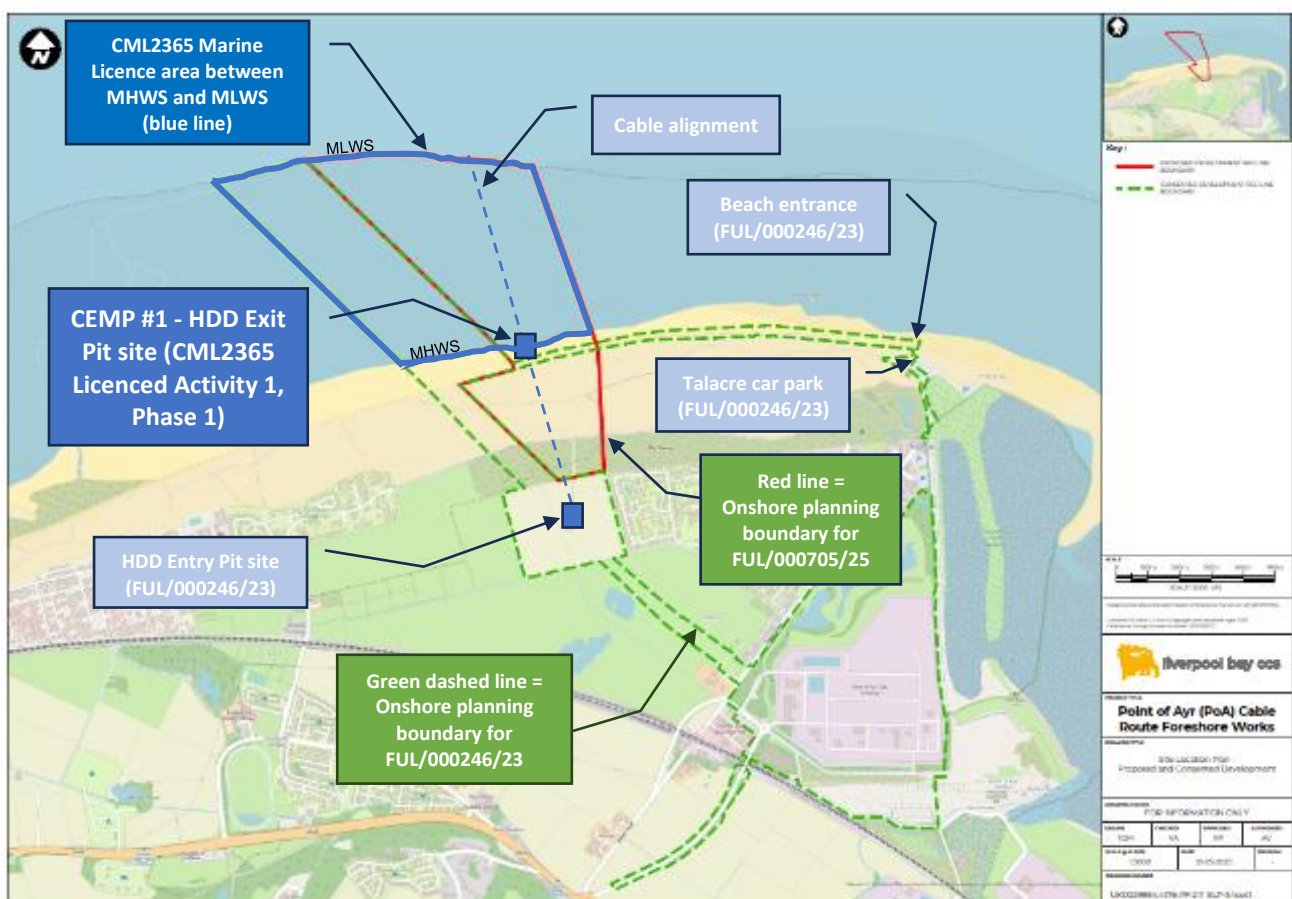


Figure 4.1: Location of CEMP #1 Licenced Activity 1, Phase 1, and its relationship to the Development Consent Boundaries

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4.2 General Site Arrangements

4.2.1 Site Set Up and Compound

Temporary construction facilities for the HDD Exit Pit works are planned at:

- **Talacre Beach:** HDD Exit Pit including sheet piled cofferdam, sheet piled raised platform, welfare cabins, equipment stores, pipe storage, and HDD conduiting pipe welding area (as shown in **Figure 4.2**).
- **Talacre Car Park:** (un)loading of larger equipment and conduit sleeve piping, and crew parking.

Access to the HDD Exit Pit site will be from the Talacre Beach car park and along the base of the dunes via the route identified and consented under TCPA planning permission **FUL/000246/23**.

A detailed design drawing showing the layout of the HDD Exit Pit works at Talacre Beach is presented in **APPENDIX A**.

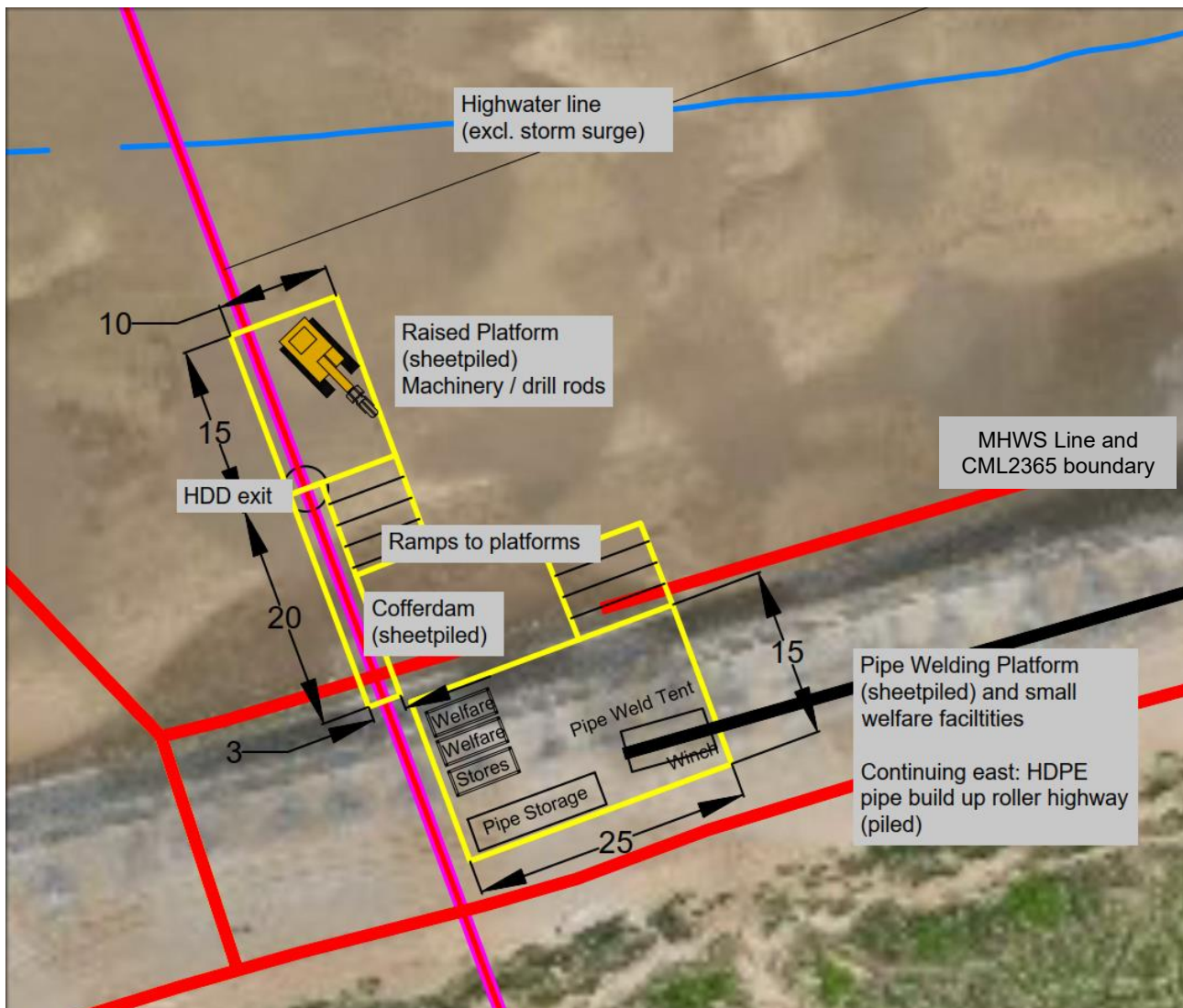


Figure 4.2: General Arrangement of HDD Exit Pit activities (CEMP #1 Licenced Activity 1, Phase 1)

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The site set up works shall include the establishment of secure site access, works signage, dedicated laydown area(s) and construction compound. The compound shall be set up in accordance with the Liverpool Bay CCS Limited Health Safety and Environment (HSE) policy and procedures. Full details can be obtained by reference to this **CEMP #1**, however, as a minimum, this will include the display of:

- Site Information / Services Plan.
- Environmental constraints map, including seasonal sensitivities timetable.
- Tide tables for Talacre.
- Construction Traffic Management Plan (Doc. No. 102700DJPC09406).

4.2.2 Fencing and Site Security

All work sites will be securely fenced or otherwise clearly demarcated to prevent public access. At beach locations, demarcation from public access is not practical due to the characteristics of the intertidal environment. Barriers placed in these areas may become dislodged by tidal activity, posing pollution risks and potential hazards to shipping. Site marshals will monitor public presence and will divert individuals or pause activities if members of the public approach the work zone. Physical screening of work areas will only be implemented when necessary to minimise disturbance to wintering bird populations.

4.2.3 Welfare Facilities

Welfare facilities will be made available at the Construction Compound as shown in **Figure 4.2**. The welfare facilities will include the following:

- **Toilets and Washing Facilities:** hand wash basins are provided.
- **Drinking Water:** To be provided during execution at suitable locations (bottled drinking water or a water-maker to be supplied by catering Subcontractor).
- **Changing rooms and Lockers:** Provided within the office cabins.
- **Rest Facilities:** A dedicated room for resting is provided in the Contractor office.

4.3 Working Hours

Where practicable, all works will be undertaken during daytime hours from Monday to Friday (08:00 to 18:00) and on Saturdays (08:00 to 13:00). A shoulder hour on either side of these times will be proposed for start-up and close-down activities such as, but not limited to, arrival and departure of workforce, site briefings, inspections and safety checks, clean-up, maintenance (non-noisy) and refuelling.

The preparation works, including ground preparation, welfare, and fencing at the beach area, are scheduled to take place on a 12-hour per day, 6 to 7 days per week basis. However, certain activities will require 24-hour operations throughout the week due to tight scheduling constraints related to tidal constraints on site access, minimise overlap with wintering bird season, and the intention to complete before the Easter holiday, which necessitates a more condensed timeline. This approach also helps address potential delays from high tide and aims to optimise operations while avoiding disruption during sensitive periods for the little Tern population.

Drilling activities must be conducted continuously, as interruptions may lead to the drilling head becoming lodged and potentially leading to tunnel collapse. This could result in abortive work and the necessity to begin a new conduit separate from the original alignment, thereby extending the duration and impact of the HDD drilling. Demobilisation of HDD is expected to occur on a 12-hour per day schedule.

For the cable mobilisation and cable installation works on the beach, this also needs to be carried out 24-hours per day. This is due to the tidal environment by which progress is limited per shift. Mobilisation, preparation

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and demobilisation at Warren Farm will be however attempted to be limited to 12 hours per day. A typical shift time for 24 hour working is from 07:00 to 19:00, and 19:00 to 07:00. Therefore, during these periods of the works, 24-hour access, and egress, is required.

The HDD conduit construction will commence in February to early April 2026, which is outside of the Little Tern breeding season.

4.4 Consents and Permits

Table 4.1 shows the licenses, consents, planning and permits applicable for this project. Copies of these will be retained on site.

Table 4.1 Consents and Permits

Licenses / Consents / Permits	Authority	Reference Number	Relevant Section (for conditions)	Responsibility
Town and Country Planning Permission	Flintshire County Council	[FUL/000000/25] & FUL/000246/23	CTMP- Condition 5	LB CCS
Marine Licence	Natural Resources Wales	CML2365	Notifications as per 3.1. and 3.2	LB CCS
Written notification of the date of commencement of any works on the site	Flintshire County Council Natural Resources Wales	[FUL/000000/25] & FUL/000246/23 CML2365	Condition 2 Notifications as per 3.1. and 3.2	LB CCS
Written notification of the date of the material start of each phase of development	Flintshire County Council Natural Resources Wales.	[FUL/000000/25] & FUL/000246/23 CML2365	Condition 2 Notifications as per 3.1. and 3.2	LB CCS
CEMP approval	Flintshire County Council Natural Resources Wales	[FUL/000000/25] & FUL/000246/23 CML2365	Condition 8 Condition 3.25	Contractor / LB CCS
Biosecurity Risk Assessment and Method Statement	Flintshire County Council Natural Resources Wales	[FUL/000000/25] & FUL/000246/23 CML2365	Condition 17 Condition 3.25	Contractor

4.5 Description of the Horizontal Directional Drilling (HDD) activities

4.5.1 Overview of HDD Method

The installation of the cables under the Gronant Dunes will utilise HDD equipment, see **Figure 4.3** for a schematic overview. This technique will be used to avoid causing disturbance to the ground surface, and disturbance to the ecologically sensitive dune system. The HDD process involves drilling a tunnel from an entry pit behind the dunes to an **exit pit** located just below the MHWS line.

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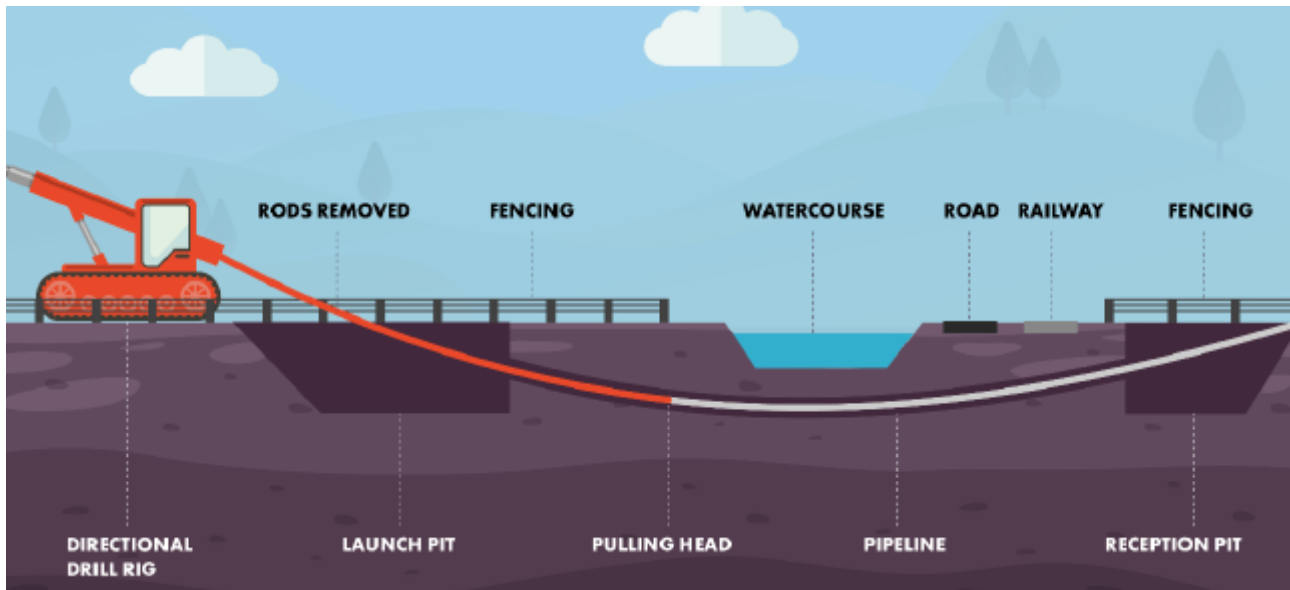


Figure 4.3: Illustration showing man features of typical HDD technique for cable installation

HDD operations are undertaken from two sites, an entry pit site, (i.e. Warren Farm), and an **exit pit** site, i.e. Talacre beach. The establishment of the **Activity 1, Phase 1 HDD Exit Pit** and associated activities is further explained within the following **Sections 4.5.2 to 4.5.9**.

4.5.2 HDD Exit Pit Establishment

The HDD Exit Pit site will be established on Talacre Beach at the same time as the Entry Pit site in Warren Farm. The HDD Exit Pit site will be appropriately signed, fenced, and house some welfare facilities. Once the site has been established, the construction equipment, such as excavators, sheet piles, pumps, and generators will be mobilised on to Talacre Beach.

A detailed design drawing showing the layout of the HDD Exit Pit works at Talacre Beach is presented in **APPENDIX A**.

Some of the equipment for the Exit Pit will be delivered to the Entry Site where it is loaded onto an agricultural tractor and trailer before being driven to the beach for installation. Larger equipment, such as excavators, will be delivered directly to the Talacre beach car park. The equipment will then access the Exit Pit site along the top of Talacre beach within the red line boundary shown in TCPA planning permission **FUL/000246/23**, as shown in **Figure 4.1**.

Due to the ramp that crosses the sea wall at the car park entrance, HGVs are unlikely to be able to cross the ramp, a detailed plan of how to manage this will be developed in time, at this stage it is likely that HGVs will have to reverse down the narrow section of road approaching the car park, equipment shall be unloaded at the bottom of the ramp and then will be driven over the ramp into the car park.

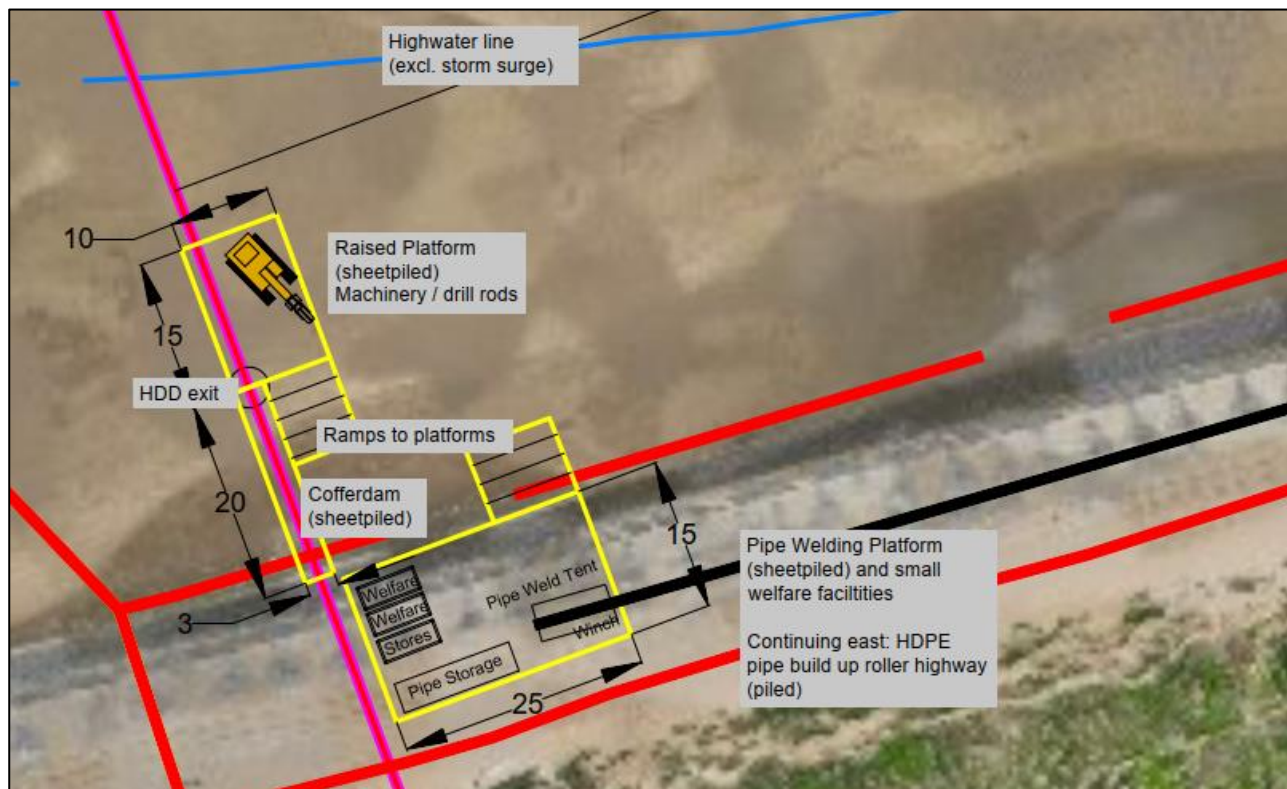
To minimise risk and inconvenience to the public this would be undertaken during early mornings when the area is quieter. A means of protection for the road surface such as car tires or rubber matting will be deployed.

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To ensure secure containment of drilling fluid during operations and prevent any discharge into the marine environment, an exit pit is constructed. For the Gronant dune system HDD on the intertidal side, this pit will be excavated 2–3 mbgl. Due to both the required depth and the associated risk of excavation collapse, it may be necessary to reinforce the excavation with trench boxes and sheet piles. Groundwater accumulating in the excavation will be removed using temporary pumps as needed, with any seawater ingress returned directly to the sea. The pile height above the beach will be determined based on predicted tidal heights and pit location to prevent seawater entry at high tide. Additionally, sandbags will be positioned around the sheet piles to minimise tidal scour effects.

During the drilling process, effective management of drilling fluid requires its transfer from the HDD exit pit back to the HDD entry site for recycling. To address this need, it is proposed that a dedicated mud return line be drilled adjacent to the HDD drill line. Given the sensitivity of the area and the impracticality of completing all transfers by road due to distance constraints, installing a mud return line via an initial bore between the HDD entry and exit sites has been recommended. The drill pipe will be left in place to function as a transfer conduit between the two locations. Upon completion of the work, this pipe will be removed.

However, cuttings present within the fluid may obstruct the mud return line; therefore, the drilling fluid is initially cleaned at the beach. To achieve this, it is recommended to install a shaker system—comparable, though smaller in scale, to the recycling facility situated at the HDD entry site at Warren Farm. This shaker will remove larger cuttings from the drilling fluid, thereby allowing the cleaned fluid to return via the mud return line. The separated cuttings will be securely contained at the beach and subsequently transported by agricultural tractor or vacuum tankers to Warren Farm, where they will be transferred by licensed carriers for either offsite reuse or disposal.



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Figure 4.4: Indicative Site Layout Exit Pit

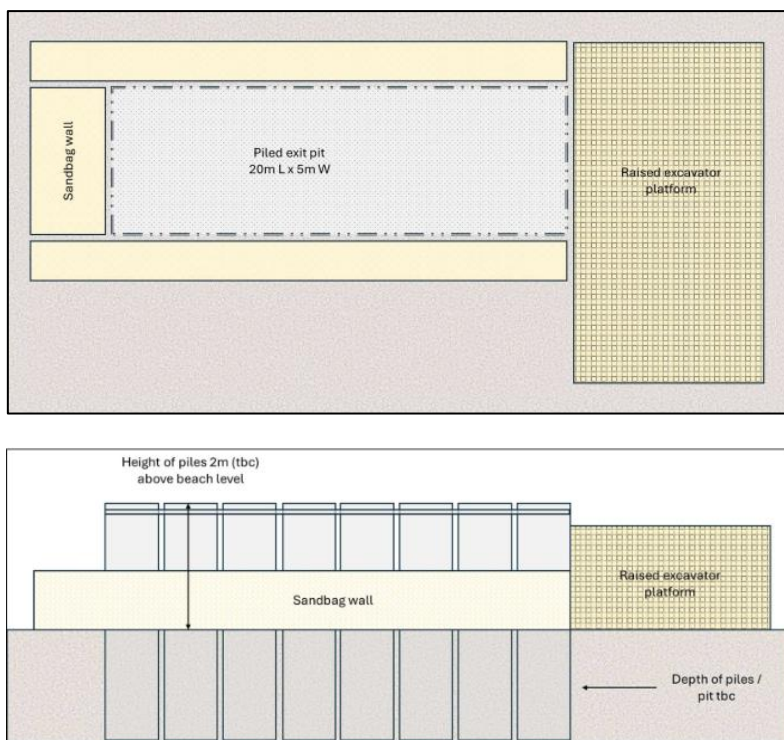


Figure 4.5: Typical Sheet Piled Exit Pit (top and side view) Raised Working Platform

A raised working platform will be required, as shown in **Figure 4.5**, to ensure equipment and storage containers are dry at high tides. A list of the main plant and equipment required at the HDD Exit Pit is resented in **Table 4.2**.

Table 4.2 List of main equipment at Talacre Beach HDD Exit Pit site for the cable conduit installation under dunes.

Equipment	Quantity*	Power generated by	External Generator supply quantity	Indication size of external generator
Welfare / office facilities	-*	Diesel generator	1-2x	30-50 kVa
Workshop /storage / control containers	-*	Same generator of welfare containers	-	-
Excavator	1-3	Internal diesel generator	Internal	-
Dozer	1	Internal diesel generator	Internal	-
Tractor / trailer	1-2	Internal diesel generator	Internal	-
Cranage	1	Internal diesel generator	Internal	-
Towerlights	4-6	Diesel generator	Internal / external	5-15 kVA each
Dewatering	0-1	Diesel generator	1x	50 kVA*

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4.5.3 Pipe welding (heat bonding)

Figure 4.6 shows that the area for the HDD conduit pipe assembly will be established besides the HDD Exit Pit. To store the machinery during high water, the pipe welding area will be set up to the east of the HDD Exit Pit. From the pipe welding area, rollers will be temporarily installed over a length of 500m to create a solid structure onto which the pipe can be assembled and secured during highwater.

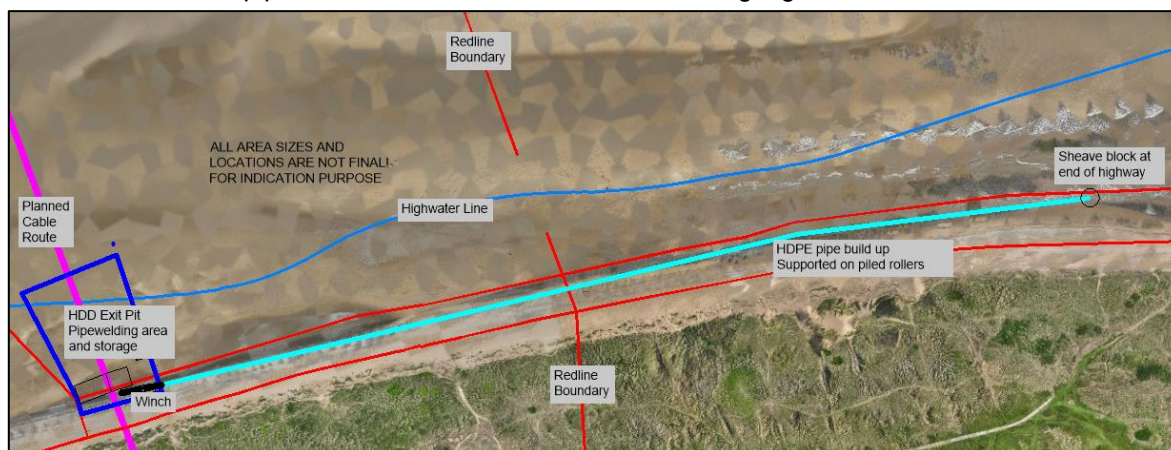


Figure 4.6: Pipe Assembly at beach proposal. HDD exit pit and location size for visual reference only - not indicative

The equipment and materials necessary for welding the HDPE ducting will initially be delivered to Warren Farm. After arrival, these items will be transferred onto a tractor and trailer for transportation to the beach area, utilizing the Talacre car park beach entry route. This approach is designed to minimize disruption to the access road at Talacre car park by reducing offloading and equipment movement at that location.

Large equipment, such as excavators that cannot be transported via standard tractor and trailer, are scheduled to be loaded or offloaded at Talacre car park and/or at the base of the sea defence ramp. Trucks will need to reverse down the narrow section of Station Road leading to the car park; machinery will then be unloaded at the bottom of the ramp and subsequently driven over the ramp into the car park. To reduce risk and minimize inconvenience to both the public and local businesses, these activities will be carried out during off-peak periods when the area is less busy. Protective measures for the road surface, such as car tyres or rubber matting, will be implemented as required. Additionally, plastic road plates may be utilised where necessary to mitigate ground disturbance and preserve the condition of the car park entrance route.

The following equipment would be required for the pipe welding area.

- 6-7x HDPE pipe stacks to store 550m of 355mm pipe incl spares. Footprint of each stack 12m x 1m.
- Welfare facility incl. generator
- Mobile winch incl. generator
- Concrete ballast blocks Approx 1t.
- Fencing and signage
- Rollers incl. piles
- Crane mats
- Excavator
- Pipe welding equipment

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Figure 4.7: Example piled roller highway (left), typical mobile winch (right)



Figure 4.8: Typical pipe welding equipment, storage of pipes and welfare not shown

A mobile winch (see **Figure 4.7**) will be mobilised to the beach and set up near the pipe welding area. The winch wire is routed below the roller highway and redirected at the end of the highway by a sheave block back to the HDPE pipe resting on the rollers. By paying in on the winch, the HDPE pipe can be moved over the roller highway for the crew to weld the next pipe section onto this. This would remove the need for multiple excavators during the pipe welding process and, therefore, limit the noise emitted during the pipe welding process. Please see **Figure 4.9** for a sketch of this setup.

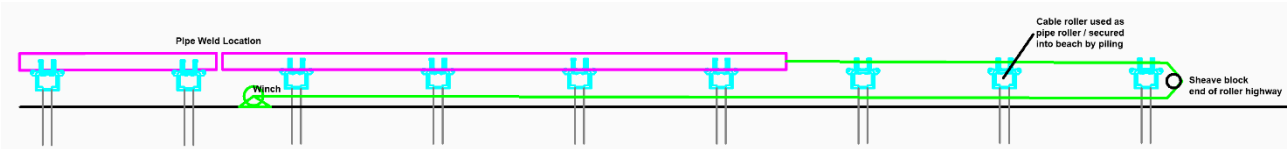


Figure 4.9: Sketch pulling HDPE pipe over roller highway by winch instead of moving it by excavators

Assembly operations may proceed throughout the tidal cycle on the beach, as machinery, equipment, and the roller highway are elevated above both the beach surface and the high water line. Where feasible, welding activities will be scheduled to avoid periods of high spring tides. The use of piled rollers additionally enables secure anchoring of the HDPE pipe during spring high water. However, it should be noted that, due to the presence of overwintering birds, these operations may require suspension for three hours on either side of high tide.

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The distance from the Talacre car park beach access point to the easternmost section of the beach site compound (specifically, the sheave block at the terminus of the roller highway) exceeds 700 m. As the final HDD exit location has yet to be determined and may potentially be positioned further east within the red line boundary, a minimum separation of 500 m will remain applicable.

4.5.4 Pilot hole

When all site establishment activities are completed and the pipe is ready the drilling process can commence, the following key activities describe the process

The first stage of the process is to drill a pilot hole from HDD entry point to HDD exit point, a drill bit with a bent section (see **Figure 4.10**) is used to make the pilot hole, directional control is achieved by orientating the bent section in the direction of desired drill path.



Figure 4.10: Typical drilling rig and pilot drilling assembly

A steering tool is positioned inside the drill bit to deliver real-time data for drilling operations. Drill pipe sections are incrementally added to the rig each time new pipe is installed; this process continues until the drill bit reaches the exit pit. Drilling fluids are pumped down the drill string to assist in jetting the strata, cooling the bit, and removing cuttings from the borehole. These fluids also help maintain the stability of the bore to prevent collapse. When bentonite interacts with surrounding soils, it forms a 'bentonite filter cake,' which is a thin, impermeable layer on the walls of permeable formations. This layer acts as a barrier between the drilling fluid and adjacent rock, soil, or groundwater.

Cuttings are removed from the drilling fluid at the mud plant located at the entry site, and the fluid is circulated continuously through the system.

4.5.5 Reaming phases

When the pilot is completed, the pilot drilling assembly is removed at the HDD exit point and replaced with a back reaming assembly. This back reaming assembly is drilled from the exit to the entry site again in sections of drill pipe which are removed one by one at the entry site, behind the reaming assembly extra drill pipes are added so that upon completion of the reaming phase a drill string remains inside the bore hole to ensure the drill path is not lost.

This process can be repeated several times to enlarge or clean the bore hole until the drilling team are satisfied that the bore hole is ready for pipe installation. Drilling fluids are also pumped constantly during this process to clean the hole of the cuttings and stabilise the bore hole.

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Figure 4.11: Rear reaming assembly

4.5.6 Pull back

When the reaming phase is complete the pipe pull back will commence, the pipe string in one continuous length is delivered the exit point of the HDD from the storage location on the foreshore, the pipe is pulled by one or more excavators until the 1st end arrives near to the exit point, then the pipe is aligned with the direction of the drilled hole. Rock bags or other may be used to keep the pipe in the required position and bend, prior entry at the exit point.

During this operation, all unauthorised personnel and public would be excluded from the work area. However, as working is planned around high tide, passage near the dunes and near the waterline remains possible for the public to pass this area. **Figure 4.12** shows a box of no access but allowing passage around it.

The pipe shall be connected to the drill string in the bore hole and then the pull back operation will be executed continuously until the pipe is fully installed. As with pilot drilling and reaming the drilling fluids are continuously pumped down the hole to lubricate the pipe and remove cuttings from the bore hole.



Figure 4.12: Pipe repositioned for pull back

4.5.7 Drilling Fluid Management

Used drilling fluids at Warren Farm are collected in a lined, secure lagoon for cleaning and recycling. Fluid levels are closely monitored to prevent overflow, and solids are separated for off-site disposal. A closed-loop system and mud return line ensure all fluids are contained and recycled efficiently between the entry and exit

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pits, with additional screening at the beach to prevent blockages. Upon completion, all remaining fluids and contaminated soil are removed by licensed waste handlers.

Please see the detailed description at **Section 6.7.2 - Drilling fluid management**.

4.5.8 Pipe finalisation

On successful installation of the duct from exit to launch pit, a gauging swab will be used to prove the internal integrity ahead of cable pulling works, as shown in **Figure 4.13 (left)**. The gauging swab is pushed through the installed duct using clean water pumped under pressure from the high-pressure mud delivery pump in the drill compound. The gauge (aluminium disk) will be sized at 90% of the inside duct diameter. Once the gauging swab has been pushed the duct any damage or deformation of the duct ID would in turn deform the gauge disk. No deformation of the gauge plate confirms the duct is installed with little or no internal defect.

Following successful passing of the gauging swab assembly, a second pass using a solid foam swab will be completed in the same manner. During this pass a messenger rope will also be installed and secured via the blanking pat each end of the duct ready for use during the cable installation operation.

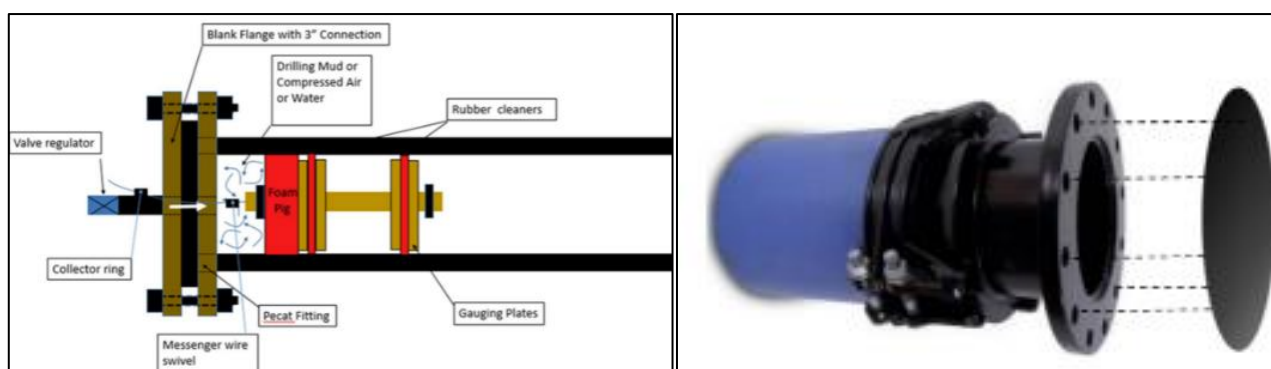


Figure 4.13: Schematic of gauging swab assembly (left), and Flange adaptor + cover plate duct seal (right)

Duct end sealing and capping will be completed using an end restraint flange adaptor and cover plate, as shown in **Figure 4.13 (right)**.

4.5.9 Programme for HDD works

Figure 4.14 summarises the activities for the installation of the HDD Exit Pit on Talacre Beach and shows that the programme will avoid the little tern breeding season by carrying out the HDD Conduit, and Exit Pit works during **February and March 2026**.

Figure 4.14 also shows the assumptions, and environmental considerations factored into the planning of the works. The anticipated duration of each activity required for the installation of the HDD Exit Pit is shown. Detailed design and engineering may require minor modifications to the exact timing of the works.

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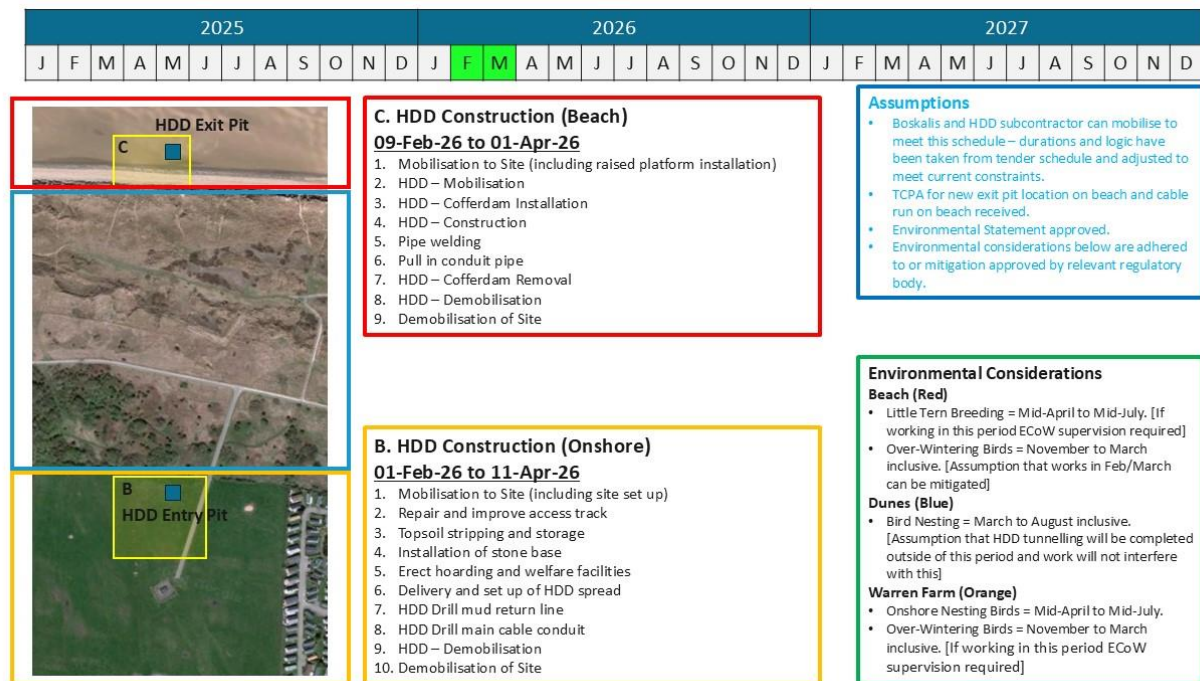


Figure 4.14: Summary activities and programme for installation of HDD Exit Pit recognising environmental sensitivities

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5.0 ENVIRONMENTAL ASPECTS

The key environmental sensitivities are summarised in this section, with consideration as to how this may be affected by the HDD Exit Pit Works.

5.1 Archaeological features

There are two Second World War aircraft crash sites in the vicinity of the HDD Exit Pit Works. There are two Spitfire wrecks that are recorded as being near the HDD Exit Pit Works. The Joint Casualty and Compassionate Centre of the Ministry of Defence confirmed that the aircraft crash locations are approximate, and that any aircraft remains would need to be excavated under licence and should be recorded and handled in line with legislation and all professional guidance. A further license is not required from Flintshire Council for aircraft crash site excavation.

The area of potential archaeological impact will be within the footprint of the HDD exit pit at the MHWS and its temporary access. Shallow archaeological remains may be affected by movement of vehicles and plant involved in construction activities, for example through rutting and compaction. A **Written Scheme of Investigation (WSI)** has been prepared as 'Project Design for Archaeological Monitoring and Recording – Point of Ayr HDD Cable Installation and Foreshore Works' (PD). The **WSI** is presented at **Appendix C**.

The cable installation between the exit pit and the MLWS does not form part of the **Phase 1** works covered by this **CEMP #1**. As described in **Section 1.1**, the cable installation works will be included in **CEMP #3**, which will follow in **February 2026**, in advance of the **Phase 3** works planned for June–July 2026.

In the unlikely event that remains of very high significance are identified, the Archaeological Fieldwork Contractor will inform the Archaeological Consultant immediately, who will then consult with the LPA Archaeological Advisor.

5.2 Ecology

Ecological surveys were conducted as part of the TCPA application **FUL/000246/23** during 2022. New and additional surveys for several notable species and habitats have been undertaken in 2024 and 2025 for TCPA application **FUL/000705/25**, and the updated findings are summarised in **Table 5.4**, and **Table 5.5**.

5.2.1 Designated Sites

The desk study identified eleven statutory nature conservation sites of international importance within 10km of the RLB for the PoA Terminal, as shown in **Table 5.1**.

Table 5.1 Statutory and Non-Statutory Designated Sites

Site	Designation	Distance from Site
Statutory Designated Sites		
Dee Estuary/Aber Afon Dyfrdwy	Site of Special Scientific Interest (SSSI)	Within RLB
The Dee Estuary	Special Protection Area (SPA) & Ramsar	Within RLB
Dee Estuary/Aber Dyfrdwy	Special Area of Conservation (SAC)	Within RLB

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Site	Designation	Distance from Site
Dee Estuary/Aber Afon Dyfrdwy	Ramsar	Within RLB
Gronant Dunes and Talacre Warren	SSSI	Within RLB
Liverpool Bay/Bae Lepwl	SPA	Within RLB
Mersey Narrows and North Wirral Foreshore	SPA	7km
Mersey Narrows and North Wirral Foreshore	Ramsar	7km
Halkyn Mountain/Mynydd Helygain	SAC	9.5km
Dee West	Shelfish Protected Area	500m
NVZ ID: 135 (Groundwater)	NVZ	1,600m southwest
Non-Statutory Designated Sites		
Dee Estuary	RSPB Reserve	270m east
Gronant Dunes	Local Nature Reserve (LNR)	1.4km
Talacre Abbey and Woods	WSF	500m
Tanlan Banks and Ffynnonogyw Woods	WSF	1km
Big Pool Wood	North Wales Wildlife Trust Reserve	1km

5.2.2 Intertidal Habitats

The HDD Exit Pit will be located on the habitat types (LS.LSa.MuSa Polychete_bivalve-dominated muddy sandy shores, and Mosaic: 85% LS.LSa.MoSa Barren or amphipod-dominated mobile sandy shores, 15% LS.LSa.MuSa Polychete bivalve dominated muddy sandy shores), as shown in **Figure 5.1**.

While all intertidal flats at Talacre form part of the qualifying SAC habitat H1140, the mobile/barren sand biotopes, in which the HDD Exit Pit will be located, are of comparatively “lower ecological value”. This is because of their low species richness and opportunistic fauna. Whereas muddy sand flats with *Macoma* and *Arenicola* are of higher conservation importance owing to their biodiversity, structural complexity and critical function in supporting internationally important bird populations.

Liverpool Bay CCS Limited recognises that ecological value can mean slightly different things depending on context (conservation importance, biodiversity richness, functional role, designation sensitivity). Notwithstanding, to demonstrate that the HDD Exit Pit will be in an area of ‘lowest’ ecological value within the red line boundary, **Table 5.2** presents estimations of the relative value of the categories of habitats at Talacre Beach (Dee Estuary, Annex I 1140 habitat).

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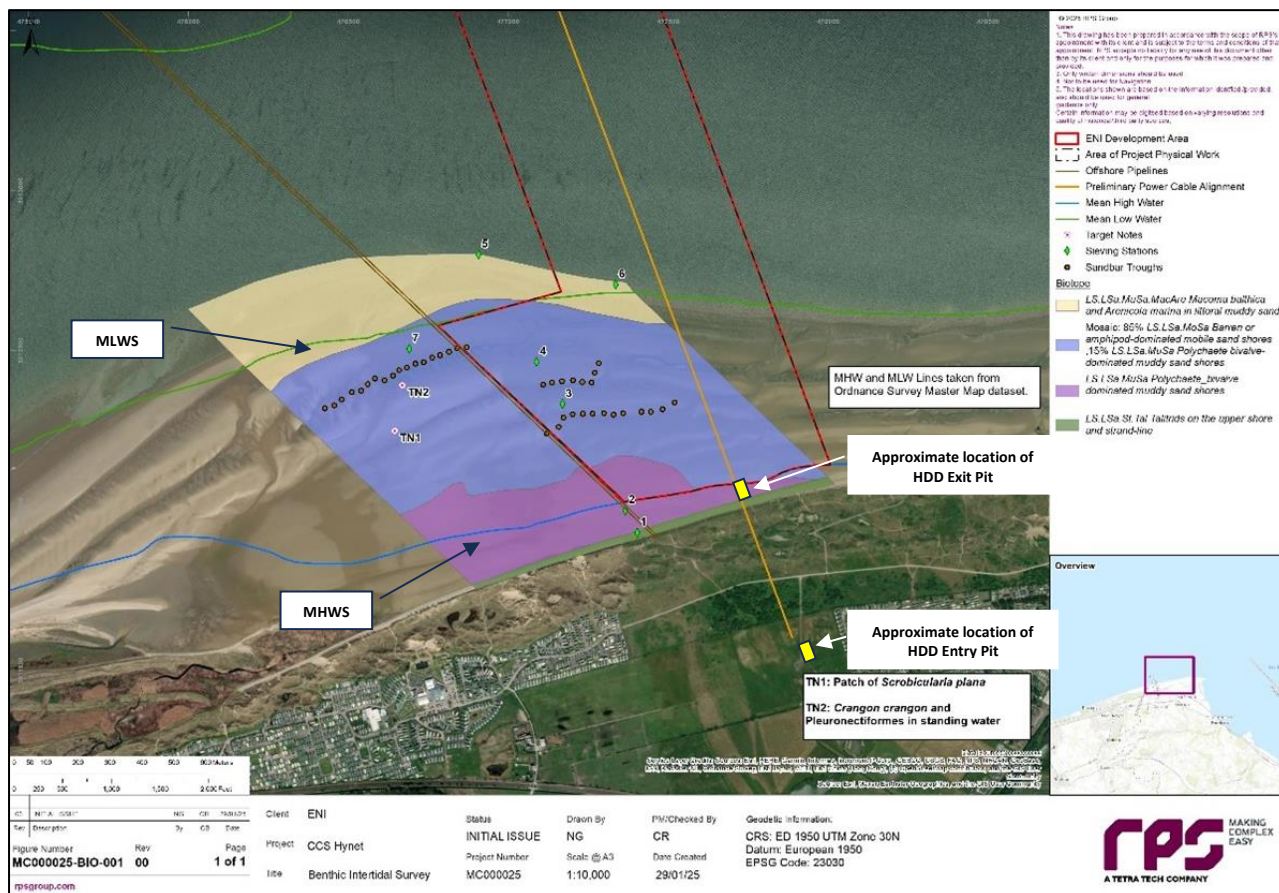


Figure 5.1: HDD Exit Pit in relation to habitat types for Talacre (Dee Estuary, Annex I 1140 habitat)

Table 5.2 Relative 'ecological value' of habitat types for Talacre (Dee Estuary, Annex I 1140 habitat)

Habitat Type	Estimation of relative value
Mobile / barren sand shores (amphipod-dominated)	Biodiversity: Typically low – sparse infauna, sometimes dominated only by amphipods (<i>Bathyporeia</i> spp.) or essentially barren due to sediment mobility. Functional role: Important as prey base for some fish and shorebirds, but overall less structurally complex and supports fewer specialist species. Conservation value: Generally considered the lowest ecological value of the listed types because of low species richness and high natural disturbance.
Polychaete–bivalve dominated muddy sand / Mixed muddy sand (<i>Macoma balthica</i>, <i>Arenicola marina</i>)	Biodiversity: Much richer; supports diverse polychaetes, bivalves, and bioturbators. Functional role: High – influences sediment structure, nutrient cycling, and provides food for waders and fish. Conservation value: Higher, especially since <i>Macoma</i> flats are recognised as important prey grounds for estuarine birds.
Strand-line (talitrids, beach hoppers)	Biodiversity: Often dominated by talitrid amphipods but linked to wrack and detrital processing. Functional role: Significant as part of the wrack-associated food web (e.g., birds, beetles). Conservation value: Higher than “barren sand,” though patchy.

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Therefore, among the Talacre Beach habitats, the mobile / barren sand shores (amphipod-dominated), in which the HDD Exit Pit will be located, can be considered of the ‘lowest’ ecological value, due to low species richness, simple trophic structure, and high natural disturbance making them less critical for conservation relative to muddy sand flats and strand-line habitats.

Table 5.3 provides a summary of some of the UK reference sources that support the notion that the mobile / barren sand / amphipod-dominated biotopes are lower in ecological value, in terms of species richness, functional complexity, and sensitivity, especially compared with, for example, muddy-sand flats with *Macoma*, *Arenicola*, etc.

Table 5.3 Reference sources supporting ‘lower’ ecological value or mobile/barren sands

Reference source	Key points from reference source	Evidence for how it supports “lower ecological value” for mobile/barren sands
JNCC Biotope: “Barren or amphipod-dominated mobile sand shores” (biotope type LS.LSa.MoSa)	Describes the habitat as “mobile sands ... limited range of species ... barren, highly mobile sands to more stable clean sands supporting communities of isopods, amphipods and a limited range of polychaetes.” (https://mhc.jncc.gov.uk/biotopes/jnccmncr00001522)	Indicates that species richness is low; the community is relatively simple and dominated by opportunistic fauna. Such simplicity often correlates with lower conservation priority relative to richer biotopes.
MarLIN: “Amphipods and <i>Scolecipis</i> spp. in littoral medium-fine sand” (LS.LSa.MoSa.AmSco)	Assesses sensitivity to changes (e.g. salinity) as “Low”, with “High” resilience. That is, the habitat can recover well from disturbance and is not highly sensitive. (Amphipods and <i>Scolecipis</i> spp. in littoral medium-fine sand - MarLIN - The Marine Life Information Network)	A habitat that is not very sensitive, with high resilience, often implies lower ecological “risk” or lower ecological “value” (as per NRW’s parlance) in trade-off terms, since loss or disturbance is less damaging in the long-term compared to sensitive habitats within the designated site.
MarLIN: “Infralittoral mobile clean sand with sparse fauna”	Characterised by a scarcity of species resulting from sediment mobility and abrasion. Fauna are transient, opportunistic. (Infralittoral mobile clean sand with sparse fauna - MarLIN - The Marine Life Information Network)	Sparse fauna, opportunism, high disturbance regime — all hallmarks of a lower complexity, lower ecological value biotope. Such habitats contribute less in terms of stable structure and specialized ecosystem services.
MarLIN: “Barren littoral coarse sand”	Notes that coarse sands drain rapidly, have low water and organic content, and high sediment mobility; macrofaunal community is mostly lacking. (Barren littoral coarse sand - MarLIN - The Marine Life Information Network)	Nearly barren, few faunal elements, largely abiotic environment. Clearly lower faunal biodiversity and lower functional complexity.

5.2.3 Other Habitats of Conservation Importance

A UK habitat classification survey identified the following habitats:

- Modified grassland
- Dense scrub and introduced shrub
- Mobile Dunes
- Dune grassland
- Dune slacks
- Intertidal habitat
- Ponds

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Table 5.4 Summary of Habitats Present

Feature	Summary
Dense scrub and introduced shrub	To the south of the access track, the habitat consisted predominantly of dense scrub classified as h3h mixed scrub in UKHab and A2.1 dense/continuous scrub in Phase 1. There were also some more open patches, dominated by false oat-grass <i>Arrhenatherum elatius</i> between less dense scrub patches and towards the north-east of the mapped dense scrub area. The scrub consisted mostly of bramble <i>Rubus fruticosus</i> , with frequent sycamore <i>Acer pseudoplatanus</i> , hawthorn <i>Crataegus monogyna</i> and grey willow <i>Salix cinerea</i> . Some individual larger trees or small tree groups were also present and were recorded and condition assessed separately for use during NBB assessment. The habitat in this area comprises a mosaic of MG1 <i>Arrhenatherum elatius</i> grassland, W24 <i>Rubus-Holcus</i> undershrub, W2 <i>Salix-Betula-Phragmites</i> woodland and W6 <i>Alnus-Urtica</i> woodland.
Modified grassland	To the south of the dense scrub, there was a large, pasture field at Warren Farm, classified as g4 modified grassland in UKHab and B4 improved grassland in Phase 1. It is not within the Site but is within the Survey Area. The field was species-poor and dominated by perennial rye-grass <i>Lolium perenne</i> and white clover <i>Trifolium repens</i> , giving a close match to the NVC community MG7 <i>Lolium perenne</i> leys.
Dunes	The foredunes habitat type equates to UKHab s3a5 embryonic shifting dunes, Annex I embryonic shifting dunes (H2110) and NVC communities SD4 <i>Elymus farctus</i> ssp. <i>boreali-atlanticus</i> foredune community and SD5 <i>Leymus arenarius</i> mobile dune community. There is no separate classification to separate this habitat type from open dunes in Phase 1 methodology. Embryonic shifting dunes were recorded along the seaward edge of the dunes in 2021/22 (with small amounts of the NVC SD4 <i>Elymus farctus</i> ssp. <i>boreali-atlanticus</i> foredune community being present) but were absent in 2025 during the walkover. Kim Norman of ENI informed the surveyors that large sections of foredunes had collapsed during storms over the winter of 2024/25, which accounted for the absence of embryonic shifting dunes. The majority of habitat within the Survey Area was classified as s3a6 shifting dunes with marram (UKHab). This equates to H6.8 open dune in Phase 1 and constitutes the Annex I habitat; shifting dunes with marram (H2120). Within the shifting dunes with marram/open dunes there were three well-defined dune slacks in the eastern half of the Survey Area. These were classified as humid dune slacks s3a3 within UKHab and dune slack H6.4 in Phase 1. This habitat constitutes the Annex I habitat, humid dune slacks (H2190). The middle slack was partially enclosed by a post and wire fence around its northern section, whilst the southern section was un-fenced. Consequently, the vegetation coverage was far thicker in the fenced section, at the time of the walkover, with a thick carpet of pointed spear-moss <i>Calliergonella cuspidata</i> present within the fenced area. SD14 <i>Salix repens</i>-<i>Campylium stellatum</i> dune slack community and the SD16 <i>Salix repens</i>-<i>Holcus lanatus</i> dune slack community were recorded within the dune slacks. Areas dominated by pointed spear-moss would also seem to indicate an affinity with the SD15 <i>Salix repens</i>-<i>Calliergon cuspidatum</i> dune-slack community. A long, narrow strip of short grassland, which ran east to west across the middle of the shifting dunes with marram/open dunes and between two of the dune slacks was recorded during the walkover. This shorter grassland was dominated by red fescue <i>Festuca rubra</i> and was classified as s3a7 dune grassland in UKHab, which equates to H6.5 dune grassland in Phase 1 and comprises the Annex I habitat, dune grassland (H2130).
Species-poor intact hedge	There are several hedgerows in the wide area. Most are along the boundaries or only just within the Site, though there is one just to the west of Station Road which cuts across the route. This hedge and others in that area are mostly heavily managed and species-poor with Hawthorn and Blackthorn being the most abundant species. There are also some non-native or only partly native hedgerows, most notably surrounding an abandoned car parking area to the south-east of the Site. Only two of the hedges on or very close to the Site were species-rich, both being short but relatively tall and wide, and both located just to the south-west of the terminal.
Intertidal habitat	Immediately to the north of the open dune/shifting dunes with marram, the Survey Area encompassed a strip of beach. This strip would be classified as t2d5 intertidal mudflats and sandflats in UKHab and as H1.1 intertidal mud/sand in Phase 1. This habitat constitutes Annex I intertidal mudflats and sandflats (H1140). The mud and sand habitat extends northwards towards the sea covering most of the intertidal area.

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5.2.4 Protected and Notable Species

5.2.4.1 Little tern:

(See also **Section 6.2.1.Birds**) Liverpool Bay CCS Limited will not be carrying out any of the works described within this CEMP during the little tern season between mid-April to end July 2026.

5.2.4.2 Bats

Surveys carried out in the vicinity of the proposed HDD Exit Pit have found no bat activity within 1.5km of the works areas. Bat foraging was observed around 1.9km to the south west of the HDD, potentially associated with confirmed bat roosts in farm buildings at Warren Farm, on Station Road.

Notwithstanding, the Applicant confirms that lighting mitigation measures, to address ecological sensitivities, are presented in **Section 6.3.2** in **Figure 6.1**.

The construction lighting has accounted for the guidance for permanent lighting schemes provided in the Institution of Lighting Guidance Note 08/23: Bats and Artificial Lighting at Night. The figure shows that lighting is directed towards the tasks being carried out to avoid unnecessary light spill.

5.2.4.3 Summary of Baseline Species and Habitats

Table 5.5 Summary of Baseline Species and Habitats

Species, Species Group or Habitat	Baseline Summary
Breeding and wintering birds	Habitats present such as the scattered trees, dense and scattered scrub, and plantation woodland, provide nesting and foraging opportunities for a variety of bird species. Ponds and wet ditches can also act as foraging/roosting and nesting places for waterfowl. Warren Farm remains a working farm with a tenant farmer. Generally, the farm holds grazing cattle during the summer months and sheep during the winter, when the cattle are kept inside various sheds. The fields are designed to be seasonally flooded from September to March via an irrigation system installed when the gas pipeline was laid. The irrigation system was constructed as part of the mitigation works for the PoA gas terminal. As a result, new habitats have been created which, when flooded, are ideal for feeding and roosting waders and wildfowl. The two large, lined ponds are provided for waders and wildfowl throughout the winter period. Wildfowl species usually present include teal, wigeon, mallard, tufted duck, shoveler and pintail. Wader species include curlew, oystercatcher, redshank, lapwing and black-tailed godwit. The hedgerows surrounding the farm support foraging migratory thrush and passerine species such as redwing and fieldfare. The seven key species at Warren Farm are teal, mallard, oystercatcher, golden plover, curlew, lapwing and redshank. A further two species of increasing significance, black-tailed godwit and wigeon have also been included as key species in more recent years.

5.2.5 Invasive Non-Native Species

A Biosecurity Risk Assessment and Method Statement has been prepared to satisfy **Condition 3.25** of **CML2365** and is included within the **Invasive Non-Native Species Management Plan** presented at **Appendix B**. Biosecurity measures are also described at **Section 6.2.4**.

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5.3 Nuisance

5.3.1 Residents and Local Community

Given the location and nature of the project activities they may affect residential properties. The sensitivity of each receptor will depend on their location and proximity to the site and identified transport routes. Potential issues include:

- Mud on roads spread by construction traffic.
- Litter.
- Noise and vibration from vehicles and plant.
- Disruption to business.
- Excessive or poorly directed light.
- Dust and fumes from vehicles and plant.
- Traffic disruption.
- Reduction of access to amenity space.

Given the existing use of the PoA terminal, the project is not expected to cause a permanent nuisance. However, temporary nuisances during construction could occur to the following:

- Talacre Beach Resort and holiday homes.
- Presthaven Beach Resort.
- Silver Birch Caravan Park.
- Residents in Gwespyr Village, Flintshire.

Measures and mitigation for managing nuisances are detailed in **Section 6.3**.

5.3.2 Air Quality

Atmospheric emissions will depend on both the potential for emissions (the type of activity and prevailing conditions) and the effectiveness of control measures. Generally, two sources of emissions need to be controlled to minimise the potential for adverse environmental effects:

- Exhaust emissions from site plans, equipment and vehicles.
- Fugitive dust emissions from site activities.

5.3.2.1 Exhaust emissions from site plans, equipment and vehicles

The operation of vehicles and equipment powered by internal combustion engines results in the emission of exhaust gases, including nitrogen oxide (NO_x), particulate matters (PM₁₀), volatile organic compounds (VOC), and carbon monoxide (CO). Emission levels depend on factors like engine type, service history, pattern of usage and fuel composition. While exhaust emissions will occur from site activities, they are not expected to be significant compared to emissions from vehicle movements on surrounding roads. Traffic will include haulage and construction vehicles, as well as vehicles for workers' commutes.

5.3.2.2 Fugitive dust emissions from site activities

Fugitive dust emissions depend on the type and extent of activities, soil type, moisture levels, road surface conditions and weather. Dry weather combined with high winds can increase dust generation. Key activities that may produce dust on site include:

- Earth moving, due to the handling and storage of soil and subsoil materials.
- Movement of heavy site vehicles on dry surfaces.
- Movement of vehicles over surfaces where muddy materials have been transferred off-site (for example, onto public highways).

Measures and mitigation for managing air quality during construction are detailed in **Section 6.3.1**.

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5.3.3 Lighting

During construction, task orientated lighting will be used in shifts at the lowest luminosity necessary for safe delivery of each task i.e. it will not be continuous. It will be designed, positioned, and directed to reduce the intrusion into adjacent properties and habitats. The exception to this will be at trenchless crossings where 24-hour working will be required for the actual drilling activity. The overall duration of works at each site will be an approximate 4-weeks at each location. It is therefore considered temporary in nature and unlikely to result in significant effects. Control measures and mitigation for managing lighting during the HDD Exit Pit activities are detailed in **Section 6.3.2.** and the construction lighting proposals shown in **Figure 6.1.**

5.3.4 Noise and Vibration

Noise and vibration from the HDD, and cable laying activities, including equipment and vehicular movements, have the potential for short-term impacts. To manage these, standard construction methodologies are to be employed to control noise and vibration in accordance with current legislation and standards including **British Standard 5228-1:2009+A1:2014:** 'Code of Practice for noise and vibration control on construction and open sites – Noise'.

The Control of Pollution Act 1974 (COPA 74) gives local authorities power for controlling noise and vibration from worksites. If deemed necessary by the Local Planning Authority a Section 61 consent may be used to agree on methods, times, durations and noise levels with the client. A Section 61 prior consent would need to be used prior to work starting. The lead period for this to be determined is 28 days, meaning that any application to work outside of the permitted hours, shall be required giving at least 28 days' notice.

Control measures and mitigation for managing noise and vibration during construction are detailed in **Section 6.3.3.**

5.3.5 Traffic, Transport and Public Rights of Way

Public Rights of Way (PRoW) include footpaths, bridleways, restricted byways, and byways open to all traffic that are expected to interact with the HDD Exit Pit Works. The PRoW at the top of Talacre Beach along the base of the dunes will be impacted by cable laying the works on the beach. This PRoW will be signposted to identify a temporary diversion through Talacre Dunes for the periods when access would be restricted during cable laying activities.

Measures and mitigation for managing traffic, transport and public rights of way are detailed in **Section 6.4.**

5.4 Water Resources and Flood Risk

The HDD Exit Pit Work is essential utility infrastructure for electricity supply from the onshore grid to offshore infrastructure. The HDD Exit Pit Works will be fully buried and must be in a flood risk area for operational reasons. The HDD Exit Pit Works cannot avoid crossing the linear coastal designation Flood Zone 3 designation, as shown in **Figure 5.1.**

The HDD Exit Pit Works would introduce no significant changes to the known level of flood risk to the site, either now, or in the future.

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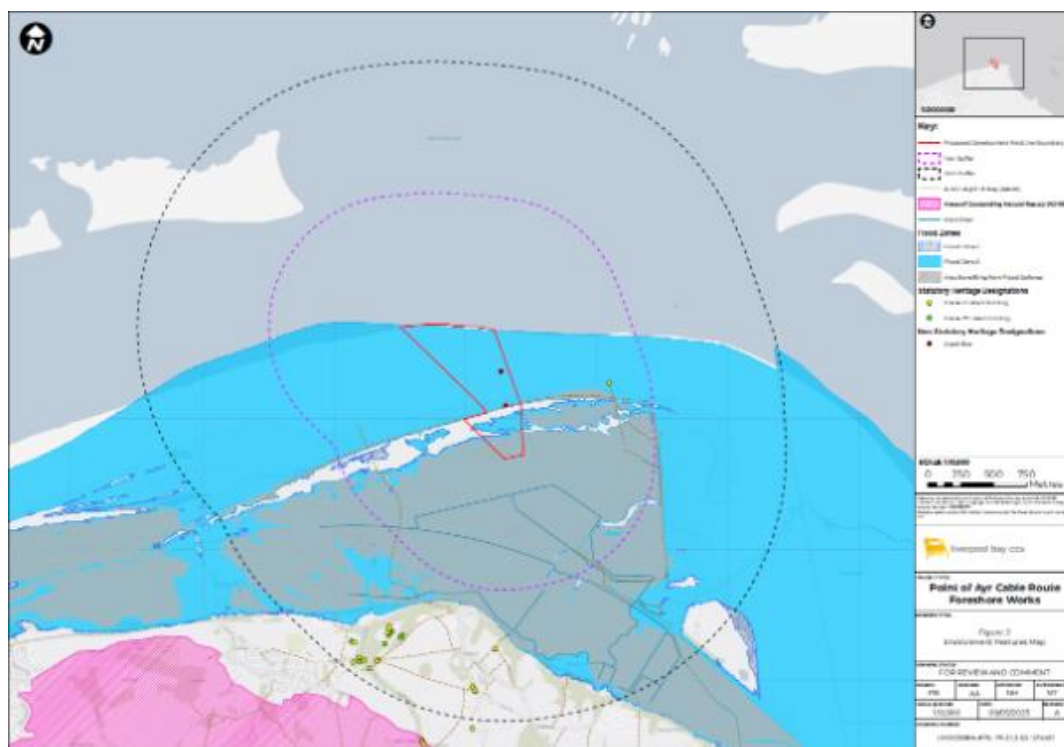


Figure 5.2: Location of HDD Exit Pit Works in relation to Flood Zone 3

5.4.1 Flooding from groundwater sources

During the consultation process, the Local Lead Flood Authority (LLFA) advised that the groundwater table is likely to be high. The superficial deposits are composed of tidal and glacial deposits, consisting of a poorly sorted mixture of sandy silt, gravel, clays that coarsen with depth. These deposits are connected to the wider groundwater table and are influenced by variations in sea levels

5.4.2 Groundwater management and monitoring

The HDD method is a closed, pressurised system designed to avoid surface disturbance, with drilling fluid (water, and bentonite clay) contained and recovered via a sump at the Exit Pit.

The Groundwater Management and Monitoring Measures in relation to the HDD Works are focussed on managing drilling fluids to prevent 'break out', and release of fluids and drill cuttings into the water environment. These measures are summarised in **Table 5.6** and include the following key elements:

- **Annular pressure monitoring:** Continuously record down-hole annular pressure and fluid discharge rates during both pilot drilling and reaming; discrepancies between pumped and returned volumes indicate losses into aquifer or hydrofractures.
- **Closed-loop containment:** Implement a closed-loop system to capture all drilling returns, with transfer pumps and retention pits, preventing seepage to the surrounding dune groundwater.
- Install a **mini-piezometer**: at a suitable depth, off-alignment, at the northern boundary of Field No. 1 at Warren Farm between the dunes, and the HDD Entry Pit. Log at intervals over one spring-neap cycle **before, during, and after** works.

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Table 5.6 Summary of Principles for Groundwater Management and Monitoring Plan

Design measure	Description
Baseline	Install piezometer, collect pre-drill water-level and quality data
Entry/Exit Pit Control	Freeboard management, cofferdams/sheet piles, closed-loop fluid containment
Drilling	Monitor annular pressure, fluid flow, detect inadvertent returns; use of approved additives
Monitoring Network	Piezometer, pressure transducers, visual inspections daily
Contingency	Defined thresholds, IR response protocols, regulatory notification procedures
Post-drilling Restoration	Decommission wells or grout in place, restore dunes, continued monitoring

5.4.2.1 HDD Works Groundwater Management and Monitoring Plan (GWMMP)

1. Pre-construction (Baseline)

- Hydrogeological baseline assessment:** Collect baseline groundwater levels, seasonal tides, salinity, hydraulic gradients, and soil permeability beneath dunes and nearshore (**data collected during June/July 2025**).

2. Groundwater Control During Drilling

Entry and Exit Pits

- Pit freeboard management:** Maintain at least a 1-ft freeboard above drilling fluid in both pits to minimise overflow and infiltration risks.
- Groundwater inflow control:** Install temporary sheet piling cofferdam around the pits, especially the exit pit in the intertidal zone, to minimise groundwater ingress.

Drilling Fluid and Pressure Monitoring

- Annular pressure monitoring:** Continuously record down-hole annular pressure and fluid discharge rates during both pilot drilling and reaming; discrepancies between pumped and returned volumes indicate losses into aquifer or hydrofractures.
- Fluid additives:** Use of PLONOR drilling fluids.
- Closed-loop containment:** Implementation of a closed-loop system to capture all drilling returns, with transfer pumps and retention pits, preventing seepage to the surrounding dune aquifer.

3. Groundwater and Environmental Monitoring

Monitoring Network

- Install a **mini-piezometer**: at a suitable depth, off-alignment at the northern boundary of Field No. 1 at Warren Farm. Log at intervals over one spring-neap cycle **before**, **during**, and **after** works.
- Surface and subsurface observation:** Conduct daily visual inspections, pedestrian surveys of mud or seepage (especially along dunes), looking for inadvertent returns, sinkholes or depressions along the alignment.
- Record drilling parameters** (loads, torque, pressure, fluid volume), and log visual/field observations after each shift

4. Contingency & Response Planning

- Event thresholds:** Define alert levels e.g. fluid loss beyond defined parameters, unexpected hydraulic head rise/drop, or detection of fluid in monitoring wells.

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- **Immediate response protocols:** Include e.g., shutdown procedures, pressure relief, pilot hole pausing, or re-routing alignment. NRW must be **immediately** contacted (by phoning our 24-hour incident hotline at **0300 065 3000**).
- **Notification lines:** Pre-establish regulatory and client notifications; maintain field logs and operators trained in inadvertent returns protocols

5. Post-drilling / Restoration

- **Well decommissioning:** All temporary monitoring point installations will be decommissioned with proper grouting to prevent creating conduits.
- **Surface restoration:** Regrade Exit Pit, and dune disturbance zones, reinstall vegetation, erosion controls and reseed where necessary.
- **Follow-up monitoring:** Continue water-level and quality monitoring for several months to confirm no residual impacts.

Appendix D includes *The Breakout Plan for the Liverpool Bay CCS Project (AMS Project J3130)*. The Breakout Plan sets out the procedures and responsibilities for managing drilling fluid “breakouts” during Horizontal Directional Drilling (HDD) works at Talacre, North Wales. It provides a structured approach to prevention, monitoring, containment, and clean-up to minimise environmental impact and ensure health and safety compliance.

It is unlikely that temporary dewatering is required, however, should extensive dewatering be necessary, the requirement for an abstraction licence will be confirmed following further ground investigation. Any abstraction will be managed in accordance with relevant NRW guidance and permitting requirements.

5.4.3 Surface Water Management

To prevent discharges of drilling fluid at the Exit Pit, the HDD contractor will continuously record down-hole annular pressure and fluid discharge rates during both pilot drilling and reaming. Discrepancies between pumped and returned volumes indicate losses into aquifer or hydrofractures. The contractor will also implement a closed-loop system to capture all drilling returns, with transfer pumps and retention pits, preventing seepage to the surrounding dune groundwater. On completion of the works, drilling fluids and cutting will be tankered away for offsite disposal at a registered site in accordance with legislative requirements.

While the HDD Exit Pit will be in the inter-tidal environment, there are no terrestrial surface watercourses located within 150m of the HDD works. Notwithstanding, monitoring checks and inspections will be conducted prior to and during works. If monitoring indicates that current mitigation measures are insufficient, adaptive mitigation strategies will be implemented accordingly.

Liverpool Bay CCS Limited does not foresee the need to seek an abstraction or impoundment licence, as the HDD operations will neither extract water from an underground source, nor alter or remove any impoundment structures. The scope of the HDD activity involves installing a cable conduit beneath the dune system, thereby eliminating the need for an open trench and minimising disturbance to the groundwater. Successful installation of the HDD conduit depends on the careful regulation of drilling fluid pressures to mitigate water loss. Upon completion of the drilling process, the conduit will be sleeved with watertight polyethylene pipework to prevent water ingress and preserve the integrity of both the conduit and the electrical cable.

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5.5 Land and Soil

5.5.1 Coal Mining

There are no coal mining deposits, or any contaminants associated with coal mining within the area of the HDD activity in the intertidal area.

5.5.2 Hydrogeology

The superficial tidal flat deposits are classified as Unproductive Strata of low permeability that have negligible significance for water supply or river base flow. Superficial blown sand deposits are classified as a Secondary A Aquifer, formed of permeable layers capable of supporting water supplies at local scale, and in some cases forming an important source of base flow to local watercourses. The underlying bedrock of the Lower and Middle Pennine Coal Measures are classified as Secondary A Aquifers (aquifer properties defined above). The area of works does not lie inside, or within 500m, of source protection zones (SPZs). The River Dee Estuary lies to the, and the Welsh Channel area of the Irish Sea to the north. Measures and mitigation for managing land and soils are detailed in **Section 6.5**.

5.5.3 Unexploded ordnance (UXO)

A magnetometer run will be performed via a drone survey across the intertidal area. Any targets that are classified as potential UXO (pUXO) and interfering with the work area will be removed prior work execution. This would require digging and investigation of the found target by a specialised 3rd party company.

It is expected that pUXOs would be in the beach area, and uncovering can be done by e.g. excavator and manually by e.g. shovels. After target investigation, the created hole can be backfilled with the same material (i.e. sand). The target itself will be contained and transported off site or requires measures on site. A specialised company will be engaged to remove the UXO.

Explosive Ordnance Clearance (EOC) Engineer support is required for ground investigation works in the area with potential UXO hazards. All staff involved with excavation on site are given a formal UXO awareness briefing.

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6.0 ENVIRONMENTAL MANAGEMENT MEASURES

This section of the **CEMP #1** outlines the site-specific control measures identified. These measures will be implemented by the Contractor, and where relevant, by its Subcontractors. Most of mitigation measures come from national laws and Register of Environmental Actions and Commitments (REAC) associated with the consented planning permission for works at Point of Ayr (**FUL/000246/23**). The relevant REAC measures have been reproduced within this **CEMP #1**.

Environmental management measures have been developed to prevent, or where that is not possible, minimise the environmental impacts associated with the works. These measures shall be incorporated into the Risk Assessment and Method Statement (RAMS) prepared by the Contractor, and all RAMS shall be communicated to the workforce.

6.1 Archaeology

A draft Written Scheme of Investigation (WSI) was shared with Heneb in July for consultation prior to submitting planning application FUL/000705/25 to FCC for the works covered by this **CEMP #1**. Following feedback received from Heneb, the draft WSI has been finalised as '**Project Design for Archaeological Monitoring and Recording – Point of Ayr HDD Cable Installation and Foreshore Works**' (PD). The WSI document can be found at **Appendix C** and sets out the required **archaeological monitoring and recording strategy**.

The PD scheme ensures that archaeological remains encountered during construction are **identified, recorded, and appropriately managed** in compliance with local planning conditions, national legislation, and professional archaeological standards.

The Key Elements of the PD are as follows:

- **Legislative Framework:** Compliance with the Historic Environment (Wales) Act 2023, Protection of Military Remains Act 1986, and related planning policies.
- **Archaeological Baseline:** The site has **moderate potential for prehistoric, medieval, and post-medieval remains**; low potential for Roman and early medieval finds. WWII features and aircraft crash sites are known nearby.
- **Methodology:**
 - Supervised mechanical excavation and hand excavation.
 - Recording through written, photographic, and digital methods.
 - Environmental sampling, finds recovery, and specialist conservation as required.
 - Specific protocols for human remains, aircraft crash sites, and unexpected discoveries.
- **Reporting & Archiving:** Findings will be reported to the client and local authority within eight weeks of fieldwork, archived with the National Monuments Record for Wales, and disseminated through professional and public channels.
- **Programme & Staffing:** Monitoring is expected to commence in **February 2026**. Qualified archaeological contractors will be appointed, overseen by an archaeological consultant liaising with local heritage authorities.
- **Health & Safety:** Compliance with CDM 2015 regulations, site-specific RAMS, UXO awareness, and standard PPE requirements.
- **Monitoring & Assurance:** Weekly progress reporting, consultant oversight, and flexibility in construction scheduling to accommodate archaeological discoveries.

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The PD establishes a robust framework to safeguard and document archaeological assets during the HDD Exit Pit works. It balances construction requirements with heritage protection, ensuring compliance with statutory obligations and best practice in archaeological monitoring.

A fully illustrated archaeological watching brief report will be made available to NRW and the LPA Archaeological Advisor within six weeks of the completion of fieldwork, in accordance with the ClfA standards and guidance as stated in the WSI developed for this for the HDD Exit Pit activities.

6.2 Ecology

6.2.1 Birds

In accordance with REAC measure T-BD-037 (**FUL/000246/23**), if avoiding works completely during the overwintering period is not feasible, works would be avoided within a two-hour period either side of high tide each day to minimise the likelihood of disturbing any overwintering birds present nearby where practicable. The Contractor keeps a record of tide times as part of ongoing management and monitoring, and this would be employed to help plan the works. Notwithstanding, physical screening of the HDD Entry Pit will be employed by a close boarded fence to provide noise and visual screening.

Where practicable, vegetation and site clearance works will be undertaken outside the bird nesting period, recognised as March to August inclusive, to avoid damage or destruction of nests. Where this is not possible, site clearance will be preceded by an inspection from an experienced ECoW within 24 hours of clearance works commencing to confirm the absence of active nests or nesting activity. If an active nest or activity is recorded, a minimum exclusion buffer of 5m within which no works can take place will be implemented and remain in place until the nest is confirmed inactive or the nest fails.

The installation of the HDD Exit Pit on Talacre Beach is programmed to avoid the little tern breeding season by carrying out the HDD Conduit, and Exit Pit works during February and March 2026.

6.2.2 Amphibians and Reptiles

No Amphibians were identified in the HDD Exit Pit location, although natterjack toad, and sand lizard inhabit the sand dunes. However, the installation of the cable conduit under the dunes using the trenchless HDD method will avoid direct impacts on the amphibians and reptiles, and their habitats. The depth of the HDD conduit means impacts on protected species within the dunes are not anticipated. This is because, as Natterjack toads typically burrow to depths of less than 50cm (although can be deeper in winter) and sand lizard burrow to up to 1m deep.

Furthermore, to ensure that significant indirect impacts to breeding Natterjack Toads are avoided, the HDD works, likely to cause significant disturbance around Talacre dune system, will be undertaken in February and March, thereby avoiding the Natterjack Toad breeding period (approximately April – July).

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6.2.3 Habitats

Control measures to protect habitats are described in the REAC Measures in **Table 6.1**: See also the description of how the works will interact with the baseline inter-tidal habitats in **Section 5.2.2**.

6.2.4 Invasive Non-Native Species

Invasive Non-Native Species (INNS) are present within the sand dunes, and wider PoA area, although have not been identified within the areas where physical HDD and cable installations works will take place. Notwithstanding, biosecurity prevention and control measures will be implemented throughout (see *Invasive Non-Native Species Management Plan included as Appendix B*).

The onshore plant and equipment, and the offshore vessels are highly unlikely to be a source of the amphibian fungus Chytrid. Notwithstanding, the applicant recognises the importance of preventing the introduction and spread of this amphibian fungus. Especially given that the native UK populations of Natterjack toad that have been tested, have returned positive for the fungi *Batrachochytrium dendrobatidis* ("Bd"), albeit apparently unaffected.

All plant and equipment will be thoroughly cleaned, in accordance with national and international protocols, prior their mobilisation to site, in accordance with the Invasive Non-Native Species Management Plan included as **Appendix B**.

Biosecurity measures include mapping the locations and extent of any INNS identified, alongside appropriate measures to control and prevent spread or propagation of INNS, which include the following:

- Any invasive plant species recorded within the working areas will be demarcated and avoided during the works as far as feasible.
- Any plant, equipment or PPE that comes into contact with invasive plant material will be thoroughly cleaned before being removed from the working area.
- Site Inductions, and toolbox talks will be provided to site contractors by a suitably qualified individual on the potential presence of these presence of these species and appropriate actions to be taken.

On completion of construction, Liverpool Bay CCS limited will continue with its long-term habitat management, and the achievement of net benefits for biodiversity. This includes specific habitat and species work programmes to control of the invasive elm scrub, and skylark breeding population surveys.

Table 6.1 presents the ecological mitigation and monitoring commitments from the REAC in Planning Permission **FUL/000246/23** that will be implemented during the execution of the HDD Exit Pit works.

Table 6.1 Ecological mitigation and monitoring commitments

REAC Ref	Mitigation and monitoring commitment
T-BD-004	The use of horizontal directional drilling (HDD) will ensure that there are no direct impacts to Talacre Brook, the Talacre dune system, and an area of grassland that forms part of the Dee Estuary Ramsar/SPA and the Gronant Dunes and Talacre Warren SSSI.
T-BD-005	Temporary mats will be laid down, where necessary, across the beach between Talacre beach car park and the HDD exit pit. This will be implemented to facilitate access across areas of soft sand, but it will also minimise damage or destruction of the existing habitats along the route. No access will be taken across the dunes. Access to the beach will be through an existing gap in the dunes at Talacre beach car park.

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REAC Ref	Mitigation and monitoring commitment
T-BD-006	Some Atlantic salt meadow habitat has colonised the Talacre beach car park. This habitat is a qualifying feature of the adjacent Dee Estuary SAC. The car park is proposed to be used as a compound area during the construction stage of the Proposed Development, for parking only. Micro-siting is to be employed to avoid impacts to the salt meadow habitat.
T-BD-008	Prior to construction, a team of suitably qualified and experienced Ecological Clerks of Works (ECOWs), will be appointed to support, oversee and monitor the Construction Contractor with the implementation of measures defined within the OCEMP. Multiple ECOWs may be required during construction to ensure appropriate oversight of multiple active works locations. Broadly, the ECOW will: • Provide ecological advice to the Construction Contractor over the entire construction programme, at all times as required. • Undertake or oversee pre-construction surveys for protected species in the areas affected by the Proposed Development. • Monitor ecological conditions during the Construction Stage to identify additional constraints that may arise as a result of natural changes to ecological baseline over time, e.g., the monitoring of badger activity within and in close proximity to construction works. • Provide ecological toolbox talks to site personnel to make them aware of ecological constraints and information; highlight mitigation to minimise impacts; and make site personnel aware of their responsibility with regards to wildlife and sensitive habitats in the context of legislation and policy. Toolbox talks will include, as required, all ecological receptors considered within the ES as a minimum. • Monitor the implementation of mitigation measures during the Construction Stage to ensure compliance with protected species legislation, licensing, and commitments within the ES. The ECOW will have previous experience in similar ECOW roles and be approved by the Applicant. The ECOW will be appointed in advance of the main construction programme commencing to ensure pre-construction surveys are undertaken and any advance mitigation measures required are implemented.
T-BD-010	Micro siting of Localised Compounds, the Equipment Yard and the Centralised Compound will be employed to minimise habitat loss and disturbance.
T-BD-017	In relation to accidental pollution events resulting from spills, pollution prevention measures are provided within the OCEMP and REAC and will be used by the Construction Contractor to prepare a detailed CEMP to be implemented during the works to ensure that pollution events do not occur. Further pollution prevention measures are referred to within the separate marine licence application.
T-BD-018	Localised Compounds and storage areas to facilitate construction of the Proposed Development have been sited on the flat areas of bare earth, which will be subject to a pre-construction ecological walkover, owing to the ecological sensitivities of this area.
T-BD-023	To prevent entrapment of wildlife, where trenches or voids are to be left overnight, a suitable means of escape will be provided (such as a ramp at no greater than a 45° angle) at regular intervals along the excavated trench channel/excavations. Any void/trench channel should be visually inspected prior to re-starting works each morning to confirm the absence of entrapped wildlife. All escape measures will be discussed and agreed with the ECOW to ensure they are suitable for the size of void and wildlife that may become trapped.
T-BD-032	Invasive Non-Native Species (INNS) are present within the Red Line Boundary, including Crangonyx pseudogracilis/floridanua, Physella sp., signal crayfish or New Zealand mud snails. A Biosecurity Method Statement will be implemented throughout the construction of the Proposed Development. The Biosecurity Method Statement will detail the locations and extent of any INNS identified, alongside appropriate measures to control and prevent spread or propagation of INNS. High-level recommendations for the treatment and removal of INNS will be identified, and will include the following: • Prior to the start of works, an updated survey of all terrestrial working areas will be undertaken by a suitably qualified person to map the current extent of INNS. This must be carried out during the main vegetative growing season (April –September) to allow for maximum visibility of any plants present and ensure that their extents are fully captured. • Any invasive plant species recorded within the working areas will be demarcated and avoided during the works as far as feasible. • The non-native invasive entire-leaved cotoneaster will be removed from the Point of Ayr colliery site • Where complete avoidance of invasive species (INNS) within working areas may not be feasible, an appropriate treatment and removal programme (appropriate to the specific species in question) will be agreed and implemented and an INNS management plan will be produced, prior to any construction works being carried out.

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REAC Ref	Mitigation and monitoring commitment
	- A separate INNS management plan will be produced for the intertidal works and will include the methods to avoid the spread of INNS via marine vessels used during the construction phase. - Any plant, equipment or PPE that comes into contact with invasive plant material will be thoroughly cleaned before being removed from the working area.
T-BD-034	Works within the intertidal area and around waterbodies and watercourses will follow best practice pollution prevention measures, as detailed in the CEMP, to avoid significant impacts on notable aquatic macroinvertebrates that may be using these habitats. Vibration reduction measures on plant and equipment, as detailed in the CEMP, will be implemented at all times and works kept to as short a duration as possible to minimise indirect disturbance.
T-BD-035	Where practicable vegetation and site clearance works will be undertaken outside the bird nesting period, recognised as March to August inclusive, to avoid damage or destruction of nests. Where this is not possible, site clearance will be preceded by an inspection from an experienced ECoW within 24 hours of clearance works commencing to confirm the absence of active nests or nesting activity. If an active nest or activity is recorded, a minimum exclusion buffer of 5 m within which no works can take place will be implemented (exclusion buffer size will be at the discretion of the ECoW and in response to the species of bird encountered) and remain in place until the nest is confirmed inactive (either eggs hatch and chicks have fledged, or the nest attempt fails). All cleared vegetation will be rendered unsuitable for nesting birds, for example, by covering or chipping depending on the purpose of the vegetation or will be removed from the works area.
T-BD-036	To avoid disturbance to flocks of non SPA-qualifying species at Warren Farm, including the Birds of Conservation Concern (BoCC) red-listed lapwing and amber-listed wigeon, works within Warren Farm will be carried out outside of the typical wildfowl wintering period, as far as practicable.
T-BD-040	To minimise the likelihood of significant impacts on terrestrial invertebrate species of conservation concern, details of dust mitigation and pollution prevention in the CEMP will be followed at all times during works around the Talacre dune system.
T-BD-041	To ensure killing or injury of species such as common toad, common reptile and other mammals, is avoided during site clearance, a PWMS will be produced prior to the works, detailing how clearance works will be undertaken to minimise impacts. Clearance works will be directly supervised by an ECoW, who will provide a toolbox talk to site contractors prior to any works being carried out. If any common toads, common reptiles and other mammals are found during clearance, the ECoW will carefully move them to a safe location outside of the areas of works, or they will be allowed to move off of their own accord. All works will be carried out in accordance with measures detailed in the CEMP, with appropriate vibrational controls on machinery and best practice followed in relation to pollution prevention.
T-BD-047	The HDD exit pit falls within the intertidal working area, directly adjacent to the embryonic shifting dune habitat. At the exit pit, a 10m3 containment sump will be present to contain any spillage of any drilling fluid. To further avoid potential contamination by drilling fluid, minimal use of a plant-friendly alternative to bentonite, which will be contained within the working area, will be used during HDD. Drilling mud will be cleaned up by hand using hand shovels, buckets, and soft-bristled brooms, minimising damage to existing vegetation. This will form part of wider pollution prevention measures, which will be detailed in the CEMP.
T-BD-049	To reduce impacts on bird species (Redshank, Teal, Pintail, Oystercatcher, Dunlin, Black-tailed Godwit and Curlew) in the Dee Estuary SPA/Ramsar and Mersey Narrows and North Wirral Foreshore Ramsar: Mitigation will involve avoidance of construction works during periods of significant numbers or levels of activity of these species within the potential disturbance distance buffer of 300m from works. The requirement for this mitigation will be informed by an ECoW, who will monitor the bird activity within this buffer in relation to time of year and state of tide. Where practicable, avoidance of sensitive periods of the year will be implemented when birds from European sites are likely to be present in significant numbers, and the construction period will be limited to the minimum practicable time for completing the works to minimise the duration of any significant impacts. Any risk of disturbance would be monitored, and works will cease completely until such time that the bird species are no longer within the Zone of Influence, if such a threat exists. If any birds are showing disturbance behaviour within the 300m buffer zone during any stage of the works, the ECoW would stop work until it can be determined that disturbance has subsided. Full details of the mitigation will be written into the CEMP.

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6.3 Nuisance

Mud, dust, noise, light, litter and water pollution must be minimised to prevent complaints or environmental degradation of the surrounding area. The following processes and procedures shall be implemented to manage potential nuisance issues.

6.3.1 Air Quality

The following best practice measures for controlling dust and mud on worksites represent the dust management plan for the works and will include:

- Follow Control of Dust from Construction Sites (BRE DTi Feb 2003).
- Use dust barriers/fencing for significant dust-generating activities.
- Park all vehicles in designated areas.
- Manage washdown facilities to control contaminants.
- Locate machinery away from sensitive receptors when possible.
- Use hard-surfaced or damped-down haul routes, cover stockpiles, and reduce drop heights.
- Cover loads entering/leaving the site and use mechanical sweepers as needed.

6.3.2 Light pollution

Once construction of the HDD Exit Pit Works is complete, there will be no permanent lighting, as there is no above ground infrastructure. The construction lighting has accounted for the guidance for permanent lighting schemes provided in the *Institution of Lighting Guidance Note 08/23: Bats and Artificial Lighting at Night*. Temporary construction lighting will be required for the HDD Entry Pit at Warren Farm; for the HDD Exit Pit on Talacre Beach; and for the cable installation on Talacre Beach. **Figure 6.1** shows the proposed arrangement of the construction lighting. This figure shows that lighting is directed towards the tasks being carried out to avoid unnecessary light spill and incorporate the best practices as follows:

- Follow BS EN 12464-2:2014 for lighting of outdoor workplaces.
- Turn off lighting when not in use, unless needed for safety or security.
- Use inward-directed, horizontally-mounted lights to reduce glare.
- Install temporary lights with full cut-off or shielding to contain illumination.
- Adjust lighting after installation to minimise light spill and avoid shadows on footpaths.
- Direct lighting below the horizontal plane to reduce spillage.

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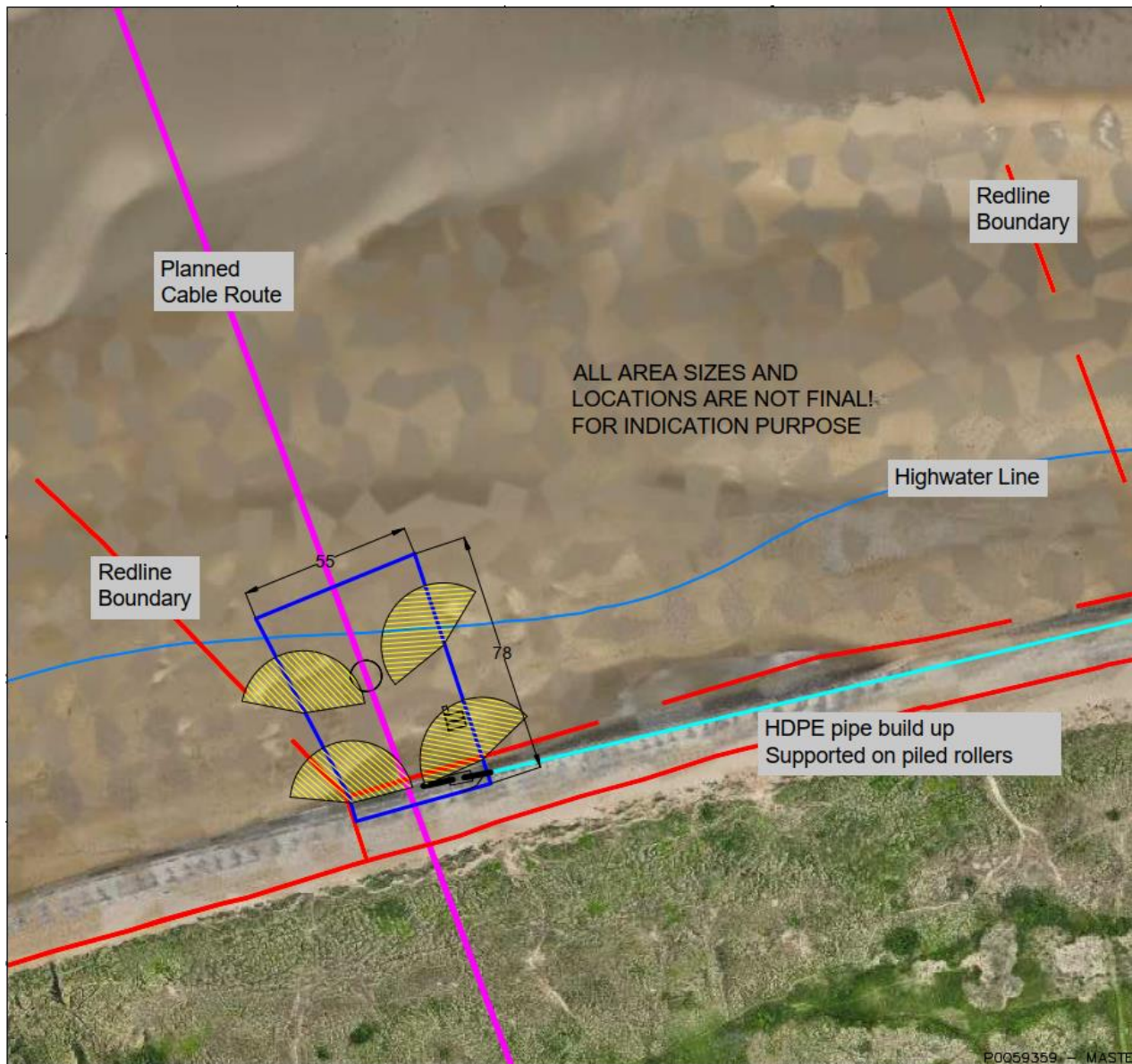


Figure 6.1: Proposed lighting scheme during construction at HDD Exit Pit

6.3.3 Noise and Vibration

6.3.3.1 Best Practicable Means

This section represents the noise and vibration management plan for the works. It presents the Best Practicable Means (BPM) that will be implemented for the construction activities proposed. The proposed control measures are in line with the REAC. All REAC References are complied with in full. **Table 6.2** presents the mitigation and monitoring commitments from the REAC in Planning Permission **FUL/000246/23** relevant to the control and management of noise and vibration that will be implemented during the execution of the HDD Exit Pit works.

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Table 6.2 Noise and vibration mitigation and monitoring commitments

Ref	Mitigation and monitoring commitment
T-NV-003	After current design, and before the commencement of the construction period, a Noise and Vibration Management Plan will be produced and agreed with the Local Authority setting out the requirements for noise and vibration mitigation measures
T-NV-004	The Construction Contractor will nominate a Community Liaison Representative (or equivalent title) who will be a nominated competent site contact for whom the contact details will be shared with local residents and other third parties within close proximity to the construction works, and will be displayed clearly within the site compounds.
T-NV-005	Construction works will utilise low noise generating plant and equipment and will adopt methods which minimise noise and vibration, wherever practicable.
T-NV-006	Where required, temporary acoustic barriers will be considered around significant noise producing plant that are in close proximity to sensitive receptors. The locations of these screens will be optimised for acoustic mitigation whilst considering other potential impacts.
T-NV-007	Optimal location(s) of all equipment with the potential to cause a significant effect on noise on site will be agreed with the Local Authorities as part of the Noise and Vibration Management Plan prior to construction to minimise noise disturbance to local sensitive receptors.
T-NV-008	During construction, the Construction Contractor will ensure that the provision of acoustic enclosures around static plant, where practicable, is in place to reduce noise disturbance.
T-NV-009	Construction vehicles will, wherever practicable, be fitted with less intrusive warning alarms, such as broadband vehicle reversing warnings.

Best Practicable Means as defined in Section 72 of the Control of Pollution Act 1974 and BS 5228-1: 2009+A1: 2014 shall be employed at all times to reduce noise to a minimum.

The Contractor shall ensure that the following guidelines will be applied where applicable:

- Whenever possible, noisy plant will be situated away from sensitive receptors;
- HDD drilling works are proposed for night-time and weekend periods. Noisy activities will take place during the daytime periods as far as is possible;
- Whenever possible fabrication will be undertaken off site;
- Where reasonably practicable, fixed items of construction plant will be electrically powered in preference to diesel or petrol driven;
- As far as reasonably practicable, the noise from reversing alarms will be controlled or limited. This will be undertaken through following a hierarchy of techniques:
 - The site layout will be designed to minimise reversing;
 - Banksman will be utilised to avoid so far as reasonably practicable the use of reversing alarms;
 - Reversing alarms will incorporate where reasonably practicable features such as broadband signals or 'smart alarms' to reduce the level of noise.
- Where an enclosure is available it will be used;
- Where reasonably practicable, vehicles and mechanical plant associated with the construction works will be fitted with effective exhaust silencers and shall be maintained in good working order;
- Machines and vehicles in intermittent use will be shut down or throttled down to a minimum during periods between works;
- Screens such as reflective acoustic cladding and louvered screens are recommended to be placed around power units such as compressors, lighting rigs and generators;
- Mobile screens will be placed around noisy hand-held equipment i.e. breakers, Stihl saws etc.
- Letter drops will be undertaken prior to any noisy works commencing that could affect local residents, this will be undertaken a minimum of two weeks in advance of the works;
- Where possible, all deliveries to support non-core works will be completed within core working hours;

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- The movement of delivery materials outside of normal working hours shall be kept to a minimum and handled in a manner that minimises noise (i.e. manual handling rather than mechanical);
- All plant, equipment and noise control measures applied to plant and equipment shall be maintained in good working order and operated such that noise emissions are minimised as far as reasonably practicable;
- Where breaking out activities are necessary the continuous use of percussive or impact breaking equipment/ methods should be minimised;
- All employees shall be provided with an appropriate induction and ongoing briefings regarding the management of environmental issues. This will involve emphasising the need for employees to show consideration to the sensitive receptors, including residential neighbours. They will be briefed on not generating unnecessary noise when on site or when leaving and arriving;
- Two-way radios to be used on site to avoid shouting; and
- All works will comply with all plant/equipment to be used listed within this application.

The above Best Practice will be briefed to all parties via:

- Site Induction;
- Toolbox talks;
- Start of Shift briefings; and
- Respite periods are provided for intensive works. This will take account of the temporal thresholds for noise insulation and temporary re-housing eligibility (i.e. 10 exceedances in 15 days, 40 exceedances in 6 months).

Additional BPM measures are also to be implemented. BPM measures are only displayed below when not mentioned in the BPM above.

- All compressors and generators shall be 'sound reduced' models fitted with properly lined and sealed acoustic covers which shall be kept closed whenever the machines are in use, and all pneumatic percussive tools shall be fitted with mufflers or silencers of the type recommended by the manufacturers. (if possible).
- Noise emitting equipment which is required to run continuously shall be housed in a suitable acoustic enclosure.
- Temporary noise barriers shall be used to reduce noise levels where appropriate and practicable. Barriers shall be located as close to the plant as possible and shall have a mass per unit area of at least 7kg/m².
- No deliveries shall arrive at the site before 0700 hours unless agreed with the local authority under exceptional circumstances.
- The engines of all parked vehicles or vehicles waiting to enter any work area shall be switched off within two minutes of arrival.
- Work compounds shall be laid out so that accesses and loading areas are located as far away from sensitive neighbours as practicably possible and so that temporary structures screen noisy areas where practicable.
- Stationary plant such as pumps, compressors and generators shall be situated as far as possible from residential property and acoustic screens erected if required. Other plant and machinery shall be screened if necessary.
- Plant known to emit noise strongly in one direction shall be, where practicable, orientated so that noise is directed away from noise-sensitive areas.

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- A speed limit of 10mph shall be set and enforced on all site traffic.
- Haul routes shall be maintained in good condition to minimise 'body slap' of vehicles.

Vibration specific measures are recommended to be implemented:

- Reducing the use of percussive or impact-based demolition equipment (e.g., jackhammers, breakers) wherever possible.
- Exploring alternative demolition techniques, such as cutting, crushing, or dismantling, which generate less vibration than impact methods.
- Using vibration-reducing demolition equipment or attachments, such as hydraulic crushers or shears, to minimise vibration transmission.
- Employing modern equipment with built-in vibration-damping features.
- Establishing vibration monitoring systems at sensitive receptors (e.g., residential areas or heritage buildings) during demolition activities to ensure levels remain within acceptable thresholds.
- Planning the sequence of demolition to minimise cumulative vibration. For example, starting with structures or elements that are less prone to transmitting vibrations to nearby receptors or phasing demolition activities to reduce simultaneous vibration sources.
- Positioning demolition equipment and plant as far as possible from sensitive receptors to reduce transmitted vibrations.
- Preparing haul routes and access roads to ensure vehicles moving demolition debris do not generate excessive ground vibrations due to uneven surfaces or "body slap."
- Taking additional precautions, such as increased monitoring, for such structures.

6.3.3.2 Construction noise predictions

The potential impacts on sensitive receptors from construction noise during the execution of the HDD and foreshore works are set out below. The main noise generating activities would be the HDD under the dunes, installation of sheet piles to create a cofferdam, and burial of the electrical cables on Talacre Beach using a cable trencher.

The likely number of properties subject to each magnitude of noise level has been determined based on noise modelling. The results of the noise survey show that, based on the existing ambient noise levels presented in **Table 6.3**, receptors fall within BS 5228-2 Assessment Category A.

Table 6.3 Ambient noise levels at noise monitoring locations

ID	Day		Evening		Night	
	Average L _{Aeq}	Range L _{Aeq}	Average L _{Aeq}	Range L _{Aeq}	Average L _{Aeq}	Range L _{Aeq}
LT17 Warren Farm	53	38-68	42	33-50	45	29-65
LT18 Station Road	54	48-61	47	42-55	49	40-58

Table 6.4 presents the likely number of receptors subject to an adverse noise impact. Particularly, impacts of medium and high magnitude have the potential for significant effects depending on the duration of the specific activity at that specific location.

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Table 6.4 Numbers of receptors affected by construction noise

Activity	Magnitude	Day	Evening	Night
HDD under dunes	Negligible	184	116	114
	Low	14	76	71
	Medium	2	6	7
	High	3	5	11

It can be seen from **Table 6.4** that, in the absence of mitigation, there will be medium and high magnitude noise impacts during HDD for the Foreshore Cables. During all other construction activities, only negligible and low magnitude noise impacts are predicted.

HDD for the Foreshore Cables, will require 24-hour working, including evening and night-time periods when a higher number of receptors will be subject to medium and high adverse noise impacts.

The estimated schedule for all works associated with the HDD is 4 weeks. This includes setup and demobilisation. However, it is estimated that night-time activities, within this 4-week period, to facilitate the cable pulling, and HDD drilling will require two to three consecutive nights (48-hour period) each. Therefore, it is considered unlikely that high and medium magnitude night-time noise impacts will exceed the duration criteria in BS5228.

Table 6.5 Predicted noise levels at biodiversity receptors during construction

Activity	Daytime Noise Level L_{Aeq} dB	
	Receptor	
	Dee Estuary SPA	Warren Ponds
HDD under dunes	45	57

6.3.3.3 Noise monitoring

The sound level meter used should be of Type 1 classification in accordance with BS EN 61672:-1:2003 'Electroacoustics. Sound level meters. Specifications'. The calibrator used conforms to the requirements of BS EN IEC 60942:2018 'Electroacoustics, Sound calibrators'.

The meter should be capable of recording the following parameters:

- L_{Aeq} , 15 min;
- L_{A90} , 15 min;
- L_{A10} , 15 min; and
- L_{Amax} , 15 min.

The sound level meter and associated calibrator will have been calibrated to international standards within the previous year. The sound level meter will be field calibrated before and after each measurement.

It is proposed that noise monitoring positions will be established at locations considered to be representative of the nearest sensitive receptors to the construction site.

The specific location of the sound level meter should be chosen in accordance with the following:

- Locations should be representative of the noise environment of the relevant receptor;

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- Locations should not be obscured by buildings or structures where there is a clear line of sight between the construction works and the receiver;
- Locations should be a minimum of three meters from any reflective surfaces, screens (e.g. houses, solid fences, vehicles);
- Locations should be away from noise sources that do not represent the construction noise and vibration at the most exposed facade, or sources which unduly mask construction noise;
- Locations should be away from areas where cattle or wild animals could interfere with the meter; and
- Microphone should be positioned 1.5 m in height from relative ground.

Measurements will be undertaken in accordance with BS 7455-1:2003 'Description and measurement of environmental noise. Guide to quantities and procedures'. Noise measurements will be undertaken under meteorological conditions conducive to environmental noise monitoring. This will include low wind speeds (<5m/s) and dry conditions.

6.3.4 Residents and Local Community

The Applicant will conduct proactive community engagement prior to the commencement of the works. This will focus on the receptors identified within this document. Community engagement will be conducted through a combination of community newsletters (postal and email), posters and boundary notifications (contact details) and project websites. The following information will be made available to the surrounding community at the commencement of the project (overview of project) and prior to any high impact activity:

- Project overview;
- Proposed working hours;
- Informing the community about high noise or vibration demolition activities, particularly for sensitive periods or structures, and providing advance notice of the timing;
- A helpline for queries and complaints.
- Start and duration of works;
- Steps being undertaken by the team to control noise and vibration;
- Any work which might be required out of specified working hours; and

6.3.5 Nuisances control measures

Table 6.6 presents the mitigation and monitoring commitments from the REAC in Planning Permission **FUL/000705/25** relevant to the control and management of potential nuisances that will be implemented during the execution of the HDD Exit Pit Works.

Table 6.6 Nuisances mitigation and monitoring commitments

Ref	Mitigation and monitoring commitment
T-PD-005	Construction lighting will follow BS EN 12464 (Parts 1 and 2) and guidance notes from the Institution of Lighting Professionals. In general, lighting will be used in shifts at the lowest luminosity necessary for safe delivery of each task i.e. it will not be continuous. It will be designed, positioned, and directed to reduce the intrusion into adjacent properties and habitats. The exception to this will be at trenchless crossings where 24-hour working will be required.
T-PD-008	Access for pedestrians along the foreshore will be maintained where possible and safe between Station Road and the dunes. Where this is not possible or safe, temporary diversions will be arranged for pedestrians.
T-PD-012	The Construction Contractor(s) will be responsible for obtaining all required environmental permits, licences and consents from the relevant authorities where required.
T-PD-016	Temporary track mats will be placed along the Foreshore Area to facilitate vehicle movements over the soft sand as necessary.

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Ref	Mitigation and monitoring commitment
T-AQ-001	The Stakeholder Communications Plan that includes community engagement will be implemented before work commences on site.
T-AQ-002	The name and contact details of person(s) accountable for air quality and dust issues will be displayed on the Site boundary and within site cabins. This may be the environment manager/engineer or the Site manager. The head or regional office contact information will also be displayed.
T-AQ-003	The Dust Management Plan (DMP) will be implemented on site by the Construction Contractor. This will include measures to control other emissions, in addition to dust and PM10 mitigation measures.
T-AQ-004	All dust and air quality complaints will be recorded, and causes identified. Appropriate remedial action will be taken in a timely manner with a record kept of actions taken including of any additional measures put in-place to avoid reoccurrence.
T-AQ-005	The complaints log will be made available to the local authority on request.
T-AQ-006	Any exceptional incidents that cause dust and/or air emissions, either on- or off-site will be recorded, and then the action taken to resolve the situation recorded in the site log book.
T-AQ-007	Daily on-site and off-site inspections (up to a minimum of 50m from the site boundary) will be undertaken by a suitably experienced person, where receptors (including roads) are nearby (within 100m of Site or access roads) to monitor dust. The inspection results will be recorded and made available to the local authority when asked. This will include regular dust soiling checks of surfaces such as street furniture, cars, and windowsills within 100m of construction works.
T-AQ-008	The frequency of Site inspections will be increased when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
T-AQ-012	Runoff of water and/or mud will be mitigated against while the Site is being set up and maintained.
T-AQ-014	Ensure all vehicle operators switch off engines when not in use and ensure there is no idling.
T-AQ-015	Where reasonably practicable reduce the use of diesel- or petrol-powered generators, for example by using hybrid site generators.
T-AQ-016	A maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas will be imposed.
T-AQ-019	Covered skips will be used to reduce the risk of materials or dusty materials blowing out and contaminating the surrounding site.
T-AQ-020	Ensure equipment is readily available on-site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.
T-AQ-022	For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust.
T-AQ-023	All construction plant and equipment will be maintained and in good working order.
T-AQ-026	Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
T-AQ-033	Bag and remove any biological debris or damp down such material before decommissioning.
T-AQ-035	There will be no bonfires or burning of waste materials.
T-LV-003	Land disturbed to make way for Construction Compounds that is not then utilised as part of the Proposed Development during operation will be reinstated and returned to existing land uses following completion of the construction stage.
T-LV-015	Any working areas, including Construction Compound (s) will be kept tidy through robust Construction Compound Management.
T-LV-016	A Dust Management Plan has been produced outlining measures to control dust, including timing works outside of prolonged dry weather and using dust suppression techniques.
T-MD-001	The construction stage(s) of the Proposed Development will be managed through the implementation of the Construction Phase Plan (required under the CDM Regulations 2015).
T-MD-003	The Applicant will undertake a programme of hazard studies.
T-MD-004	The Proposed Development will be managed in accordance with Environmental, Health & Safety Management systems.
T-MD-005	All construction risks will be managed in accordance with the CDM Health & Safety Plan and Construction Phase Plan.
T-MD-006	The Proposed Development will be managed in accordance with supplier management environmental, health & safety standards (for example, Construction Skills Certification Scheme).
T-MD-007	The Applicant and the Construction Contractor will implement a risk management system.
T-MD-009	The Applicant and Construction Contractor will implement a Construction and Environmental Management systems (including the CEMP).

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Ref	Mitigation and monitoring commitment
T-MW-001	The Construction Contractor will ensure that the application of circular economy principles will be followed, as implemented in the detailed CEMP, including: - Design solutions to prevent the production of waste where feasible, and to send the waste produced for recovery where possible; - Considering all phases of construction, operation and decommissioning in a lifecycle approach; and - Identification of resource streams that might be considered by-products (i.e. not wastes, as per applicable legislation) and reused or recycled.
T-MW-002	The Waste Management Plan, which will be produced by the Construction Contractor(s), will adhere to all relevant legislation and the Applicant's waste management procedures including technical guidance note (AMTE TG 010) as detailed in the Applicant's policy.
T-MW-003	Waste storage areas will be incorporated into the design with waste segregation measures put in place by the Construction Contractor.
T-MW-004	Identification and specification of material resources that can be acquired responsibly, in accordance with BES 6001 Responsible Sourcing of Construction Products
T-MW-005	The Construction Contractor will implement, and follow guidance within, the Materials Management Plan (MMP) in accordance with the CL:AIRE Definition of Waste: Code of Practice.
T-MW-006	Engage early with Construction Contractors to identify possible enhancement and mitigation measures to identify opportunities to further reduce any waste through collaboration and regional synergies.
T-PH-002	Where possible, a standard working-day of 10 hours per day and 5 days per working week and 5 hours on Saturdays is will be implemented for the construction of the Proposed Development
T-PH-003	A Construction Traffic Management Plan will be prepared and will provide details of procedures for construction related traffic.
T-PH-004	The public will be informed of the nature, timing and duration of particular construction activities and the duration of the construction works by newsletters and liaison with the construction contractor.
T-PH-005	Construction Compounds will be set out and managed so as to reduce impacts on access to / from private property and housing, and community facilities as far as practicable.
T-PH-006	Clear signage and directions for any alternative routes and appropriate alternative diversions will be provided and diversions clearly publicised to maintain access. Signage to advertise that businesses are open and operating as normal will also be provided where required.
T-PH-007	Community Facilities will be consulted prior to construction where access arrangements will be directly affected. Traffic management systems and diversion routes will be put in place to maintain access to identified community facilities.
T-PH-008	Vehicular access will be maintained at all times to community facilities which perform emergency service activities.
T-PH-009	A Dust Management Plan has been prepared to set out mitigation measures for dust and PM10. This is provided within the OCEMP (Document Reference: T.5.1).
T-PH-010	Construction activities that take place adjacent to Point of Ayr Holiday Park and Haven Presthaven Holiday Park, where practicable will be outside of the peak holiday seasons (e.g. peak summer season (July – August) as well as half terms and Easter holidays.

6.4 Construction Traffic Management Plan (CTMP)

Transport management measures relevant to the HDD Exit Pit Works are included within the Construction Traffic Management Plan, and Construction Workers Travel Plan submitted in respect of the conditions with the extant planning permission (**FUL/000246/23**). Additionally, the transport management measures relevant to the HDD Exit Pit Works are presented within the following sections.

Best practice measures include:

- Follow BS 5489-1:2020 and BS 8442:2022 for temporary and permanent traffic controls.
- Promotion, management and control of such general provisions and measures for traffic management and control to be implemented by all contractors and sub-contractors throughout the extent and duration of construction.

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- On-site provision for site access roads and pedestrian footways, with controlled access from the public domain for pedestrians and vehicles, on-site parking provisions, standing, lay-down and unloading facilities for delivery vehicles, and on-site compound, welfare facilities and material holding areas for use by all contractors and sub-contractors.
- Ensuring that the on-site provisions are controlled, managed and shall be safe at all times through the provision of planned and informed procedures and segregation between vehicular and pedestrian traffic.

6.4.1 Site Access

Site access for the proposed works will be via the following locations:

- **HHD Exit Pit Establishment** – via beach entry near Talacre car park incl. movements between Entry site and Exit Site via agricultural tractor and trailer. Unloading of equipment at Talacre car park, and unloading at the bottom of the ramp of the seawall prior driving to the car park/beach.
- **Pipe welding** – site compound at HDD Exit Pit.
- **Drilling Fluid Break-out** – access to dune area for clean-up required in contingency situation.

A maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas will be imposed. Crew/personnel/visitors are using same site access on daily basis. Car sharing to limit vehicles on site is promoted.

Truck movements will be undertaken during early mornings when the area is quieter, and to be minimised at peak times during the days of the holiday season. Clear signage and directions for any alternative routes and appropriate alternative diversions will be provided and diversions clearly publicised to maintain access. Signage to advertise that businesses are open and operating as normal will also be provided where required. It should be noted that no diversions of public roads are planned at this stage.

Temporary mats may be laid down where necessary, across the beach between Talacre car park and HDD exit site. This will be implemented to facilitate access across areas of soft sand, but it will also minimise damage of the existing habitats along the route.

Access for pedestrians is expected only to be affected at Talacre car park, beach entry and at the beach itself. The aim is to have both the car park and beach entry accessible throughout the operations for pedestrians and emergency vehicles, however temporary diversions may be required to keep them clear of work sites.

At the beach, site compounds and work areas are temporarily fenced off for the public. However during the pipe pull-back, and cable installation preparations, installation and burial works the work area cannot be practically fenced off due to the area being intertidal. Appropriate measures will be taken for pedestrians to walk by safely. Temporary diversions on the beach for pedestrian use will be arranged as required, either between the HDD exit pit and the dunes or across the dunes in the case that the beach must be fully closed, full closure of the beach will be reduced to the minimum. It should be noted that barriers cannot be placed on the beach intertidal areas, as these may come loose due to the large tidal range and become a pollutant and a hazard for shipping activities. Workers will look out for the public and direct them to pass the work site safely. Alternatively, works are stopped if they are too close.

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6.4.2 Expected Traffic Volume

The expected traffic volume during the various stages of the project is shown in **Table 6.7**. As explained in the programmes of the activities in **Section 4.5.9** and **Figure 4.14** the works are scheduled for the following months:

- HDD activities: February to April 2026
 - HDD entry and Talacre Beach conduit welding 08-02-2026 until 05-04-2026.
 - HDD exit 01-03-2026 until 01-04-2026.

The traffic volume will fluctuate throughout the different phases of the project. Most truck movements are expected during site establishment and demobilisation. During the project, vehicles will be required to transport consumables—such as food, water, bentonite, fuel, and equipment—to the site, as well as to remove cuttings, waste, and wastewater. The overview below provides an estimate of these vehicle movements; daily numbers may vary, potentially being higher on some days and absent on others. Vehicle movements are categorised based on their destination: Warren Farm or Talacre car park and the beach area. It is anticipated that vehicle movements via Talacre car park will not significantly restrict access to this area. Equipment may first be offloaded at Warren Farm and subsequently transported by tractor/trailer to the beach, resulting in two movements as reflected in **Table 6.7**.

The following considerations can be and have been taken to limit the impact:

- Where practicable, deliveries are made on weekdays (Monday to Friday).
- It has been checked that there is no school between the site compounds and the main road (A548). i.e., no movements need to be planned outside school hours.
- Consideration can be given, where possible, to reduce the truck movements during peak times/afternoon and increase these in the morning and evenings.
- Truck drivers will receive delivery instructions (which will be part of the more detailed TMP) to keep them on the right roads as planned and agreed upon. Do and don'ts can be included within this instruction.

Besides truck movements, personnel movements will be done by car, vans, and/or 4x4s to access the beach via Talacre car park. No busses transporting personnel to/from and between sites are planned for personnel transfer. Dedicated car parking will be made available on the valve field, beach location and/or at Talacre car parking. Personnel movements are not detailed in **Table 6.7** but will be reviewed daily at time of execution.

Table 6.7 Overview of truck movements for indication traffic volume peaks (*= no truck movements planned)

Month of 2026	Week	Main Activity (no delays considered)	Trucks via Talacre car park / beach (incl. collection at Warren Farm)
February	Wk. 6 (Mo 2 Feb)	Mobilisation	*
	Wk. 7 (Mo 9 Feb)	Mobilisation	Up to 3 daily
	Wk. 8 (Mo 16 Feb)	Mobilisation HDD exit at beach and Talacre Car park for welding	Up to 3 daily
	Wk. 9 (Mo 23 Feb)	Mobilisation HDD exit at beach and Talacre Car park for welding	Up to 6 daily
March	Wk. 10 (Mo 2 Mar)	HDD Installation	Up to 6 daily
	Wk. 11 (Mo 9 Mar)	HDD Installation	Up to 4 daily
	Wk. 12 (Mo 16 Mar)	Potential delay installation / Start breaking up / demob	Up to 4 daily
	Wk. 13 (Mo 23 Mar)	Demobilisation Beach	Up to 6 daily
April	Wk. 14 (Mo 30 Mar)	Demobilisation Beach	Up to 4 daily

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Table 6.8 presents the traffic and transport related mitigation and monitoring commitments from the REAC in Planning Permission **FUL/000246/23** that will be implemented during the execution of the HDD Exit Pit work.

Table 6.8 Traffic, and Transport mitigation and monitoring commitments

Ref	Mitigation and monitoring commitment
T-TT-001	Careful consideration will be taken of the siting of temporary access points during construction. Access points will require the incorporation of site-specific and appropriate visibility splays, turning radii and, where deemed necessary or appropriate, speed limit reductions.
T-TT-002	The Construction Contractor will follow the mitigation measures in the Construction Traffic Management Plan (CTMP) during construction works.
T-TT-003	Sensitive selection and specification of construction access points off the public highway. Construction traffic routes have been selected to reduce, where possible, traffic effects on links that would be more sensitive to changes in traffic volumes, due to the presence of built environment indicators used by sensitive affected parties.
T-TT-004	Details of temporary diversions for footpaths are provided within the Outline CTMP included within the OCEMP (Document Reference: T.5.1), of which the Construction Contractor will implement on site.
T-TT-005	Community Engagement and Public Information. Information regarding construction traffic activities and movements would be provided to the public. The means of communication would include online updates, letter drops, information boards and details of key contacts.
T-TT-006	CTMP measures to include other standard forms of mitigation including for example temporary traffic management, hazard signage, timing restrictions – details and requirement for these measures to be agreed with the LPA. Specific measures to include: - the introduction of temporary speed restrictions; - controls on timings to minimise HGV deliveries at peak times; and - the use of traffic marshals to manage HGV movements with local traffic and pedestrians/cyclists to minimise exposure for these groups to construction traffic; - the details and requirement for these measures to be agreed with Flintshire County Council by the contractor in development of the full CTMP.

6.5 Soil and Land

The following best practice construction methods have the potential to reduce adverse impacts and have been included:

- Materials excavated for the Exit pits work will be stockpiled adjacent to the works and reused during backfilling of the excavations.

Table 6.9 presents the land and soil related mitigation and monitoring commitments from the REAC in Planning Permission **FUL/000246/23** that will be implemented during the execution of the HDD Exit Pit Works.

Table 6.9 Land and soil mitigation and monitoring commitments

Ref	Mitigation and monitoring commitment
T-LS-002	Any facilities for the storage of oils, fuels or chemicals will be sited on impervious bases and surrounded by impervious bund walls. The volume of the bunded compound should be 110% of the capacity of the tank, all filling points, gauges, vents and sight glasses will be located within the bund. Associated pipework should be located above ground and protected from accidental damage. All filling points and tank overflow pipe outlets will be detailed to discharge downwards into the bund and refuelling will be supervised at all times, preferably on an impermeable surface. This system will reduce the potential for the addition of new contaminants to the existing baseline environment (e.g., spill or leak)
T-LS-003	Any waste materials generated as a result of the Proposed Development will be disposed of satisfactorily by registered waste carriers and in accordance with Section 34 of the Environmental Protection Act 1990 and NRW relevant guidance on waste management. Uncontrolled disposal or

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Ref	Mitigation and monitoring commitment
	discharge of waste is strictly forbidden, and compliance of all activities related to the management of waste with all existing local laws and regulations shall be assessed and assured by the subsidiary
T-LS-004	Acute exposure to potential contamination will be mitigated through normal working practice using appropriate Risk Assessment Method Statement and use of standard PPE and hygiene best practice. Where contamination is suspected, construction workers will be provided with appropriate Personal Protective Equipment (PPE) or Respiratory Protective Equipment (RPE) (over and above the standard PPE) to prevent direct contact, ingestion or inhalation of potential soil or groundwater contamination.
T-LS-005	Earthworks will be completed in accordance with a Contaminated Land: Applications in Real Environments (CL:AIRE) compliant Materials Management Plan (MMP) to ensure re-used material does not present a risk to human health or the environment and complies with UK waste legislation regulations. An earthworks specification will be produced that will include protocols for testing and limiting values to ensure that imported materials are suitable for their intended use in terms of their chemical quality;
T-LS-008	Appropriate measures to limit contamination to the ground from construction related plant/machinery and storage of materials will be incorporated within the detailed CEMP
T-LS-009	The handling and temporary storage of soils will be in accordance with DEFRA (2009) Construction code of Practice (Ref. 11.31) and the IoQ (2021) Soil Handling Guide (Ref. 11.32).
T-LS-026	The Construction Contractor will appoint an appropriately qualified person (e.g., Environmental Clerk of Works (EnvCoW)) to maintain a Watching Brief for the duration of any ground excavations. The aim and scope of the Watching Brief will be to identify any unexpected contamination and advise on the correct course of action if discovered. Should unexpected Made Ground or unexpected contaminated ground (i.e., visual or olfactory evidence of contamination) be encountered during the construction phase the ECoW or equivalent qualified person will be notified. Testing of Made Ground for a minimum of asbestos, metals, petroleum hydrocarbons and polyaromatic hydrocarbons to assess suitability for re-use and potential risks to construction works should be undertaken.
T-LS-029	An Unexploded Ordnance (UXO) assessment will be undertaken and will be used during the production of all risk assessments and method statements.

6.6 Resource Use and Management

The Contractor will follow a waste hierarchy approach: eliminate, reduce, reuse, recycle, and dispose.

6.6.1 Fuel Storage and Refuelling

To reduce spills and leaks, fuel storage and refuelling will be managed as follows on site:

- Materials should never be stored on bare ground, always impermeable surfaces to be used.
- Materials should never be stored anywhere near to watercourses, soakaways or other sensitive areas.
- Plant nappies of suitable size must be always placed under static plant & equipment. Drip trays will be used if plant nappies are not available.
- Regularly check the plant, equipment & vehicles for leaks. Leaking plant will be taken out of service and maintained.
- Use secondary containment systems with a 110% capacity.
- Keep spill kits available near fuel storage areas. If spill kits are utilized to contain a spill on site, the products will be replenished for future use.
- Refuel in designated areas away from water bodies.
- Supervise all fuel transfers and ensure appropriate protective measures are in place.
- Where possible, refuelling should only be carried out in a designated area, which will be secured/locked out of hours.
- The refuelling area shall be located away from drains and watercourses (>10m from a watercourse and >50 meters from a spring, well or borehole).

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- Areas of permanent waste oil/fuel/chemical storage will be located 50m away from watercourses or drainage paths. Where this is not possible, advice will be sought from the Field Environmental Manager, and a minimum distance will be agreed with the Client.
- Refuelling will always be supervised by a competent supervisor.
- Mobile plant must be refuelled away from surface waters, drains, permeable pavements and open excavations. A fuel drip tray must be used.

6.6.2 Use and Storage of Hazardous Materials/Substances

The use and storage of solvents, cements, adhesives, grout and concrete shall be managed as follows during the HDD activities :

- The Contractor is responsible for carrying out a risk assessment of each substance and ensuring that all appropriate storage, protective equipment and if necessary, emergency procedures are put in place on site.
- All hazardous materials shall be labelled, sealed and stored with their Control of Substances Hazardous to Health (COSHH) assessment in a bunded and lockable container away from drains and watercourses when not in use.
- COSHH datasheet will be read and understood before using any hazardous materials.
- Any spent (contaminated) spill kits, absorbent granules, sheets or fibres must be disposed of in accordance with COSHH regulations requirements.
- Hazardous liquids shall be transferred using a funnel and drip tray and sealed and returned to the container immediately after use. Damaged containers shall be reported to the Field Environmental Manager.
- All usages shall comply with its requirements.
- Hazardous liquids must be re-sealed after use. Empty containers are to be disposed of to the designated container within the waste compound.
- Construction workers are required to wear Personal Protective Equipment (PPE) such as gloves and face masks (where appropriate) to prevent dermal contact and inhalation or ingestion.

Table 6.10 presents the resource use and management related mitigation and monitoring commitments from the REAC in Planning Permission **FUL/000246/23** that will be implemented during the execution of the HDD Exit Pit works.

Table 6.10 Resource use and management mitigation and monitoring commitments

Ref	Mitigation and monitoring commitment
T-GG-001	The Detailed Design of the Proposed Development will ensure the design is optimised to avoid unnecessary permanent design aspects, and minimising material consumption and waste generation, as far as reasonably practicable
T-GG-002	The Detailed Design of the Proposed Development will aim to substitute-in and use alternative raw materials and resources , where practicable.
T-GG-003	The Detailed Design of the Proposed Development will aim to reduce the elements required and maximise the re- use of existing equipment where possible.
T-GG-004	Maximising the opportunity to use more sustainable materials and products with reduced embodied carbon emissions and materials/resources featuring recycled content (where safe and of sufficient integrity for engineering), eventually supported with eco- and carbon labels or verified Environmental Product Declarations (EPD), are preferred.
T-GG-005	Construction materials will be sourced from local suppliers and local waste disposal facilities will be used where available and practicable to minimise the distance materials are transported from source to Site and from Site to disposal.

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Ref	Mitigation and monitoring commitment
T-GG-006	Avoid disposal of construction waste to landfill, maximising recycling, and reuse of waste where possible.
T-GG-007	Using modern and efficient low emission construction plant and delivery vehicles, and/or those powered by electricity from alternative/lower carbon fuels, as far as practicable. Construction Contractors will ensure high performance of plant and equipment through correct and efficient operation, maintenance, and servicing of vehicle fleet to avoid polluting emissions.
T-GG-008	Training policies will be in place during site induction to avoid idling of engines, spills of fuels (for example, when refuelling) and safe/environmentally sensitive driving techniques to maximise fuel saving.
T-GG-009	The sustainability credentials of suppliers and companies in the supply chain will be considered as part of the procurement process.
T-GG-010	To reduce the level of energy consumption used during construction, innovative construction methods will be utilised where practicable. These may include: - avoiding sharp acceleration and braking to conserve fuel; - adjusting haul and access road/points to smoother gradients to avoid unnecessary fuel usage; and - only using plant when required (including future planning as to what plant is required, and when).
T-WR-016	Waste fuels and other fluid contaminants will be collected in leak-proof containers prior to removal from the construction area to an approved recycling processing facility.
T-WR-017	Oil absorbent booms will be made available at construction compounds and works areas and will be deployed as soon as possible in the event of a significant spillage.
T-WR-019	Measures implemented to control spillage or pollution risks for site runoff or works within watercourses will be regularly inspected to ensure they are working effectively.
T-WR-025	Sewage generated from site welfare facilities will be disposed of appropriately. This may be by discharge to the foul sewer network or by collection in septic tank for disposal off-site.
T-WR-026	Works will be undertaken in compliance with the relevant sections of BS6031:2009 Code of Practice for Earthworks (British Standards, 2009) with respect to protection of water quality and control of Site drainage including washings, dewatering, abstractions, and surface water.

6.7 Waste Management Plan

6.7.1 General principles

The works will be carried out in compliance with the Waste Duty of Care Code of Practice. The Contractor shall seek to promote the re-use of excavated materials through optimisation of cut and fill operations to improve the sustainable and cost-effective development of land, as per the Definition of Waste: Development Industry Code of Practice (DoWCoP). In many instances the DoWCoP can provide an alternative to Environmental Permits or Waste Exemptions when seeking to reuse excavated materials.

The control measures that will be applied to waste management during the HDD Exit Pit Works include:

- Set up waste collection areas with segregated containers for different waste types.
- Implement a Site Waste Management Plan and audit waste transfer records.
- Regularly update recycling progress and report any waste incidents.
- Spoil and recycled aggregate transfers shall be carried out in accordance with an approved Materials Management Plan and all transfer tickets must be retained on site.
- Use licensed waste carriers and keep duty of care documentation on-site.
- Divert waste from landfills by recycling or reusing materials such as timber, metal, and concrete.
- All waste incidents shall be reported immediately to the Construction Manager and Field Environmental Manager.

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The waste management foreseen for the HDD Exit Pit Works will arise from the use, generation, and handling of the following:

- Drilling Fluids.
- Unplanned bentonite discharge into sea.
- Water abstraction for water supply on site.
- Toilet water.
- Canteen waste.
- Packaging / plastic.
- Cuttings.
- Unplanned bentonite break out.
- Unplanned potential dewatering.
- Dirty water.
- Wood/steel/concrete waste.
- Oil and waste fuel.

6.7.2 Drilling fluid management

The used drilling fluids are collected and deposited in a mud lagoon for cleaning prior to re-use at the Warren Farm / HDD Entry site. Used drilling mud will be transferred from the storage lagoon to the recycling system by way of an electrical submersible slurry pump. The multi screened cleaning system separates cuttings from the used fluid using a combination of mesh screens and a series of hydro-cyclones to remove coarse and fine particles from the used fluid. Reducing the solids sufficiently allows the used drill fluid to be returned to the mixer and static holding tanks and then re-used downhole. The separated solids removed from the drill fluid are collected and stockpiled for removal from site on completion.



Figure 6.2: Drill Fluid Recycling Plant (typical)

Due to the sensitivity of the area and the distance to travel by road from the Exit Pit to the Entry Pit site, it is not deemed practicable to transfer the fluids by road. Therefore, a mud return line will be installed by drilling an initial bore from HDD entry to HDD exit site. This will transfer the drilling fluid back from the HDD exit pit to the HDD Entry site for recycling.. The drill pipe is left in place to serve as transfer line between the two sites. On completion of the works, this pipe is removed.

However, as cuttings within the fluid may block the mud return line, first the drilling fluid is cleaned at the beach. To do so, a shaker system (similar but smaller than the recycling facility at the HDD entry- see **Figure 6.2**) at Warren Farm. With this the rougher cuttings are separated from the drilling fluid. Allowing the drilling fluid to return via the mud return line, while the separated cuttings are contained at the beach before being transported by agricultural tractor / vacuum tankers back to Warren Farm. These cuttings are stockpiled.

At the end of the project, drilling fluid incl. the fluid in the lagoon will be taken away by tanker. This will be reused on other projects and otherwise disposed of by an accredited waste handler.

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Ground that encountered the drilling fluid, i.e. at the HDD exit pit, will be excavated and transported from site to be handled by a registered waste handler.

6.7.3 Cuttings

Cuttings from the drilling works are stockpiled during the works and will be removed by transporting them from site on completion of the works. The cuttings will be either stored in skips or tipper lorries for transporting. Disposal of the cuttings will be made in accordance with this Waste Management Plan and legislative requirements.

6.7.4 Unplanned drilling fluid break-out

During the drilling process there is an inherent risk that an uncontrolled release of drilling fluids may occur, Contractor will maintain lookout for such occurrence at all stages of the drilling operations. In the event this does occur the drilling will be stopped, and a cleanup and mitigation plan will be implemented. This may require some personnel and equipment to access the sand dunes area.

While precautions will be taken to avoid this happening, if it does, it is required to be able to clean up and drilling fluids that are lost. This would be with handheld equipment where possible, but use of a small, tracked excavator and some pumping equipment or a dumper truck can be required. Access to the dunes is done via the valve field exit towards the dunes and/or other parking space found in the area.

Appendix D includes *The Breakout Plan for the Liverpool Bay CCS Project (AMS Project J3130)*. The Breakout Plan sets out the procedures and responsibilities for managing drilling fluid “breakouts” during Horizontal Directional Drilling (HDD) works at Talacre, North Wales. It provides a structured approach to prevention, monitoring, containment, and clean-up to minimise environmental impact and ensure health and safety compliance.

The introduction explains the function of drilling fluids in HDD operations and highlights the risk of inadvertent returns to surface when bore pressures exceed local ground strength. The plan describes how the HDD works (a ~500 m bore with a polyethylene duct) will be executed, and the measures in place to respond to breakout events. It stresses commitment to protecting sensitive dune and beach habitats, supported by the Contractor’s HSE Plan and Environmental Management Plan.

Detailed sections cover the principles of drilling fluid use, including their generally benign nature, and outline proactive monitoring by drill operators and mud technicians to reduce risks. Breakout management is described in four stages: prevention (careful fluid monitoring and bore design), monitoring (continuous inspection and patrols along the drill line), containment (using hay bales, sandbags, pumps, or vacuum tankers to manage spills), and clean-up (safe disposal, reinstatement of affected areas, GPS and photographic recording, and Ecological Clerk of Works monitoring).

The document also lays out clear reporting protocols (**STOP–CONTAIN–NOTIFY**), public and environmental safety considerations for accessing the Warren and dunes, and separate procedures for minor and major breakouts. A list of plant and equipment required for rapid deployment is included. Finally, health and safety provisions are described, including PPE standards, first aid availability, COSHH compliance, and the need for all personnel to be inducted, competent, and signed onto the risk assessment. A briefing register at the end ensures accountability and awareness of the method statement.

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Overall, the breakout plan demonstrates a strong emphasis on environmental protection, health and safety compliance, and clear operational procedures to manage the unlikely event of drilling fluid escape during HDD works.

6.7.5 Potential need Abstraction permit for water supply on site / Hydrant licence

For the water supply of the drilling, water will be delivered by 3rd party, and they will provide the relevant extraction license for the provision of water.

6.7.6 Potential Dewatering

No dewatering or discharge is anticipated during Horizontal Directional Drilling (HDD) activities at the exit pit, and Talacre beach. While the HDD Exit Pit will be in the inter-tidal environment, there are no terrestrial surface watercourses located within 500m of the HDD works. Notwithstanding, monitoring checks and inspections will be conducted prior to and during works.

Successful HDD conduit installation is from is the careful management of drilling fluid pressure to prevent water ingress. Furthermore, once the conduit is drilled, the HDD conduit is sleeved by watertight glass reinforced plastic (GRP) pipework to prevent further water ingress and maintain the integrity of the conduit, and electrical cable.

6.7.7 Other Waste

Waste originating from the personnel and welfare facilities on site will be disposed of as per local regulations. Waste is stowed in covered skips where possible to prevent materials being blown out by the wind. Waste water coming from the welfare facilities will be contained in tanks. Waste and waste water is removed by trucks from registered waste carriers. Covers are used where required to limit escape of materials during transport. No burning of waste on site is considered.

Good housekeeping is held on the site to limit debris flying around and where possible machinery is switched off when not in use. This also relates to maintenance of construction plant and equipment on site to ensure good working order and to prevent spills. In case of spills, equipment is readily available on-site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods. Please see **Chapter** Error! Reference source not found. Error! Reference source not found..

Electricity on site is provided by generators, and solar panels and battery packs can also be used for certain equipment to reduce emissions. Fuel is transported to site by truck and stored in double bunded fuel tank on site. When refuelling, the appropriate measures are taken to limit potential spills.

Table 6.11 presents the waste management, and water management related mitigation and monitoring commitments from the REAC in Planning Permission **FUL/000246/23** and **FUL/000705/25** that will be implemented during the execution of the HDD Exit Pit Works.

Table 6.11 Waste management and water management mitigation and monitoring commitments

Ref	Mitigation and monitoring commitment
T-MW-001	The Construction Contractor will ensure that the application of circular economy principles will be followed, as implemented in the detailed CEMP, including:

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Ref	Mitigation and monitoring commitment
	- Design solutions to prevent the production of waste where feasible, and to send the waste produced for recovery where possible; - Considering all phases of construction, operation and decommissioning in a lifecycle approach; and - Identification of resource streams that might be considered by-products (i.e. not wastes, as per applicable legislation) and reused or recycled.
T-MW-002	The Waste Management Plan, which will be produced by the Construction Contractor(s), will adhere to all relevant legislation and the Applicant's waste management procedures including technical guidance note (AMTE TG 010) as detailed in the Applicant's policy.
T-MW-003	Waste storage areas will be incorporated into the design with waste segregation measures put in place by the Construction Contractor.
T-MW-004	Identification and specification of material resources that can be acquired responsibly, in accordance with BES 6001 Responsible Sourcing of Construction Products
T-MW-005	The Construction Contractor will implement, and follow guidance within, the Materials Management Plan (MMP) in accordance with the CL:AIRE Definition of Waste: Code of Practice.
T-MW-006	Engage early with Construction Contractors to identify possible enhancement and mitigation measures to identify opportunities to further reduce any waste through collaboration and regional synergies.
T-WR-012	Emergency response plans will be developed, and spill kits made available on-site.
T-WR-013	Measures to be put in place to prevent pollution from construction plant including: - activities involving vehicles and machinery including refuelling and lubricating are to be carried out in designated areas, on an impermeable surface, with appropriate cut-off drainage located away from watercourses; - plant to be maintained in a good condition with wheel washing in place (avoiding vehicle cleaning near to existing watercourses), - all refuelling would be supervised and carried out in a designated area. In the event of plant breakdown, drip trays would be used during any emergency maintenance and spill kits would be available on-site. Guidance for Pollution Prevention would be used to inform the CEMP.
T-WR-014	Fuels and potentially hazardous construction materials would be stored in bunds that have areas with external cut-off drainage; fuel would be stored in double skinned tanks with 110% capacity.
T-WR-015	Construction plant will be checked regularly for oil and fuel leaks, particularly when construction works are undertaken in or near the existing waterbodies.
T-WR-016	Waste fuels and other fluid contaminants will be collected in leak-proof containers prior to removal from the construction area to an approved recycling processing facility.
T-WR-017	Oil absorbent booms will be made available at construction compounds and works areas and will be deployed as soon as possible in the event of a significant spillage.
T-WR-019	Measures implemented to control spillage or pollution risks for site runoff or works within watercourses will be regularly inspected to ensure they are working effectively.
T-WR-025	Sewage generated from site welfare facilities will be disposed of appropriately. This may be by discharge to the foul sewer network or by collection in septic tank for disposal off-site.
T-WR-026	Works will be undertaken in compliance with the relevant sections of BS6031:2009 Code of Practice for Earthworks (British Standards, 2009) with respect to protection of water quality and control of Site drainage including washings, dewatering, abstractions, and surface water.

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7.0 MARINE POLLUTION CONTINGENCY PLAN

7.1 Emergency Preparedness

7.1.1 Spill kits

Spill kits for hydrocarbon and chemical spills will be available at all worksites, with clear signage for easy identification. The site team shall ensure:

- Additional spill kits are located at construction compounds, fuel storage points, and COSHH stores.
- Each kit will include:
 - Absorbent pads.
 - Absorbent booms.
 - Absorbent granules.
 - Hazardous waste disposal sacks.
- Regular checks will ensure spill kits are fully stocked and ready for use.
- Spill drills will be conducted periodically to ensure the workforce can effectively handle spills.
- All drills will be documented, with records kept throughout the project.

7.1.2 Fire prevention

Means to raise the alarm in the event of a fire shall be available at the points of work. An assembly point shall be designated a safe distance from the active works locations and will be communicated to all members of the workforce before works commence. The workforce shall assemble at the point for a rollcall and to receive further instructions. All individuals at the worksite, including visitors, will be obliged to immediately sign in on arrival.

7.1.3 Extreme weather

The Contractor's Site Manager shall register to receive Met Office weather warnings. All warnings issued by the Met Office with the potential to impact upon the works shall be communicated by the Construction Manager to the workforce in a timely manner so that measures can be implemented where necessary. In the absence of the Construction Manager the Field Environmental Manager or equivalent person shall also receive and act upon all alerts.

It should be noted that the PoA site operator is registered with the Natural Resource Wales (NRW) Flood Warning system and has implemented an Emergency Response plan that includes protocols for flood risk and emergency situations. This plan enables rapid response to events such as an unlikely breach of tidal flood defences. Incident Reporting and Investigation

7.2 Incident Reporting and Investigation

7.2.1 Reporting

All incidents, including near misses, shall be classified according to the categories outlined in **Table 7.1**. All categories of environmental incident shall be reported by the Contractor to the client as outlined below.

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Table 7.1 Reporting

Incident Classification	Definition
Near Miss	An event, controlled through implementation of an effective incident control measure (e.g. drip tray used, effective use of noise barrier).
Minor Environmental Incident	Incidents that have caused minor harm or damage to the environment e.g. - A minor fuel spill below 10 litres onto ground which is immediately cleared. - A minor spill of a chemical not classified as presenting an ecotoxic risk. - Exceeding noise levels. - Silt runoff from site which does not enter into a surface water feature; or - Excess dust emissions.
Major Environmental Incident	Incident that has caused or may cause significant harm or damage to the environment e.g. - A minor fuel spill which impacts a sensitive land feature, a water, or drains. - A major fuel spillage or 10 litres. - Any spillage of a chemical which is classified as presenting an ecotoxic risk. - Silt runoff from site which enters a water feature. - Receipt of a nuisance complaint.

Minor incidents and near misses must be reported to Liverpool Bay CCS Limited within 24 hours. Major incidents must be reported to the Project Manager as soon as reasonably practicable.

The contractor, after informing Liverpool Bay CCS Limited, shall report all environmental incidents that are required to be reported to National Resources Wales and/or to any other relevant statutory or regulatory bodies. Emergency contact details are outlined in **Section 7.2.3** for all contacts relevant to the works.

7.2.2 Investigation

Reporting of an incident to the Project Manager shall, where necessary, commence the incident investigation which shall be jointly conducted between Liverpool Bay CCS Limited and its contactor[s].

The Contractor shall prepare an investigation report for all environmental incidents. The report is to include:

- Summary of the environmental incident, describing the:
 - Nature of the incident.
 - Details of any pollutant released including the type and quantity of pollutant released.
 - Location for the incident (e.g. grid reference).
- Receptors that were or could have been impacted.
- An analysis of what led to the incident occurring.
- Summary of immediate actions taken to mitigate the incident.
- Summary of any remedial action required.
- Lessons learned and future measures or actions to be implemented.

Liverpool Bay CCS Limited will verify the incident investigation and agree with its contractors any further actions which are to be implemented to prevent a reoccurrence of comparable incidents. A timeline for the implementation of all actions shall be established, and the contractors shall provide details of when they have been implemented.

An incident investigation shall be complete when all details have been recorded on file.

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7.2.3 Emergency Contacts

In the event of an emergency occurrence at the Site, the Client and its contractors shall determine the relevant statutory and regulatory bodies that must be notified. Notification shall be in accordance with the measures outlined above in **Section 7.2.2**.

Table 7.2 Emergency Contacts-

Emergency Contacts	
Contact	Contact Details
Client Site Manager – Guy Lister	+44 (0) 7801 617 526
Contractor Site Manager – Pete Goss	07917 608 768
Contractor Environmental Manager – Wayne Halsall	07342 997 869
Boskalis Emergency number (24/7)	+31 (0) 78 6969 999
National Resources Wales	0300 065 3000
Health and Safety Executive (HSE Construction)	01519 229 235
Local Authority – Flintshire County Council	01352 703020
Fire	999 / 112
Police	999 / 112
Ambulance	999 / 112

7.3 Incident Response

All pollution incidents should be managed through the **STOP – CONTAIN – NOTIFY** concept. As soon as an incident is identified, the first action should be **STOP** and prevent further discharge to drainage/river/ground.

CONTAIN may constitute control of discharge in the event of a spill, or cessation of works if it is the works that are resulting in the incident, e.g. halting excavations until silt runoff is contained. It is recognised that due to personal health and safety risks it may not always be safe to stop the source of the spill, for instance if a significant volume of an unidentified substance has been released.

NOTIFICATION should take place as soon as practicable and frequently can take place while further release is being stopped or while a spill is being contained. The emergency contact numbers outlined in **Table 7.2** should be used.

Appendix D includes *The Breakout Plan for the Liverpool Bay CCS Project (AMS Project J3130)*. The Breakout Plan sets out the procedures and responsibilities for managing drilling fluid “breakouts” during Horizontal Directional Drilling (HDD) works at Talacre Beach, North Wales. It provides a structured approach to prevention, monitoring, containment, and clean-up to minimise environmental impact and ensure health and safety compliance.

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8.0 GENERAL ENVIRONMENTAL REQUIREMENTS

8.1 Roles, Responsibility and Authority

The Contractor shall make available sufficient time and resource for the effective management of environmental risks that could arise during construction work. This includes appointing adequately qualified personnel with knowledge and capability in the environmental management of construction site works. Persons having responsibility for environmental site management, and in particular any persons required to undertake and oversee response to any incidents with potential environmental consequences, shall be empowered to make decision and take appropriate action necessary to avoid or mitigate adverse environmental effects, even when this may lead to delay and/or additional cost to the Contractor.

8.1.1 Project Roles

The Liverpool Bay CCS Limited team and all appointed contractors will be responsible for ensuring that the potential risks to the environment are adequately avoided or controlled by the application of measures as documented within this **CEMP #1**, which shall be complied throughout construction.

During the execution of the activities foreseen by the Project, the Contractor/Subcontractor:

- will carry out its activities in accordance with the applicable national legislation, its own and Liverpool Bay CCS Limited's standards, the Environmental Statement and the Register of Environmental Actions and Commitments (REAC), and international best practices;
- will be responsible for the environmental impacts resulting from its activities and operations and for implementing all measures necessary to avoid or, if not possible, reduce and mitigate them, in accordance with Contractual requirements;
- will react promptly to accidental events for which it is responsible to mitigate the resulting impacts as much as possible;
- will implement this **CEMP #1** and all identified mitigation and monitoring measures and operational control actions.

The most important Project Functions, responsible for development, implementation and monitoring of this **CEMP #1** are identified and described in the following sections.

8.1.1.1 Project Director / Project Manager

The Project Director (PD) / Project Manager (PM) is responsible for ensuring that the Project is executed in a responsible manner that is protective of human health and environment. The responsibilities of the PD / PM are as follows:

- supervise compliance with regulatory requirements and adherence to applicable standards and procedures to which the Contractor has committed to adhere;
- approve this document and ensures its application on Site with the support of the Project HSE Manager and the Project Environmental Manager;
- ensure the availability of adequate funds and human resources for the implementation of this document;
- define the Project strategies in relation to environmental protection measures, supervising the planning and scheduling of activities;
- support initiatives and awareness campaigns on environmental issues.

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8.1.1.2 Project HSE Manager

The Project HSE Manager (PHSEM) manages and supervises the Project activities of competence related to health, safety and environment during the development of the Project, ensuring the correct application of the HSE Management System of the Contractor; its function includes:

- ensuring the review of the contractual documents of competence;
- controlling the activities related to the HSE aspects of the Project carried out by the various functions;
- ensuring the preparation of the Environmental Plans for the construction phase in accordance with the HSE objectives of the Project;
- ensuring the review of the Project documents on environmental matters, to verify compliance with the HSE Management System of the Contractor;
- coordinating the HSE audit activities for the Project;
- ensuring, in line with the contractual constraints and local legislation and coordinating with the other Project positions, the definition of the environmental requirements to be considered and applied in all phases of the work, subsequently verifying their implementation.

8.1.1.3 Environmental Manager

The Environmental Manager (EM) shall:

- ensure that the Project activities comply with the requirements of environmental legislation;
- provide guidance to the Environmental Team and the Project on environmental management;
- be overall responsible for the implementation and monitoring of the environmental program;
- monitor the implementation of the environmental management requirements as described in this Plan;
- ensure support to the PM in relations with the Client and with the relevant environmental bodies;
- report environmental incidents to the Client and implement corrective actions of this **CEMP #1** when necessary;
- be responsible for ensuring that this **CEMP #1** is developed in a timely manner and in accordance with applicable national legislation, current authorizations and international best practices;
- ensure that adequate knowledge is provided to all workers and interested parties regarding the contents of this Plan;
- ensure that adequate training on the contents of this procedure are identified, developed and provided;
- ensure that any corrective actions are correctly identified and implemented;
- identify and develop specific environmental campaigns to raise awareness of environmental issues;
- develop environmental incident management procedures and spill response plans to ensure a rapid and effective response in the event of an environmental incident.

8.1.1.4 Construction Manager

With the support of PHSEM and EM, the Construction Manager (CM) is responsible for:

- ensuring that the planning and programming of the Project take into account the environmental management aspects, coordinating to this end with the other organizations and functions involved in the implementation of the Project and ensuring the most appropriate solutions;
- ensuring the coordination of the environmental management activities with the other Project plans and programs, the Construction Plans, defining the construction methods, logistics, activity programming, tools and control methods;
- participating, as far as it is competent and in conjunction with PHSEM, in the development, updating and adjustment (if necessary) of this **CEMP #1**.

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8.1.1.5 Field HSE Manager

In collaboration with CM, Project HSE Manager and Field EM, the Field HSE Manager (FHSEM) has the following responsibilities:

- ensure adequate resources and facilities provided at Site for HSE management in compliance with national legislation and international standards;
- provide training and awareness to all relevant workers to ensure proper implementation of the HSE management plans and procedures;
- monitor Site conditions to ensure that HSE mitigation measures are being implemented;
- monitor the correct implementation of HSE procedures on site;
- coordinate the HSE inspections and audits, ensure the follow-up actions.

8.1.1.6 Field Environmental Manager

The Filed EM's responsibilities include:

- ensuring compliance of this **CEMP #1** with the requirements of the Contractor and Liverpool Bay CCS Limited;
- verifying the implementation of this **CEMP #1** for construction site activities;
- verifying the implementation of the requirements contained in the environmental permits;
- participating in accident investigations;
- planning and supervising the application of environmental procedures;
- updating and providing training on environmental issues;
- planning and carrying out environmental audits, checks and inspections;
- managing environmental reporting for the Contractor;
- developing and updating this **CEMP #1** in relation to possible legislative changes or operational activities;
- ensuring that all personnel are aware of the environmental management strategy in the following Plan and comply with it;
- planning and carrying out environmental emergency response drills;
- participating in the analysis of the causes of any accidents and ensuring the collection of data;
- carrying out the analysis of environmental data and formulating the necessary improvement proposals;
- ensure control over the correct compilation of documentation in compliance with current legislation;
- keep all documents relating to environmental management archived, organized and available for reporting and auditing.

8.1.1.7 Workers

All personnel are responsible for their environmental performance during the Project.

As a minimum, personnel are expected to:

- comply with the requirements of applicable environmental legislation and environmental authorities, including the specific requirements of Project approvals and supporting documentation;
- be responsible for their environment and for fully complying with all plans, procedures and other work instructions applicable to their work activities;
- undertake activities in an environmentally responsible manner;
- undertake activities in accordance with agreed environmental management plans, procedures and working method statements;
- ensure they are aware of the identity of key persons relevant to environmental management on the site;

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- report any non-compliance with this **CEMP #1**, environmental management procedures or regulatory approval requirements where identified;
- report any incidents which have resulted in, or may potentially result in, environmental damage;
- ensure they attend any environmental training provided relevant to their role and responsibilities.

8.1.1.8 Subcontractors

All environmental requirements for which the Contractor is responsible fall to the Subcontractors, which shall carry out their activities in accordance with the regulatory provisions, this Plan and the ongoing environmental authorization process.

Each Subcontractors shall have an operational site structure (e.g. presence of a Field EM) adequate to guarantee complete and efficient control of the environmental aspects of the field and to carry out the necessary management and coordination activities for these issues.

Contractor will provide each Subcontractor with the copy of this document prior to start of their activities and organize additional trainings to all Subcontractors, if required. Subcontractors are responsible to Contractor for respecting the provisions of this document and are subject to Contractor's supervision and audits. Subcontractors are responsible to provide Contractor with the data of their environmental performances.

8.2 Competence, Training and Awareness

The Contractor shall ensure that appropriate awareness training is delivered to all site operatives and only appropriately qualified Subcontractors are appointed.

Every member of the workforce shall be required to participate in a site induction prior to starting work on the site. The level of induction training will depend upon the position and duties the person is to perform. The site induction will include:

- A brief overview of the works to be undertaken and any potential environmental aspects associated with construction.
- A summary of the sensitive environmental receptors near the site.
- An overview of the applicable environmental mitigation and pollution control measures.
- An overview of the health and safety management measures in particular emergency response procedures required at the site.

Liverpool Bay CCS Limited will require its Contractors to provide continuing training and awareness raising of the workforce. This can be delivered in the form of Toolbox Talks tailored to the specific environmental mitigation measures required dependent on the work activities being undertaken and to raise awareness on environmental best practice.

Records of all inductions and Toolbox Talk deliveries shall be maintained at the site office. Copies shall be made available to Liverpool Bay CCS Limited on request.

8.2.1 Internal Communication

The Contractor's CM, Field EM or equivalent person and other relevant team members shall meet weekly to review the status of environmental aspects including but not limited to:

- Works activities underway and planned.

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- Mitigation measures required to be implemented.
- Results of weekly inspections and any audit results/feedback.
- Any corrective and preventative actions required to be implemented.
- Identification of areas for continual improvement.
- Status of staff competence and training needs.
- Status of **CEMP #1** and of any required consent and approvals and the need for review and updating.

Liverpool Bay CCS Limited shall be informed of the outcome/minutes of all such meetings.

Additional and ongoing communication of environmental performance and requirements is to be determined by the Contractor and provided as appropriate.

8.2.2 Notice Boards

The Contractor provides and maintains project environmental notice board(s) which are positioned to ensure all operatives can review the notice board a daily basis. The notice boards should be updated at least monthly. As a minimum, the notice boards shall contain:

- Clients Environmental Policy.
- Emergency contacts list.
- Relevant statutory and non-statutory advice and guidance.
- Description of the key environmental risks and intended risk mitigation measures.

These environmental notice boards will be situated in prominent positions including the main reception area of the site office.

8.2.3 Toolbox Talks

Toolbox Talks will be used to inform all site personnel of key information concerning the management of the site, procedures to be followed and expected standards / controls when working on the project. The Toolbox Talks will cover a broad range of topics including those related to best practice environmental management.

A record of Toolbox Talks will be kept on site, starting date, description of non-conformance, potential implications, proposed corrective actions, individual responsible and target data. Toolbox Talks shall include, but will not be limited to, instances where:

- There is a change to existing legislation, which requires an operation change.
- Site inspections or audits have identified corrective actions which require communicating.
- There are significant changes in environmental conditions i.e. heavy rainfall.

The frequency and topics of the Toolbox Talks shall depend upon the phase construction. They shall be provided as often as necessary to address site-specific environmental requirements.

8.2.4 External Communication

The Contractors, with Liverpool Bay CCS Limited's agreement, will notify residents and relevant businesses of upcoming works at least two weeks before starting, typically via letter. A Liaison Officer may be appointed to handle inquiries and complaints, and a hotline or email may be provided during construction.

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All received complaints will be assessed and addressed promptly, aiming for same-day contact with the complainant. The CM or an equivalent person will be the contact for regulatory authorities, and any communications received will be reported to Liverpool Bay CCS Limited immediately. A record of all communications will be maintained, with incident-related communications detailed in **Section 7.2** of this **CEMP #1**. The workforce will be informed during induction to direct any public inquiries to the CM, who will document these and inform Liverpool Bay CCS Limited's Project Team.

8.3 Documentation

The Field EM shall be responsible for documenting and retaining safe all suitable records relating to environmental issues at the site and/or arising from site operations. Documents shall be stored in a suitable manner and backups created to safeguard the records. The **CEMP #1** shall be controlled document and authorised latest version shall be signed and dated by the responsible person[s]. Other site data records and environmental management document would include, but not necessarily be limited to the following:

- Copies of relevant consents, permissions, or other approvals/ authorisations.
- Environmental data records including waste transfer notes/records of waste collection and treatment/ disposal.
- Records of any environmental incidents including actions taken and resolution.
- Records of all plant/equipment entering / leaving site together with any relevant compliance documentation (for instance in respect of noise or air pollutant emissions class).
- Copies of any enforcement notices or instructions issues by the local authority or statutory regulatory body.
- Record of any prosecutions pending or resolved, and any penalties enforced.
- Records of daily site inspections.
- Records of weekly/monthly audits and minutes of environmental team briefings.
- Records of staff training including site inductions and toolbox talks.

8.4 Monitoring

The Contractor shall be responsible for managing environmental performance during all site works. This will be supported with a programme of monitoring, inspections and audits.

8.4.1 Daily Inspections

Daily inspections shall be undertaken by the Contractor and recorded as follows:

- Visual inspection of the site perimeter to check for dust deposition (evident as soiling and marking) on vegetation, cars and other objects.
- Visual inspection of the local haul roads to check their condition to ensure there is no build-up of dust or earth deposits liable to cause dust emissions as vehicles pass.
- Vehicles, equipment and plant inspections shall be completed to check the absence of damage or maintenance issues and that it is correctly functioning.
- Visual inspection of all acoustic barriers / screening to check they are present and in good condition.
- Visual inspection of waste containers and waste storage areas to verify wastes are being correctly segregated and to confirm the absence of mixing of hazardous and non-hazardous wastes.
- Visual inspection of all site areas to ensure there is no deposited or wind-blown litter.
- If a waste collection is made, a check shall be made of the Waste Transfer Note / Hazardous Waste Consignment Note provided for the collection.

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On all days when potentially dust emitting activities are being conducted, the level of dust generation shall be kept under constant review. A record shall be added to the official site diary when such activities are conducted, the dust emission conditions observed and when necessary, the mitigation measures taken.

Any elements of the site management found to be in an unsatisfactory condition during the site inspection shall be addressed on the day. In the event it is not possible to address the matter on the day it is raised; a note of the reason why shall be made on the inspection record sheet.

8.4.2 Audits

Only suitably trained and competent staff will be authorised to perform environmental audits.

Audits (or at a suitable frequency to be determined by the nature / duration of the work) of the worksites and Contractors shall be undertaken by or on behalf of Liverpool Bay CCS Limited. All aspects of the environmental management at the site shall be assessed against this **CEMP #1**. The audit shall include checks of the site records including the daily inspection record sheets, vehicle arrival logs and waste disposal paperwork. All audits shall be documented; where audit actions are raised, close out of these actions shall be assessed at the following audit.

An audit of an Environmental Management Process will be undertaken by the EM throughout the Project duration and will typically cover the activities identified in the above chapters.

8.4.3 Non-Conformity and Corrective Action

Where Liverpool Bay CCS Limited has a concern or raises an issue for resolution, or where potential issues are raised from an inspection or audit of the site/ operations, or by a regulatory authority, the Contractor shall investigate the root cause and any implications arising from the issue and shall if necessary following discussion with Liverpool Bay CCS Limited implement measures to rectify the problem.

The Contractor shall monitor the effectiveness of the corrective action and report the outcome to the client and where relevant the regulatory authority. All documentation of the issue/ event and corrective action/ outcome shall be retained by the contractor.

8.4.4 Data Reporting

The Contractor may be required to submit to Liverpool Bay CCS Limited all relevant data on the following (list non exhaustive):

- Energy usage (i.e. electricity meter readings and diesel generator fuel used/delivered to site).
- Water consumption (i.e. water meter readings or bowser water deliveries to site).
- Waste collections.
- Heavy Duty Vehicles entering/leaving site.

The Contractor shall comply with any additional reporting requirements that may be introduced through the conditions of any agreements or permits.

8.5 Review and updates

A management review of the performance of the Environmental Management System will be undertaken yearly and will include Liverpool Bay CCS Limited's PM and senior management (as a minimum this should include

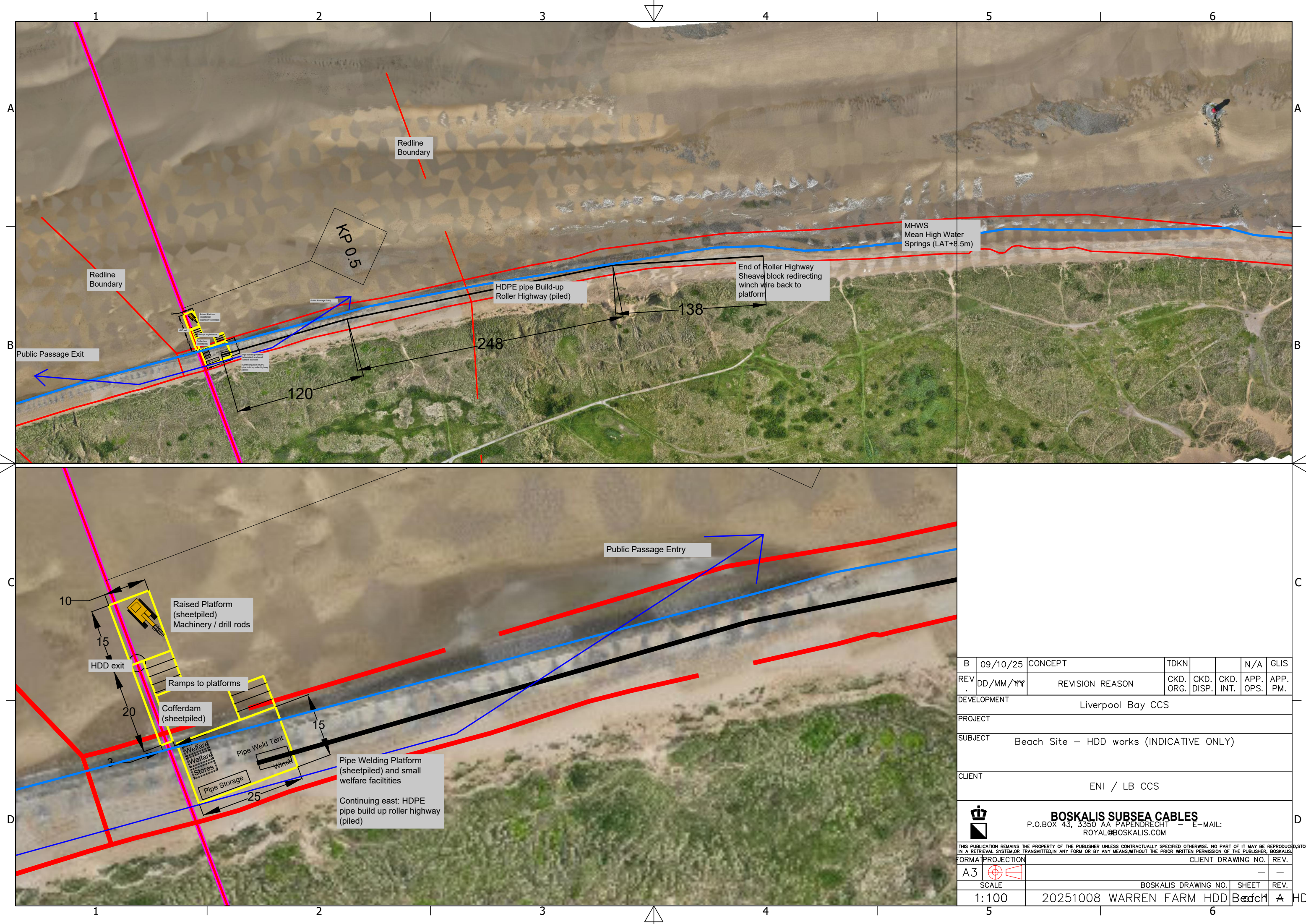
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the PD, HSEQ Manager and senior corporate representative) key personnel including the Field Environmental Manager.

Matters such as staffing, training, matters arising from audits and inspections and performance against Key Performance Indicators (KPIs) will be discussed and where there is a shortfall in performance, actions shall be agreed to rectify this.

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APPENDIX A – SITE PLAN BEACH – HDD WORKS



B	09/10/25	CONCEPT	TDKN			N/A	GLIS
REV	DD/MM/YY	REVISION REASON	CKD. ORG.	CKD. DISP.	CKD. INT.	APP. OPS.	APP. PM.
DEVELOPMENT			Liverpool Bay CCS				
PROJECT							
SUBJECT			Beach Site – HDD works (INDICATIVE ONLY)				
CLIENT							
ENI / LB CCS							
 BOSKALIS SUBSEA CABLES P.O.BOX 43, 3350 AA PAPENDRECHT – E-MAIL: ROYAL@BOSKALIS.COM							
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APPENDIX B – INVASIVE NON-NATIVE SPECIES MANAGEMENT PLAN

Liverpool Bay CCS Ltd

HYNET CARBON DIOXIDE TRANSPORTATION AND STORAGE PROJECT - OFFSHORE

Environmental Statement

Volume 4, appendix T: Invasive Non-Native Species Management Plan



EHE7228B
Liverpool Bay CCS Limited
Final
February 2024
Offshore ES
Invasive Non-Native
Species Management Plan

Document status					
Version	Purpose of document	Authored by	Reviewed by	Approved by	Date
FINAL	Final	RPS	Eni UK Ltd	Eni UK Ltd	February 2024

This report was prepared by RPS within the terms of RPS’ engagement with its client and in direct response to a scope of services. This report is supplied for the sole and specific purpose for use by RPS’ client. The report does not account for any changes relating the subject matter of the report, or any legislative or regulatory changes that have occurred since the report was produced and that may affect the report. RPS does not accept any responsibility or liability for loss whatsoever to any third party caused by, related to or arising out of any use or reliance on the report.

Prepared by:	Prepared for:
RPS	Liverpool Bay CCS Limited

Glossary

Term	Meaning
INNS	Any non-native animal or plant that can spread causing damage to the environment, the economy and human health.
Non-native Species	The equivalent of ‘alien species’ (as used by the Convention on Biological Diversity (CBD)) and ‘non-indigenous species’ (as used by the OSPAR Commission and the UK Marine Strategy); it refers to a species intentionally or unintentionally introduced outside its native range by human actions.
Project	The HyNet Carbon Dioxide Transportation and Storage Project.
Proposed Development	The offshore components of the Project which are subject of this Environmental Statement, as described in Chapter 3: Proposed Development Description.

Acronyms and Initialisations

Acronym/ Initialisation	Description
CBD	Convention on Biological Diversity
CCS	Carbon Capture Storage
CMS	Construction Method Statement
CO ₂	Carbon Dioxide
EIA	Environmental Impact Assessment
ES	Environmental Statement
EMP	Environmental Management Plan
HRA	Habitats Regulations Assessment
INNS	Invasive Non-Native Species
INNSMP	Invasive Non-Native Species Management Plan
LAT	Lowest Astronomical Tide
MCAA	Marine and Coastal Access Act
MHWS	Mean High Water Springs
MMMP	Marine Mammals Mitigation Plan
MMV	Monitoring, Measurement and Verification
PDE	Project Design Envelope
PWA	Pipeline Works Authorisation
SAC	Special Area of Conservation
UK	United Kingdom
WFD	Water Framework Directive

Units

Unit	Description
m	Metre (distance)
km	Kilometre (distance)
kV	Kilovolt (electrical potential)

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1 INVASIVE NON-NATIVE SPECIES MANAGEMENT PLAN

1.1 Introduction

1.1.1 Background

This Invasive Non-Native Species Management Plan (INNSMP) has been prepared by RPS on behalf of Liverpool Bay CCS Ltd (the Applicant) to support the Environmental Statement (ES) for the HyNet Carbon Dioxide Transportation and Storage Project - Offshore (hereinafter referred to as the 'Proposed Development'). This INNSMP considers the installation, operation and maintenance and decommissioning of the Proposed Development within the waters of Liverpool Bay (Figure 1.1).

Several invasive non-native species (INNS), including the high – medium risk American lobster *Homarus americanus*, Chinese mitten crab *Eriocheir sinensis*, the kelp wakame *Undaria pinnatifida*, Japanese skeleton shrimp *Caprella mutica*, wireweed *Sargassum muticum* and Pacific oyster *Crassostrea gigas* have been recorded within Liverpool Bay (Hurst, 2016; Solway Firth Partnership, 2015) although the majority of records were only single or a few individuals found within ports and harbours.

This management plan has been drawn up using the Precautionary Principle to assess the risk of the introduction and spread of INNS associated with the Proposed Development and to present appropriate measures to minimise these risks as much as possible following best guidance (GB INNS, 2023; Cook *et al.*, 2014; Payne *et al.*, 2015). Furthermore, the INNSMP addresses a comment made within the Scoping Opinion by The Offshore Petroleum Regulator for Environment and Decommissioning whereby:

'Section 7.2.7: Potential Mitigation, where it states 'Compliance with available guidance on mitigating the introduction and spread of INNS', we advise that a full Biosecurity Risk Assessment and Invasive Non-Native Species (INNS) Management Plan is completed in relation to all marine operation activities associated with the Project. The risk assessment and management plan should include consideration of all activities, vehicles and equipment used as well as how the risk will be minimised through appropriate mitigation and adherence to best-practice guidance and management measures. The risk assessment should include a review of all the available data in relation to the presence of marine INNS where applicable to the Project, and the potential risks associated with each species identified.'

1.1.2 Scope

The scope of the INNSMP is for the activities taking place within the Proposed Development seaward of Mean High Water Springs (MHWS). This INNSMP considers the installation, operation and maintenance and decommissioning of the Proposed Development within the waters of Liverpool Bay (Figure 1.1).

1.1.3 Purpose

This document provides an outline INNSMP aimed at providing an overview of the aspects that will form the basis of the INNSMP. The INNSMP will be further developed post-application in advance of the construction phase of the Proposed Development.

The purpose of the INNSMP is to set out the approach to INNS management and mitigation in respect of the Proposed Development. The management plan will provide an outline of the measures proposed to be implemented to facilitate biosecurity control and to minimise potential impacts on the local and wider environment.

The INNSMP will ensure all procedures pertaining to marine works (including construction, operation and maintenance and decommissioning of subsea structures) and vessel operations follow best practice guidance,

preventing and reducing the risk of the possible spread or introduction of INNS into the waters of the Proposed Development.

The method employed follows the principles of the ‘Great Britain (GB) INNS Strategy’ (GB NNSS, 2023). The INNS Strategy follows a hierarchical approach which emphasises prevention, followed by early detection and rapid response, and finally long-term management and control. The key outcomes of the GB INNS Strategy are that by 2030 it will have achieved:

- **Prevention:** reduce establishments of INNS by at least 50% compared to 2000 levels.
- **Surveillance, early detection and monitoring:** significantly improve our detection and monitoring capability, including increasing inspections and investigations.
- **Management:** eradicate, control or contain INNS – prioritised by greatest impact and the likelihood of success.
- **Prioritisation and risk analysis:** set out an agreed approach to the prioritisation of species based on risk and likelihood of success to ensure our efforts are focused on where they can achieve the greatest benefit.
- **Evidence:** commission the research priorities outlined in the Evidence Strategic Plan, to ensure that the strategy is based on the best available evidence and identify gaps and priority areas for further development.
- **Awareness raising:** increase awareness of INNS issues and promote appropriate changes in behaviour or attitudes throughout all relevant sectors and among the general public.
- **Coordination:** improve coordination of actions within governments, government-associated bodies, and key actors outside government.

This INNSMP will be finalised prior to construction and will remain a ‘live’ document throughout the lifetime of the Proposed Development, with periodic updates by the Applicant during the construction, operational and maintenance, and decommissioning phase, as outlined within Section 1.4.7 (Evaluation and Review).

1.1.4 Document structure

The INNSMP is structured as follows:

- Section 1.2: Project Description;
- Section 3: Legislative Context and Consenting Process
- Section 4: Invasive Non-Native Species Management Plan Methodology; and
- Section 5: Invasive Non-Native Species Management Plan.

1.2 Project Description

This section provides the project characteristics, policies and consents relevant to the Proposed Development for the management of INNS, and how this INNSMP links with other management plans.

1.2.1 Proposed Development location

The Proposed Development is located in the Irish Sea, within Liverpool Bay, approximately 12 km to the north of the Welsh coastline and 2 km west of the English coastline. It covers an area of approximately 576.82 km². The application for a marine licence for the Proposed Development is shown as a red line boundary which encompasses all the planned and modified infrastructure (Figure 1.1). This includes the pipeline and cables corridor (up to Mean High Water Springs (MHWS)). The pipeline and cables corridor shore approach are located to the north of Talacre in Flintshire, Wales based at the mouth of the Dee Estuary (Figure 1.1).

1.2.2 Proposed Development characteristics

The key offshore infrastructure of the Proposed Development will include both new and repurposed existing infrastructure. The new and re-purposed infrastructure will be located within the Proposed Development (Figure 1.1).

The key offshore infrastructure of the Proposed Development will include:

- New Infrastructure:
 - Installation of a new Douglas CCS platform to replace the existing Douglas Process platform to receive CO₂ from the onshore Point of Ayr (PoA) Terminal and distribute CO₂ to the Hamilton Main, Hamilton North, and Lennox wellhead platforms and when necessary, provide heating to the CO₂ stream. Installation of the new Douglas CCS platform will include up to eight driven piles.
 - Installation of new sections of pipeline to connect the new Douglas CCS platform and the existing subsea natural gas pipelines.
 - Installation of new topsides on the Hamilton Main, Hamilton North, and Lennox wellhead platforms to receive and inject CO₂ into the depleted hydrocarbon reservoirs.
 - Implementation of a programme of Monitoring, Measurement and Verification (MMV) activities - This includes the drilling of two new monitoring wells, one at Hamilton North and one at Hamilton Main.
 - Installation of two submarine 33 kilovolt (kV) power cables, with integrated fibre-optic cable connections (35 kilometres (km) from PoA Terminal onshore to the modified Douglas platform, including within the intertidal/foreshore area up to MHWS, within Welsh waters only).
 - Installation of new submarine 33 kV power cables with integrated fibre-optic connecting the modified Douglas platform with the Hamilton Main (12 km; 33 kV), Hamilton North (15 km; 33 kV) and Lennox (35 km; 33 kV) platforms.
 - Installation of cable and/or pipeline protection, at crossings of existing cables, and in areas where cable burial is not deemed feasible, or as a remedial secondary protection measure if the target cable depth of lowering cannot be achieved.
- Repurposing infrastructure:
 - Repurposing of the existing subsea natural gas pipelines for their change of use from hydrocarbon to CO₂ service.
 - Development of the Hamilton Main, Hamilton North and Lennox reservoirs for CO₂ storage through the drilling and re-completion of injection wells by side-tracking existing production wells. This includes drilling and recompletion operations, all of which will be within the existing footprint (template) of each platform.
 - Implementation of a programme of MMV activities - Additional monitoring wells will be created from the recompletion of existing wells within the existing footprint (template) of each platform: one monitoring well created by side-tracking an existing well in Lennox; and two sentinel wells, one in Hamilton North and one in Lennox.

To facilitate the construction, operation and maintenance, and decommissioning of the Proposed Development, vessels will be used.

For further information on the Project Description, see volume 1, chapter 3 of the ES.

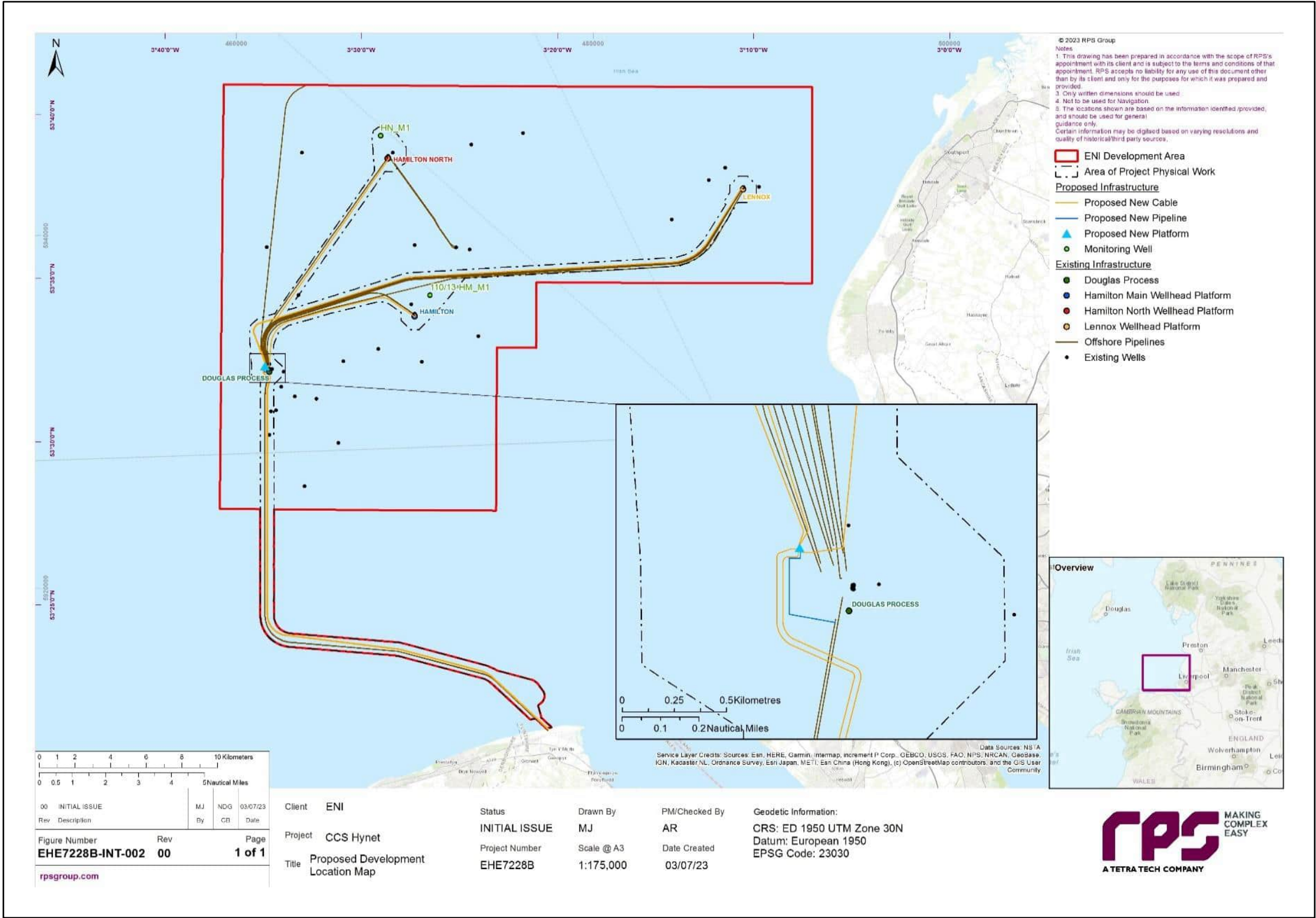


Figure 1.1: Location Overview Of The Proposed Development

1.3 Legislative context and consenting process

1.3.1 Policy

1.3.1.1 International

Convention on Biological Diversity (CBD)

This convention arose from the United Nations Conference on Environment and Development held in Rio in 1992. Within the framework of the convention, there are 15 Guiding Principles for the prevention, introduction and mitigation of impacts of alien species that threaten ecosystems, habitats or species. These principles provide an international framework for governments and other organisations to develop effective strategies to prevent the introduction, control and eradicate invasive non-native species. Article 8(h) states that each Contracting Party shall prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species.

Acknowledging the growing threat from INNS, the CBD has provided a major driver for international action. One of its guiding principles calls for national strategies on INNS. In response to this, devolved governments across the UK have produced the 'GB INNS Strategy' (GB NNSS, 2023) as described in Section 1.1.3. This Strategy provides the framework to support the coordination of policy and action across GB and aligns these efforts with national and international biosecurity and environmental strategies.

1.3.1.2 National

EU Regulation (1143/2014) on the prevention and management of the introduction and spread of invasive alien species.

EU Regulation 1143/2014 was retained in domestic law under the European Union (Withdrawal) Act 2018. It was amended through several statutory instruments to ensure operability following the UK's exit from the EU but applies to Great Britain only.

This Regulation sets out rules to prevent, minimise and mitigate the adverse impact on the biodiversity of the introduction and spread within the Union, both intentional and unintentional, of invasive alien species.

The Invasive Alien Species (Enforcement and Permitting) Order 2019

The Invasive Alien Species (Enforcement and Permitting) Order 2019 came into force on 1 December 2019 and pertains to England and Wales. It contains provisions relating to offences, penalties, enforcement, licensing and permitting to meet the requirements of the Regulation.

1.3.2 Consents

This section provides a summary of the consenting process and associated legislative requirements being followed for the Proposed Development.

Table 1.1 sets out the permits and licences pertinent to the Proposed Development and to which the following legislation applies. The applications will be supported by an ES, as well as a Water Framework Directive (WFD) assessment, and a Report to Inform Appropriate Assessment (RIAA).

Should additional pre-construction licences be required, these will be discussed and agreed upon with the relevant consent authority during the pre-construction phase of the Proposed Development.

Table 1.1: Consents Applicable To The Proposed Development

Activity	Permit / Licence / Requirement	Key Legislation
Benthic Ecology Baseline Surveys: – Intertidal Benthic Survey – Subtidal Benthic Survey	• Marine Licence (Band 1) from Natural Resources Wales-Marine Licensing Team (Marine Management Organisation exemption) • OPRED Survey Notification • Crown Estate seabed survey licence	• Marine and Coastal Access Act (MCAA) 2009
Pipeline repurposing / Installation of new pipeline spools to new platform	• Pipeline Works Authorisation updates/renewals for the repurposed pipeline • Marine Licence Band 3	• The Pipeline Safety Regulations 1996 • The Offshore Chemicals Regulations 2002 (as amended) • MCAA
New Platform Installation	• Marine Licence Band 3 • Consent to Locate for fixed installation	• MCAA 2009 • Energy Act 2008
Drilling	• Master Application Templates and Subsidiary Application Templates for new wells, side-track drilling and well intervention	• Offshore Oil and Gas Exploration, Production, Unloading and Storage (Environmental Impact Assessment) Regulations 2020 • The Offshore Chemicals Regulations 2002 (as amended) • Part 4A of The Energy Act 2008 (as amended) • The Offshore Petroleum Activities (Oil Pollution Prevention and Control) Regulations 2005 (as amended) • Consent for a Marine Geological Survey or Investigation under The Offshore Petroleum Activities (Conservation of Habitats) Regulations 2001 (as amended)
Environmental Impact Assessment	• Scoping • ES Production • Screening and appropriate assessment • WFD assessment • Submission and Public Notice	• The Offshore Oil and Gas Exploration, Production, Unloading and Storage (Environmental Impact Assessment) Regulations 2020; • The Offshore Environmental Impact Assessment (The Marine Works (Environmental Impact Assessment) Regulations 2007 (as amended)); • Habitat Regulations Assessment (Conservation of Habitats and Species Regulations 2017 (as amended); Conservation of Offshore Marine Habitats and Species Regulations 2017 (as amended)); • EU (Withdrawal) Act 2018 • The Habitats and Birds Directive • Water Framework Directive;
Carbon Storage	• Carbon Dioxide Appraisal and Storage Licence already awarded by Oil and Gas Authority (now North Sea Transition Authority) • Crown Estate Lease • Carbon Storage Permit	• Energy Act 2008

Activity	Permit / Licence / Requirement	Key Legislation
Cable Laying and associated activities	• Marine Licence Band 3 in Welsh Waters • Pipeline Works Authorisation for inter-platform cables in English Waters	• MCAA 2009 • The Pipeline Safety Regulations 1996 • The Offshore Chemicals Regulations 2002 (as amended)

1.3.3 Linkages with other consents management plans

The INNSMP is consistent as far as possible with other relevant consent management plans prepared to inform the implementation of the Proposed Development. Additionally, management plans will be added as and when available. These are set out in Table 1.2 below with details of the linkages presented.

Table 1.2: Linkages With Other Consent Management Plans

Consents Management Plan	Linkage with the INNSMP
Environmental Management Plan (EMP)	The EMP provides the overarching framework for environmental management during the construction, operational and maintenance, and decommissioning phases of the Proposed Development. This can include proposed monitoring, methodologies and timings, along with a range of management plans including stakeholder engagement, traffic, waste, emergency response, invasive non-native species management and decommissioning and restoration.

1.4 Invasive Non-native Species Management Plan Methodology

This section outlines the process of creating an INNSMP using the best available evidence and following best practice guidance (Cook *et al.*, 2014, Payne *et al.*, 2015). To make an accurate risk assessment of the Proposed Development, and derive a suitable INNSMP, a stepwise approach was taken as outlined in Figure 1.2 and described in detail below.

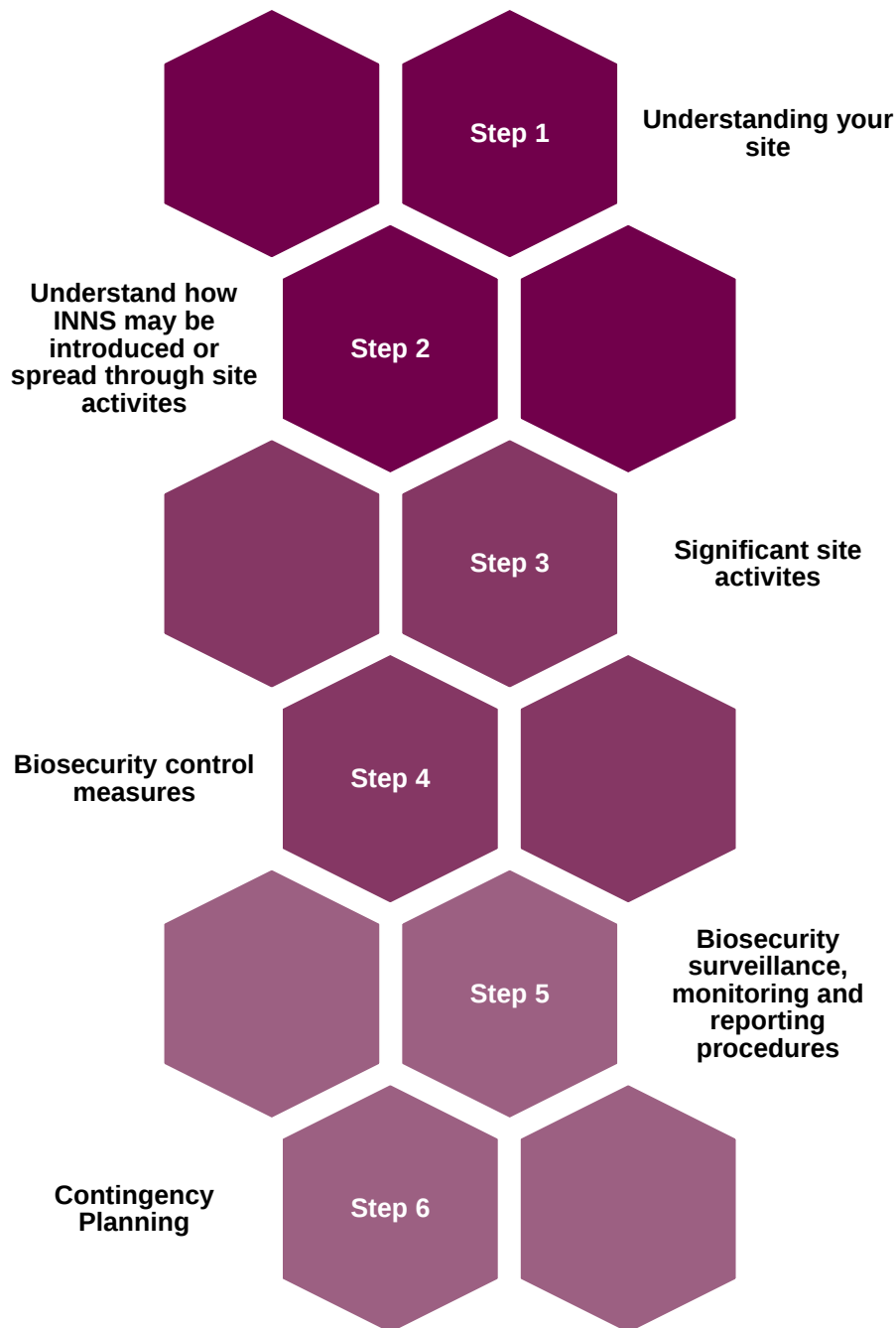


Figure 1.2: Six Steps Used To Produce The INNSMP For The Proposed Development

1.4.1 Step 1: Understanding your site

The first step in creating an INNSMP is to provide a detailed description of the site. This information should include the environmental conditions of the site, such as salinity, depth and the availability of hard substrate (Zaiko, 2007), details of any man-made structures, and if INNS are present within the site.

Understanding the salinity of the site will determine if INNS are present. The majority of marine flora and fauna are unable to tolerate freshwater due to osmoregulatory effects leading to death (Evans, 1980). An increased volume of freshwater flowing into a site will likely result in less hospitable conditions, decreasing the risk of INNS on-site; conversely, a fully marine site tends to represent a greater risk of INNS introduction to communities of native species (Tang *et al.*, 2022).

The depth profile of a site can influence the ability of a species to colonise a site. Species live within an ecological range of tolerances, should a site be too deep for a species to live there, then it won't establish. Equally, within shallow environments, periods of tidal inundation and air exposure may decrease the likeliness of a species to establish.

The establishment of a species can also be influenced by the presence of a suitable hard substrate, for more sessile-encrusting organisms (Zaiko, 2007). Should a site only have gravel or sand present, then the likeliness of an INNS that requires a hard substrate to establish is reduced. Therefore, the presence of artificial structures increases the risk of INNS establishment, even if the structure has only been present for just a few weeks as INNS are quick to establish populations (Bax *et al.*, 2003). Information related to any slow or stationary periods of work or climatic conditions that may increase biosecurity risk should be included.

If INNS have been found on-site, then the INNSMP should focus on reducing the risk of introducing new INNS and consider how to prevent the spread of existing INNS to other sites. Throughout the whole process, the precautionary principle should be followed, even if no INNS are present on site.

Using this information, a site can be assessed as having a low or significant risk of introducing or spreading INNS. Table 1.3 provides an example of this.

Table 1.3: Example Of Low And Significant-Risk Sites (Payne *et al.*, 2015)

Low-Risk Site	Significant Risk Site
• Supply of fresh water from a local river. • Isolated from surrounding environments by walls or breakwaters (i.e. closed or semi-enclosed areas with little to no flow of water). • Anti-fouling is used on artificial structures with periodic removal for air drying.	• Full salinity with no freshwater inflow. • Artificial structures have no antifouling coating with no management in place for maintenance. • The site has connectivity to similar environments.

1.4.2 Step 2: Understand how INNS may be introduced or spread through site activities

In addition to understanding the site, consideration of pathways by which INNS may be introduced or spread is needed. This step should be iterative and revisited when the INNSMP is due for review. The questions and associated risks included in Table 1.4 have been adapted from Payne *et al.* (2015) and provide the type of questions to consider when creating an INNSMP.

Table 1.4: Example Of Questions And Risks To Consider Whilst Creating An INNSMP (Payne *et al.*, 2015)

Question	Yes = High	Yes = Medium	Yes = Low
1. Has the vessel/ equipment just arrived from the local area?			
2. Has the vessel/ equipment had an anti-fouling coating applied to submerged structures within the last 12 months (or the time recommended by the manufacturer)?			
3. Are all the visible submerged surfaces of vessels or equipment to be deployed free of biofouling (a green 'slime' is OK)?			
4. Do the visible submerged surfaces of vessels or equipment to be deployed have more than a green 'slime' coating?			
5. Does the vessel or equipment to be deployed have noticeable clumps of algae and/ or animals clinging to the visible parts?			
6. Has the vessel/ equipment just arrived from another country or region with similar environmental conditions (e.g. seawater temperature)?			
7. Has the vessel/ equipment just arrived from a water body known to have INNS present?			
8. Does the vessel/ equipment spend long periods of time stationary at sites in between anti-fouling treatments?			
9. Is the vessel 'slow moving', such as a construction barge or drilling rig?			

For example, a recreational vessel showing no signs of biofouling on the hull or below the waterline would be considered a low risk for introduction of INNS; conversely, a work vessel/barge that moves from site to site and is present on site for long periods may have a medium–high risk, and therefore a significant risk of introducing INNS to site. For this step, information on the vessels and equipment to be used will be obtained from the Project Description, see volume 1, chapter 3 of the ES. A condition assessment of all vessel/equipment to be used will be performed based on the questions in table 3.2. Any results from this assessment that fall within the 'Low' category will be assessed as 'Low' Risk. Any results that fall within the 'Medium' or 'High' category will be assessed as a 'Significant' Risk. This is considered to present a conservative approach to assessing the risk of introducing INNS.

1.4.3 Step 3: Identify significant site activities

The outputs from Step 2 will be used to compile a list of all the significant risks of introducing INNS as a result of the Proposed Development. This will include all vessels and equipment and the associated activities which have been assessed as being of significant risk of introducing INNS and their associated activities within the different phases of the Proposed development. Once this list has been created, the next step is to develop relevant and proportionate control measures.

1.4.4 Step 4: Biosecurity control measures

The outcomes of Steps 1 – 3 will be used to guide the biosecurity measures which should be implemented. Measures to control the introduction or spread of INNS must be effective, clear, realistic and easy to communicate to others. These measures must also consider how much control is enforceable over the site. A list of example control measures can be found within Cook *et al.* (2014), and Payne *et al.* (2015), many of which are included in the INNSMP (see section 1.5.4). Where possible, biosecurity measures should be included in the in-design stage of a new development and aim to 'design out' any possible significant risk of introducing or spreading INNS.

1.4.5 Step 5: Biosecurity surveillance, monitoring and reporting procedures

This step will outline what procedures should be followed in the event of discovering and positively identifying an INNS on-site. All staff and other site users should be encouraged to report any unusual sightings to the biosecurity officer.

1.4.6 Step 6: Contingency plan

In the event of the failure of the 'prevention', 'early detection' and 'rapid response' methods to effectively manage INNS introduction (section 1.5.6), a contingency plan will be created. This document should be short, provide a step-by-step approach to action and be accessible to all staff. This plan will review the identified listed activities, identify potential biosecurity control failures and recommend actions for effective management. For example, if a vessel had been wrongly assessed as low risk and introduced an INNS to the site, the introduced species would be sampled and identified, with the relevant authorities notified, followed by further containment and management measures being sought.

1.4.7 Evaluation and review

Following completion of the INNSMP, a clear recording system and review cycle date will be put in place to refine and update the INNSMP as required in line with relevant regulations and legislation.

1.5 Invasive Non-Native Species Management Plan

1.5.1 Step 1: Understanding your site

1.5.1.1 Site description

The Proposed Development is located in Liverpool Bay in the Irish Sea, covering an area of about 576.82 km². It is positioned 12 km north of the Welsh coast and 2 km west of the English coast. The marine licence application area for the Proposed Development is shown as a red line boundary which encompasses all the planned and modified infrastructure including the pipeline and cables corridor up to MHWS, near the mouth of the Dee Estuary. The cable and pipeline make landfall within the Dee Estuary SAC. For further information see Section 1.2.1.

1.5.1.2 Environmental conditions affecting biosecurity

Liverpool Bay is a region of freshwater influence with strong horizontal density gradients. The bay is also strongly tidally dominated, with a high tidal range and extensive intertidal areas. Freshwater enters Liverpool Bay from several rivers, including the Mersey, Dee, Ribble, Conwy and Clwyd, which collectively maintain a strong salinity gradient and freshwater plumes (Bricheno *et al.* 2014; Polton *et al.*, 2011; Howarth and Palmer, 2011).

The Proposed Development is located in water depths that range from 0.72 m Lowest Astronomical Tide (LAT) to 35 m LAT, with average water depths across the development area being approximately 20 m LAT. Shallower water is generally present towards the southern and eastern boundaries of the Proposed Development, including the pipeline and cables, situated in inshore waters.

Tidal currents in the area are relatively weak, with spring tides indicating a current flow speed of up to 1m/s, flooding to the east, and ebbing to the west, at a current flow speed of circa 0.8 m/s, as determined through the desktop study for volume 2, chapter 6 of the ES.

The 2019 EUSea Map datasets, describe the Proposed Development area as being composed predominantly of EMODnet seabed substrate folk classification 311 gravelly Sand, 212 (gravelly) Sand, and 211 Sand (EMODnet, 2019). Fine and sandy sediments are dominant in inshore waters and particle sizes range from

260 to 420 µm in areas with stronger currents and from 190 to 250 µm in areas with contrasting, weaker currents (Eni, 2019). This has been corroborated through volume 2, chapter 6 of the ES.

Overall, the influx of freshwater into Liverpool Bay and through the Proposed Development is likely to reduce the presence of INNS. Furthermore, tidal currents and a higher proportion of sand fractions, with no rock, found throughout the Proposed Development are likely to reduce the likeliness of INNS being present within the area. Therefore, the environmental conditions of the site can be assessed as **Low-Risk**.

1.5.1.3 Man-made structures

Section 1.2.2 listed the existing hard structures present within the Proposed Development area. These hard structures include the platforms, injection, monitoring and sentinel wells and pipelines. It is important to note that some of these structures may be buried, such as the power and fibre optic cables and pipelines. Furthermore, Gwynt y Mor offshore wind farm is located within the south-western most corner of the Proposed Development. These structures are likely to increase the potential for INNS to establish. Therefore, the presence of man-made structures are likely to increase the risk of INNS to the site and is assessed as a **Significant-Risk**.

1.5.1.4 INNS within the Proposed Development

The Proposed Development is located within the Dee Estuary Special Area of Conservation (SAC), which is primarily tidal rivers, estuaries, mud flats, sand flats and lagoons (including saltwork basins) (81% coverage). The SAC is designated for a range of Annex I habitats including mudflats and sandflats not covered by seawater at low tide, as well as Annex II species, such as sea and river lamprey (*Petromyzon marinus* and *Lampetra fluviatilis*, respectively). The Natura 2000 - Standard Data Form (JNCC, 2015) for the SAC identifies INNS as a high ranked negative impact pressure. However, it should be noted that this pressure is attributed to the terrestrial invasive saltmarsh species, common cord grass *Spartina anglica*. No marine INNS have, as of yet, been identified as a negative pressure on the Dee Estuary SAC.

National Biodiversity Network (NBN) data (2023) indicated no INNS are present within the Proposed Development area. However, within the wider area of the Proposed Development, Liverpool Bay is known to have INNS present within ports and harbours. As the Proposed Development will require the use of vessels during the construction, operational and maintenance, and decommissioning phases, INNS that have been identified within ports and harbours have been listed on a precautionary basis (Table 1.5).

Table 1.5: Non-Native Species Known To Be Present Throughout Liverpool Bay

	Non-native Species ¹	Environmental risk to native Great Britain species ²
Present throughout Liverpool Bay:	- American lobster <i>Homarus americanus</i> - Chinese mitten crab <i>Eriocheir sinensis</i> - Wakame <i>Undaria pinnatifida</i>	High Risk
	- Slipper limpet <i>Crepidula fornicata</i> - Japanese skeleton shrimp <i>Caprella mutica</i> - Wireweed <i>Sargassum muticum</i> - Pacific oyster <i>Crassostrea gigas</i>	Medium Risk
	Acorn Barnacle <i>Elminius modestus</i>	Risk not assessed / available

¹ Sources: Hurst (2016); Solway Firth Partnership (2015); NBN Gateway (2023).

² According to assessment by GB Non-Native Species Secretariat ([Risk assessment » NNSS \(nonnativespecies.org\)](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/684848/Risk_assessment_NNSS_nonnativespecies.org.pdf)).

Non-native Species ¹	Environmental risk to native Great Britain species ²
• Bay barnacle <i>Amphibalanus improvisus</i> • Bryozoan <i>Bugulina simplex</i> • Bryozoan <i>Bugulina stolonifera</i> • Carpet sea squirt <i>Didemnu vexillum</i> • Colonial sea squirt <i>Aplidium cf. glabrum</i> • Compass sea squirt <i>Asterocarpa humilis</i> • Chain Tunicate <i>Botrylloides violaceus</i> • Darwin's barnacle <i>Austrominius modestus</i> • Devil's tongue weed <i>Grateloupia turuturu</i> • Green sea fingers <i>Codium fragile fragile</i> • Polychaete <i>Goniadella gracilis</i> • Orange-striped anemone <i>Diadumene lineata</i> • Orange-tipped sea squirt <i>Corella eumyota</i> • Red ribbon bryozoan <i>Watersipora subatra</i> • Tufty buff byozoan <i>Tricellaria inopinata</i> • Trumpet tubeworm <i>Ficopotamus enigmaticus</i> • Leathery sea squirt <i>Styela clava</i>	

A species account has been provided for those with a high to medium risk:

- High Risk:
 - American Lobster: A large crustacean from the north-west Atlantic. Slightly larger than (but very similar to) the native lobster (GB NNSS, 2015). The species has been recorded in Solway, at Workington (Solway Firth Partnership, 2015).
 - Chinese mitten crab: The Chinese mitten crab measures up to 56 mm in carapace length. Its carapace has a square outline, tapering towards the front, and features four teeth on each side. The most prominent characteristic of this crab is the thick layer of hair covering its claws and legs. The species have been found to be distributed within the River Dee, Mersey, Ribble and at the mouth of the River Duddon (NBN Gateway, 2023).
 - Wakame: A large species of kelp native to Japan, which has a broad frond with fingered edges and a conspicuous midrib. The holdfast is compact and root-like, and the stipe above it bears many folded reproductive frills. Grows on hard substrates from low intertidal to approximately 18 m, tolerant of salinities as low as 20 (GB NNSS, 2019a). The species has been recorded in Liverpool Bay and is currently contained within Fleetwood Marina, located near Blackpool, however, it has increased in abundance in recent years (Hurst, 2016).
- Medium Risk:
 - Slipper Limpet: Shell is oval and up to 5 cm in length. The large shell opening has a shelf, extending half its length. Shell is smooth and white, cream, yellow or pinkish in colour with streaks or blotches of red or brown. The species is now distributed in Europe from Norway to the Mediterranean, with population explosions on the south and south-west England. Within Liverpool Bay, the species has been recorded along the north-west of Wales around Anglesey and at the mouth of the River Mersey (NBN Gateway, 2023).

- Japanese skeleton shrimp: An aggressive skeleton shrimp originally from northeast Asia, which is rapidly invading and has established populations in the North Sea, the West coast of Scotland and the Irish Sea (GB NNSS, 2012). The species has been recorded in Loch Ryan and can be found in harbours and marinas amongst fouling growth on boat hulls, ropes and nets where it can clog equipment and nets as well as outcompete native species (Hurst, 2016).
- Wireweed: A highly distinctive large olive-brown seaweed, often over 1m long. Its lateral branches hang like washing from a line when held out of the water. Wireweed competes with native seaweeds and sea grasses through rapid growth, shading and abrasion. It is a nuisance in harbours and shallow waters where it is a hazard to boating due to the entanglement of propellers (GB NNSS, 2019b). The species is distributed widely along the coasts of south and west England, Wales and West Scotland. It was first recorded in Scotland in Loch Ryan in 2004 and has since populated various areas further north up the west coast (Hurst, 2016).
- Pacific oyster: There are extensive beds of naturally recruited Pacific oysters in some southern estuaries of England and sparse settlements are known from the north coast of Wales near Conwy. Mature individuals were first recorded on the Galloway coast at Ravenshall in October 2012, Ross Bay in December 2012 and Balcary Bay in January 2013. A survey published in 2015 confirmed the Solway Firth to be an ideal habitat for the species although densities were low (Solway Firth Partnership, 2015).

Volume 3, Marine Biodiversity Technical Report (RPS Group, 2024) appendix I of the ES highlights the discovery of an INNS, the polychaete worm *Goniadella gracilis*, at the partially decommissioned station GS28 by Hamilton North (Figure 1.1).

The presence of INNS within and near to the Proposed Development area is considered to be of **Significant-Risk**.

Should any further INNS be recorded in the area prior to finalising the plan, these should be highlighted here, identifying the risk that each species represents to the UK's native species. Table 1.6 presents a summary of the results of Step 1.

Table 1.6: Summary Of The Site Risk Of The Introduction And Spread Of INNS

Site factor affecting risk of INNS	Assessment Result	Risk of INNS
Environmental conditions affecting biosecurity	The influx of freshwater into Liverpool Bay, tidal currents and a higher proportion of sand fractions, with no rock, found throughout the Proposed Development are likely to reduce the likeliness of INNS being present within the area. Therefore, the environmental conditions of the site can be assessed as Low-Risk.	Low
Man-made Structures	The presence of existing hard structures within the Proposed Development, as well as the presence of Gwynt y Mor offshore wind farm located within the south-westernmost corner of the Proposed Development are likely to increase the potential for INNS to establish. Therefore, the presence of man-made structures is assessed as a Significant-Risk.	Significant
INNS within the Proposed Development	NBN data (2023) indicated no INNS are present within the Proposed Development area. However, within the wider area of the Proposed Development, Liverpool Bay is known to have INNS present within ports and harbours. Additionally, volume 3, Marine Biodiversity Technical Report (RPS Group, 2024) appendix I of the ES highlights the discovery of an INNS, the polychaete worm <i>Goniadella gracilis</i> , at the partially decommissioned station GS28 by Hamilton North within the Proposed Development area. Therefore, the presence of this INNS is considered to be of Significant-Risk.	Significant

Given the results of Step 1 indicate two areas where the risk of INNS is significant, the INNSMP should focus on reducing the risk of further introducing new INNS and consider how to prevent the spread of existing INNS to other sites.

1.5.2 Step 2: Understand how INNS may be introduced or spread through site activities

1.5.2.1 Vessels and equipment to be used in the Proposed Development

Table 1.7 lists the vessels and equipment to be used for the Proposed Development with a 'risk' indicator for the potential to introduce or spread INNS. This risk assessment will be updated once the final project parameters have been confirmed and will be based on professional judgement, the final Proposed Development design, INNS present within the area (see Section 1.5.1), and available guidance.

The ES is based on the Proposed Development design parameters, which include the use of several vessels, planned infrastructure, such as cables and CO₂ injection, sentinel and monitoring wells, and the modification of existing installations (Figure 1.1). Additionally, there may be a requirement to use concrete mattresses and rock armour. These will be refined post-consent, such that the risk can be accurately assessed. As stated previously, this is a 'live' document and as such, if specific details of the Proposed Development undergo review or are changed, this document will be updated accordingly.

The results of Step 2 as presented in Table 4.2 indicate that the use of vessels in all phases of the Proposed Development presents a significant risk for the introduction of INNS. However, operational speeds of the vessels combined with the implementation of standard control measures to comply with relevant regulations such as MARPOL and those to manage ballast water will reduce the risk to low.

Man-made structures also present a significant risk to the introduction of INNS and given the identified presence of an INNS within the Proposed Development. Additional project specific control measures will be required to manage this risk.

Table 1.7: Vessel, Foundation Types, And Substrates To Be Used In The Proposed Development

Name	Type	Details & Risk factors	Risk before control measures: Low/Significant	Assumptions and Standard Control Measures	Risk after control measures: Low/Significant
Vessels (Construction phase)	Various	- Vessel types and sizes to be used in the construction phase for the: - Oil Platform and wells include: Main installation and support vessels, tug/anchor handlers, cargo barges, support vessels, survey vessels, pre-comm vessels, seabed preparation vessels and crew transfer vessels; and - Cables and pipe include: cable lay installation & support, vessels, jack-up, multicat, working boat, support vessel (for trenching), dsv/lcv (for cable pull-in), survey vessel, seabed preparation vessel, crew transfer vessel, cable protection installation vessel and cable burial installation vessel. - Indicative construction port: - Port of Belfast Shipyard, Belfast, N.Ireland, UK (150 nm from the Proposed Development), and - Arnish Point Yard, Isle of Lewis, Scotland, UK (380 nm from the Proposed Development), with the final decision still to be made.	Significant	Vessels will be slow moving during construction and are expected to come from the Port of Belfast, approximately 150 nm from the Proposed Development. Vessels will be required to have an anti-fouling coating, inspection history complying with relevant regulations (MARPOL Regulations) and to manage ballast water. Anti-fouling coating and adherence to the MARPOL regulations and ballast standards will reduce the risk of INNS being present on the hulls of vessels.	Low
Vessels (operation and maintenance)	Various	- Vessel types and sizes to be used in the operation and maintenance phase include a jack-up barge and a multi-purpose support vessel. - The indicative operation and maintenance port is yet to be confirmed.	To be confirmed	Vessels will be required to have an anti-fouling coating and inspection history complying with relevant regulations (MARPOL Regulations).	To be confirmed

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Name	Type	Details & Risk factors	Risk before control measures: Low/Significant	Assumptions and Standard Control Measures	Risk after control measures: Low/Significant
Vessels (Decommissioning phase)	Various	- Vessel types and sizes to be used in the decommissioning phase include decommissioning and support vessels, tug/anchor handlers, cargo barges, cable decommissioning and support vessels, survey vessels, and crew transfer vessels. - Indicative decommissioning port: - Port of Belfast Shipyard, Belfast, N.Ireland, UK (150 nm from the Proposed Development), and	Significant	Vessels will be slow moving when removing structures during decommissioning and are expected to come from the Port of Belfast, approximately 150 nm from the Proposed Development. Vessels will be required to have an anti-fouling coating, inspection history complying with relevant regulations (MARPOL Regulations) and to manage ballast water. Anti-fouling coating and adherence to the MARPOL regulations and ballast standards will reduce the risk of INNS being present on the hulls of vessels.	Low
New Infrastructure	- CCS platforms - Topsides	Infrastructure, pile jacket and topsides will be delivered via heavy lift vessel, crane or transport barge.	Low	The piles will be prefabricated at an onshore facility and delivered offshore by means of a transportation barge and are unlikely to come into contact with the water, (and therefore INNS), until installation.	Low
	Pipeline	A 595 m length of the pipeline is to be installed and laid on the seabed. This is likely to be transported via barge.	Low	The pipeline will be delivered offshore by means of a transportation barge and is unlikely to come into contact with the water, (and therefore INNS), until installation.	Low
	Monitoring Wells	Monitoring wells are to be drilled.	Low	INNS are unlikely to colonise the drilled wells.	Low
	Cables	Cables will be installed from onshore through to the connection point via the installation vessel.	Significant	Cables are to be installed throughout a wide range of environmental conditions and habitats, with vessels likely to have come from ports where INNS may be present. There is therefore an increased risk of introducing an INNS along the cable.	Low

Name	Type	Details & Risk factors	Risk before control measures: Low/Significant	Assumptions and Standard Control Measures	Risk after control measures: Low/Significant
				However, according to the Project Description cables are expected to be buried thereby mitigating any colonisation of INNS on the cable	
	Concrete Mattresses/ Other External Cable Protection	Concrete mattresses and other external cable protection will be installed at crossings of existing cables, and in areas where cable burial is not deemed feasible, or as a remedial secondary protection measure if the target cable depth of lowering cannot be achieved	Low	Concrete mattresses/ other external cable protection are to be delivered to the site via barge and will not come into contact with the water, (and therefore INNS), until installation.	Low
Repurposed infrastructure	- Repurposing of existing pipelines - Redevelopment of reservoirs - Recompletion of monitoring wells	Existing infrastructure is to be repurposed for the Proposed Development.	Significant	Volume 3, Marine Biodiversity Technical Report (RPS Group, 2024)appendix I of the ES has reported that one specimen, the polychaete worm <i>Goniadella gracilis</i> was recorded at the partially decommissioned station GS28.	Significant

1.5.3 Step 3: Significant site activities

Based on the results of Step 2, a list of the Proposed Development activities per phase, that may have a significant risk of introducing or spreading INNS is provided in Table 1.8. The assessment in Step 2 was derived from information provided in the Project Description and will be updated based on the final project design as explained in Step 2 (section 1.5.2), with these activities predicted to represent a significant risk of INNS introduction during the construction, operation and maintenance and decommissioning phases.

Table 1.8: Site Activities Which Have A Significant Risk Of Introducing Or Spreading INNS

Phase	Activity Description
Construction	• Presence of existing man-made structures that may have INNS present.
Operation and Maintenance	• Presence of man-made structures that may have INNS present. • Maintaining man-made structures and ancillary equipment that may have INNS present.
Decommissioning	• Removal of man-made structures and ancillary equipment that may have INNS present. • Cleaning and disposal of biofouling from man-made structures and ancillary equipment.

1.5.4 Step 4: Biosecurity control measures

This section provides information on site-specific risks and control measures associated with the Proposed Development.

1.5.4.1 Presence/maintenance/ removal of existing man-made structures that may have INNS present

Risk

This may pose one of the greatest risks of INNS spreading associated with the Proposed Development. New or clean surfaces, such as vessels and infrastructure are typically the first colonisation sites for INNS due to their ability to settle and rapidly proliferate, replacing native populations (Huxel, 1999). Newly available hard surfaces (e.g. new platforms and auxiliary infrastructure) associated with the Proposed Development may be susceptible to colonisation by INNS found at the partially decommissioned station GS28 (near Hamilton North and Hamilton) in the first few weeks/months after installation (Bax *et al.*, 2003).

Control measures

Any man-made structure to be used for the Proposed Development should be of terrestrial origin (i.e. not coming from another marine environment) and inspected for INNS prior to placement in the marine environment. During maintenance, the structure should be inspected for any INNS present, and if detected, then actions should be followed as presented in Section 1.5.6.

It should be noted that the INNS *Goniadella gracilis* is a species of polychaete worm, these worms are unlikely to adhere themselves to structures but will be inhabiting the surrounding sediments of the station GS28. As the species does not adhere to structures, this is likely to decrease the risk of spreading the INNS to other areas. However, caution should be advised if dredging within the vicinity of GS28 is required.

1.5.4.2 Cleaning and disposal of biofouling from structures during operation and maintenance activities and decommissioning

Risk

During routine operations and maintenance activities (e.g. jet washing of marine growth from the splash zone, or component replacement where required), there is potential for any established INNS to be detached from subsea structures. Where there is an identified risk that these activities may lead to the spread of INNS in the marine environment, additional control measures may be required.

Following the removal of marine structures during the decommissioning phase, INNS, if present, may still be attached to the surface. Should the INNS be removed without due care and washed back into the marine environment surrounding the Proposed Development, these INNS may represent a risk of spreading to areas previously unaffected.

Control measures

Where there is an identified risk that operation and maintenance activities (e.g. periodic cleaning of infrastructures) may lead to the spread of INNS (e.g. if there is a high risk that INNS are present on infrastructure), control measures may be required to minimise the amount of material entering the marine environment.

Large volumes of material detached or removed from decommissioned subsea infrastructure should be prevented from re-entering the marine environment. The material should be taken away and properly disposed of onshore. Control measures taken in relation to the disposal of biofouling will be aligned with the relevant Port Authority 'Waste Management Plan'.

Biosecurity action

Prior to the installation of subsea structures or operation of new vessels to the Proposed Development, the Applicant and their contractors must include the following biosecurity clauses in any contract agreement:

- The contractor must submit a Biosecurity Risk Assessment to the Project Environmental Manager at least six weeks prior to installation/operations; and
- The contractor must ensure that all equipment, materials, machinery, Personal Protection Equipment (PPE) and vessels used are in a clean condition prior to their arrival on-site to minimise the risk of INNS introduction into the marine environment.

1.5.4.3 Additional biosecurity measures

The Proposed Development has been assessed as Significant in Step 1, therefore, using the precautionary approach, additional biosecurity measures have been presented.

1.5.4.4 Using vessels from outside of the Proposed Development

Risk

Using vessels from outside the Liverpool Bay area poses a significant risk of introducing INNS to the area (Minchin and Gollasch, 2010), especially vessels coming from areas of a similar marine environment. Information on the origin of the vessels to be used in all phases of the Proposed Development will be included within the INNSMP once the exact details and origins of vessels are specified following the appointment of construction contractors.

Control measures

All vessels to be used for construction, operation and maintenance and decommissioning activities must follow the guidelines as directed by the 'Guidelines for the Control and Management of Ships' biofouling to minimize the transfer of invasive aquatic species³, and where applicable, to comply with the 'International Convention for the Control and Management of Ships' Ballast Water and Sediments'⁴.

1.5.5 Step 5: Biosecurity surveillance, monitoring and reporting procedures

Table 1.9 outlines who is responsible for carrying out certain checks of INNS, where these checks are to be carried out and when. Note that these positions are indicative, and roles and responsibilities will be confirmed upon contract award.

Table 1.9: Roles, Responsibilities, And Instructions For Staff, Contractors, And Site Users

Who	What	Where	When
Project Operations & Environment Manager - developers and contractors	- Oversee removal of flora and fauna from infrastructure, concrete mattress etc. and ancillary equipment, ensure material is properly disposed of and that no material is released into the water as per the relevant Port/Harbours 'Waste Management Plan'. - Awareness of INNS, including identification guidance on the key risk species. If uncertainty arises, follow the contingency plan.	At Port	Beginning of works
Project Operations & Environment Manager or appropriate contractor	- Oversee installation and removal of infrastructure, concrete mattress etc. and ancillary equipment, checking for INNS or unknown organisms. - For operations and maintenance, periodic checks should be carried out to ensure no growth/settlement of INNS, when possible. - Be aware of any slow-moving or inactive craft and take steps to assess risk. - Ensure a Check, Clean and Dry message is sent to any new developers or contractors. - Where possible, collaborate with the relevant port/Harbours and other users of Liverpool Bay to raise INNS awareness.	At Port	Beginning of works
Developers and contractors	- Confirm the origin of the material used in infrastructure, concrete mattress etc. and ancillary equipment (i.e. terrestrial origin, not previously submerged in marine water). - Encourage 'toolbox' talks on INNS prevention and monitoring.	N/A	Throughout works
Project Operations & Environment Manager - developers and contractors	Through collaboration with the Regulators (including relevant stakeholders) will develop measures appropriate to the Proposed Development deployment specific to the site, nature, and duration of activities on a case-by-case basis.	N/A	Beginning of works

³ For more information, see: [Biofouling \(imo.org\)](https://www.imo.org)

⁴ For more information, see: [Ballast Water Management \(imo.org\)](https://www.imo.org)

1.5.6 Step 6: Contingency plan

Table 1.10: Contingency Plan In The Event Of Failure Of Prevention Of INNS Introduction

Action	Responsibility
Stage One – Suspected arrival of high-alert species	
Take photographs of the sample and collect the sample in a plastic bag.	Designated biosecurity officer, site manager, Contractor Environmental Manager or Client Environmental Manager (depending on the phase of the project), or any member of staff at the site of INNS discovery.
Check the organism against the identification sheet (see ID sheets » NNSS (nonnativespecies.org))	Designated biosecurity officer, site manager, Contractor Environmental Manager or Client Environmental Manager (depending on the phase of the project), or any member of staff at the site of INNS discovery.
Report to Recording » NNSS (nonnativespecies.org)	
Stage Two – Presence of high-alert species confirmed	
Initiate immediate containment measures, including restricted vessel movements.	Designated biosecurity officer, site manager, Contractor Environmental Manager or Client Environmental Manager (depending on the phase of the project).
Carry out a wider survey of vessels and structures.	Designated biosecurity officer, and qualified ecologist.
Stage Three – Eradication/employ long-term control measures	
Seek advice from the GB Non-Native Species Secretariat on appropriate measures and actions for long-term control.	Designated biosecurity officer and Contractor Environmental Manager or Client Environmental Manager (depending on the phase of the project).

1.5.7 Evaluation and review

1.5.7.1 Location of biosecurity logbook

A biosecurity logbook will be kept (in electronic form) for the Proposed Development and will be made available for inspection and review as and when required.

1.5.7.2 Plan review date

This plan will be updated prior to construction to include the final project design and include an updated risk assessment based on that final design. This will include all measures to manage INNS during the construction, phase as agreed with the relevant regulatory authorities.

The plan will be updated following the completion of construction and at the beginning of the operational and maintenance phase to ensure the plan is appropriate for the next phase of the development and the risks and activities associated with it. The plan will be updated at regular intervals during the operational and maintenance phase and prior to the decommissioning phase to ensure all measures are appropriate and any changes in the environment and risk of INNS (e.g. records of INNS being present on site) are reflected in the INNSMP, as agreed with the relevant regulatory authorities.

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APPENDIX C – WRITTEN SCHEME OF INVESTIGATION

PROJECT DESIGN FOR ARCHAEOLOGICAL MONITORING AND RECORDING

Point of Ayr Cable Route Foreshore Works

Town and Country Planning Act 1990

Document Reference Number PF.3.7

Applicant: Liverpool Bay CCS Limited

English Version

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1. INTRODUCTION

1.1. PROJECT BACKGROUND

- 1.1.1. WSP has been commissioned by Liverpool Bay CCS Limited to produce a Project Design (PD) for archaeological monitoring and recording for the Point of Ayr (PoA) Foreshore Works, adjacent to the River Dee Estuary and the Welsh Channel in Flintshire. (Fig 1 in **Annex A**). The Proposed Development comprises excavation of a Horizontal Directional Drill (HDD) exit pit as part of the construction of new electricity and telecommunications cables (the Foreshore Cables) across the intertidal.
- 1.1.2. The aim of the investigation is to ensure that any archaeological features or finds identified during the excavation of the HDD Exit Pit within the foreshore, are appropriately managed and recorded during the works. The PD sets out the scope and methodology for the archaeological monitoring, including the fieldwork method, approach to sampling, progress reporting, post-excavation reporting, archiving and dissemination.

1.2. DEVELOPMENT DESCRIPTION

- 1.2.1. The components of the Proposed Development, and associated construction activities are as follows:
- Construction of part of a cable conduit under the Gronant Dunes using a trenchless HDD method of installation. The buried depth of the cables across the foreshore is anticipated to be a minimum of 1.1m, however the depth may be greater for the trenchless crossings to ensure sufficient depth to cross obstructions.
 - An HDD Exit Pit entailing installation, at approximately 3m below beach level, of a temporary steel prefabricated containment stump, approximately 3m x 3m in width and length, to capture any drilling fluid emitted from the drilling process. This will have approximately 10m³ capacity. A cofferdam approximately 20m x 20m will be installed to enable construction of the Exit Pit. Reinstatement of the HDD Exit Pit beach area on completion.
 - The installation of a combined electrical and fibre optic cable within the HDD conduit.

- The simultaneous lay and burial of the cable across Talacre Beach from the HDD Exit Pit to the MLWS line.

1.3. PREVIOUS PLANNING CONSENT

- 1.3.1. Planning permission FUL/000246/23 was granted in May 2024, to build new infrastructure and to modify existing facilities at the PoA Terminal in Flintshire to operate with carbon dioxide (the 'Consented Development'). The Consented Development and Proposed Development will form part of the wider HyNet Carbon Dioxide Pipeline ('the Project') that will transport carbon dioxide captured from existing industry in North Wales and Northwest England, as well as from new hydrogen production facilities that are proposed as part of the Project. The captured carbon dioxide will be stored in depleted offshore gas reservoirs.

1.4. SCOPE OF WORK

- 1.4.1. This PD is for the archaeological monitoring and recording of any archaeological features or finds identified during the excavation of the HDD Exit Pits.
- 1.4.2. The requirement for further archaeological work is assumed as an archaeological planning condition (ref FUL/000246/23, dated 06 April 2023) was attached to the planning permission for the Consented Development. This condition, Condition 11 is reproduced below:

Condition 11

No development within the Construction phase shall take place until a programme of archaeological work has been implemented in accordance with a written scheme of investigation, which has been submitted to and approved in writing by the Local Planning Authority. The archaeological programme of work will be undertaken and completed in accordance with the relevant Standards and Guidance provided by the Chartered Institute for Archaeologists.

REASON: In the interests of the protection of historic assets. To comply with Policy EN and SPG28 of the Flintshire Local Development Plan.

- 1.4.3. As Condition 11 of the Consented Development was applicable to the works within the inter-tidal area, the condition's wording has been used to inform the PD scope.

- 1.4.4. Section 2 of this PD provides a summary of the archaeological and historical background. Sections 3–5 deal with the archaeological watching brief, and outline the aims, objectives, and methodology. References are provided in **Annex B**.

1.5. LEGISLATIVE AND POLICY FRAMEWORK

- 1.5.1. The following legislation was considered when preparing this PD:

HISTORIC ENVIRONMENT (WALES) ACT 2023

- 1.5.2. An Act to consolidate and amend the laws relating to designated historic assets including scheduled monuments, listed buildings, conservation areas and registered parks and gardens. The act sets out the procedures to control the register of scheduled monuments, listed buildings, conservation areas and registered parks and gardens; gives protection to the designated assets; and requires any works within the boundaries of the scheduled monuments to be taken under Scheduled Monument Consent granted by the Welsh Ministers. Works on and within the environs of listed buildings are required to be undertaken under Listed Building Consent granted by the Local Planning Authority in which the asset is located and/or the Welsh Ministers.

PROTECTION OF MILITARY REMAINS ACT 1986

- 1.5.3. An Act to secure the protection from unauthorised interference of the remains of military aircraft and vessels that have crashed, sunk or been stranded and of associated human remains; and for connected purposes, including a general prohibition on any disturbance or removal of such remains without a licence granted by the Secretary of State.

1.6. GUIDANCE AND STANDARDS

- 1.6.1. The following guidance and standards were consulted in preparation of this PD:

- Conservation Principles for the Sustainable Management of the Historic Environment in Wales (Cadw 2011);
- Heritage Impact Assessment in Wales (Cadw 2017a);
- Setting of Historic Assets in Wales (Cadw 2017b);
- Standard and guidance for archaeological monitoring and recording (ClfA 2023a);

- Standard and guidance for commissioning work or providing consultancy advice on archaeology and the historic environment (ClfA 2020b);
- Standard and guidance for nautical archaeological recording and reconstruction, Chartered Institute for Archaeologists (ClfA 2020d);
- Standard and guidance for the creation, compilation, transfer and deposition of archaeological archives (ClfA 2020a);
- Standard and guidance for the collection, documentation, conservation and research of archaeological materials (ClfA 2020c);
- Technical Advice Note (TAN) 24: The Historic Environment (Welsh Government 2017); and
- Managing the Marine Historic Environment of Wales (Cadw 2020).

1.7. AIMS AND OBJECTIVES

1.7.1. The Aims and Objectives of the PD are as follows:

- To propose measures for mitigating effects upon any archaeological material that may be encountered during the works associated with the development;
- To establish the reporting, publication, conservation, and archiving requirements for any archaeological works undertaken as part of the development.

1.8. CONSULTATION

1.8.1. Liverpool Bay CCS Limited contacted the Joint Casualty and Compassionate Centre (JCCC) of the Ministry of Defence to discuss the two Second World War aircraft crash sites within the red line boundary of the development on the 29th and 30th of April 2025 and the potential requirement for a licence. The JCCC representative confirmed that the wreck sites were far enough away to not require a licence at the offset of the excavation but if any remains relating to the crashes were observed with the excavation site, their disturbance or removal would need to be undertaken under licence.

1.8.2. The LPA Archaeological Advisor (Heneb: Clywd Powys Archaeology) and the advisor at the Royal Commission on the Ancient and Historical Monuments of Wales has not been consulted to date

regarding this PD but will be consulted and provided with a copy of the PD for comment and approval prior to the onset of any works being undertaken within the site.

1.9. SITE INSPECTION

- 1.9.1. There has been no site inspection carried out for the PD, but a site inspection was carried out for the Baseline Validation Survey in support of the Point of Ayr Cable Route Foreshore Works Town and Country Planning Act (TCPA) application on the 1st of April 2025.

1.10. PROJECT ROLES

- 1.10.1. *'The Client'* is Liverpool Bay CCS Limited. The Client will be responsible for confirming land ownership and site access arrangements prior to the commencement of work.
- 1.10.2. The *'Archaeological Consultant'* has not been appointed as of writing, but will be suitably qualified and competent archaeologist, with experience operating in the marine and intertidal zones. They are responsible for contracting the *Archaeological Fieldwork Contractor* on behalf of *the Client* and for the design and technical assurance of all archaeological works. The *Archaeological Consultant* will liaise directly with the *Local Planning Authority (LPA) Archaeological Advisor*.
- 1.10.3. The *'LPA Archaeological Advisor'* is Heneb: Clywd Powys Archaeology (H: CPA) who provides the development control and planning advice to the LPA and has the final decision on the scope of work and signs off the fieldwork when it is complete, in consultation with the *Archaeological Consultant*. The *LPA Archaeological Advisor's* remit includes the intertidal area.
- 1.10.4. The Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW) is the Archaeological Curator responsible for heritage matters in the marine environment up to MHWS in Wales and will be consulted in conjunction with the *LPA Archaeological Advisor* regarding activities undertaken as part of this PD.
- 1.10.5. The *'Archaeological Fieldwork Contractor'* has not been appointed but will be competent and qualified to carry out the work, they will be responsible for carrying out the fieldwork, post-excavation reporting, deposition of the archive and dissemination. All reporting by the *Archaeological Fieldwork Contractor* will be submitted via the *Archaeological Consultant*.

- 1.10.6. The 'Principal Contractor' is the contractor appointed by *the Client* to control the construction phase of a project involving more than one contractor. For this project the *Principal Contractor* is currently undetermined and will be appointed prior to any works being undertaken. The *Principal Contractor* is responsible for planning, managing, coordinating and monitoring all construction activities so that they follow Health and Safety legislation, guidance and procedure. The *Principal Contractor* will organise cooperation between contractors, is responsible for site security and welfare and may provide plant. The *Principal Contractor* will prepare a Construction Phase Plan and operate under CDM Regulations 2015.

2. HISTORIC ENVIRONMENT BASELINE SUMMARY

2.1. SITE LOCATION

- 2.1.1. The Proposed Development is located on Talacre Beach (see **Figure 1**), to the north of Talacre in the historic parish of Llanasa, in the county of Flintshire, north-east Wales. The Proposed Development is adjacent to the Welsh Channel area of the Irish Sea (north and west).
- 2.1.2. The landscape of the Proposed Development is a flat sand foreshore and beach area.

2.2. TOPOGRAPHY

- 2.2.1. Topography can provide an indication of suitability for settlement, and ground levels can indicate whether the ground has been built up or truncated, which can have implications for archaeological survival.
- 2.2.2. The Proposed Development is in a flat coastal landscape approximately 6m above sea level.

2.3. GEOLOGY

- 2.3.1. Geology can provide an indication of suitability for early settlement, and potential depth of remains.
- 2.3.2. The British Geological Survey (BGS) records the geology within the Site Boundary as comprised of the following:
- Superficial Deposits – Largely comprise Tidal Flat Deposits, and localised areas of Tidal River or Creek Deposits, Saltmarsh Deposits and Blown Sand.
 - Bedrock - Comprises the Lower and Middle Pennine Coal Measures, described as mudstone, siltstone and sandstone. Units of the Lower and Middle Measures.

2.4. PREVIOUS ARCHAEOLOGICAL WORK

- 2.4.1. There have been no known past archaeological investigations within the Site Boundary other than a site walkover inspection. Current understanding of the extent of past human activity is limited, in particular for the prehistoric, Roman and the early Saxon period, for which there is no documentary record.

2.5. ARCHAEOLOGICAL POTENTIAL

- 2.5.1. The TCPA Proposed Development has moderate potential to contain prehistoric remains. The foreshore and intertidal areas of the TCPA Proposed Development were likely to have been either underwater or within a marginal environment during this period which will have been utilised for easy access to natural resources. Although the presence of trackways or small boats cannot be discounted, it is considered more likely that the remains are limited to smaller evidence of resource extraction including traps and isolated remains. Outside of areas of later development, survival of early remains is likely within alluvial and aeolian deposits where they will have been deposited or buried.
- 2.5.2. The TCPA Proposed Development has low potential to contain Roman remains. The placement of the coastline and any associated marginal environment is unclear as result of a lack of historic archaeological investigation within the Study Area (**Figure 2**) and the scarce evidence of Roman activity would suggest that the finds are likely to be limited to isolated remains. It is possible that the foreshore and intertidal areas of the TCPA Proposed Development were underwater or within a marginal environment during this period. It is clear that the River Dee was used by the Romans and known Roman settlements are present along the Dee and the coastline.
- 2.5.3. The TCPA Proposed Development has low potential to contain early medieval remains within alluvial and aeolian deposits. The foreshore and intertidal areas of the TCPA Proposed Development were likely to have been within a marginal environment which would have been utilised for its easy access to the estuary and the Irish Sea and its natural resources. The placement of the coastline and any associated marginal environment is unclear as result of a lack of archaeological investigation within the Study Area. It is possible, however, for isolated remains to be present within the alluvial deposits given the extensive traffic within the Dee Estuary during this period.
- 2.5.4. The Site Boundary has moderate potential to contain later medieval remains. It is possible that the foreshore and intertidal areas of the TCPA Proposed Development were still within a marginal environment which would have been utilised for its easy access to the estuary and the Irish Sea and its natural resources. The placement of the coastline and any associated marginal

environment is unclear as result of a lack of historic archaeological investigation within the TCPA Proposed Development or Study Area. It is possible, however, for remains to be present within the alluvial deposits given the extensive traffic within the Dee Estuary during this period.

- 2.5.5. The Site Boundary has moderate potential to contain post-medieval and modern remains. Four post-medieval shipwreck sites are noted within the foreshore and intertidal around the red line boundary which suggests the potential for remains as the locations of the wrecks are approximate. The foreshore was used during the Second World War for target practice by the Royal Air Force and defensive structures from the war survive within the wider foreshore. Two Second World War aircraft crash sites are noted within the red line boundary with dispersed remains from these incidents possible around the wreck sites.

3. ARCHAEOLOGICAL MONITORING AND RECORDING

3.1. AIMS

- 3.1.1. The aims of the archaeological monitoring and recording are:
- To record, as far as reasonably possible, the location, extent, condition, significance and quality of any survival archaeological remains;
 - To provide a photographic and written record of the surviving remains; and
 - To report the results of the archaeological monitoring and recording and to provide recommendations for post-excavation analysis, if appropriate, in a report to the Client and LPA Archaeological Advisor.

3.2. OBJECTIVES

- 3.2.1. Archaeological monitoring and recording, as defined by the Chartered Institute for Archaeologists (CIfA), is 'a formal programme of observation and investigation conducted during any operation carried out for non-archaeological reasons' (CIfA 2023a). The objective is 'is to establish and make available information about the archaeological resource existing on a site' (CIfA 2023a).
- 3.2.2. The guidelines further state that the purpose of archaeological monitoring and recording is 'to allow... ..the preservation by record of archaeological deposits, the presence and nature of which could not be established... ..in advance of development or other potentially disruptive works' and 'to provide an opportunity, if needed, for the watching archaeologist to signal to all interested parties, before the destruction of the material in question, that an archaeological find has been made for which the resources allocated to the watching brief itself are not sufficient to support treatment to a satisfactory and proper standard'.
- 3.2.3. The specific archaeological research objectives, as outlined by the North East Wales Regional Research Framework (A Research Framework for the Archaeology of Wales, 2025) and based on the archaeological potential, are as follows:
- What evidence is there for Roman or Early Medieval activity? If present what is its nature, extent and significance?

- How were ancient coastal and marsh inter-tidal areas exploited in the prehistoric period?
- How has the area's usage as a firing range during WWII impacted archaeological survival?
- What are the nature and levels of natural deposits, and has there been any modern disturbance?

3.3. METHODOLOGY

INTRODUCTION

- 3.3.1. The fieldwork methodology will conform to best professional practice as summarised in Chartered Institute for Archaeologist's *Standard for archaeological monitoring and recording* (CIfA 2023a) and *Universal guidance for archaeological monitoring and recording* (CIfA 2023b).
- 3.3.2. The relevant finds archive repository for the finds recovered will be identified by the Archaeological Fieldwork Contractor and a unique project number - a 'site code' obtained from Henneb prior to the start of the project. The local finds repository is expected to be the Flintshire Museum system. The digital archive needs to be deposited as described in section 4.
- 3.3.3. The area of potential archaeological impact will be within the footprint of the HDD exit pit at the MHWS and its temporary access. Shallow archaeological remains may be affected by movement of vehicles and plant involved in construction activities, for example through rutting and compaction. Due to the method through which the trench between the exit pit and the MLWS will be excavated and filled in, these works are excluded from this PD and will be monitored through the implementation of the Protocol for Archaeological Discoveries submitted with the Marine Licence Application (Licence number: CML2365) for the marine elements of the works (Environmental Statement Report Volume 4, Appendix U).

MECHANICAL EXCAVATION

- 3.3.4. Groundworks will be opened initially by a mechanical excavator equipped with a toothless grading bucket, under the constant supervision of a qualified and experienced archaeologist provided by the Archaeological Fieldwork Contractor. The removal of overburden and other deposited waste shall be monitored. All such mechanical excavation shall be conducted with a minimum of one

experienced archaeologist per mechanical excavator. The attending archaeologist will indicate to the Plant Attendance Contractor that archaeological remains have been identified, and that mechanical excavation should cease until they have been recorded.

HAND CLEANING AND EXCAVATION

- 3.3.5. Following initial exposure of archaeological horizons, investigation by the Archaeological Fieldwork Contractor will be by hand to fulfil the objectives of the archaeological monitoring and recording. All walls and floor surfaces will be cleaned to allow for appropriately detailed photography and instrument survey of architectural details and floor surfaces, where necessary. Where sub-surface archaeological features are discovered during the watching brief, these will be excavated according to the following general principles:
- All pits will have 50% excavated through half sections or two quarter sections, depending on their size, prior to full excavation; and
 - At least 10% of linear features will be excavated that relate to drainage or agricultural activities, with no individual section being less than 1m wide.
- 3.3.6. It may be appropriate to resort to supervised machine excavation, a technique that is only appropriate for the removal of homogeneous and 'low-grade' layers where it can reasonably be argued that more detailed attention would not produce information of value, and where their removal may give a 'window' onto underlying levels.
- 3.3.7. In addition to the recording of archaeological (i.e. man-made) deposits, in accordance with an identified research objective, an assessment of natural deposits may be necessary, especially when these are organically preserved and laid down within archaeological timescales; for example, alluvial or peat deposits, which can hold palaeoenvironmental potential.
- 3.3.8. In the unlikely event that remains of very high significance are identified, the Archaeological Fieldwork Contractor will inform the Archaeological Consultant immediately, who will then consult with the LPA Archaeological Advisor. The identification of such remains may require further fieldwork, such as targeted excavation, with the deployment of additional archaeological staff. Appropriate measures will be taken to protect such remains from any damage or deterioration. This might involve for instance protective boxing,

wrapping deposits or features in a geo-textile such as terram, sealing with sand or other suitable soft materials, or other means as deemed suitable/appropriate in consultation with the LPA Archaeological Advisor and relevant specialists, where required.

- 3.3.9. Alternatively, if it is apparent from initial monitoring that no archaeological remains are present, the need for subsequent monitoring could be reduced in scope, following consultation between the Archaeological Consultant, acting on behalf of the Client, and the LPA Archaeological Advisor.
- 3.3.10. The Site Boundary is adjacent to the intertidal zone, and portions of the site may be affected by this. A constant cycle of wetting and drying can affect the survivability of archaeological remains. *Managing the Marine Historic Environment of Wales* by Cadw has further guidance if any areas in the Site Boundary are affected by intertidal effects and processes.

ARCHAEOLOGICAL RECORDING

- 3.3.11. Any archaeological remains which are identified shall be fully recorded according to the ClfA standards (ClfA 2023a) and universal guidance (ClfA 2023b) for archaeological monitoring and recording. Machine excavation shall cease, and sufficient time will be given for the recording process. All written records will be created on pro forma record sheets giving details of location, composition, shape, dimensions, relationships, finds, samples, cross-references to other elements of the record and other relevant contexts, etc.
- 3.3.12. The archaeological remains shall be hand cleaned to allow the structure to be fully recorded through instrument survey using a Global Navigation Satellite System (GNSS) or EDM, tied into the Ordnance Survey National Grid. A measured drawing consisting of at least one plan, at 1:20 scale may be required to demonstrate the scale, if the survey does not provide enough detail. Sections shall be drawn at 1:10 scale.
- 3.3.13. The feature shall be recorded digitally, using a high-resolution digital camera with a minimum resolution of 24 megapixels. Photographs taken for recording purposes are to include a scale and, where appropriate, an information board recording the relevant context number(s) and a north arrow.

ARCHAEOLOGICAL FINDS

- 3.3.14. All recovery, retention and treatment of finds and samples will be carried out mindful of the overall purpose of the exercise, i.e. to evaluate for further decision making, as expressed in ClfA (2023b). To this end, all artefactual and ecofactual material will be reviewed on site for its capability to inform the watching brief report.
- 3.3.15. Identified archaeological finds and artefacts will be carefully recovered by hand and bagged or boxed according to the type of artefact (i.e. pottery, ceramic building material/CBM, bone, worked flint, metal) archaeological context from which they came, with a label indicating the site code, find type and context reference number). Particularly notable artefacts will be recorded as a 'registered' find and recorded three dimensionally with Ordnance Datum levels. This will include *in situ* prehistoric worked flint.
- 3.3.16. Initial conservation and storage will be in a proper manner and to standards set out follow *First Aid for Finds* (Leigh *et al.* 1998) and the ClfA 'Standard and Guidance for the collection, documentation, conservation and research of archaeological materials' (ClfA 2020c). If necessary, an appropriately qualified and experienced archaeological conservator will be appointed to advise and assist in the lifting of fragile finds of significance and or value and to arrange for the X-raying and investigative conservation of objects as may be necessary.
- 3.3.17. Certain classes of bulk material, i.e. post-medieval pottery and building material may be discarded if there is a considerable quantity (more than a single standard archive box of c. 0.016m²), after recording with a representative sample.
- 3.3.18. All pottery, bone and worked flint will be washed and then marked in accordance with the project archive repository guidelines. Most building material and burnt flint (not including significant diagnostic material) will be identified, counted, weighed and discarded. Samples will be retained as appropriate. The finds identification and specialist work will be undertaken by the relevant finds specialists agreed with the LPA Archaeological Advisor to assess the date range of the assemblage with particular reference to pottery use relevant county or region-specific type series for identification and dating, where available. This evidence will be used to characterise the site, and to establish the potential for all categories of finds should further archaeological work be necessary. Records of artefact assemblages will clearly state how they were

recovered, sub-sampled and processed. Consideration will be given for donation of appropriate artefacts to type series reference collections.

- 3.3.19. All finds of gold and silver, or other objects definable as 'treasure' under the *Treasure Act 1996*, will be removed to a safe place and reported to the local Coroner according to the procedures of the *Treasure Act 1996*, the *Treasure (Designation) Order 2002* and the *Treasure (Designation) (Amendment) Order 2023*. Where removal cannot be effected on the same working day as the discovery suitable security measures will be taken to protect the finds from theft.

ENVIRONMENTAL SAMPLING

- 3.3.20. Environmental sampling is a crucial component of archaeological fieldwork, aimed at recovering data necessary for understanding past environments, human activity, and site formation. It supports research on reconstructing past climates, vegetation, and human interactions, as well as understanding site development and supporting archaeobotanical and zooarchaeological studies. Various types of samples, including bulk, soil, and waterlogged materials, are collected using methods such as flotation, sieving, and soil micromorphology to recover plant and animal remains, analyse soil properties, and understand deposition processes. Proper documentation and archiving of these samples are essential to ensure their context is preserved, with details such as sample identification, location, and method recorded. After collection, samples are analysed in laboratories, and the results are incorporated into site reports. Following best practices in line with the ClfA guidelines ensures that environmental sampling is conducted ethically, complies with legal requirements, and contributes to long-term preservation and future research.

HUMAN REMAINS

- 3.3.21. In the event of human remains being discovered, their presence will be reported to the Archaeological Consultant, who in turn shall contact the Client and the LPA Archaeological Advisor. The Archaeological Fieldwork Contractor will then inform the local police on the discovery and arrange for any necessary site visits to be made. After confirmation from the Coroner that they are satisfied the remains are historic in origin, they shall be covered and protected before being backfilled. If deemed necessary by the LPA

Archaeological Advisor, the remains may be excavated in accordance with guidance provided by ClfA Updated Guidelines to the Standards for Recording Human Remains (ClfA 2017). Human remains can only be excavated and removed with a Burial Licence as issued by the Ministry of Justice (Coroner's Division). It will be necessary to ensure that adequate security is provided.

AIRCRAFT CRASH SITES

- 3.3.22. There are the remains of two Second World War aircraft crash sites in the vicinity of the proposed development. There are two Spitfire wrecks that are recorded as being in close proximity to the Proposed Development. The Joint Casualty and Compassionate Centre of the Ministry of Defence confirmed that the aircraft crash locations are approximate, and that any aircraft remains would need to be excavated under licence and should be recorded and handled in line with legislation and all professional guidance.
- 3.3.23. A further license is not required from Flintshire Council for aircraft crash site excavation.

4. REPORTING, DISSEMINATION & ARCHIVING

4.1. REPORTING

- 4.1.1. A fully illustrated archaeological evaluation report will be made available to the Archaeological Consultant within eight weeks of the completion of fieldwork. The Archaeological Consultant will disseminate the report to the Client and LPA Archaeological Advisor.
- 4.1.2. In accordance with ClfA standards and guidance (ClfA 2023 and good practice, this will include, as a minimum, the following:
- *Non-technical summary.* One-page summary outlining project background and circumstance, the principal reason for the work and when it was undertaken and by whom, its objectives, main results, and where appropriate, recommendations. *As per the Guidance for the Submission of Data to the Welsh Historic Environment Records (HERs)*, a bilingual non-technical summary, will be provided.;
 - *The project design or appropriate reference to it;*
 - *Introduction, aims and objectives.* This will set out the circumstances of the project such as planning background and the reason for the work and will include the aims and specific research objectives reflected or reiterated in this PD;
 - *Fieldwork methodology.* The methods used. This will include the detail of any variation to the agreed PD and the reasons for such;
 - *Archaeological and historical background.* A brief summary with the site description (including size, geology and topography, location) and background. In most cases this will be derived from the HEDBA report;
 - *Results.* This will present a series of summary objective statements, organised clearly in relation to the methods used, and describing both structural data and associated finds and/or environmental data recovered. Descriptive material will be clearly separated from interpretative statements. Technical terminology (including dating or period references) will be explained;
 - *Conclusions.* Summary and interpretation the results and their likely significance. Other elements might include a confidence rating on the results and limitations (e.g. weather or problems of

access). Recommendations on further work may also be included;

- *References and bibliography.* A list of all sources used. The final destination of the archive (records and finds) will be noted in the report along with the site code assigned by the relevant project archive repository;
- *Appendices.* Essential technical and supporting detail, including for example lists of artefacts and contexts or details of measurements, gazetteers, Data Management Plan, Archive Selection Strategy, etc. Pottery reports will be expected to refer to the appropriate type series for Roman, medieval and post-medieval pottery; and
- *Illustrations.* Location plan, plans and sections at appropriate scales showing location and position of trenches dug and features located and selective photography. Section drawing will include heights Ordnance Datum (OD); plans should include OD spot heights for all principal strata and features.
- *Copyright.*

- 4.1.3. In accordance with the Welsh Language Standards (No. 1) Regulations 2015, 4 and associated compliance relevant to HER service delivery, all new records created in the HER from 1st April 2016 must have a summary description in both Welsh and English.

4.2. PUBLICATION AND DISSEMINATION

- 4.2.1. The results of the investigation will need to be published and disseminated at a level that is appropriate to the significance of the remains recorded.
- 4.2.2. A pdf of the report should be deposited with the Welsh Historic Environment Record (HER) managed by Heneb, on the understanding that it will be made available as a public document after an appropriate period (not exceeding six months from the completion of fieldwork); a further copy will be sent to the client.
- 4.2.3. A summary account of the work should be submitted to the editor of the CBA Journal Archaeology in Wales, in addition to, the relevant local archaeological journal Archaeology Round-ups and period journals (e.g. Medieval Archaeology, Proceedings of the Prehistoric Society) as appropriate no later than March 31st of the year following completion of fieldwork.

- 4.2.4. Further publication may range from a 'grey literature' archaeological report, to a short journal article in local and period-based archaeological journals as appropriate (as above), to a full monograph (in the event that the watching brief resulted in further excavation). The level of dissemination would be determined in consultation with the LPA Archaeological Advisor.
- 4.2.5. Additionally, in all cases a short summary of the results of the work will be submitted to the HER and Archaeological Data Service (ADS).

4.3. ARCHIVING

- 4.3.1. The site archive will contain all the data collected during the fieldwork, including records and finds, and all reports. The archaeological fieldwork subcontractor will ensure that the archive is quantified, ordered, indexed and internally consistent, and adequate resources will be provided to ensure that all records are checked. Archive consolidation will be undertaken immediately following the conclusion of fieldwork. Any finds of archaeological interest should be appropriately conserved and deposited in the Flintshire Museums: any finds which cannot be so deposited should be fully analysed and published.
- 4.3.2. The paper and digital archive produced during works will be deposited with the National Monuments Record held by RCAHMW, including a copy of the final report, upon completion of the archaeological works.
- 4.3.3. Finds and records will be assembled and curated by a single organisation, and be available for public consultation in a project archive repository compatible with other archaeological archives in the county, and adhering to guidelines and standards set out in the following:
- RCAHMW Guidelines for Digital Archives (2015) (RCAHMW, 2015);
 - Archaeological Archive Forum (2011), *Archaeological Archives: a guide to best practice in creation, compilation transfer and curation*;
 - Chartered Institute for Archaeologists, Standard and Guidance for the Creation, Compilation, Transfer and Deposition of Archaeological Archives (CIFA 2020a);

- Museums and Galleries Commission (1992) *Standards in the Museum Care of Archaeological Collections*;
- Society of Museum Archaeologists (1995) *Towards an Accessible Archive. The Transfer of Archaeological Archives to Museums: Guidelines for Use in England, Northern Ireland, Scotland and Wales*;
- Welsh Museums Federation National Standard and Guidance on Collecting and Depositing Archaeological Archives in Wales 2019 (Welsh Museums Federation, 2019); and
- United Kingdom Institute for Conservation (1990) *Guidelines for the preparation of excavation archives for long term storage*.

4.3.4. Copyright of the written archive will be vested in the project archive repository, which will be clearly identified in the watching brief report. The site archive will be deposited within six months of issuing the report.

4.4. OWNERSHIP OF FINDS

4.4.1. Whereas ownership of any finds on the site lies with the landowner, it is necessary that the landowner gives the necessary approvals, licences and permissions to donate any finds recovered from the site to the project archive repository, to enable that body to carry out its obligations to curate the finds, in perpetuity, as part of the archaeological archive from this site.

4.4.2. These approvals, licences and permissions shall be either confirmed in the Agreement and Contract regulating the archaeological works and/or confirmed by the completion of the relevant Deed of Transfer form.

4.4.3. The Client (or their agent) will make arrangements for the signing of a Deed of Transfer Form by the client or, if the landowner is different to the client, by the landowner.

4.4.4. Notwithstanding the above, subsequent arrangements may be made if required between the landowner, the client and the project archive repository for the conservation, display, provision of access to or loan of selected finds in or near their original location.

5. PROGRAMME, STAFFING AND ATTENDANCES

5.1. INITIAL TIMETABLE AND STAFFING

- 5.1.1. The archaeological monitoring and recording is anticipated to start in February 2026. The duration of on-site attendance will depend on the programme of below-ground works.
- 5.1.2. The Archaeological Fieldwork Contractor will provide a programme for the archaeological monitoring to the Archaeological Consultant, which will include detailing of staffing requirements.
- 5.1.3. The exact details of time, areas and numbers of staff involved would be agreed in discussions between the Archaeological Consultant, the Client, and the LPA Archaeological Advisor.
- 5.1.4. If significant archaeological remains are revealed which cannot be satisfactorily investigated and recording in the period initially defined, there should be sufficient flexibility within the construction programme and resources to enable the remains in question to be investigated to the satisfaction of the Archaeological Consultant in consultation with the LPA Archaeological Advisor.

5.2. PROJECT TEAM

- 5.2.1. The work will be undertaken by an archaeological fieldwork subcontractor that is a Registered Organisation with the Chartered Institute for Archaeologists (CIfA) and approved by the Archaeological Contractor.
- 5.2.2. Details of the Archaeological Fieldwork Contractor staff including post-excavation specialists will be provided once the archaeological fieldwork subcontractor has been appointed.
- 5.2.3. The Archaeological Consultants staff will comprise:
- *Ashley Blair*, BA MA ACIfA Senior Consultant;
 - *Josh Hunter*, BA MA PCIfA, Consultant; and
 - *Toby Gane*, BA MPhil MCIfA, Marine and Coastal Cultural Heritage and Archaeology Lead.
- 5.2.4. CVs of the key members of staff will be made available upon request.

5.3. PROGRESS REPORTS

5.3.1. The Archaeological Consultant will provide the Client and, if appropriate, the LPA Archaeological Advisor, with a weekly summary progress memo (1–2 pages). This will:

- Summarise the work undertaken during the week and the key findings;
- Report on site attendance, where appropriate;
- Confirm that the work will be completed to programme and identify any potential issues to programme; and
- Identify any health and safety issues (including near miss).

5.4. POST-FIELDWORK PROGRAMMING

5.4.1. The time required to complete watching brief report will depend on the volume of records generated during the mitigation work. In light of the nature of the mitigation it is anticipated that no further post-excavation assessment would be likely.

6. HEALTH AND SAFETY

6.1. INTRODUCTION

- 6.1.1. The work will be carried out during construction activities and is therefore subject to Construction (Design and Management) regulations (CDM 2015). The Principal Contractor will take overall responsibility for health and safety on site.
- 6.1.2. Health and Safety will take priority over all other requirements. A conditional aspect of all archaeological work is both safe access to the area of work and a safe working environment. The project will be carried out in accordance with safe working practices.
- 6.1.3. The following sections outline the health and safety aspects of the site work along with known constraints and maybe subject to change following consultation with the client, landowner, and the archaeological fieldwork subcontractor.

6.2. RISK ASSESSMENT AND METHODOLOGY STATEMENT (RAMS)

- 6.2.1. The Archaeological Fieldwork Contractor will produce a site-specific Risk Assessment and Methodology Statement (RAMS) to cover the onsite fieldwork and will supply a copy of the company's Health and Safety Policy. These will be reviewed by the Archaeological Consultant to ensure that the policy and measures are appropriate and compliant with the Principal Contractor RAMS.
- 6.2.2. WSP UK Ltd is one of the largest engineering and environmental consultancies in the UK. Health and Safety is a priority and to this end we will ensure that our archaeological fieldwork subcontractor RAMS are in line with our cross-disciplinary industry standards. This comprises:
- Clear, concise, and site-specific. Bespoke to the site, and without generic text for hazards that do not apply or mitigation that is not applicable;
 - Tabulation of site specific hazards, risk grading and mitigation measures;
 - Site manager contact details provided, along with a deputy; and
 - Emergency action plan, with an address and route map to the closest Accident and Emergency.

- 6.2.3. Archaeological Fieldwork Contractor RAMS will be reviewed by an appropriately qualified and experienced member of staff (e.g. Project Manager).
- 6.2.4. The RAMS will need to be compliant to the Principal Contractor RAMS, which will have primacy over the archaeological fieldwork subcontractor RAMS.
- The Principal Contractor RAMS will take account of the archaeological fieldwork subcontractor working practices, i.e. it does not compromise normal and safe archaeological procedure as set out in this PD and in the archaeological fieldwork contractor RAMS;
 - All RAMS will ensure that there is no significant conflict between archaeological fieldwork subcontractor H&S procedures and those proposed by the Principal Contractor;
 - The archaeological fieldwork subcontractor will be notified by the Principal Contractor of the full hazards present prior to preparing the RAMS and will be made aware of new threats or hazards as they arise during on-site involvement; and
 - The Archaeological Fieldwork Contractor RAMS will be approved by the Principal Contractor prior to commencement.
- 6.2.5. The RAMS will have been read, understood, and signed by all staff attending the site before any fieldwork commences.

6.3. PERSONAL PROTECTIVE EQUIPMENT (PPE)

- 6.3.1. Staff present on site will be required to wear the appropriate Personal Protective Equipment (PPE), as identified in the Principal Contractors RAMS. As a minimum this will be protective shoes, high-visibility long sleeve top, gloves and safety helmet. The requirement for any additional PPE will be identified in the RAMS.

6.4. WELFARE

- 6.4.1. The Principal Contractor will be responsible for providing and positioning suitable welfare facilities on site, including toilet and water for washing.

6.5. SITE SECURITY

- 6.5.1. The Principal Contractor will be responsible for site security and for ensuring that the site is secure with the use of Heras fencing or

such required to secure any areas under archaeological investigation.

6.6. ACCESS

- 6.6.1. Site access from the relevant landowners will be arranged by Client or their representative before site works commence. The Archaeological Consultant and Archaeological Fieldwork Contractor shall be notified if access arrangements change prior to or during the watching brief programme.

6.7. NON-ARCHAEOLOGICAL CONSTRAINTS

- 6.7.1. The Principal Contractor will ensure that all information on services and utilities is provided to the Archaeological Fieldwork Contractor and that provision is made for a UXO Engineer and Ground Contamination specialist to be present should this be necessary.
- 6.7.2. If unforeseen engineering or health and safety issues should arise, or if extensive, significant deposits are found to survive in the area which cannot be satisfactorily excavated and recorded in the period defined by the archaeological fieldwork contractor and the programme of the Principal Contractor, there should be sufficient flexibility within the programme and resources to enable the deposits in question to be excavated and recorded to the satisfaction of the Archaeological Consultant in consultation with the LPA Archaeological Advisor.

6.8. UNEXPLODED ORDNANCE (UXO)

- 6.8.1. There is a potential hazard for UXO within the Proposed Development in the site. This area was in the immediate vicinity of Prestatyn Air Gunnery Range. Aircraft used High Explosive 20mm cannon shells on the range and Small Arms Ammunition. There have been reports of munitions found on site recent years (Zeteca, 2021).
- 6.8.2. It has been recommended that all staff involved with excavation on site are given a formal UXO awareness briefing.
- 6.8.3. Explosive Ordnance Clearance (EOC) Engineer support is required for ground investigation works in the area with potential UXO hazards.

6.9. CONTAMINATED GROUND

6.9.1. Widespread contamination is not anticipated on site.

7. MONITORING AND ASSURANCE

7.1. MONITORING VISITS

- 7.1.1. The Archaeological Consultant will monitor and assure on-site archaeological work on behalf of the Client. The Archaeological Consultant will complete all on-site activity in accordance with accepted Health and Safety protocols and their RAMS.
- 7.1.2. The Archaeological Consultant will complete at least one site visit per week for the duration of the on-site archaeological monitoring to ensure that the archaeological work is being conducted following the method set out in the PD and health and safety requirements.
- 7.1.3. The Archaeological Consultant shall also attend site on the first day of the groundworks to deliver a toolbox talk to all site staff to ensure that the role of the attending Archaeological Fieldwork Contractor is understood and to clarify that they have control of the machining in the targeted archaeological monitoring areas.

7.2. ON SITE FIELDWORK

- 7.2.1. The Archaeological Fieldwork Contractor will ensure that the work is carried out in accordance with this Project Design, professional standards, and the requirements of the LPA Archaeological Advisor. Any unavoidable variance in the scope of work shall be made known to the Archaeological Consultant who will then consult with the LPA Archaeological Advisor.
- 7.2.2. If the Archaeological Fieldwork Contractor proposes a change to excavation strategy or work scope this change shall be communicated by to the Archaeological Consultant who will then contact the Client and LPA Archaeological Advisor.
- 7.2.3. Should they be required, visits by the LPA Archaeological Advisor will be arranged.

7.3. POST-EXCAVATION DELIVERABLES

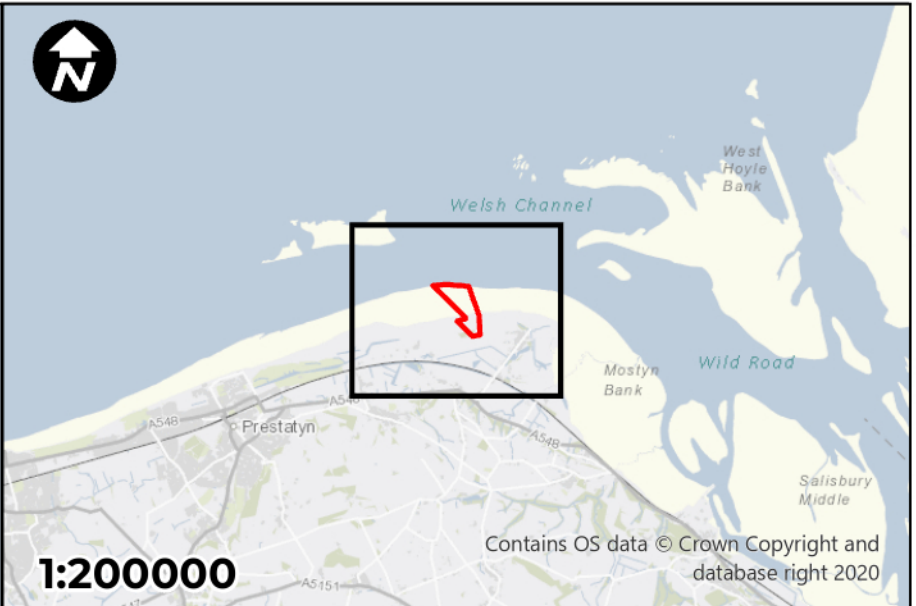
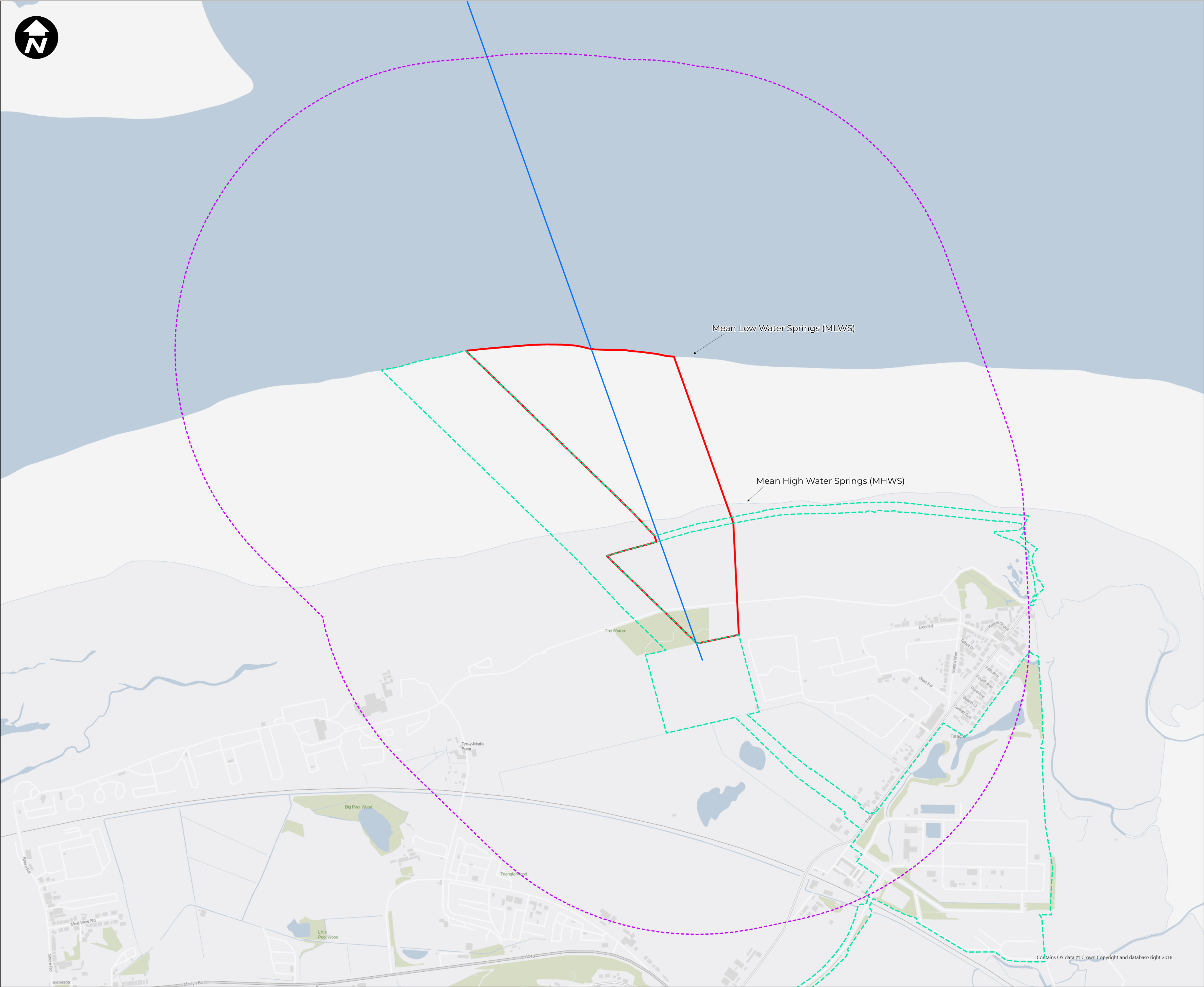
- 7.3.1. The Archaeological Consultant will technically assure the deliverables conform to the format and scope agreed with the LPA Archaeological Advisor, and that the reporting is accurate and clear and with sound conclusions, and that it has been produced to professional standards and the requirements of the LPA

Archaeological Advisor. This will be the case whether the agreed deliverables take the form of an archaeological report for the HER, journal article or monograph.

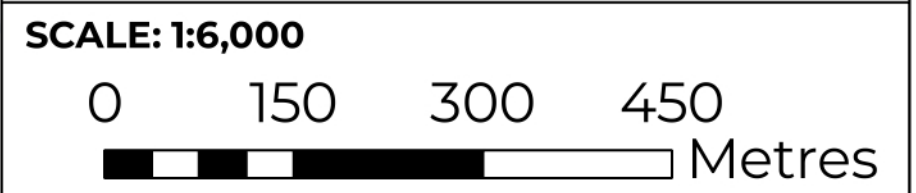
- 7.3.2. The Archaeological Consultant will liaise with the archaeological fieldwork subcontractor to ensure that the work is carried out to an agreed delivery programme.

Annex A

FIGURES



- Key :**
- Proposed Development Red Line Boundary
 - Foreshore Area Cable Alignment
 - Consented Development Red Line Boundary
 - 1km Buffer



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PROJECT TITLE

Point of Ayr Cable Route Foreshore Works

DRAWING TITLE

Figure: A.1
Planning Application Boundary
for the Proposed Development

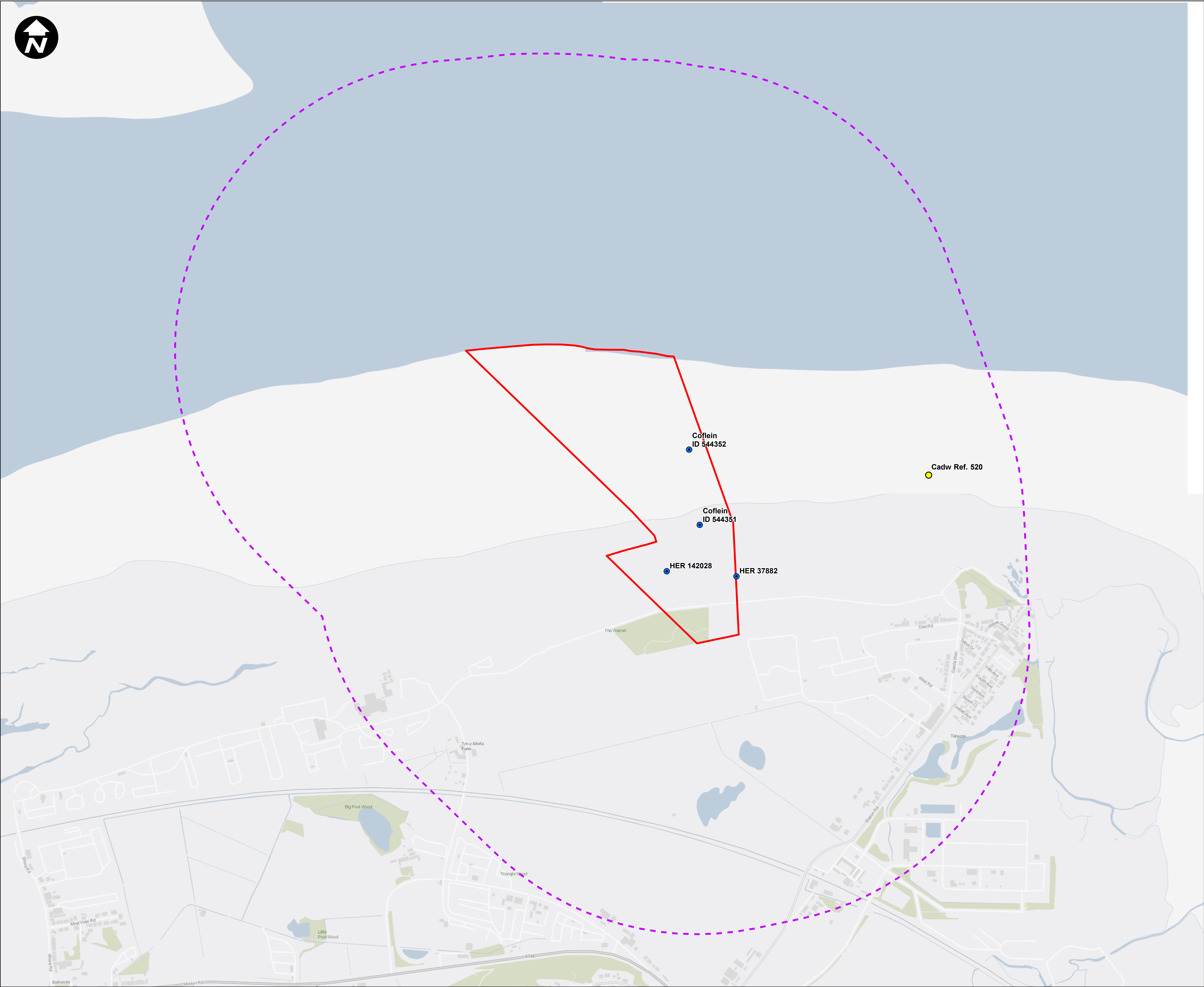
DRAWING STATUS

FOR REVIEW AND COMMENT

DRAWN	CHECKED	APPROVED	AUTHORISED
PB	AA	NH	MT
SCALE @ A1 SIZE		DATE	REVISION
1:6,000		15/08/2025	B

DRAWING NUMBER

UK0029984.4176- PF.3.7.1-ES- Sheet1

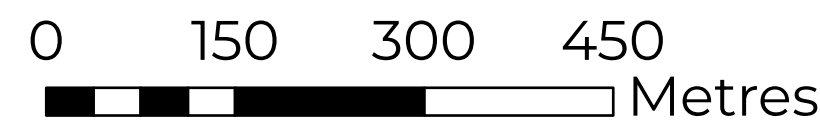


1:200000

Key:

- Proposed Development Red Line Boundary
- 1km Buffer
- Statutory Historic Designations
 - Grade II Listed Building
- Non-Statutory Historic Designations
 - Non-Designated Historic Asset

SCALE: 1:6,000



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liverpool bay ccs

PROJECT TITLE
**Point of Ayr Cable Route
Foreshore Works**

DRAWING TITLE

Figure: A.2
Heritage Constraints Map

DRAWING STATUS
FOR REVIEW AND COMMENT

DRAWN	CHECKED	APPROVED	AUTHORISED
PB	AB	NH	MT
SCALE @ A1 SIZE		DATE	REVISION
1:6,000		11/07/2025	A

DRAWING NUMBER
UK0029984.4176- PF.3.7.2-REP- Sheet1

Annex B

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ANNEX B: REFERENCES

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Annex C

EXAMPLE DATA MANAGEMENT PLAN

1. Project

Site Code: TBA

Site Name: Point of Ayr Cable Route Foreshore Works

Project Type: Watching Brief

Local Authority: Flintshire County Council

Local Authority Archaeological Advisor: Heneb: Clywd Powys Archaeology

Data Repository: National Monuments Record for Wales (Royal Commission for the Ancient and Historical Monuments of Wales)

2. Data Collection and Standards

Methods of collection will conform to appropriate recording practices and standards as outlined in ClfA Standard for archaeological monitoring and recording (ClfA 2023a). Details will be included as part of the method statement by the Archaeological Fieldwork Contractor.

Data collection will adhere to FAIR Principles and will be in line with ClfA Dig Digital Guidance

(https://guides.archaeologydataservice.ac.uk/g2gp/Geophysics_Toc) and RCAHWM (2015) guidance (<https://rcahmw.gov.uk/wp-content/uploads/2016/09/RCAHWM-Guidelines-for-Digital-Archives.pdf>).

The intended repository for digital data is the Archaeology Data Service (ADS) and National Monuments Record for Wales.

The intended repository for physical site records is the National Monuments Record for Wales.

Site Records

Details will be included as part of the method statement by the Archaeological Fieldwork Contractor.

Photographic Record

Details will be included as part of the method statement by the Archaeological Fieldwork Contractor. Details should include type of camera, number of megapixels and photograph format.

Data Standards

Details will be included as part of the method statement by the Archaeological Fieldwork Contractor. Details should include data type and format for storage and archives for the following data types: spreadsheets, text documents, photography, GIS shapefiles and plans.

3. Data Storage and Backup

Details will be included as part of the method statement by the Archaeological Fieldwork Contractor. Details should include data storage methodology and

location for the following data types: site records (physical and digital), text documents, photography, photography backup, GIS shapefiles and plans.

Data intended for digital archive will be structured in the server directory as follows:

- Archives
 - Graphics
 - GIS
 - Photos
 - Spreadsheets
 - Reports

4. Metadata

Metadata tables for each data type will be populated as the project progresses and will use the standard format for each data type as recommended by: ADS Guides to Good Practice (Niven 2021).

<https://archaeologydataservice.ac.uk/help-guidance/guides-to-good-practice/the-project-lifecycle/project-metadata/>

Data documentation will meet the requirement of the Project, Museum Deposition Guidelines, Digital Repository Guidelines and the methodology described in Section 4.3 of the WSI.

5. Ethics and Legal Compliance

Personally Identifiable Information (PII) will be removed from the archaeological project archive and permission to include individual's names in any reporting will be gained prior to use.

Copyright for all data collected by the project team belongs to the Archaeological Fieldwork Contractor (TBA), and formal permission to include data from external specialists and contractors is secured on the engagement of the specialist or contractor.

Where formal permissions and/or license agreements are linked to data sharing, details of these will be included in the project documentation folders and will accompany the project archive.

6. Archive

Digital archive material will be deposited with a trusted digital repository, where data migration and backup procedures are in place, and the integrity of the digital archive is maintained (see Section 1).

Version control will be applied throughout the project in line with standard operating procedures and ADS (2021), ClfA (2019), and HE (2015) guidelines.

Only the final version of 'born digital' documents (reports, databases, images, GIS files) will be selected for inclusion in the Digital Archive. The material de-

selected from inclusion in the preserved archive will be duplicates or reproductions created during the lifespan of the project.

Digital photographs will be assessed during post-excavation and selection based on the principles set out in the ADS (2011) and HE guidelines (2015).

Raw data (all formats) will only be preserved if specifically requested by the Client or specified by local authority requirements, e.g. raw photogrammetric data. Where an archive of raw data with an accepted repository (e.g. ADS) is required, a subsequent costing for storage and archiving will be provided.

Selection will be defined against the research aims, regional and national research frameworks, specialist advice and the significance of the project results. Selection will be carried out based on the following guidelines:

- ADS (2021) Guidelines for Depositors
<http://archaeologydataservice.ac.uk/advice/guidelinesForDepositors>;
- ADS (2018) Guidance for the selection of material for deposit and archive
<https://archaeologydataservice.ac.uk/advice/selectionGuidance.xhtml>;
- CIfA (2019) Selection Toolkit for Archaeological Archives
<https://www.archaeologists.net/selection-toolkit>; and
- RCAHWM (2015) guidance (<https://rcahmw.gov.uk/wp-content/uploads/2016/09/RCAHWM-Guidelines-for-Digital-Archives.pdf>).

7. Data Sharing and Accessibility

Data specific requirements, ethical issues or embargos which are linked to particular data formats will be documented within the relevant metadata tables accompanying the project archive.

A summary of the project will be included within Welsh publicly available Historic Environment Record data.

A final version of the project report will be supplied to the Historic Environment Record and any data which they request can also be provided directly.

The Repository listed in Section 1 will disseminate the digital elements of the Archaeological Archive online per their guidelines.

8. Responsibilities

The Project Manager (TBA) will be responsible for updating and implementing the Data Management Plan, and ensuring it is reviewed and revised at each stage of the project.

Data capture, metadata production and data quality are the responsibility of the Project Team, assured by the Project Manager with support from the Geomatics Manager and Archives Officer.

Storage and backup of data in the field is the responsibility of the field team. Data management on site will be supervised by the site lead (TBA).

Data on the archaeological fieldwork contractor's project server, storage and backup is managed by their IT Support Team.

Data archiving is undertaken by the project team under the guidance of the Archives Officer with the support of the Geomatics Manager.

The Archives Officer is responsible for the transfer of the Archaeological Project Archive to the agreed repository.

	 BOSKALIS SUBSEA CABLES		Validity Status	Revision Number
				01
Company Document ID 000593_DV_EX.HSE.0408.000	Contractor Document ID N/A	Vendor Document ID N/A	Sheet of Sheets 77 / 81	

APPENDIX D – BREAK OUT MANAGEMENT PLAN



	
Project Title Boskalis	AMS Project Number J3130
Project Location Liverpool Bay	Status For Review
Document Title Breakout Plan	
AMS Document Number J3130-AMS -ZZZZZZ-PLN-AB-00007	Revision B
Client Document Number N/A	Date 29/08/2025
*** UNCONTROLLED WHEN PRINTED ***	
Copyright 2025 AMS No Dig Ltd	

UNCONTROLLED WHEN PRINTED

Document Number: J3130-AMS-ZZZZ-PLN-AB-00007
Revision: A

Approvals		
Author	Signed	Date
Michael Moore		01/10/2025
Checked	Signed	Date
Matt Waterson	<i>Matt Waterson</i>	01/10/2025
Approved (Client)	Signed	Date

Revision History			
Revision	Date	Author	Signature
A	29/08/2025	Michael Moore	
B	01/10/2025	Michael Moore	

Change Log		
Revision	Location	Brief Description of Change
A	All	Document Creation & inception into project
B	All	Revised following comments from Client

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1.0 Abbreviations

Code	Description
AMS	AMS No Dig Ltd
HDD	Horizontal Directional Drilling
EMP	Environmental Management Plan
RAMS	Risk Assessment & Method Statement
SHEQ	Safety, Health, Environmental, Quality
COSHH	Control of Substances Hazardous to Health
HSE	Health & Safety Environment
HDPE	High Density Polyethylene
SDR	Standard Dimensional Ratio
CCTV	Closed Circuit Television
LOLER	Lifting Operations & Lifting Equipment Regulations
CSCS	Construction Skills Certificate Scheme
CPCS	Construction Plant Competence Scheme
PPE	Personal Protective Equipment
SDS	Material Safety Data Sheet
OD	Outside Diameter
PE	Polyethylene
POWRA	Point of Work Risk Assessment
ECOW	Environmental Clerk of Works
LCM	Loss Circulation Material

2.0 References

For the purposes of traceability this document shall be read in conjunction with the following reference documentation.

Document Reference	Document Title	Old Document Number
10xxxxxxxxxxxxxxxxx	PoA Cable Route and Foreshore Works CEMP	N/A

3.0 Introduction

During the normal operation of the directional drilling process, drill fluid (“mud”) is pumped into the borehole to facilitate the transfer/flow of ground cuttings back to the entry (and exit) pit and also to provide physical support to the drilled borehole. As the length of the drilled bore increases then additionally the internal fluid pressure will also increase to ensure a continuous flow of fluid is maintained back to the entry pit. Modelling of the bore internal fluid pressure is carried out during detailed design and will highlight “potential risk areas” along the drill path where fluid loss may occur based on the calculated internal bore fluid pressure vs vertical ground pressure imparted on the bore due to the overlying strata. Whilst the model is an extremely useful tool, local variations in ground strength, compaction, ground water and sub-surface voids or fissures cannot be accounted for in the model and therefore unplanned surface fluid loss may occur. This document details the preventative measures to minimise this risk as well as the procedure to be implemented should loss of drill fluid to the surface occur.

4.0 Project Overview

Boskalis is undertaking the Liverpool Bay Carbon Capture and Storage (CCS) Transport and Storage Project, a key infrastructure initiative supporting the UK's decarbonisation objectives. As part of this project, Boskalis is seeking to appoint a competent contractor to deliver the Horizontal Directional Drilling (HDD) landfall work package.

The scope of works includes the installation of a single polyethylene (PE) cable duct using HDD techniques. The drill will extend approximately 500 metres, commencing from an onshore entry point and terminating at the beach front exit point. AMS will utilise proven HDD technology and a streamlined methodology to minimise environmental impact, reduce disruption to the surrounding area, and ensure precise alignment of the installed duct.

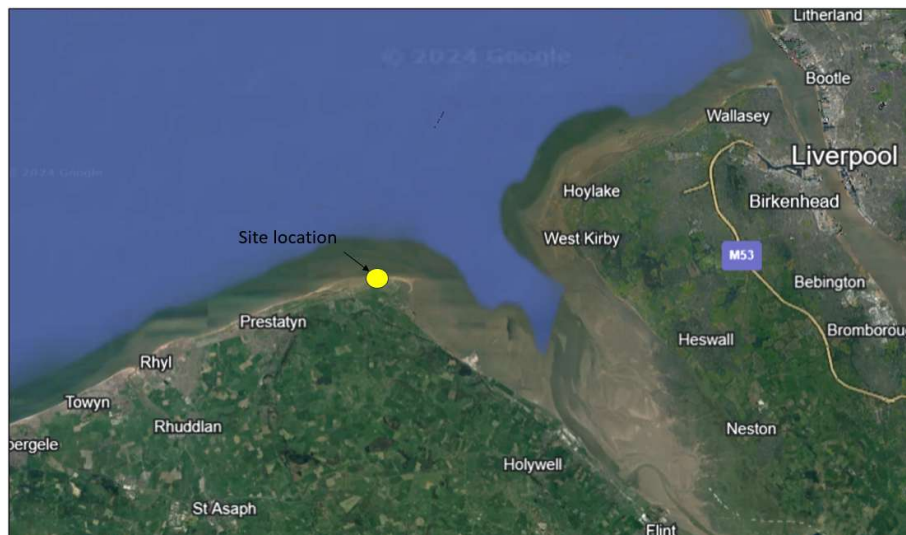


Fig 1: HDD Drill Location – Talacre, North Wales

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5.0 Scope of Works

The scope of works involves the Monitoring, Identification, Containment, Reporting and Clean-up of any inadvertent breakout drilling fluid that occurs on land during the HDD process involving:

- Stopping all HDD works
- Sand dune & beach access and egress
- Movement of sandbags and/or hay bales
- Containment of the drilling fluid.
- Clean up and removal of drilling fluid.
- Removal of material from site.
- Assessment of any remediation works if necessary, reinstated as found.

ADD SNAPSHOT OF LATEST PROFILE DRAWING HERE

Fig 2: Document number – document title
Drawing for Reference Only

In summary, the details of the HDD duct is as follows:

Pipe Information	Details
No. of drills	1
Pipe Diameter	315mm TBC
Pipe Length	500m
Pipe Type	Polyethylene cable duct

6.0 Commitment to the Environment

Principles and objectives for this project are documented in the Boskalis HSE Plan, the Environmental Management Plan, and the Project Quality Plan. Commitment to SHEQ is instilled throughout the AMS organisation by competent trained managers and operators who are accountable for themselves and those around them.

The following procedures detail the actions to be taken in the event of surface fluid loss with particular consideration to the existing local flora, fauna and wildlife prevalent in the area.

7.0 Drilling Fluid Principals

The breakout of drilling fluid (Mud) occurs when fluid pathways are developed between the borehole and surface, due to the hydraulic pressure of drill fluid within the annulus of the bore exceeding the confining formation strength of the surrounding geology.

Stakeholders should be reminded that drilling fluids are freshwater suspensions of inert clay particles. Although slippery, they are environmentally benign and in fact can be utilised to improve the water retention of poor-quality soils. Control Of Substances Hazardous to Health, (COSHH), and Material Safety Data Sheets, (SDS), are kept on site for all products involved in the drilling operation.

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During the drilling of the pilot hole entry and exit curves, when the depth of cover, formation consolidation and confining strength are at a minimum, breakout is most likely. The design of the drill is carried out to minimise the risk of the breakout in high risk areas, ensuring sufficient depth of cover.

A Breakout can also travel to surface via existing pathways, e.g., previously installed utilities, foundation piles and existing boreholes. Any Site Investigation bores sunk must wherever possible be offset to the proposed drill line and sealed up on completion, boreholes directly on the drill line will increase the risk of breakouts during drilling operations.

Once punch out at exit point has been achieved, the annular pressure within the bore is relieved. Breakout during hole opening and pipe pulling operations is therefore much less likely to occur.

In the event that a drill fluid break out does not self-seal & drilling mud continues to break out at the surface then a loss circulation material (LCM) shall be prepared. LCM material is designed to seal fissures in the formation and is added to the drilling mud as required. The LCM comes in many forms such as cork or manufactured inert polymers PAC. These additives will be pumped into the system and can stem the flow and in certain conditions seal the flow completely.

8.0 The Stages of Drilling Fluid Breakout Management

1. Prevention (Proactive)

A breakout occurs when annular fluid pressures exceed formation fracture pressures. Annular fluid pressures are minimised by constant monitoring of the drilling fluid parameters. The Drill Fluids Operator will monitor drill fluid density, viscosity, and solids content on an ongoing basis, to ensure that the fluid does not increase in viscosity, requiring additional pressure to maintain mobility.

The Drill Rig Operator will monitor the drill fluid pressures, volumes, viscosities and densities of mud being pumped through the bore. Any deviation in pump pressure experienced by the Drill Operator will be investigated immediately by the driller to prevent the risk of pressure build up within the annulus.

In some circumstances, dependant on the drilling equipment being used, the pilot drill Bottom Hole Assembly (BHA) may will be fitted with a down hole pressure monitor to measure pressure in the annulus between the drill and the bore wall this will give an early indication of pressure build up in the hole and will provide the drill operator the best chance of preventing a breakout. In the event of a pressure monitor being fitted this would be only be during the Pilot Drilling.

Cleaning runs and tripping out the drill line will enable any excess down hole cuttings to be remove which will reduce the down hole pressure reducing the risk of a breakout. This method should also be used in the first instance when trying to seal a bore before the use of LCM's detailed in the containment section of this document.

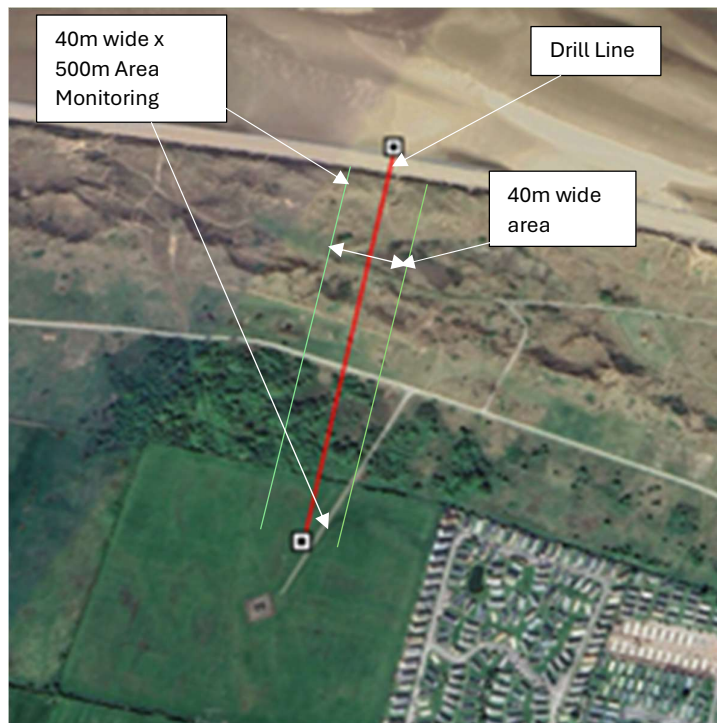
More information is detailed in Section 10 of this document.

2. Monitoring

It should be recognised that in most cases the extent of a drilling fluid breakout is limited to the time it takes to turn off the mud pump which will instantly stop the flow of drilling mud. In extreme cases mud may continue to escape from the bore due to the static head pressure exceeding the overburden pressure of the formation that is being drilled but this event is rare. The drill (rig hand) is responsible for monitoring the flow of mud at both the drill entry and exit points. This is a continuous operation and is carried out by two-way radio communication. The mud technician is responsible for monitoring mud volumes within the mud system.

In addition, monitoring by way the an Operative of walking the Drill Line will take place during day and night shifts where 24 hour working allows (the frequency is dependent on the location, environment, and potential risks, where the ground is likely to have a high potential of breakouts). It is proposed that a 40m x 500m channel including Drill Line will be monitored.

The Drill Line will be identified by the placement of posts with a identification tape, this will make it identifiable the operatives carrying out the monitoring walk. In the event of drill fluid breakout, the operation will be stopped, and the Boskalis will be informed as soon as possible.



More information is detailed in Section 10 of this document.

3. Containment

This section identifies possible leakage paths that have been identified and includes both those potential paths that emanate at surface and those that discharge elsewhere. This list is not exhaustive and should be populated further if additional potential leakage paths are identified on site. Haybales and/or sandbags, vacuum bowers, and positive displacement pumps will be stored in the works compound ready for deployment to the breakout location.

In the event of a break out within the Warren / Dune area, we propose will use the defined pathways to attempt to get as close as possible to the affected area. Small mobile plant will be used to transport the haybales and sandbags to and from the site compound. Where possible hand tools will be used to minimise the use of larger equipment.

A sand bag bund may be constructed around the breakout area and drilling fluid recovered from the bund by using either a vacuum tanker or by using a positive displacement pump to pump from the bund directly back the mud pit or by manually sweeping the fluid into a receptor for disposal. (Barrow, dumper, pickup) it may be necessary to excavate a small catchment pit to contain the breakout. In the event of any walkway being obstructed by pump hoses this will be mitigated by the use of ramps to enable walkers, cyclists and wheelchair users access over the pipe. All mobile plant will use plant nappies and spill kits to protect the ground from any fluid leaks. Passers by will be prevented access to the breakout area initially by a Marshall whilst barriers are put in place.

More information is detailed in Section 10 of this document.

As a last resort, If loss of drilling fluid has occurred and re-conditioning the bore fails to seal the fissure loss circulation material (LCM) will be introduced into the bore. This material will help seal any leakage to the bore. Following the introduction of LCM material regular visual and circulating fluid volume checks will be carried out to ensure loss pathways have been sealed. When adding LCM additives the volume of drilling fluid in the drill line this will be a calculated in accordance with manufacturers guidance, volume and pump rates. Drilling Fluid split during LCM deployment will be contained.

4. Clean Up

The Clean-up operation is a very important part of the process, the following tasks must be completed.

1. Contaminated Sandbags/Haybales are removed and all other items will be disposed of in accordance with the waste management plan..
2. Removal of any signage and barriers erected.
3. Making safe any area that has been affected because of access and egress.
4. Returning the breakout area and route to an as found state, back filling holes with local material, cleaning pathways and roads to ensure any residual mess is a minimum.
5. As part of the report the location is to have the GPS coordinates this can be done using the mobile app at the location.
6. Photographs to be taken of the breakout prior to cleaning up.
7. Photographs to be taken of the breakout after cleaning up.(in app)
8. Photographs to be taken of the route to the beach prior and after

9. ECoW monitoring must be carried out to determine the recovery of the habitats following the pre-works habitat condition survey.
10. Report created and submitted via **My Compliance**.
11. The area will be made accessible for the public following the Clean-up process

9.0 Plant & Equipment

The following plant and equipment will be ready and available when required:

- Tractor, trailer and Vacuum tanker
- Small pumps suitable for handling slurry
- Tracked Dumper or Similar
- Sandbags or Hay bales
- Shovels
- Barriers, tape and signage to create a safe working area and to keep the area protected

10.0 Breakout Procedure

10.1 Identify and Reporting

All incidents must be reported as soon as is practicable to the AMS Trenchless Project/Site Manager and HSE Manager, in addition to this the Boskalis Management and HSE Team and their Environmental representation. Boskalis will inform local Stakeholders and landowners as appropriate.

In the event of a spill/ breakout, the priority is to **STOP** inform drill operator to shut down pumps to stop the breakout **Contain** to prevent it from continuing to spill if possible and to prevent the substance from spreading further, if safe to do so recover fluid.

STOP-CONTAIN-NOTIFY

Inform your supervisor/manager immediately and warn fellow employees working nearby to either evacuate the area or keep well clear ensuring a safe cordon zone is established. If necessary, evacuate the site.

Any incident will be reported as soon as practicably possible to Boskalis.

Photos of the areas will be taken, and the incident will be reported to the SHEQ Manager via the web-based reporting system My Compliance.



Fig 3: My Compliance QR Code

All employees will be encouraged to install the My Compliance (My Incident) app but this is not essential as just scanning the QR Code here will open the portal.

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You will then be taken through a series of reporting questions enabling a full report to be generated for AMS SHEQ team to respond to.

10.2 Access to the Warren and Dunes

The area that would be at the most is risk of drilling fluid break out is the lower Warren area. This is due to the depth of cover would be at its lowest point during HDD drilling process. In the event of a drilling fluid break out in this area and the dunes, all necessary plant and equipment that is required to access will only use the defined pathways. Two banks persons will be present, taking care that the area is fully respected and any members of the public are kept safe from the manoeuvring plant and equipment.



10.3 Minor and Major Breakout Response

Minor Breakout:

In the event of the discovery of a drilling fluid break out, AMS will contain the spillage by the use of hay bales and or sand bags creating a barrier or bund to contain the lost fluids, taking in to consideration the nature of the warren and dune area access and egress of the area. it may be necessary to excavate a small catchment pit to contain the breakout. Containment of the works will be demarcated by using wooden posts and or pegs and orange netting which will be managed by operatives.

AMS will attempt to transport by small mobile plant or similar to move all the sandbags and bales as near as possible to the affected area by using the defined pathways, then manhandled to the affected area. Where the flow of slurry is continuous the use of a small pump may be required for immediate control to pump the slurry to a point whereas a tractor

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and vacuum bowser could be used remove the slurry from the area to the recycling plant. If the break out ceases to continue and no further evidence is found, the area will be cleaned and all remains of slurry, bales and sandbags removed and disposed of. The area will be left in a satisfactory condition. Plant and equipment will not drive over vegetation, plants or bushes.

Major Breakout or Continuous:

For immediate control we would implement the use of a pump if the breakout is continuous. Once again hay bales and or sandbags will be used as an immediate method of containment

The hay bales and/or sandbags will be lifted by two persons when required and loaded into a dumper, the items would be transported as near as possible to the affected area using the defined pathways.

Containment of the works will be demarcated by using wooden posts and or pegs and orange netting which will be managed by operatives.

With permissions in place from Boskalis, it may be necessary to excavate a small catchment pit to contain the breakout. The team will then lay a pump suction pipe and discharge hose across the warren using pathways to minimise any environmental disruption. This pump will be used to remove the slurry from the affected area to a point whereas a tractor and vacuum bowser could be used remove the slurry from the area to the recycling plant.

This would be a managed operation to ensure that there is no risk to the health, safety and environmental welfare of the area and members of the public.

If the break out ceases to continue and no further evidence of additional slurry is found, the area will be cleaned and all remains of slurry, bales and sandbags removed and disposed of. The recovery of the haybales and/or sandbags will be handballed back to the dumper along with any sand requiring to be disposed and disposed of in an appropriate manner and the area will be left in a satisfactory condition.

Points to Note:

- In advance of commencing Drilling Operations both the Day and Night team will walk this route, this will be deemed as a drill and captured accordingly on a Drill report form.
- This will allow all members of the Team to familiarise the route.
- The key personnel will be:
 - Supervisor
 - Marshals / Banks persons
 - Mobile plant operator
- Barrier Management is placed at relevant points along the route and around the breakout point to prevent members of the public from entering
- Any members of the public in the immediate/surrounding vicinity are politely asked to leave the area.

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- Either the Project Manager or Night Site Manager will liaise with members of the public if required.
- Highlight any issues that the driver needs to consider.
- Move any obstructions (that can be moved by hand)
- Whilst the break-out is being cleaned/removed the operatives will respectfully direct members of the public that approach and ask questions to the Project Manager.
- **CALL AN ALL STOP** if any danger exists to the public, or any wildlife is identified. The above will be captured and defined in the daily/pre shift TBT.

11.0 Health & Safety

AMS

All site personnel shall have attended a project induction which will be organised by the AMS responsible manager. All site personnel will have completed the CITB health & safety test and will be trained and assessed as competent in their area of responsibility. All operators hold valid CSCS and CPCS cards or suitable equivalent as required.

PPE

AMS shall supply the following PPE (free of charge) to all AMS sites staff and operatives. All operatives to use only AMS issued/approved PPE, the following must be worn during this operation:

PPE Equipment	Safety Standard
Hard Hat	EN 397
Coveralls	FR21
Safety Footwear	EN20345 S3
Reflective Clothing	EN 20471
Safety Glasses	EN166:2001 1F
Suitable Gloves	EN 388

The standard of the PPE required to undertake the task is detailed in the site-specific risk assessment.

All site personnel shall comply with any additional PPE requirements that have been identified by permit or on-site risk assessment.

First Aid

- First aid facilities will be always available on-site.
- First aiders are displayed on the HSE board.
- Mental Health First Aider
- First Aid kits,
- Eyewash station
- Defibrillator

Risk Assessments

A risk assessment has been prepared for the scope of work covered by this method statement. It is the responsibility of the project manager/supervisor to ensure that all personnel are briefed and have signed off, about risks and signed onto the risk assessment, hazards, and precautions to be taken. The project manager/supervisor should also ensure that adequate supervision is always available on-site to achieve full compliance. Night and lone working will be covered in the HDD construction risk assessment method statement.

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COSHH

As per the Project COSHH assessment register and SDS which are available in the site file and via the My Compliance software. All COSHH assessments will be provided to Boskalis in advance of the HDD works commencing.

12.0 Briefing Register

Method Statement Briefing Register	
Date and Time of Briefing	
Location	
Name of Person Conducting Briefing	

The purpose of signing this register is to confirm that you have received a briefing in relation to this method statement and that you fully understand its contents.		
Name	Signature	Date

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