Future Port Talbot

Environmental Impact Assessment
Scoping Report
Volume II – Appendices B to N and Glossary & Abbreviations

November 2025



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Appendix B
Detailed Unexploded Ordnance (UXO) Threat and Risk Assessment with Risk Mitigation Strategy



Port Talbot

AECOM

Detailed Unexploded Ordnance (UXO) Threat and Risk Assessment with Risk Mitigation Strategy

Meeting the requirements of the United Kingdom's
Construction Industry Research and Information Association's
Unexploded Ordnance Risk Management Frameworks:
C681 and C754

6 Alpha Associates Ltd

Project No.: 10296

27th June 2023

V3.0

Using This Report

This Detailed UXO Threat and Risk Assessment with Risk Mitigation Strategy is designed to inform the reader whether military related Unexploded Ordnance (UXO) is likely to pose a hazard at the Study Site and if so, calculate the level of risk generated by proposed or likely ground intrusive operations at the Site. The assessment is intended to meet with the requirement of Stages 2 and 3 of the *Health and Safety Executive* endorsed *CIRIA C681* and *C754* UXO Risk Management Frameworks – for both of which, *6 Alpha* were the lead technical author.

There are two prospective outcomes of this report; either the risk level requires a Risk Mitigation Strategy aimed at reducing UXO risks As Low As Reasonably Practicable (ALARP) in accordance with the Project's minimum legal responsibility; or that no further action is required. In the former instance *6 Alpha* will provide a Risk Mitigation Strategy consisting of proactive and/or reactive risk mitigation measures aimed at reducing the identified risks to ALARP.

Document Control

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Executive Summary

Document Scope

6 Alpha Associates Limited (6 Alpha) has been commissioned by *AECOM* to provide an Unexploded Ordnance (UXO) Threat and Risk Assessment with Risk Mitigation Strategy, for the Site described as "*Port Talbot*". The Study Site comprises areas above and below the high-water mark and as a result, *6 Alpha's* threat and risk assessment will be divided into an "Onshore" and an "Offshore" element.

The overall Study Site is depicted at Appendix 1 and the demarcation between the Onshore and Offshore elements of the Site is presented at Appendix 2.

UXO Threat Assessment Summary

6 Alpha's UXO Threat Assessments for the onshore and offshore Sites have been summarised at Table 1:

UXO Threat Assessment Summary			
Threat Source		**Result**	**Comments**
	Was the Site or its vicinity considered a primary bombing target during WWII?	✔	*Luftwaffe* aerial photography identified 6 primary targets within the Site.
	Was the Site or its vicinity bombed during WWII?	✔	The onshore Site was subjected to significant aerial bombardment during WWII; which may also have overspilled into the offshore site.
	Was the Site or its vicinity damaged by bombing during WWII?	✔	Port facilities within the onshore site were damaged by bombing during WWII.
	Has ordnance been manufactured and/or stored at the Site or its vicinity?	✔	*Port Talbot* was declared a military port during WWII and was significantly involved in the transport of military munitions, vehicles and personnel.
	Was the Site subject to mining during WWI and/or WWII?	✔	Three vessels are present within the Site that were sunk by covert WWII mining operations from *German* submarines and aircraft.
	Are any munitions-related shipwrecks located on-site?	✔	

	Were any defensive military installations located on-site and/or nearby?	✔	At least 20 coastal artillery gun batteries were recorded nearby that possessed a firing arc template covering the offshore Study Site.
	Has the Site been requisitioned for military training previously?	✘	Whilst military training was documented in the Site's wider area, there is no evidence that the Site has been requisitioned for this purpose previously.
	Does UXO contamination pose a potential hazard at the Study Site?	✔	The most probable UXO threat is posed by WWII-era *German* HE bombs.

Table 1: UXO Threat Assessment Summary

UXO Threat Items

Given the evidence presented at Table 1, *6 Alpha* consider it reasonably foreseeable that a UXO encounter could occur at this Site. The most probable UXO threat items are *German* aerially delivered ordnance and naval mines – including potentially low-ferrous LMA mines – and *British* Anti-Aircraft Artillery projectiles (particularly offshore). *Allied* Abandoned Explosive Ordnance, Land Service Ammunitions and Small Arms Ammunition may also pose a residual threat, particularly in the ultra-nearshore areas of the Site.

Potential UXO Burial Depth

Given the likely ground conditions at the Study Site, the average WWII bomb penetration depth onshore has been calculated as 7m below WWII ground level at this Study Site. Although larger Unexploded Bombs (UXBs) could be present below this depth (potentially up to 16m), they were deployed infrequently during WWII and are highly unlikely to be encountered.

In the offshore environment, the mitigative effects of a body of water (e.g. in slowing and reducing the impact of munitions on the seabed) will often reduce potential UXO burial depth; though there are few studies applicable to the offshore environment concerning WWII-era UXB burial depths. Despite this, threat spectrum UXO penetration into the seabed could be as much as 7m below WWII ground level in the shallowest part of the Study Site (less than 5m LAT). As the water depth increases, the likely bomb penetration depth decreases; though the likely bomb penetration depth across the Site is assessed as a minimum of 4m below WWII seabed level due to the relatively shallow depths present across the entirety of the Site.

UXO Risk Assessment

Semi-Quantitative UXO Risk Assessments (SQRAs) have been undertaken for the likely intrusive works in the onshore and offshore environments. These SQRAs have assessed that the worst case UXO risk rating to onshore and offshore intrusive works is:

HIGH

Nonetheless, in certain areas of the offshore Study Site it has been possible to zone the Site risk into ***HIGH***, ***MEDIUM*** or ***LOW*** risk areas (as undermentioned).

Conclusions

The following conclusions have been drawn:

Onshore

Given the lack of detailed bombing records associated with this Site, it is not possible to assess specific geospatial locations of individual bomb strikes, instead the evidence is more general but does show that the onshore Site was subject to significant bombing during WWII.

Therefore, it is plausible that the proposed intrusive works might encounter WWII-era UXBs in any ground not previously disturbed since the end of WWII. In such areas, the UXO risk to proposed GI and potential construction operations has been assessed as ***HIGH*.**

In some areas of the Site, it is apparent that the Study Site has undergone post-WWII development, specifically concerning the reclamation of land, the installation of a new harbour, and the re-development of industrial facilities at the port between 1965 and 1982. Consequently, it is considered likely that any UXO contamination within ground that has been disturbed since WWII would likely have been discovered and removed. In those areas, the UXO risk to intrusive works is considered to be ***LOW*** (and see section 6.2 for further detail).

However, in most areas it is not possible to prove that the associated development works have involved the disturbance of ground down to the likely average UXO burial depth of 7m bgl and therefore, a risk zoning diagram cannot yet be provided.

Once the specific nature, locations and depths of the proposed intrusive works have been finalised, then *6 Alpha* may be able to further refine the UXO risk zoning of the onshore Site.

Offshore

It is standard *6 Alpha* practice to divide the Study Site into multiple UXO risk zones based upon one, or a combination of, the following factors:

- The nature and scope of seabed intrusive activities and the distances from pertinent UXO threat sources;
- The varying water depths (in LAT) across the Study Site;
- The post-WWII redevelopment of the Study Site;
- The project stakeholders' assumed appetite for the carriage of residual UXO risks.

The relatively shallow depths of water across the whole of the *Port Talbot* offshore Study Site, together with the historical evidence of substantial UXO threat sources prevent the much of the site from being zoned based on the first two criteria. Therefore, proposed works in large areas of the Site have been assessed and classified as ***HIGH*** at the initial strategic assessment level.

Nonetheless, as section 10.1.2 outlines, a minimum of 7.2m of seabed was dredged from the Site during the construction of the harbour at *Port Talbot* and during subsequent re-development projects. This exceeds the assessed bomb penetration depth for the Site and therefore, in those areas the UXO risk to intrusive operations has been assessed as ***LOW***.

The aforementioned dredging activity occurred across a longer approach channel, leading from the harbour out into *Swansea Bay*. In the shallowest areas of the approach channel, between 4m and 5m of seabed was removed, which equates to the likely bomb penetration depth in those limited areas. As a result, the UXO risk to intrusive activities in a small part of the approach channel can be downgraded to ***MEDIUM***.

The UXO risk zoning has been presented at Appendix 17.

Risk Mitigation Strategy – Onshore and Offshore

As per *Construction Industry Research and Information Association* (CIRIA) C681 and C754 guidance, *6 Alpha* recommended that the identified UXO risks to onshore and offshore intrusive works are reduced As Low As Reasonably Practicable (ALARP). *6 Alpha*'s approach is therefore, that UXO risk to the intrusive operations both onshore and offshore can effectively be reduced to ALARP, by removing one (or more) element(s) of a source-pathway-receptor risk model, or otherwise mitigating the risks associated with a single element of the model.

The proposed strategic risk mitigation options based upon source-pathway-receptor modelling are:

Avoidance of Threat Sources

A strategy of potential UXO (pUXO) detection and avoidance is proposed as the most cost effective and efficient method of reducing UXO risks to ALARP. By surveying for and avoiding direct or indirect contact with any pUXO (the source of the risk), and by moving any intrusive activity away from such

prospective hazards (wherever this is practicable), such risks are appropriately and effectively reduced.

Avoidance is typically considered more practicable in the offshore environment, than onshore.

Removal of Threat Sources

Where pUXO cannot be avoided, another alternative option is to verify pUXO by investigation and where it is classified as confirmed UXO (cUXO), then to either move it (to a position where it cannot reasonably be initiated by project operations – generally only considered viable at offshore sites) and/or then rendering it safe (effectively removing the source element of the source-pathway-receptor model).

This option is commonly the most effective strategy for reducing onshore UXO risks ALARP but also, is likely to prove the most effective fall-back option offshore, if pUXO targets cannot be avoided by the proposed intrusive works by a suitable safety distance.

UXO Risk Mitigation Measures

The strategy of reducing UXO risk by the avoidance and/or removal of UXO threat sources should be executed through the implementation of the following proactive and reactive risk mitigation measures:

Proactive UXO Risk Mitigation Measures: Onshore

Non-Intrusive UXO Survey and/or EOD Engineer in the Watching Brief Role

Where “open” intrusive works into previously undisturbed ground are proposed and where the extent is within the effective capabilities of survey equipment, a non-intrusive geophysical UXO survey should be trialed.

If the trial proves successful, a non-intrusive geophysical UXO survey should be employed either site-wide, or in specific areas where intrusive works are to be implemented to identify for signs of sub-surface anomalies which may model as the threat spectrum UXO in advance of said works.

If the survey proves partially or wholly ineffective, an Explosive Ordnance Disposal (EOD) Engineer should be present in the UXO Watching Brief role to monitor ongoing “open” intrusive works to identify any suspicious items that may be UXO related (this service can be provided by *6 Alpha*).

Intrusive Magnetometer Survey

Where “blind” intrusive works into previously undisturbed ground are proposed, an intrusive UXO survey (employing down-hole magnetometer or *MagCone* techniques) is strongly recommended. Such a survey should extend to the **assessed average bomb penetration depth of 7m bgl** or to the maximum depth of the works, whichever is encountered first, or until geology is encountered through

which it is assessed a UXB would not penetrate, to identify for signs of sub-surface anomalies which may model as threat spectrum UXO in advance of said works. (This service can be provided by *6 Alpha*).

Proactive Risk Mitigation Measures: Offshore – *HIGH* and *MEDIUM* Risk Zones only

A geophysical UXO survey, appropriately designed to detect threat spectrum UXO, is recommended prior to the commencement of seabed intrusive operations in the ***HIGH*** and ***MEDIUM*** risk zones, to provide the basis for a strategy of pUXO avoidance, or for its identification and removal.

The survey must consist of surface and sub-surface survey methods.

Surface UXO Detection

Surface detection for threat spectrum UXO should consist of Side Scan Sonar and Multi-Beam Echo Sounder, or work-class remotely operated vehicle camera search, over the area of proposed operations and prior to their commencement. This is subject to visibility and resolution, especially in areas where shallow water operations are planned.

Sub-Surface UXO Detection

Sub-surface detection for threat spectrum UXO should also be undertaken ahead of the Geotechnical Investigation (GI) and construction/development campaigns at the Site. This should consist of magnetometer/gradiometer survey over the area of the proposed operations.

Low-Ferrous UXO Threat Mitigation

6 Alpha's threat assessment has also identified that a low ferrous mine threat might also be present at this Study Site. Consequently, UXO detection surveys may also need to be capable of detecting partially, or wholly buried, low ferrous *German* LMA mines. Further guidance regarding the methods of mitigating the risks associated with low ferrous LMA mines ought to be provided once further detail regarding the nature and scope of the proposed works is known.

Dredge Head "Bomb Grid"

The dredging tool ought to be equipped with a suitable gauge head (or colloquially commonly understood as a "bomb grid") in order to prevent threat spectrum UXBs from being suctioned into the dredging tool. The size of the bomb grid ought to be not greater then 300mm x 200mm in order to mitigate the UXO risks associated with the minimum sized UXO threat item (and see section 15.2).

Dredged Material Screening

If dredging occurs in the ***HIGH*** or ***MEDIUM*** risk zones and the material is to be transported onshore, then wherever it is practicable to do so, any dredged material is to be spread and levelled on the surface of a dump barge in order to ensure that it is free from UXO. The need for this measure is threefold; first, by using experts to screen-out UXO at the earliest possible opportunity of encounter

(i.e., seabed and then dump barge), it reduces the likelihood of a UXO encounter and transportation and therefore it is risk mitigative, concerning especially the risks to personnel.

Secondly, it is a reasonably foreseeable hazard to transport prospectively contaminated material from the offshore environment, onshore and therefore, it is necessary to attempt (reasonably) to ensure that the dredged material is not contaminated with UXO before it is taken ashore.

Third, if the dredged material has been investigated to ensure it is not contaminated before it comes ashore, then all subsequent UXO risks associated with the potential search, loading, transportation and dumping of the material to the final dump site will be ameliorated as the prospective UXO pathway will have been limited.

Reactive Risk Mitigation Measures: Onshore and Offshore

Operational UXO Emergency Response Plans

Appropriate management documentation should be held at the onshore Site to guide and plan for the actions which should be undertaken in the event of a suspected or real UXO discovery (this plan can be supplied by *6 Alpha*).

Any vessels involved in intrusive works should also be equipped with UXO specific emergency response plans, so that in the event of an unplanned UXO discovery the vessel Master and/or the offshore superintendent/party chief (or similar) are informed in advance about what safety actions must be taken.

UXO Safety and Awareness Briefings

Safety briefings are considered as an essential reactive risk mitigation measure, to be implemented whenever there is a possibility of UXO encounter and as such, they are considered a vital part of the general UXO safety requirement. All personnel involved with intrusive works both onshore and offshore, the operational support staff working on vessels and/or any other relevant workers are to receive a safety briefing concerning the identification of relevant UXO and safe actions to take in the event of a potential UXO encounter, in advance of undertaking intrusive work.

Risk Mitigation Measures: Designs, Specifications and Guidance

The specific designs and specifications of the recommended UXO risk mitigation measures are part of the next phase of the UXO risk management framework. Nonetheless, it is important to evidence that the UXO risk mitigation measures are congruent and consistent with, an overarching risk mitigation strategy. Therefore, further strategic level guidance concerning the designs and specifications for risk mitigation measures is provided at Section 15 of this document.

ALARP Safety Sign-Off Certification

ALARP safety sign-off certification provides an independent source of evidence that a Client has followed industry best practice and has successfully managed and reduced UXO risks to ALARP. Following the execution of *6 Alpha's* UXO risk mitigation measures, we can deliver ALARP safety sign-off certification, in advance of the proposed operations.

In such circumstances the project will be able to certify for the benefit of all of its stakeholders, that all reasonably practicable measures have been taken to protect contractors from UXO hazards and that the commissioning Client will have acted in compliance with industry best practice as well as the national safety legislation.

Recommended Next Steps

We recommend that the Client's next steps are focused upon phase four of the UXO Risk Management Framework namely, the detailed designs of the recommended proactive UXO risk mitigation measures as outlined above. The design ought to be finalised and the UXO risk mitigation measures are to be executed in advance of the GI and/or construction phases of work, in order to warrant and to evidence that UXO risks can be mitigated and reduced to ALARP.

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Acronyms and Abbreviations

AAA	Anti-Aircraft Artillery
AHT	Anchor Handling Tugboat
ALARP	As Low As Reasonably Practicable
ARP	Air Raid Precaution
AXO	Abandoned Explosive Ordnance
BGS	British Geological Survey
BPD	Bomb Penetration Depth
CIRIA	Construction Industry Research and Information Association
CPT	Cone Penetration Testing
CS	County Series
cUXO	Confirmed UXO
DP	Dynamically Positioned
EOD	Explosive Ordnance Disposal
ERP	Emergency Response Plan
GI	Geotechnical Investigation
Ha	Hectares
HE	High Explosive
IB	Incendiary Bomb
JUB	Jack-Up Barge
Kg	Kilogram
Km	Kilometre
LAT	Lowest Astronomical Tide
LMA	Luft Minen A
LMB	Luft Minen B
LSA	Land Service Ammunition
M	Metre
Mm	Millimetre
MMBA	Munitions Migration and Burial Assessment
MoD	Ministry of Defence
MPa	Megapascal
NEQ	Net Explosive Quantity
OS	Ordnance Survey
OSPAR	Oslo-Paris Convention for the Protection of the North-East Atlantic
pUXO	Potential UXO
RAF	Royal Air Force
SAA	Small Arms Ammunition
SI	Site Investigation
SQRA	Semi-Quantitative Risk Assessment
TAN	Technical Advisory Note
TI	Target Investigation
TNT	Trinitrotoluene
UK	United Kingdom
UKHO	United Kingdom Hydrographic Office
UXB	Unexploded Bomb
UXO	Unexploded Ordnance
WWI	World War One
WWII	World War Two

Part I: Introduction

1 Document Overview

1.1 Scope of Work

6 Alpha Associates Limited (6 Alpha) has been commissioned by *AECOM* to provide an Unexploded Ordnance (UXO) Threat and Risk Assessment with Risk Mitigation Strategy, for the Site described as "Port Talbot". The Study Site comprises areas above and below the high-water mark and as a result, *6 Alpha's* threat and risk assessment will be divided into an "Onshore" and an "Offshore" element.

The overall Study Site is depicted at Appendix 1 and the demarcation between the Onshore and Offshore elements of the Site is presented at Appendix 2.

1.2 Study Site Location

The Study Site is situated within *Port Talbot* and totals an area of approximately 2,500 hectares (ha). The majority of the Study Site is located below the high-water mark within *Swansea Bay* but the onshore element of the Site consists of multiple structures and hardstanding roads, along with smaller areas of undeveloped ground. Aerial photography of the Study Site is presented at Appendix 3.

1.3 Aims and Objectives

This document has the following aims and objectives:

1.3.1 Aims

The document aims to assess and evidence the nature and scope of the UXO risks to people, plant, equipment and/or the environment at this Study Site. In the event that an intolerable UXO risk is identified, a recommended UXO risk mitigation strategy will also be articulated.

1.3.2 Objectives

The document has the following objectives:

- To assess the nature and scope of potential UXO contamination at the Study Site;
- To assess whether any UXO contamination generated at the Site is likely to remain extant;
- To consider whether the proposed intrusive works will generate a viable UXO risk pathway;
- To identify those sensitive receptors likely to be impacted by an inadvertent UXO encounter during the proposed intrusive works;
- To assess the UXO risk to those sensitive risk receptors during intrusive works;
- To outline proportional risk mitigation measures that are consistent with a coherent overarching risk mitigation strategy, in order to effectively manage the UXO risk As Low As Reasonably Practicable (ALARP).

2 Introduction to UXO Risk Management

2.1 Definition of Unexploded Ordnance

For the purposes of this risk assessment, *6 Alpha* have adopted the definition of UXO outlined in the undermentioned *Construction Industry and Research Information Association's* (CIRIA) *C681* and *C754* guides, as follows:

"Explosive ordnance that has been primed, fused, armed, or otherwise prepared for use and used in an armed conflict. It may have been fired, dropped, launched or projected and should have exploded but failed to do so…UXO also refers to explosive ordnance that has not been used during an armed conflict, that has been left behind or dumped by a party to an armed conflict, and which is no longer under control of the party that left it behind or dumped it..."

2.2 Generic UXO Threats

There are multiple factors which may have contributed to the UXO contamination of a development site in the *UK* but generally, UXO contamination is likely to result from the warfighting activity associated with WWI and WWII, the military occupation and use of land such as airfields, camps and both onshore and offshore training areas; and the manufacture of munitions to support the armed forces.

For example, *WWII Bomb Census* data from the *Ministry of Home Security* calculated that approximately 10% of bombs dropped on *Britain* during WWII failed to function as designed. If the bomb did not detonate when it was dropped, the force of impact enabled the Unexploded Bomb (UXB) to penetrate the ground. Whilst efforts were made to locate and render safe those UXBs that were observed entering the ground (or left behind clear evidence of having done so) during WWII, evidence of such UXBs was readily obscured by bomb damage debris, vegetation and a lack of footfall in some settings – thus, ensuring that an unquantifiable number of UXBs were left *in situ* below the surface of the ground. UXBs falling into bodies of water were also scarcely observed and did not leave behind any evidence of their presence.

Additionally, it has been estimated that at least 20% of the *UK's* land surface area has been used for military training activities or has otherwise been requisitioned for military use historically. Large areas of *British* coastal waters have also been requisitioned as military practice and exercise zones historically. Therefore, *British* Abandoned Explosive Ordnance (AXO), Land Service Ammunition (LSA), Small Arms Ammunition (SAA) and aerially delivered ordnance is also commonly encountered in areas that were formerly occupied by military forces (such as *Royal Air Force* (RAF) airfields, military camps and/or military training areas). Conventional and chemical munitions dumping was also prevalent in

these periods with little consideration given to future safety implications. There was also widespread unrecorded dumping of LSA and SAA below the ground and within bodies of water that was rarely recorded because the activity was often perceived to be inconsequential.

2.3 Generic UXO Risks

The explosive or chemical fill within UXO rarely becomes inert or loses its effectiveness with age, but the explosive fill may change or crystallise over time – increasing the high explosive's sensitivity to a physical shock or an impact. Trigger mechanisms and fuses, which may have failed, may corrode and deteriorate over time, becoming more sensitive to detonation. It is therefore possible that a significant impact on the UXO case, and the resultant effect upon the fuse, may cause its inadvertent detonation.

2.4 UXO Industry Best Practice

In the absence of specific legislation concerning the management of UXO risks during construction projects and in the marine environment, the CIRIA has published two best practice guides for the assessment and management of UXO risk in the onshore construction industry (*CIRIA* document reference C681) and in the marine environment (*C754*). Both *CIRIA* guides have been judged and recognised by the *Health and Safety Executive* as a minimum standard of good practice, that satisfies the law when applied in an appropriate manner.

6 Alpha were *CIRIA's* lead technical author for their *C681* and *C754* publications and as such, are in a unique position to ensure that Client's manage UXO risk in a safe, cost-effective and time-efficient manner. Whilst the two *CIRIA* guides are predominantly consistent in their advice, *6 Alpha* have applied *CIRIA C681* guidance for all areas of the Study Site considered to be above the high-water mark, whilst any intrusive works planned for below the high-water mark have been assessed in accordance with *CIRIA C754* guidance. In any limited areas where the two *CIRIA* guides are not consistent (such as Section 2.5 below), *6 Alpha* have applied *CIRIA C754* guidance as it is the more recent and (in *6 Alpha*'s professional opinion, complete) guidance.

2.5 UXO Risk Management Strategic Framework

At Section 5 of *CIRIA's C754* guide, a framework for the management of UXO risk is articulated and consists of five key stages. These correspond with the framework employed by *6 Alpha*, as presented at Table 2.

6 Alpha Risk Management Framework	UXO Risk Management Phase	CIRIA C754 Risk Management Framework	Delivered within Report? (✔/✘)
UXO Threat Assessment	**PHASE ONE**	UXO Threat Assessment	✔
UXO Risk Assessment	**PHASE TWO**	UXO Risk Assessment	✔
Strategic Risk Mitigation Options	**PHASE THREE**	UXO Risk Management Strategy	✔
Risk Mitigation Design and Specification	**PHASE FOUR**	UXO Risk Mitigation (Planning)	✘
Implementation	**PHASE FIVE**	UXO Risk Mitigation (Delivery)	✘

Table 2: 6 Alpha and CIRIA UXO Risk Management Frameworks

3 UXO Threat and Risk Assessment Methodology

3.1 Source – Pathway – Receptor Risk Model

The source-pathway-receptor model is a conceptual risk model employed by *6 Alpha* across all projects that informs how UXO risks are assessed. The model also helps to explain the link between the separate sections of this report and the UXO risk assessments at Sections 7 and 11. The components of the model are as follows:

3.1.1 UXO Sources

The nature and scope of the UXO threat is summarised in individual UXO threat assessments for both the Onshore and Offshore elements of the project. The prospective UXO threats form the source element of the source-pathway-receptor risk model.

3.1.2 UXO Pathways

The UXO pathways are the routes by which the sources can reach the receptors. UXO pathways are likely to be either by contact and/or through soil or water energy transfer, through which the resulting shock wave (generated by a UXO source, or sources) may reach potential receptors. Nonetheless, surface events may also generate a through-air risk pathway in which blast and fragmentation from the UXO sources may also reach the receptors.

UXO risk pathways may be generated by a variety of operations that interact with the ground or seabed. Whilst the specific development operations have not been communicated to *6 Alpha*, a suite of pertinent potential operations have been assessed and summarised (at Sections 6 and 9), to demonstrate the potential risk pathway elements of the model.

3.1.3 UXO Receptors

Receptors are defined as anything which might be adversely affected by the consequences of an inadvertent detonation of any UXO source through an identified pathway. The proximity, robustness, and sensitivity of such receptors is essential in determining their capacity to withstand such high explosive effects and defining what degree of UXO risk might be tolerated (if any).

3.2 Semi-Quantitative Risk Assessment Methodology

The assessment of UXO risk is a semi-quantitative measure of the probability of UXO encounter and initiation and the consequence of an inadvertent UXO initiation; the former being a function of the identified hazard and proposed development methodology and the latter being a function of the type of hazard and the proximity of personnel (and/or other sensitive receptors) to the hazard.

Individual Semi-Quantitative Risk Assessments (SQRAs) have been conducted for the Onshore and Offshore works but a consistent methodology has been applied to both areas where possible.

For both the Onshore and Offshore works, UXO risk is calculated using the following formula:

Risk **(R)** = Probability **(P)** x Consequence **(C)**

3.3 Information Sources

Significant archive research associated with the Study Site has been undertaken to corroborate and to highlight, any and all potential sources of UXO contamination as well as to assess their likelihood of encounter and the Site's development history. For the production of this report, *6 Alpha* have reviewed information from the following sources:

- Information gathered from the *National Archives* at *Kew*, including but not limited to:
    - *Ministry of National Security WWII Bomb Census* statistics;
    - *Air Raid Precaution* (ARP) written records and associated bomb strike mapping;
- *Ministry of Defence* (MoD) *Abandoned Bomb Register*;
- *Former 33 Engineer Regiment* (Explosive Ordnance Disposal – EOD) records at *Carver Barracks, Wimbish*;
- Post-WWII *RAF* aerial photography;
- *County Series* (CS) and *Ordnance Survey* (OS) mapping.;
- *British Geological Survey* (BGS);
- *European Marine Observation and Data Network*;
- *James Martin Centre for Nonproliferation Studies*;
- *Naval Historical Centre*;
- *Naval History and Heritage Command*;
- *Oslo-Paris Convention for the Protection of the North-East Atlantic* (OSPAR)
- *Royal Navy* (Diving Units);
- *UK Hydrographic Office* (UKHO);
- AECOM, *Land at Harbourside, Port Talbot: Geo-environmental and Geotechnical Desk Study*, Project number: 60666960 / 5.1, Dated 14th July 2022;
- Atkins, *Port Talbot Renewable Energy Plant: Scheme to Address Potential Risks Associated with Contamination of the Site,* Final Report (Rev B), Dated April 2009;
- British Transport Commission, *Report on Site Investigation for Proposed (1960) Development at Port Talbot Docks,* Lab. Ref. No. S/2333*,* Dated May 1960;

- *Fugro, Marine Geotechnical and Geophysical Site Investigation Report: Port Talbot Tidal Harbour,* Report No. 55090-1 (Issue 02), Dated 23rd November 1995;
- Terra Firma (South), *Factual Ground Investigation Report: Proposed Quarry Infilling, Port Talbot Docks*, Report No: 5427 (Rev. 19), Dated June 2014;
- Wimpey Laboratories*, Proposed New Harbour at Port Talbot Glamorgan: Report on Site Investigation,* Lab Ref No: S/5052, Dated February 1966.

3.3.1 Azimuth© UXO Threat Database

The above list is not exhaustive, and *6 Alpha's Azimuth*© database has also been heavily drawn upon to deliver the UXO threat assessment element of this report. The *Azimuth*© database contains digitised historic charts, aerial photographs and other extensive analogue records from an exhaustive range of additional national, regional and global archives and/or data sets that have been digitised.

3.3.2 Use of Geo-referenced Source Material

Where practical, *6 Alpha* have digitised historical source documents, mapping and aerial photography and have presented them at the end of the report as a series of appendices. However, the sources presented in the appendices does not represent an exhaustive list – as demonstrated by Section 3.3. In some instances, *6 Alpha* have not presented the georeferenced source material where it was either impractical or undesirable to do so for the purposes of protecting intellectual property.

3.4 Constraints

This UXO threat and risk assessment is constrained and limited by that information which is reasonably available to *6 Alpha* at the time of writing, as well as that UXO information that is reasonably accessible in a variety of archives, which *6 Alpha* have digitised and georeferenced or have otherwise summarised in written form.

In addition, the risk assessments for the Onshore and Offshore works are impacted by the uncertainty regarding the specific nature, locations and depths of the proposed intrusive works for the project.

This document may also require updates and changes, especially wherever and whenever the circumstances and factors associated with assessing UXO risk change. For example, if UXO threats are subsequently discovered and they are different from those that have been anticipated, and/or if proposed intrusive operations are significantly changed. In such circumstances, risks may require re-evaluation and any such changes are to be made by *6 Alpha*, to ensure the continued technical veracity and risk management efficacy of this document.

Part II: Onshore UXO Threat & Risk Assessment

4 UXO Threat Assessment

4.1 WWII Aerial Bombing

Within *Wales*, the cities of *Cardiff* and *Swansea* were subject to the most sustained attacks during WWII. The docks and industrial works within this region of *Wales* – including at *Port Talbot* – made the area an obvious target, but there were attacks elsewhere too. Ordnance factories, oil installations, mining towns and even rural communities were bombed by orchestrated attacks, lost planes, or those just eager to lose their payload before returning home.

4.1.1 WWII HE Bomb Density

The Study Site was located within *Port Talbot Municipal Borough,* as presented at Appendix 4. This region recorded a single High Explosive (HE) bomb strikes per 100ha, a "very low" level of bombing. However, further **site-specific data** has been considered regarding the potential bombing of the Site during WWII.

4.1.2 WWII Luftwaffe Bombing Targets

Luftwaffe aerial reconnaissance photography identified six primary targets within the Study Site, these were: *Port Talbot Steelworks*, *Cander's Creosote Work*, *Taibach Tinplate Factory*, *Ffrwdwylli Tinplate Factory, Rio Tinto Copper Refinery* and the *Quest Keen and Baldwin Iron and Steel Co. Ltd. Steel Mill*. Three additional primary bombing targets were also located in the Site's immediate vicinity; a *Tin Factory* (immediately to the east), a *Gas Works* (175m to the north-west) and a *Copper Works* (495m to the south-east).

The locations of Luftwaffe bombing targets, in relation to the Study Site, are presented at Appendix 5.

4.1.3 WWII HE Bomb Strikes

During WWII, *ARP* wardens and other local officials compiled detailed logs of bomb strikes across their respective districts that were then often consolidated and mapped at a later date. However, such records associated with this Study Site were not available. Nonetheless, further research of historical records identified numerous bomb strikes impacting various areas of the Study Site, including; on the railway sidings near *Port Talbot Steelworks* (located in the northern quarter of the Site), at the *Aluminium and Copper Works* (in the east of the Site) and between the *Steelworks and Dock Ferry* (approximately central within the Study Site). Three bomb strikes also impacted near the *Port Talbot Harbour Gates* (in the west of the Site). Furthermore, there are also accounts of numerous bomb strikes impacting near railway lines within the Site, however the specific location of these strikes were not documented.

Furthermore, whilst Incendiary Bombs (IBs) may have fallen within the Study Site, they were dropped in large clusters and accurate record keeping was often either non-existent or perfunctory.

In addition to IBs and HE bomb strikes, during the latter stage of WWII, when more conventional aerial bombardment of the *UK* had significantly declined, the main threat came from *V* type weapons. *V1* and *V2* rockets were thin-skinned, unmanned and inaccurate weapons and generally exploded upon impact and thus, are less likely to pose a UXO threat. There is also no evidence to suggest that the Study Site (or its immediate vicinity) was subjected to rockets strikes during WWII.

4.1.4 WWII Bomb Damage

Official bomb damage mapping associated with the Study Site was not available, however given the concentration of bombing recorded within the Site, it is highly likely that the Study Site would have been damaged by bombing during WWII. Indeed, extensive research of historical records uncovered evidence of minor bomb damage to electricity cables and railway lines within the Site, from a bomb strike on the 20th of August 1940. Furthermore, multiple houses within the surrounding residential areas of *Oakwood Street* (as near as 290m to the north-east of the Site) *and Ty-draw Hill* (as close as 775m to the north-east) suffered moderate bomb damage; the most severe being at two properties on *Corporation Road* (approximately 310m to the north-east).

4.1.5 UXB Entry Holes

The CS mapping prior to WWII (1938) shows that the Study Site was located in a developed industrial docklands area during WWII. The Site itself consisted of numerous railway lines, industrial buildings and docklands facilities and would therefore, have been accessed frequently during WWII. Nonetheless, given the extensive bombing recorded at the Site, it is plausible that a UXB entry hole within the Site could have been obscured by bomb damage debris, causing them to have gone unnoticed at the time, despite the frequency of footfall.

4.2 *British* Military Activity

There is evidence to suggest that military activity has also occurred at the Study Site and/or its immediate area previously, as detailed below:

4.2.1 Historic Military Activity

The Study Site is located within *Port Talbot*, which during the early years of WWII was declared a "protected place" and access to the docklands was restricted to permit-holders. This was accompanied by the militarisation of the port in 1939; with Anti-Aircraft Artillery (AAA) guns positioned at strategic points around the port. Specifically, a coastal artillery gun battery was recorded in the western sector of the Site, near the dock entrance and it was almost certainly fired operationally to defend the area against the aforementioned bombing raids.

In 1940, the Site also began to be used for the offloading of ammunition, military vehicles and government stores; *British* military personnel were housed on-site, and a new dock (*Crown Warf*) was built to facilitate these operations. The *Port Talbot Dry Docks Company* also used the premises to convert cargo ships for the *Royal Navy* for usage in minesweeping, boom defence and commercial escort work.

In addition, the docklands were regularly used for the embarkation of military vehicles and personnel; with a special berth for receiving tank landing ships being constructed at *Llewellyn's Quay* in 1943. The *Canadian* military also used *Port Talbot* to house their military equipment; notably being allocated a specific area of the port to store thousands of military vehicles. During the later stages of the war, *Port Talbot* also played host to the *American* military and was extensively used for their *D-Day* preparations.

Consequently, it is apparent that *British* and other *Allied* forces' munitions were located, stored or transported through the Study Site. Whilst it is unlikely that such munitions would have been deliberately discarded at the Site, it is possible that AXO/LSA/SAA could provide a residual and shallow buried threat at this Site.

4.2.2 Modern Military Practice and Exercise Areas

Notwithstanding the extensive use of *Port Talbot* throughout WWII, there is no evidence to suggest that any more modern military activity has occurred at the Study Site.

4.3 Previous UXO Encounters

An analysis of historic records noted numerous UXO encounters within the vicinity of the Study Site, as follows:

4.3.1 Abandoned Bombs

The *Abandoned Bomb Register* was compiled from wartime records and was published in the form of a written answer to the *House of Commons* in 1996. The list initially only covered abandoned bombs in *London* but has since been released for the rest of the *UK*.

An examination of the *MoD*'s official abandoned bomb records has not identified any abandoned bombs within 1km of the Study Site.

4.3.2 UXO Disposal Tasks

An examination of pertinent historical records associated with the Study Site has identified the following UXO disposal tasks in the vicinity of the Study Site;

- One UXB was recorded within *Port Talbot* on 29th of June 1940 which almost certainly landed on-site, with further UXBs recorded around *Dock Street* in 1941;

- The removal of a UXB, from *Tata Steelworks, Port Talbot* (situated 400m to the east of the Study Site), on the 23rd of January 2020;
- The removal of a UXB, from *Corus Steelworks, Port Talbot* (located 420m to the east of the Study Site), on the 13th of November 2008;
- The removal and controlled detonation of a UXB, from the railway line near *Tata Steelworks, Port Talbot* (positioned 595m to the east of the Study Site), on the 22nd of June 2011.

4.4 UXO Threat Summary

Given the evidence presented above, *6 Alpha* consider it reasonably foreseeable that a UXO encounter could occur at this Site. The most likely source of UXO contamination is *German* aerially delivered ordnance, which ranges from small IBs through to large HE bombs (the latter forms the principal threat). However, *British* and *Allied* AAA, LSA/SAA and AXO might also pose a residual threat at this Study Site.

5 UXO Burial Depths

5.1 Overview

It is important to establish the likely burial depth for threat spectrum UXO at the Study Site, which was dependent on a number of factors including but not restricted to those prior to striking the ground (e.g. velocity and orientation of the UXB), which in turn will be influenced on factors such as the release altitude from the aircraft and encounters with infrastructure during its fall; those encountered at the point of impact (i.e. was the impact on concrete, grass, water etc.) and finally, the below ground level conditions (e.g. infrastructure/services, basements, foundations, and geology).

Accordingly, the ground conditions at the Study Site must be understood in order to determine the average and maximum *German* UXB penetration depths, as well as the potential for other types of munitions to be buried. The provenance of made ground must also be considered in order to accurately determine the ground levels at the time when UXO contamination may have occurred (so as to accurately determine the average/maximum bomb penetration depths).

5.1.1 Ground Conditions

As the Study Site covers a significant area, it is likely that the ground conditions will vary throughout. As a result, *6 Alpha* have consulted high-level *BGS* mapping associated with the Study Site to understand the likely 'natural' ground conditions at the Site. The *BGS* mapping suggests that the Site is likely to be underlain by a bedrock of "*South Wales Middle Coal Measures Formation* - Mudstone, Siltstone and Sandstone".

Nonetheless, the Client has provided *6 Alpha* with a number of reports associated with previous geotechnical investigation campaigns undertaken at the Site. Those reports are focussed on a limited portion of the central and southern of the Study Site boundary associated with this report. Thos reports suggest that the localised ground conditions in that area are likely to diverge from those outlined by the high-level *BGS* mapping; though in many areas, the current ground conditions may have been altered by the post-WWII history of the Study Site.

5.2 UXB Burial Depths

Based on the the findings of the *BGS* mapping covering the Study Site, it is expected that much of the Site was underlain by mudstone during WWII. Therefore, the average Bomb Penetration Depth (BPD) for a 250kg *German* HE bomb is assessed to be approximately 7m bgl, with the maximum BPD considered to be approximately 15m bgl.

Although it is possible that the *Luftwaffe* deployed larger bombs in the area, an analysis of WWII bomb census data clearly evidences that their deployment was infrequent. Therefore, to use such larger bombs for BPD calculations **are not justifiable under the ALARP principle and thus, *CIRIA C681* guidance**.

WWII *German* bombs have a greater penetration depth when compared to IBs and AAA projectiles, which are unlikely to be encountered at depths greater than 1m bgl.

5.2.1 The J-Curve Effect

As a UXB penetrated the ground, it's velocity naturally slowed where it either came to an abrupt stop (e.g., against foundations) or would continue along a route of least resistance – which often resulted in a curving of the trajectory back towards the surface. This is known as the "J Curve" effect and often resulted in a considerable horizontal off-set from the point of entry. This explains why UXBs have been discovered against or under the foundations of buildings which were present during WWII, or many meters from their entry holes. A diagrammatical representation of the "J Curve" effect is presented at Figure 1.

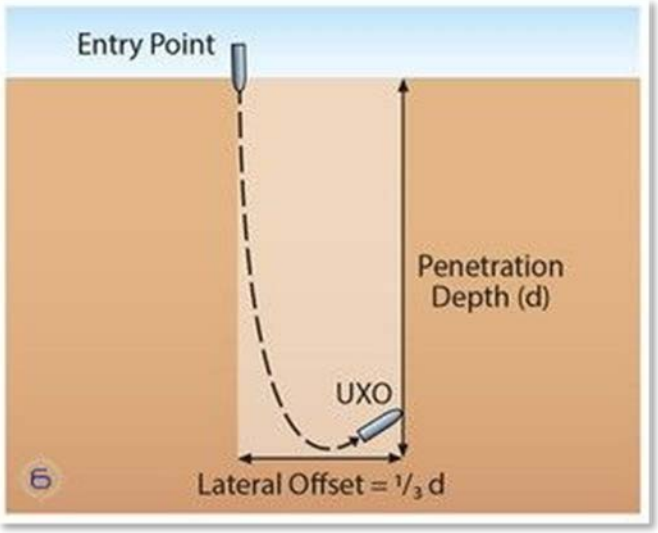


Figure 1: The "J Curve" Effect

5.3 AXO/LSA/SAA Burial Depths

If present, *British* and/or *Allied* AXO/LSA/SAA are likely to be encountered in previously undisturbed ground to depths of circa 2.0m.

6 UXO Risk Pathways

6.1 Overview

In order to assess whether a viable UXO risk pathway might exist at the Study Site, potential UXO contamination sources must be assessed (and have been at Section 5 of the report) and the likely depth of UXO contamination ought to be established (as per Section 6 of the report). Additionally, the Site's construction history ought to be considered to assess whether any previous intrusive works will have encountered and removed any UXO contamination present at the Site.

6.2 Study Site Development History

From an analysis of CS and OS mapping, together with aerial photography, the following high-levelhistory of the wider Study Site can be deduced:

Year	Development History
1900 CS Map	The Study Site was located in a developed docklands area. The Study Site consisted of structures and railway lines associated with docklands industry.
1938 CS Map	Some expansion of docklands industry had occurred through the Site, particularly within the north-western quarter with the installation of new railway lines and structures.
1951 OS Map	No major changes were recorded on-site.
1965 OS Map	Land in the south of the Site had been reclaimed as it is now above the high-water mark.
1980-82 OS Map(s)	Railway lines associated with numerous docklands industries had been removed. Steel works facilities were expanded into the south-western quarter of the Study Site. A new harbour had also been installed by this time within the west of the Site.
1993 OS Map	Numerous industrial buildings within all areas of the Site were decommissioned and most had been replaced by industrial estate units.
2023 Street View	No major structural changes were recorded on-site but larger roads had been installed in the north of the Site

Table 3: Study Site Development History

As per Table 3, and at a high-level, it is apparent that the Study Site has undergone post-WWII development in certain areas, specifically concerning the reclamation of land, the installation of a new

harbour, and the re-development of industrial facilities at the port between 1965 and 1982. Consequently, it is considered likely that any UXO contamination within ground that has been disturbed since WWII would likely have been discovered and removed. However, in most areas it is not possible to prove that the associated development works have involved the disturbance of ground down to the likely average UXO burial depth of 7m bgl. Whilst it is not possible to provide a risk zoning diagram evidencing in which areas of the Site the UXO risk has already been mitigated by previous development work, the Client has provided *6 Alpha* with further information which has been used to identify areas where previous development of the onshore Site has removed the potential for a UXO encounter.

6.2.1 Tarmac Sand Quarry

The Client has provided *6 Alpha* with a Site Investigation (SI) report associated with the infilling of the former *Tarmac Sand Quarry*, located in the central/western section of the Site, in the north-west of the *Port Talbot Docks* and close to the Site of the former *Tata Steel Works*. The quarrying of this area occurred between 1996 and 2008 and involved the removal of at least 2m of ground, which has subsequently been backfilled with slag originating from the nearby steel works.

Any works occurring within the area previously quarried by *Tarmac* are highly unlikely to generate a UXO risk pathway **up to 2m below ground level**. The potential for UXO encounter during any works descending to a greater depth remains extant; as does the potential for a UXO encounter in the area of the former quarry used to deposit material dredged from *Swansea Bay* previously.

6.3 Proposed Works

An outline of the proposed intrusive works is also presented in order to evidence the potential UXO risk pathways that may be generated, should such work encounter those threat spectrum UXO that have been identified in Section 5. Specifically, the Client has described that a Geotechnical Investigation (GI) campaign will be undertaken, including the following:

- "*Nineteen Trail Pits;*
- *Five Cable Percussive Boreholes with installations;*
- *Six Dynamic Sampling Boreholes with installations;*
- *Five Dynamic Sample Boreholes*."

In addition, *6 Alpha* have also been informed that the GI campaign is associated with the wider redevelopment of the port. The project is currently in its early stages and therefore, specific development plans for the port have not yet been finalised. As a result, *6 Alpha* have assumed that a range of construction operations might be undertaken at the Site in the future.

If the planned methods are changed, then the risk assessment is to be reviewed and updated if necessary.

7 UXO Risk Assessment

7.1 Threat Items

The most probable sources of UXO risk at this Study Site are *German* HE bombs and IBs. *British* AAA projectiles and *Allied* AXO/LSA/SAA may pose a residual threat. The consequences of initiating *German* HE bombs are generally more severe than initiating IBs or AAA projectiles, and thus they pose the greatest prospective risk to intrusive works.

7.2 Risk Pathways

Given the nature and scope of the prospective UXO hazard at the Study Site, all types of aggressive intrusive activities (i.e., investigative groundworks and construction methodologies) into previously undisturbed ground (including ground below any post-WWII redevelopment) to a depth of 7m bgl may generate a significant risk pathway.

7.3 Risk Receptors

The likely risk receptors include:

- Site personnel;
- Plant and equipment;
- Third-party infrastructure (utilities/services) and buildings;
- The natural environment.

Consequences of UXO initiation include:

- Injuries and/or fatalities to personnel;
- Damage to plant and equipment, nearby buildings and infrastructure;
- Rupture and damage underground utilities/services and the natural environment.

Consequences of an unexpected and unplanned UXO discovery include:

- Incurring delays and additional costs through the expenditure of additional risk mitigation resources and EOD clearance;
- Disruption to local community;
- Negative publicity.

7.4 Semi-Quantitative Risk Assessment

An SQRA has been undertaken to calculate the probability of encountering and initiating UXO, during each of the proposed and/or likely ground intrusive activities associated with the project, and the consequences of an inadvertent UXO detonation.

The results of the SQRA are presented at Table 5.

Activity	UXO Threat Item	Probability (SH+EM=P)	Consequence (D+PSR=C)	Risk (PxC=R)
Trial Pits	Aerial Bombs	2+2=4	3+3=6	**4x6=24**
	AXO/LSA/SAA	1+2=3	3+2=5	**3x5=15**
Window Sampling	Aerial Bombs	2+3=5	3+2=5	**5x5=25**
	AXO/LSA/SAA	1+3=4	3+2=5	**4x5=20**
Boreholes	Aerial Bombs	2+3=5	3+2=5	**5x5=25**
	AXO/LSA/SAA	1+3=4	3+2=5	**4x5=20**
Excavations	Aerial Bombs	2+2=4	3+3=6	**4x6=24**
	AXO/LSA/SAA	1+2=3	3+2=5	**3x5=15**
Trenching	Aerial Bombs	2+2=4	3+3=6	**4x6=24**
	AXO/LSA/SAA	1+2=3	3+2=5	**3x5=15**
Piling	Aerial Bombs	2+3=5	3+2=5	**5x5=25**
	AXO/LSA/SAA	1+3=4	3+2=5	**4x5=20**

Abbreviations – Site History (SH), Engineering Methodology (EM), Probability (P), Depth (D), Consequence (C), Proximity to Sensitive Receptors (PSR) and Risk (R).

Table 5: UXO SQRA Results

7.5 Onshore Conclusions

Given the lack of detailed bombing records associated with this Site, it is not possible to assess specific geospatial locations of individual bomb strikes, instead the evidence is more general but does show that the onshore Site was subject to significant bombing during WWII.

Therefore, it is plausible that the proposed intrusive works might encounter WWII-era UXBs in the onshore environment in any ground not previously disturbed since the end of WWII. In such areas, the UXO risk to proposed GI and potential construction operations has been assessed as ***HIGH*.**

In some areas of the Site, it is apparent that the Study Site has undergone post-WWII development, specifically concerning the reclamation of land, the installation of a new harbour, and the re-development of industrial facilities at the port between 1965 and 1982. Consequently, it is considered likely that any UXO contamination within ground that has been disturbed since WWII would likely have been discovered and removed. In those areas, the UXO risk to intrusive works is considered to be ***LOW***.

However, in most areas it is not possible to prove that the previous development works have involved the disturbance of ground down to the likely average UXO burial depth of 7m bgl and therefore, a risk zoning diagram cannot yet be provided.

Once the specific nature, locations and depths of the proposed intrusive works have been finalised, then *6 Alpha* may be able to further refine the UXO risk zoning of the onshore Site.

Part III: Offshore UXO Threat and Risk Assessment

8 Sources of UXO Contamination

Significant archive research associated with the offshore element of the Study Site has been undertaken to corroborate and to highlight, any and all potential sources of UXO contamination as well as to assess their likelihood of encounter.

8.1 Aerial Bombing

Air dropped bombs may be encountered in areas where conflict and/or air campaigns have occurred, although the precise locations of bombing raids and aerial attacks in the offshore environment have not always been accurately documented. There are, however, a number of historical sources which may suggest whether or not a UXB threat is likely to have been generated in the marine environment.

Specifically, an analysis of *Luftwaffe* aerial photography and target documents associated with the Site indicated that nine factories and industrial facilities within *Port Talbot* were identified as primary bombing targets, including six that were located within the onshore boundary of the Study Site.

Extensive desk-based research of bomb strikes in *Port Talbot* and the surrounding area indicated that the port was subject to intensive aerial bombing during WWII, between 1940 and 1943. For example, three HE bomb strikes were observed near the *Port Talbot Harbour Gates* (situated on-site), in addition to bombing at the *Port Talbot Steelworks*, *Aluminium and Copper Works*, and at the *Dock Ferry* (all located within 1km of the Study Site). Historical records suggest that the dockland and railway facilities were heavily bombed, though not all bomb strikes were accurately plotted and recorded.

An analysis of *UKHO* shipwreck data has not identified any WWII-bombing undertaken against offshore vessels within the Site, but the bombing of onshore targets provides clear evidence that a UXB threat might have been generated at the offshore Study Site as a result of bombing "overspill", poor targeting techniques and equipment and/or as a result of "tip and run" tactics.

A geo-referenced summary of the aerial bombing threat at the Study Site is presented at Appendix 6.

Likelihood of UXO Contamination	Associated UXO Threat Items
LIKELY	WWII-era Aerial Bombs

Table 6: Historic Aerial Bombing Threat Summary

8.2 Naval Engagements

The combatant navies of the 20th Century commanded fleets that consisted of armed surface craft such as destroyers and battleships, as well as more covert craft such as submarines and motor torpedo boats – all of which were armed with a variety of weapons systems. As with aerial bombardment in the offshore environment, the specific locations of most naval engagements were neither commonly nor accurately recorded in contemporary records.

Nonetheless, an analysis of *6 Alpha's* in-house *Azimuth*© database indicated that no shipwrecks resulting from naval engagements were located within the Study Site, nor within 5km of its boundary. Given the dock facilities at both *Port Talbot* and *Swansea* however, it is likely that military vessels would have transited across the Study Site during WWII – notably during preparations for the *D-Day Landings*, though there is no evidence to suggest that they were attacked by submarines at this location, as was the case elsewhere in the *Bristol Channel* and the *Celtic Sea* more generally.

Consequently, it is highly unlikely that a UXO contamination threat originating from wartime naval engagements would have been generated at the Study Site.

Likelihood of UXO Contamination	Associated UXO Threat Items
HIGHLY UNLIKELY	N/A

Table 7: Naval Engagements Threat Summary

8.3 Naval Minefields

A naval sea mine is a self-contained high-explosive weapon that is placed in the water to destroy ships and/or submarines and would have been fused to ensure that detonation under appropriate circumstances, either upon impact or otherwise upon a close encounter with a ship. During the conflicts of the 20th Century, naval mines were generally employed either offensively, to hamper enemy shipping and to blockade harbours; or defensively, to protect shipping and by creating safe movement zones through them.

During WWI and WWII, defensive minefields were typically laid by surface craft, whereas offensive minefields were often laid by aircraft or submarines – the latter therefore delivering an element of secrecy and uncertainty to the positions of the minelaying operations. Minefields that were deployed by aircraft or submarines were also less likely to be accurately recorded than those laid by surface vessels and as such, the exact positions of these types of minelaying operations are difficult to corroborate with any degree of certainty.

8.3.1 WWI Minefields

Detailed desk-based research of historical records and charts did not identify any WWI-era mining operations at the Study Site, nor within 5km of its boundary. Indeed, the closest recorded mining incident was that of the *French* vessel *Saint Louis* – which struck a mine laid by the *German* submarine *UC-46* in December 1916 and sunk approximately 7.6km to the south-west of the offshore site.

Despite this incident being recorded in the wider area, there is no evidence to suggest that WWI-era naval mines will present a potential UXO contamination threat at the Study Site.

Likelihood of UXO Contamination	Associated UXO Threat Items
HIGHLY UNLIKELY	N/A

Table 8: WWI-era Naval Minefields Threat Summary

8.3.2 WWII Minefields

Detailed desk-based research of historical records and charts did not identify any WWII minefields deployed on-site, nor within 5km of its boundary. Despite this, historical accounts on minelaying during WWII indicated that covert operations were undertaken by *German* aircraft and submarines across *Swansea Bay*, likely encompassing the Study Site given its location at the entrance to *Port Talbot Harbour*.

Significantly, this minelaying activity is evidenced by a cross-examination with wartime shipwreck records, which show that three vessels – the *MV Cabenda*, *MV Madjoe* and *SS Stahlheim* – were all sunk within the Study Site boundary after detonating naval mines in 1940-41. In addition, the *SS Fort Medine* (situated 3.8km to the west) and *SS Strombus* (4.8km to the west) were also sunk by mines in the wider area. Contemporary minesweeping records suggest that magnetic and/or acoustic mines were deployed in the region, including aerially deployed low-ferrous aluminium skinned *Luft Mines* (of the LMA variety, given the larger LMB mine was first introduced in 1943), which are therefore likely to pose a significant UXO contamination threat.

An analysis of WWII-era naval charts indicated that a maritime navigation channel was swept between *Port Talbot* and the shipping lanes in the *Celtic Sea* and beyond, designated as "*326 S*". Nonetheless, empirical evidence strongly suggests that such historic clearance has not guaranteed the removal of all mines because they were situated beyond the minesweepers effective range and/or may have by then, sunk to the bottom of the seabed. Therefore, mines may remain present and as such they may continue to pose a significant UXO contamination threat at the Study Site.

This assessment is strongly supported by the discovery of a naval mine in *Swansea Bay* by a fishing vessel in October 2006. Although the precise location of this encounter was not documented, it might have occurred in the vicinity of the Study Site and in any case, evidences that unreliability of post-WWII naval mine clearance operations.

The location of the recorded WWII-era shipwrecks resulting from mines, in relation to the Study Site, are presented at Appendix 7.

Likelihood of UXO Contamination	Associated UXO Threat Items
LIKELY	WWII-era Naval Mines

Table 9: WWII-era Naval Minefields Threat Summary

8.4 Military Practice and Exercise Areas

The *Bristol Channel*, as well as the *Welsh* coastline, has been used for much of the 20th and 21st centuries by various national and international military forces to conduct training and weapons' systems testing. These activities may have employed live or practice munitions (the latter being difficult to distinguish from the former once abandoned on the surface of the seabed for many years), which in most cases are likely to have remained in the marine environment, once the training activities have ceased.

8.4.1 Historic Military Training Areas

A detailed examination of historic records indicated an AAA firing range, designated as *N98 Langland Bay*, was situated 4.6 km to the south-west of the Study Site at its closest point. Given the location and scope of this firing range, it is highly unlikely to have generated a UXO contamination threat at the Study Site itself.

Nonetheless, during WWII *Port Talbot* was declared as a "protected place" and was heavily militarised with military personnel and equipment regularly passing through its harbour facilities. As a result, a coastal artillery gun battery and AAA gun batteries were installed at the harbour, which were almost certainly fired operationally to defend the area against the aforementioned bombing raids. Consequently, it is likely that a UXO contamination threat might have been generated by the movement of military materiel in the area, as well as by projectiles associated with the AAA defences. Such a threat is likely to be posed in a limited, very nearshore area of the Study Site.

Likelihood of UXO Contamination	Associated UXO Threat Items
LIKELY	WWII-era AAA Projectiles, LSA and SAA

Table 10: Historic Military Training Areas Threat Summary

8.4.2 Modern Military Practice and Exercise Areas

An analysis of available documentation relating to modern military Practice and Exercise Areas in *Wales* did not identify any modern military training areas located on-site, nor within 5km of its boundary.

Likelihood of UXO Contamination	Associated UXO Threat Items
HIGHLY UNLIKELY	N/A

Table 11: Modern Military PEXA Threat Summary

8.5 Coastal Armaments

An assessment of local and national archive sources and databases indicated that numerous WWII-era defensive installations were constructed along the *South Wales* coastline, with an analysis of *6 Alpha's Azimuth*© database indicating that at least 24 defensive features were located within 5km of the Study Site, predominantly wartime concrete bunkers (commonly known as "pillboxes"). Given these defensive installations, together with the recorded movement of military materiel during WWII, it is possible that *Allied* LSA and SAA might present a UXO contamination threat in the nearshore environment.

Furthermore, it is also likely that a prospective AAA threat may have been generated at the Study Site as a result of AAA gun battery training and testing, as well as operational firing during air raids. At least 20 coastal artillery and AAA gun batteries were installed in WWII around *Swansea Bay* and *Port Talbot* that are highly likely to have had overlapping firing templates/arcs of fire which intersected the offshore Study Site. Information regarding the calibre of guns at these sites was not available, however, although the calibre of guns employed by the artillery batteries around the *British* coastline varied greatly, the most common types including 3.7" Quick Firing and 6" Breech Loading armaments (for AAA batteries and coastal artillery batteries, respectively).

A georeferenced summary of all recorded defensive features, including coastal armaments and AAA batteries, is presented at Appendix 8.

Likelihood of UXO Contamination	Associated UXO Threat Items
LIKELY	WWII-era AAA Projectiles

Table 12: Coastal Armaments Threat Summary

8.6 Munitions Dumping

Stockpiles of *Allied*, *Central Powers*, and *Axis* munitions of the conventional variety (i.e. HE filled), and chemical munitions that had been earmarked for wartime use, were disposed of at the end of WWI and WWII. As a cost effective and military expedient, conventional and chemical munitions were often dumped offshore or into other suitable bodies of water, such as lakes.

Whilst the centre of mass of such dumpsites were typically recorded, the logistical accuracy of dumping such munitions was then, less than perfect. Such munitions were commonly short-dumped and although some chemical and conventional munitions were dumped in small munitions containers, the effects of their break-up and subsequent munitions migration may well have further spread the theoretical extent of such contamination.

An analysis of pertinent naval and admiralty charts, together with relevant marine environment protection agency databases and specific supplementary research, did not identify any recorded munitions dumps within 10km of the Study Site.

Likelihood of UXO Contamination	Associated UXO Threat Items
HIGHLY UNLIKELY	N/A

Table 13: Munitions Dumping Threat Summary

8.7 Munitions Related Shipwrecks and Aircraft

Merchant and naval vessels that were sunk during 20th Century conflicts may have contained munitions – as armament and/or cargo. The prospective extent of UXO contamination may vary, depending upon nature and integrity of the wrecks. Wreck investigations have found that munitions can spill from ships as they sink and break up, otherwise their ordnance may remain sealed within their holds and remain immobile. Similarly, military aircraft that were shot down or otherwise had to forcibly crash-land into the sea, may have also carried munitions.

It is also unlikely that any ship would have been sunk in the first exchange of fire due to the relative inaccuracy of naval weapons during these conflicts; and it is therefore likely that many bombs, projectiles, and torpedoes would have initially missed their targets and might remain on the seabed

as UXO. Regardless of the type of weapons systems employed to attack ships or aircraft, it is entirely feasible that several exchanges of fire would have preceded a successful attack. Generally, the closer the munitions related shipwreck is located to the Study Site, the more likely a UXO contamination threat is to have been generated in its vicinity.

An examination of historical shipwreck records, together with corroborative evidence gathered from *6 Alpha's Azimuth©* UXO database, indicated that three munitions related shipwrecks were located within the Study Site boundary, all originating from WWII-era minelaying activities. A further two such wrecks were noted within 5km to the west, also as a result of naval mines. These documented shipwrecks therefore serve to supplement and reinforce the historic evidence of naval mines being deployed across the region during WWII, including at the Study Site.

A georeferenced summary of all recorded munitions-related shipwrecks in the area, combined with their high-level cause of sinking, is presented at Appendix 9.

8.8 Previous UXO Encounters

An analysis of the *OSPAR* database and supplementary research of available data did not identify any recently recorded munitions encounters within the offshore Study Site itself.

Nonetheless, on the 27th of October 2006 three partly corroded artillery shells were recovered by a dredger in *Swansea Bay*, and were subsequently safely destroyed approximately 980m to the west of the Study Site, as recorded in the *OSPAR* database of UXO encounters. An additional encounter was also reported in October 2006, when a naval mine was caught in the net of a fishing vessel at an unspecified location in *Swansea Bay*, potentially in proximity of the Study Site. Multiple UXO encounters have also been documented onshore at *Port Talbot*, as detailed in Part II of this document.

UXO encounters within the marine environment are not always documented in the public domain, though the fact that historic munitions were and continue to be found highlights the longevity of the threat that might be posed by UXO in the marine environment.

The location of the recorded *OSPAR* munitions encounter, in relation to the Study Site, is presented at Appendix 10.

8.9 UXO Threats – Summary

A georeferenced chart depicting the considered range of prospective UXO contamination sources at the Study Area is presented at Appendix 11.

Based upon the threat element of this assessment, the following types of UXO, complete with their measurements, estimated ferrous mass, and expected Net Explosive Quantity (NEQ) (based upon equivalent Trinitrotoluene (TNT) masses), may pose a UXO threat at the Study Site.

8.9.1 Aerial Bombs

Designation	Length x Diameter	Estimated Ferrous Mass	NEQ
SC-500 HE Bomb	1,415mm x 457mm	280kg	220kg
SC-250 HE Bomb	1,194mm x 368mm	126kg	130kg
SC-50 HE Bomb	762mm x 200mm	25-30kg	25kg

8.9.2 Naval Mines

Designation	Length x Diameter	Estimated Ferrous Mass	NEQ
TMB Mine	1,981mm x 533m	145kg	720kg
LMA Mine	1,730mm x 660mm	>10kg	390kg
EMC Mine	1,232mm x 1,168mm	331kg	389kg
TMA Mine	2,832mm x 533mm	181kg	280kg
EMA Mine	1,016mm x 864mm	232kg	212kg
EMD Mine	743mm x 743mm	119kg	52kg

8.9.3 Artillery Projectiles and LSA

Designation	Length x Diameter	Estimated Ferrous Mass	NEQ
6" Artillery Projectile	582mm x 152mm	39.4kg	6kg
3.7" Artillery Projectile	360mm x 94mm	11.6kg	0.93kg
3" Mortar Shell	406mm x 81mm	4kg	0.55kg
Mills Grenade	95mm x 61mm	0.66kg	0.1kg
Mk2 Grenade	90mm x 57mm	0.58kg	0.06kg

9 UXO Risk Pathways – Planned Operations

Whilst a summary of the proposed works has not been provided, *6 Alpha* understand that the project comprises a GI campaign and the development of the port complex. Consequently, a suite of expected operations that may be employed is presented in order to evidence the potential UXO risk pathways that may be generated, should such work encounter those threat spectrum UXO that have been identified in Section 8. If the planned methods are changed, then the risk assessment is to be reviewed and updated if necessary.

9.1 Geotechnical Investigation Operations

A GI campaign will likely be undertaken in order to gather data on the local seabed's makeup and conditions within the Study Site. It is expected that the following GI methodologies will be employed as part of the campaign:

9.1.1 Boreholing

Continuous sampling/coring borehole operations employ kinetic energy to invasively penetrate the seabed. Such techniques are capable of initiating UXO, especially if the leading edge of the borehole equipment comes into contact with it.

9.1.2 Cone Penetration Testing

Cone Penetration Testing (CPT) measures the resistance to penetration of the seabed, using a steel rod with a conical tip. Given that this methodology employs kinetic energy to invasively penetrate the seabed, it is possible that if the CPT tool comes into direct contact with UXO, the kinetic energy generated may be sufficient to cause its initiation.

9.1.3 Vibrocoring

Vibrocoring employs the force of gravity, combined with kinetic energy (supplied by a vibrating head), to drive a sampling-core into the seabed, in order to collect sub-seabed samples. Therefore, given the kinetic energy involved in the process, vibrocoring is considered to be capable of initiating UXO, especially if the leading edge of the sampling equipment comes into direct contact with it.

9.1.4 Environmental Grab Sampling

Surface grab sampling can be used as a method of recovering sediments from the seabed during environmental/benthic surveys of the seabed and involves a simple grab bucket being lowered to the seafloor, closing upon impact and securing a sediment sample, before being brought back to the surface – usually through the means of a winch. Grab sampling tends to be an aggressive investigative operation which generates kinetic energy as the bucket falls to the seabed and as the sample is taken.

In addition, there is a possibility of inadvertently recovering small UXO to the deck of the vessel along with the grabbed sample; such risks should therefore be mitigated.

9.2 Harbour Regeneration Operations

It is understood that the proposed works will include regeneration of the harbour entrance, potentially including the following construction operations:

9.2.1 Dredging

It is likely that the approaches to *Port Talbot Harbour* will be subject to dredging operations to ensure that navigation channels are suitable for a variety of vessels. All dredged arisings would then be deposited to awaiting dump barges to be moved to the jetty and subsequently transferred to awaiting dump lorries.

There are several stages of this process which could cause an initiation event including: the initial excavator dredging operations; the dumping of dredged material into dump barges; the transfer and transportation of any UXO contained within dredged material in transport truck to the final dump site (via public roads); and at the dumping of the dredged material at the final dump site.

9.2.2 Piling

Soft-start piling techniques might be adopted with the proposed piles driven using a combination of crane suspended vibro and impact hammers – potentially mounted on the deck of a crane barge. If the piles were to be driven into an item of UXO, or else into the seabed in very close proximity of such UXO, then it is highly like that the resultant kinetic energy would inadvertently initiate such an item.

9.3 Enabling Operations

The following methodologies may be employed to facilitate the proposed works:

9.3.1 Dynamically Positioned Vessels

Dynamically Positioned (DP) vessels employ computer-controlled systems to automatically maintain their position and heading by using propellers and thrusters. Position reference sensors and satellite navigation, combined with wind sensors, motion sensors, and gyrocompasses provide information to a computer that maintains vessels' positions, constantly accounting for the magnitude and direction of environmental forces affecting them. DP vessels are commonly used to support a wide variety of sub-seabed operations.

If a DP vessel does not contact the seabed (because it is not anchored and will not ground), then a prospective encounter with UXO from such a work platform does not present a UXO pathway and thus a risk is not generated. A risk however might be presented in shallow water, if thrusters disturb UXO

in close proximity of the influence (of the thruster), especially if the UXO is located on the surface of the seabed or shallow buried beneath it.

9.3.2 Jack-Up Barge Deployment

A Jack-Up Barge (JUB) is a type of mobile platform that consists of a buoyant hull fitted with multiple movable legs, capable of lifting it over the surface of the sea, thus affording a stable work platform for operations such as piling and boreholing. The buoyant hull facilitates relatively easy transportation of the barge between operations and once it is at the desired location, the hull is raised (jacked-up on legs), to the required elevation above the sea and its legs are supported by the seabed.

From a UXO risk perspective, the legs of such barges may be designed to penetrate the seabed, and/or may be fitted with enlarged sections or footings. Generally, JUBs are not self-propelled and rely on Anchor Handling Tugboats (AHT) for positioning and upon its anchors for stability and movement. Nonetheless, if the JUB leg or its anchor (deployed by an AHT) encounters UXO, then a risk pathway might be generated.

9.3.3 Diving Operations

There is no indication that divers are currently being considered to assist or undertake works. Nonetheless, divers are especially vulnerable to the types of underwater shock generated by UXO detonations and, subject to UXOs' NEQ, diver fatalities can easily be generated hundreds of metres from the seat of an underwater high explosive event. Therefore, divers must not be deployed where there is a risk of such a detonation event.

If divers are to be used, then the associated risks must be reassessed by *6 Alpha*.

10 Study Site Characterisation

10.1 Local Seabed Conditions

The Study Site's local seabed conditions are important influencing factors when assessing the potential for UXO burial and/or migration and the potential consequences of an unplanned encounter and initiation of UXO during the proposed operations.

10.1.1 Bathymetry

A body of water will both absorb and transmit energy, generated by either a bomb entering the water and/or a high explosive event of the sort that might be generated by a UXO detonation. In general, the consequences of a through-water UXO detonation will reduce, as the "stand-off" (or separation distance) increases between prospective receptors and the UXO either buried in or lying upon the seabed.

An analysis of publicly available bathymetric data indicated that water depths are likely to range between 0m Lowest Astronomical Tide (LAT) (i.e. landfall) and approximately 15m LAT within the offshore Study Site.

Given the shallow water depths anticipated across the whole Study Site, the consequences of potential UXO initiation associated with most threat spectrum UXO are unlikely to be significantly mitigated by such a body of water and remain substantial even for relatively small NEQ UXO.

The water depths across the Study Site (in LAT) are presented at Appendix 12.

10.1.2 Previous Harbour Dredging

The Client has provided a series of diagrams and reports associated with the post-WWII development of the outer harbour at *Port Talbot*. Those sources evidence that the initial SI work associated with the development of the existing harbour occurred in 1960, with *OS* mapping indicating that the work had been completed by 1982. This included the dredging of the harbour, with additional dredging occurring between 1995 and 1999 to create a deeper harbour pocket.

An analysis of *UKHO* charts associated with the port suggests that the water depths within the harbour prior to its creation (and crucially, during the time that it might have been contaminated with UXO) were between 0m (i.e. land) to 4m LAT, with much of the Site being located in an intertidal range – as per Appendix 14. However, after the 1995-1999 dredging works were completed, the water depths at the site had increased to at least 11.2m LAT, with the berth pocket dredged to a depth of between 17m and 18m LAT. Consequently, it is apparent that as a minimum, 7.2m of seabed has been removed from an area within the harbour.

Additionally, a dredged approach channel was also created at the same time leading into the harbour. This channel was originally dredged and is maintained at a depth of 11.2m LAT. However, the "natural" water depths along this dredged channel range from between ~6m to 12m LAT and therefore, it is apparent that a maximum of 5m has been dredged from the approach channel and specifically, in the areas in closest proximity to the harbour. The amount of seabed dredged from the channel reduces as the channel moves further offshore, with minimal seabed removal at the channel's western extremity (less than 1m).

The spatial extent of the previous dredging work is depicted at Appendix 15.

10.1.3 Seabed Sediments and Shallow Soils

The nature of local seabed sediments and shallow soils also needs to be considered to determine the prospect for UXO burial in general and UXB burial in particular, upon their initial deployment and/or subsequently by seabed sediment movement. UXO scour and/or migration may also be influenced by seabed sediments.

Although detailed shallow soil and seabed sediment information for the Study Site has not yet been collected, an analysis of *BGS* records indicated that the seabed is likely to primarily comprise sandy mud sediments, in addition to areas of muddy sand in its southern sector.

Muddy sediments such as gravels are generally less likely to form a mobile seabed than one comprising solely of sandy sediments. It is still possible that UXO may have become shallow buried (after their initial deployment, having come to rest upon the surface of the seabed), by mobile seabed sediment, particularly in those areas comprising of predominantly sand sediments in the nearshore sector.

10.2 UXO Burial and Munitions Migration

In the offshore environment, all items of UXO are potentially subject to a variety of environmental and human factors, which may result in their scour and burial, or else their migration across the seabed. Primarily, this is driven by the localised bathymetric conditions including the composition of the seabed sediments, water depth and tidal currents.

10.2.1 Initial Impact Burial

As with impact burial of UXO on land, only those munitions travelling at a high terminal velocity at the point of impact (typically aerially delivered iron bombs or gun/mortar launched projectiles), have the potential to penetrate the seabed upon their initial deployment. Historically, studies of typical bomb penetration depths have been undertaken for the terrestrial environment based upon *inter alia*, the soil type in general and its shear strength in particular, as well as the UXO type, size and mass and their angle/speed of initial impact.

Such studies are not directly applicable in the offshore environment, given the mitigative effects of water (e.g. in slowing and reducing the impact of munitions on the seabed).

Nonetheless and in general, threat spectrum UXO penetration into the seabed could be as much as 7m below WWII ground level in the shallowest part of the Study Site (less than 5m LAT). As the water depth increases, the likely bomb penetration depth decreases; though the likely bomb penetration depth across the Site is assessed as a minimum of 4m below WWII seabed level due to the relatively shallow depths present across the entirety of the Site.

10.2.2 Munitions Migration Effects

If geophysical UXO survey data is more than one year old from its date of capture, it may compromise the subsequent longevity of an ALARP safety sign-off certificate in general and the positional accuracy of pUXO (designated for avoidance) in particular, because of the risk of prospective munitions migration effects.

To address this issue and to extend the longevity of ALARP safety sign-off certification, a Munitions Migration and Burial Assessment (MMBA) can be undertaken. An MMBA can be based on appropriate metocean data, which would model the potential for UXO migration based upon seabed geomorphology in general and the Site's seabed characteristics in particular. Such characteristics can typically comprise the seabed sediments, current direction, and strengths.

10.3 Marine Protection Areas

Areas of the offshore marine environment have been designated as requiring protective, conservation, restorative and/or precautionary measures and there is a growing body of regional, national and international legislation supporting offshore environmental conservation. An analysis of national and regional databases indicated the *Cynffig Special Area of Conservation* is located 3.7km to the south-east of the Study Site.

Whilst it is therefore highly unlikely that UXO disposal should be required within the bounds of such areas, it is *6 Alpha's* typical recommendation that techniques such as low-order/low-noise or deflagration might be preferred over other high-order disposal methods regardless of location, although it is of particular pertinence within marine protection areas.

11 UXO Risk Assessment

11.1 Risk Assessment Findings

The results of the strategic level risk assessment at different depth intervals are summarised and presented below and are supported by an unexpurgated project SQRA, which is presented at Appendix 16. The latter presents the complete risk assessment for each individual seabed intrusive activity for each UXO threat group in various water depth intervals.

11.1.1 GI Operations

The likely GI operations are categorised as posing ***MEDIUM*** UXO risks to both the vessel and personnel (i.e. vessels' crews) across the Study Site. This is driven by the likelihood of encountering and initiating a range of prospective UXO threats including aerial bombs, naval mines and AAA projectiles – as represented at Table 14. Given the shallow depths of water, the reduced likelihood of encountering threat spectrum UXO during relatively small point-focal GI operations is insufficient to wholly reduce the level of risk that might be generated during intrusive works.

UXO Threat	UXO Risk (Vessels and Personnel Only)		
	~5m LAT	~10m LAT	~15m LAT
Aerial Bombs	MEDIUM		
Naval Mines	LOW	MEDIUM	
Artillery Projectiles	MEDIUM		
LSA	LOW		VERY LOW

Table 14: GI Operations SQRA Summary

11.1.2 Harbour Construction Operations

Construction operations associated with the redevelopment of the harbour, which might include dredging and piling, may generate ***HIGH*** category UXO risks as a worst-case scenario. This is again driven by a variety of ordnance that might have deployed across *Swansea Bay* during WWII, in areas of shallow water. Given the expected water depths, this elevated risk rating is extant across the entire Study Site.

The risk levels for the construction phase of the project are summarised and presented at Table 15.

UXO Threat	UXO Risk (Vessels and Personnel Only)		
	~5m LAT	~10m LAT	~15m LAT
Aerial Bombs	HIGH		
Naval Mines	MEDIUM	HIGH	
Artillery Projectiles	HIGH		
LSA	HIGH	LOW	VERY LOW

Table 15: Harbour Construction Operations SQRA Summary

11.1.3 Enabling Operations

The UXO risk associated with the potential enabling operations in support of the proposed GI and construction operations vary depending on the precise operation. Nonetheless, Table 16 articulates the worst-case scenario associated with the prospective enabling operations (i.e. those resulting from the deployment of JUB vessels) as generating ***HIGH*** category UXO risks across the Study Site. Such risks are substantially reduced for enabling methodologies such as the use of DP vessels – which are unlikely to generate a UXO risk pathway and are assessed as ***LOW*** risk only.

UXO Threat	UXO Risk (Vessels and Personnel Only)		
	~5m LAT	~10m LAT	~15m LAT
Aerial Bombs	HIGH		
Naval Mines	LOW	HIGH	
Artillery Projectiles	HIGH		MEDIUM
LSA	MEDIUM	LOW	VERY LOW

Table 16: Enabling Operations SQRA Summary

11.2 UXO Receptors

11.2.1 Surface Vessels and Personnel

Although there is evidence to suggest that encountering and initiating UXO is plausible at the Study Site, such an encounter is generally considered a low probability-high consequence event. The consequences of exposing the vessels' crews to the kind of forces associated with an underwater initiation of an indicative selection of high, medium, and low NEQ threat spectrum UXO has been carefully modelled and the results are summarised separately at Table 17. These consequences are presented as a "worst-case" scenario, in the event that no risk mitigation measures have previously been enacted to reduce the likelihood of encountering and initiating threat spectrum UXO.

UXO	NEQ	Consequence		
		at ~5m LAT	at ~10m LAT	at ~15m LAT
SC-50 HE Bomb	25kg	Vessel Sinking / Fatalities		Serious Structural Damage / Fatalities
6" Artillery Projectile	6kg	Vessel Sinking / Fatalities	Serious Structural Damage / Fatalities	Mechanism Damage / Minor Injuries
3" Mortar Shell	0.55kg	Serious Structural Damage / Fatalities	Slight Damage	Acceptable

Table 17: Consequences of UXO Initiation

Table 17 has been compiled using *6 Alpha's* in-house shock wave calculator. This tool employs algorithms based on a variety of open-source academic and military studies concerning military ordnance detonations underwater, the peak pressures generated, and the effects of through water shock waves on the vessels' hulls directly as well as the indirect effects upon their crew.

Although the probability of initiating UXO varies with the types of subsea operations, the consequences of an initiation of each type of UXO is not driven by how such an initiation event might be caused. The calculations presented within Table 17 are also employed to inform *6 Alpha's* SQRA (at Appendix 13) to assess and grade potential UXO detonation consequences based upon the shock wave effects.

11.2.2 Underwater Equipment

If UXO is inadvertently encountered and initiated, it is likely that underwater equipment or tools employed in their close proximity are likely to be significantly damaged and/or completely destroyed. Such risks are presented in the full SQRA (at Appendix 13) but are highly likely to be considered tolerable, under the auspices of the ALARP principle, as long as they are unlikely to also pose a concurrent risk of harm to surface vessels and their crew, which may not be practicable given the very shallow water depths expected across the Study Site.

11.2.3 Vessel and Diver Safety Distances

The SQRA assesses the risk of an unplanned initiation of UXO with reference to relevant sensitive receptors (e.g. vessels and their crew and/or underwater equipment), resulting from underwater explosive shock waves and to a reduced extent, localised underwater, high velocity fragmentation effects.

Such underwater detonation effects are determined by the energy that might be generated by detonating high explosive UXO. TNT is employed as a representative baseline high explosive for the likely type of UXO that might be encountered within the Study Site (regardless of the precise nature of their high-explosive fill), as well as estimating the distances separating the source (UXO) and the sensitive receptors (equipment/vessels).

The following formula has been applied to calculate peak pressure with the resultant shock wave output (Reid, 1996):

$$Peak\ Pressure\ (MPa) = 52.4.\left(\frac{M^{\frac{1}{3}}}{R}\right)^{1.18}$$

Using this formula, Table 18 summarises the distances at which point the prospective consequences of an underwater encounter and initiation of a selection of threat spectrum UXO to the vessel(s) and

their crew(s) becomes intolerable (e.g. where injuries are sustained from exposure to more than 4MPa of peak pressure). In addition, Table 18 also summarises the minimum safety distance for divers – if they are to be employed (these distances have been calculated by *6 Alpha's* UXO experts).

UXO	NEQ	SQRA Consequence Score Peak Pressure Exposure (MPa) and Vessel Safety Distance		Swimmers and Divers Safety Distance
		1 0 – 2 (MPa)	**2** 2 – 4 (MPa)	Burst on seabed with diver on seabed
TMB Mine	720kg	143m	80m	1,987m
SC-500 HE Bomb	220kg	96m	54m	1,605m
6" Artillery Projectile	6kg	29m	17m	839m

Table 18: Underwater Explosion Safety Distances

For the consequences of an initiation of high NEQ UXO to be completely ameliorated in terms of its effects upon the vessel (<2 MPa and see consequence column 1), the minimum vessel safety stand-off distance must be not less than 143m. Given the extremely shallow water depths expected at the Study Site and its location in proximity to *Port Talbot*, such a safe stand-off distance is highly unlikely to be practicable during the proposed works.

Consequence column 2 articulates the depths of water at which superficial damage to the vessel may be caused and the exposure of the vessel and its crew to intolerable and dangerous high-explosive effects is likely to occur at depths of less than 80m, if a large NEQ UXO is initiated. If the vessel(s) and its crew(s) are exposed to greater than 4MPa of pressure, the likely effects include damage to electronics, injuring crew and partial loss of vessel steering and control. Vessel damage becomes more severe as the peak pressure exposure increases, with fatalities highly likely to be caused at 8MPa pressure and greater. These consequences have been calculated without accounting for the vessels' age/condition nor their specific design characteristics in general or their robustness, in particular. Therefore, the precise consequence modelling and minimum safe stand-off distances are subject to change, especially as additional factors such as vessel draught are introduced.

In addition, divers are highly vulnerable if they are exposed to the kind of underwater shock generated by UXO initiation. As Table 18 evidences, swimmers and divers must be located at between 839m and 1,987m from the seat of a seabed initiation of threat spectrum UXO (smallest to largest respectively),

to be considered safe, which further evidences the risks involved with deploying divers during sub-seabed operations, wherever UXO contamination might be expected.

11.3 UXO Risk Zones

It is standard *6 Alpha* practice to divide the Study Site into multiple UXO risk zones based upon one, or a combination of, the following factors:

- The nature and scope of seabed intrusive activities and the distances from pertinent UXO threat sources;
- The varying water depths (in LAT) across the Study Site;
- The post-WWII redevelopment of the Study Site;
- The project stakeholders' assumed appetite for the carriage of residual UXO risks.

The relatively shallow depths of water across the whole of the *Port Talbot* offshore Study Site, together with the historical evidence of substantial UXO threat sources prevent the much of the site from being zoned based on the first two criteria. Therefore, proposed works in large areas of the Site have been assessed and classified as ***HIGH*** at the initial strategic assessment level.

Nonetheless, as section 10.1.2 outlines, a minimum of 7.2m of seabed was dredged from the Site during the construction of the harbour at *Port Talbot* and during subsequent re-development projects. This exceeds the assessed bomb penetration depth for the Site and therefore, in those areas the UXO risk to intrusive operations has been assessed as ***LOW.***

The aforementioned dredging activity occurred across a longer approach channel, leading from the harbour out into *Swansea Bay*. In the shallowest areas of the approach channel, between 4m and 5m of seabed was removed, which equates to the likely bomb penetration depth in those limited areas. As a result, the UXO risk to intrusive activities in a small part of the approach channel can be downgraded to ***MEDIUM*.**

The UXO risk zoning has been presented at Appendix 17.

Part IV: UXO Risk Mitigation Strategy

12 UXO Risk Mitigation Strategic Options

12.1 Overview

As per *CIRIA* C681 and C754 guidance, *6 Alpha* recommended that the identified UXO risks to onshore and offshore intrusive works are reduced ALARP. Crucially, the ALARP principle states that if the cost of reducing a risk significantly outweighs the benefit, then the risk may be considered tolerable. This does not mean that there is never a requirement for UXO risk mitigation, but that any mitigation must demonstrate that it is beneficial. Any additional mitigation that delivers diminishing benefits and that consumes disproportionate time, money and effort are considered *de minimis* and thus unnecessary. Because of this principle, UXO risks will rarely be reduced to zero (nor need they be).

12.2 Strategic Options

6 Alpha's approach is that UXO risk to the intrusive operations both onshore and offshore can effectively be reduced to ALARP, by removing one (or more) element(s) of a source-pathway-receptor risk model, or otherwise mitigating the risks associated with a single element of the model.

The three main strategic risk mitigation options based upon source-pathway-receptor modelling are, in priority order:

12.2.1 Avoidance

A strategy of potential UXO (pUXO) detection and avoidance is proposed as the most cost effective and efficient method of reducing UXO risks to ALARP. By surveying for and avoiding direct or indirect contact with any potential UXO (pUXO, or the source of the risk), and by moving any intrusive activity away from such prospective hazards (wherever this is practicable), such risks are appropriately and effectively reduced.

Avoidance is typically considered vastly more practicable in the offshore environment, than onshore.

12.2.2 Removal of Risk Receptors

An alternative option is to remove the receptor element (of the source-pathway-receptor model) by moving certain sensitive and vulnerable receptors (typically the crews of offshore vessels), to a safe distance from the point of the intrusive activity and thus the pUXO hazard. Clearly, this is not always achievable and such a course of action is commonly impractical, especially onshore and in the very shallow water depths present at the offshore Site.

12.2.3 Removal of Threat Sources

Where pUXO cannot be avoided, another alternative option is to verify pUXO by investigation and where it is classified as confirmed UXO (cUXO), then to either move it (to a position where it cannot

reasonably be initiated by project operations) and/or then rendering it safe (effectively removing the source element of the source-pathway-receptor model).

This option is commonly the most effective strategy for reducing onshore UXO risks ALARP but also, is likely to prove the most effective fall-back option offshore, if pUXO targets cannot be avoided by the proposed intrusive works by a suitable safety distance.

13 Onshore UXO Risk Mitigation Measures

In order to reduce the UXO risk to onshore intrusive works ALARP, the following proactive and reactive risk mitigation measures ought to be implemented in advance of, or concurrently alongside, proposed intrusive works at the Study Site.

13.1 Proactive UXO Risk Mitigation Measures

The following proactive risk mitigation measures should be undertaken prior to the commencement of intrusive works:

13.1.1 Non-Intrusive UXO Survey and/or EOD Engineer in the Watching Brief Role

Where "open" intrusive works into previously undisturbed ground are proposed and where the extent is within the effective capabilities of survey equipment, a non-intrusive geophysical UXO survey should be trialed.

If the trial proves successful, a non-intrusive geophysical UXO survey should be employed either site-wide, or in specific areas where intrusive works are to be implemented to identify for signs of sub-surface anomalies which may model as the threat spectrum UXO in advance of said works.

If the survey proves partially or wholly ineffective, an EOD Engineer should be present in the UXO Watching Brief role to monitor ongoing "open" intrusive works to identify any suspicious items that may be UXO related (this service can be provided by *6 Alpha*).

13.1.2 Intrusive Magnetometer Survey

Where "blind" intrusive works into previously undisturbed ground are proposed, an intrusive UXO survey (employing down-hole magnetometer or *MagCone* techniques) is strongly recommended. Such a survey should extend to the **assessed average bomb penetration depth of 7m bgl** or to the maximum depth of the works, whichever is encountered first, or until geology is encountered through which it is assessed a UXB would not penetrate, to identify for signs of sub-surface anomalies which may model as threat spectrum UXO in advance of said works. (This service can be provided by *6 Alpha*).

13.1.3 Geophysical UXO Survey Efficacy

Certain ground conditions may constrain geophysical UXO survey, as magnetometer survey is adversely affected in mineralised and made ground. Nonetheless, *6 Alpha* can advise the likely efficacy of such survey work in advance of their trial and implementation as and when required.

13.2 Reactive UXO Risk Mitigation Measures

The following reactive risk mitigation measures should also be undertaken for all activities in all areas:

13.2.1 Operational UXO Emergency Response Plan

Appropriate site management documentation should be held on-site to guide and plan for the actions which should be undertaken in the event of a suspected or real UXO discovery (Emergency Response Plans (ERPs) can be supplied by *6 Alpha*).

13.2.2 UXO Safety and Awareness Briefings

The briefings are essential when there is a possibility of explosive ordnance encounter and are a vital part of the general safety requirement. All personnel working on the Site should receive a briefing on the following:

- The identification of threat spectrum UXO;
- What actions they should take to keep people and equipment away from such a hazard and to alert site management.

Information concerning the nature of the UXO threat should also be held in the site office and displayed for general information on noticeboards - both for reference and as a reminder for ground workers.

The safety awareness briefing is an essential part of the *Health & Safety Plan* for the site and helps to evidence conformity with the appropriate health and safety standards and legislation.

14 Offshore UXO Risk Mitigation Measures

In order to reduce the UXO risk to offshore intrusive works ALARP, the following proactive and reactive risk mitigation measures ought to be implemented in advance of, or concurrently alongside, proposed intrusive works at the Study Site.

14.1 Proactive Risk Mitigation Measures – *HIGH and MEDIUM Risk Zone Only*

A bespoke geophysical UXO survey, appropriately designed to detect threat spectrum UXO, is recommended prior to the commencement of seabed intrusive operations in the ***HIGH*** and ***MEDIUM*** risk zones, to provide the basis for a strategy of pUXO avoidance, or for its identification and removal.

The survey must consist of surface and sub-surface survey methods.

14.1.1 Surface UXO Detection

Surface detection for threat spectrum UXO should consist of Side Scan Sonar and Multi-Beam Echo Sounder, or work-class remotely operated vehicle camera search, over the area of proposed operations and prior to their commencement in the ***HIGH*** and ***MEDIUM*** risk zones. This is subject to visibility and resolution, especially in areas where shallow water operations are planned.

14.1.2 Sub-Surface UXO Detection

Sub-surface detection for threat spectrum UXO should also be undertaken ahead of the GI and construction/development campaigns in the ***HIGH*** and ***MEDIUM*** risk zones. This should consist of magnetometer/gradiometer survey over the area of the proposed operations.

14.1.3 Low-Ferrous UXO Threat Mitigation

6 Alpha's threat assessment has also identified that a low ferrous mine threat might also be present at this Study Site. Consequently, UXO detection surveys may also need to be capable of detecting partially, or wholly buried, low ferrous *German* LMA mines. Further guidance regarding the methods of mitigating the risks associated with low ferrous LMA mines ought to be provided once further detail regarding the nature and scope of the proposed works is known.

14.1.4 Dredge Head "Bomb Grid"

The dredging tool ought to be equipped with a suitable gauge head (or colloquially commonly understood as a "bomb grid") in order to prevent threat spectrum UXBs from being suctioned into the dredging tool. The size of the bomb grid ought to be not greater then 300mm x 200mm in order to mitigate the UXO risks associated with the minimum sized UXO threat item (and see section 15.2).

14.1.5 Dredged Material Screening

If dredging occurs in the ***HIGH*** or ***MEDIUM*** risk zones and the material is to be transported onshore, then wherever it is practicable to do so, any dredged material is to be spread and levelled on the surface of a dump barge in order to ensure that it is free from UXO. The need for this measure is threefold; first, by using experts to screen-out UXO at the earliest possible opportunity of encounter (i.e. seabed and then dump barge), it reduces the likelihood of a UXO encounter and transportation and therefore it is risk mitigative, concerning especially the risks to personnel.

Secondly, it is a reasonably foreseeable hazard to transport prospectively contaminated material from the offshore environment, onshore and therefore, it is necessary to attempt (reasonably) to ensure that the dredged material is not contaminated with UXO before it is taken ashore.

Third, if the dredged material has been investigated to ensure it is not contaminated before it comes ashore, then all subsequent UXO risks associated with the potential search, loading, transportation and dumping of the material to the final dump site will be ameliorated as the prospective UXO pathway will have been limited.

14.2 Reactive UXO Risk Mitigation Measures – All Risk Zones

Reactive risk mitigation measures are recommended across the entire site regardless of UXO risk rating, not only to reduce intolerable risks to ALARP but also, to mitigate any residual risks that may remain once any proactive risk mitigation measures have been implemented. They are:

14.2.1 Operational UXO Emergency Response Plan

Any vessels involved in intrusive works should be equipped with UXO specific ERPs, so that in the event of an unplanned UXO discovery the vessel Master and/or the offshore superintendent/party chief (or similar) are informed in advance about what safety actions must be taken.

14.2.2 UXO Safety and Awareness Briefings

Safety briefings are considered as an essential reactive risk mitigation measure, to be implemented whenever there is a possibility of UXO encounter and as such, they are considered a vital part of the general UXO safety requirement. All personnel involved with seabed intrusive works, operational support staff working on vessels and/or any other relevant workers are to receive a safety briefing concerning the identification of relevant UXO and safe actions to take in the event of a potential UXO encounter, in advance of undertaking GI work.

Safety and awareness mini-posters concerning the nature of the UXO threat and key actions to be taken, are to be displayed on operational vessels for general information and on notice boards, both for reference and as a UXO safety reminder for offshore crew.

14.2.3 On-Call EOD Engineers

Following the implementation of proactive UXO risk mitigation measures, shore-side and office-based explosive ordnance disposal engineers may be engaged to provide remote, rapid UXO recognition advice and to provide immediate safety management guidance in the event that UXO is discovered. Such a service provides UXO risk management expertise as and when it is required on a just-in-time basis and not only affords safety, but also avoids prospective project delays that might otherwise be caused by the discovery of misidentified UXO, that might prove to be benign, non-UXO debris.

15 Risk Mitigation Measures: Designs, Specifications and Guidance

The specific designs and specifications of the recommended UXO risk mitigation measures are part of the next phase of the UXO risk management framework. Nonetheless, it is important to evidence that the UXO risk mitigation measures are congruent and consistent with, an overarching risk mitigation strategy. Therefore, the following strategic level guidance underpins subsequent detailed designs and specifications for risk mitigation.

15.1 Geophysical Survey Specifications

In accordance with the risk management recommendations contained within *CIRIA*'s *C754* UXO guide, the survey contractor will need to provide evidence that their proposed survey methodology and equipment is fit for the purpose of identifying threat spectrum UXO. Accordingly, a geophysical survey specification is to be drafted for each proposed survey method, outlining the required survey parameters, equipment and calibrations to ensure that the survey is fit for the purpose of threat spectrum UXO detection.

In addition, a Survey Verification Test is to precede the main survey acquisition work itself, to validate and prove the efficacy of the survey equipment.

15.2 Minimum Size UXO Threats

The minimum size of UXO to be detected by geophysical UXO survey is dependent upon the types of UXO that might be encountered, and that may generate intolerable risks to personnel during intrusive works, and environmental factors – especially those relating to water depths in the marine environment.

Typically, the minimum size UXO threat for the purposes of detection by *inter alia* gradiometer survey is based on UXO threats' ferrous metal contents rather than its physical dimensions, or any other factor.

In the land and intertidal environments, geophysical UXO survey must be capable of detecting ***British*** **AXO/LSA/SAA and a *German SC50* HE bomb**. *6 Alpha* can provide further guidance on this matter, if required.

In the offshore environment, conventional geophysical UXO survey must be capable of detecting a ***German*** **SC50 HE bomb**.

The minimum UXO threat detection recommendation does not account for the potential for encountering low ferrous LMA mines at the Site, as per the recommendations made at Section 14.1.2.

15.3 Geophysical Survey Data Longevity

In accordance with *CIRIA C754* UXO guidance (pp 91-92 and 149), geophysical survey data is generally employed for up to 12 months (from the time of its final capture) in the marine environment, for UXO risk management and mitigation purposes. Once offshore survey data is more than 12 months old and subject to *inter alia* environmental conditions, additional risk mitigation measures may need to account for the potential changes in position of the pUXO, especially in highly mobile seabed circumstances.

In such circumstances, an MMBA can be undertaken to gain a better understanding of the type of UXO that might move, as well as the magnitude and direction of its likely migration path.

There are no such concerns regarding onshore survey data.

15.4 pUXO Avoidance Radii

Any offshore geophysical UXO survey anomaly that is classified as pUXO is to be avoided, wherever possible, by not less than 15m from the leading edge of any underwater equipment or platform, **provided** the survey data positional accuracy is demonstrated to be suitably accurate. Such safety avoidance is designed to ensure that if non-verified pUXO is in fact cUXO, it will neither be encountered nor initiated (directly or indirectly). Thus, safety is afforded.

If such a safety avoidance distance proves problematic to implement (for example, because there is a profusion of pUXO anomalies), such avoidance might be safely reduced through the medium of a Technical Advisory Note (TAN). A TAN can consider, *inter alia*: the kinetic energy generated by the type and nature of the intrusive activity; high-level and shallow sub-seabed geotechnical considerations, and the prospective detonation sensitivity of those types of UXO that might be encountered. Typically, such (*6 Alpha* produced) TAN can reduce safety avoidance distances by about one third.

Avoidance is highly likely to be more practicable offshore works, than it is onshore.

15.5 pUXO Verification by Investigation

In the event that pUXO cannot be avoided, they might instead be verified by a campaign of Target Investigation (TI) to classify them as cUXO, or otherwise as benign debris – which is especially pertinent for onshore UXO risks. Such TI operations require professional quality control and independent oversight, to ensure that its outputs can properly inform and support the subsequent production of ALARP safety sign-off certification.

15.6 cUXO Disposal

Where pUXO is investigated and classified as cUXO, it will require safe disposal either *in situ* or, if it is considered safe to do so, through it being removed and subsequently rendered safe. For safety reporting and third-party avoidance purposes, the relevant local and national *Police* and/or *Coast Guard* authorities - amongst a variety of other stakeholders - will also require notification upon discovery of cUXO.

16 ALARP Safety Sign Off Certification

ALARP safety sign-off certification provides an independent source of evidence that a Client has followed industry best practice and has successfully managed and reduced UXO risks to ALARP. Following the execution of *6 Alpha's* UXO risk mitigation measures, we can deliver ALARP safety sign-off certification, in advance of the proposed operations.

In such circumstances the project will be able to certify for the benefit of all of its stakeholders, that all reasonably practicable measures have been taken to protect contractors from UXO hazards and that the commissioning Client will have acted in compliance with industry best practice as well as the national safety legislation.

In accordance with best practice therefore, *6 Alpha* ALARP safety sign-off certification does not imply that any site is free from UXO, rather, that the necessary and appropriate UXO risk mitigation measures have been appropriately applied to evidence that UXO risks have been reduced ALARP.

16.1 Recommended Next Steps

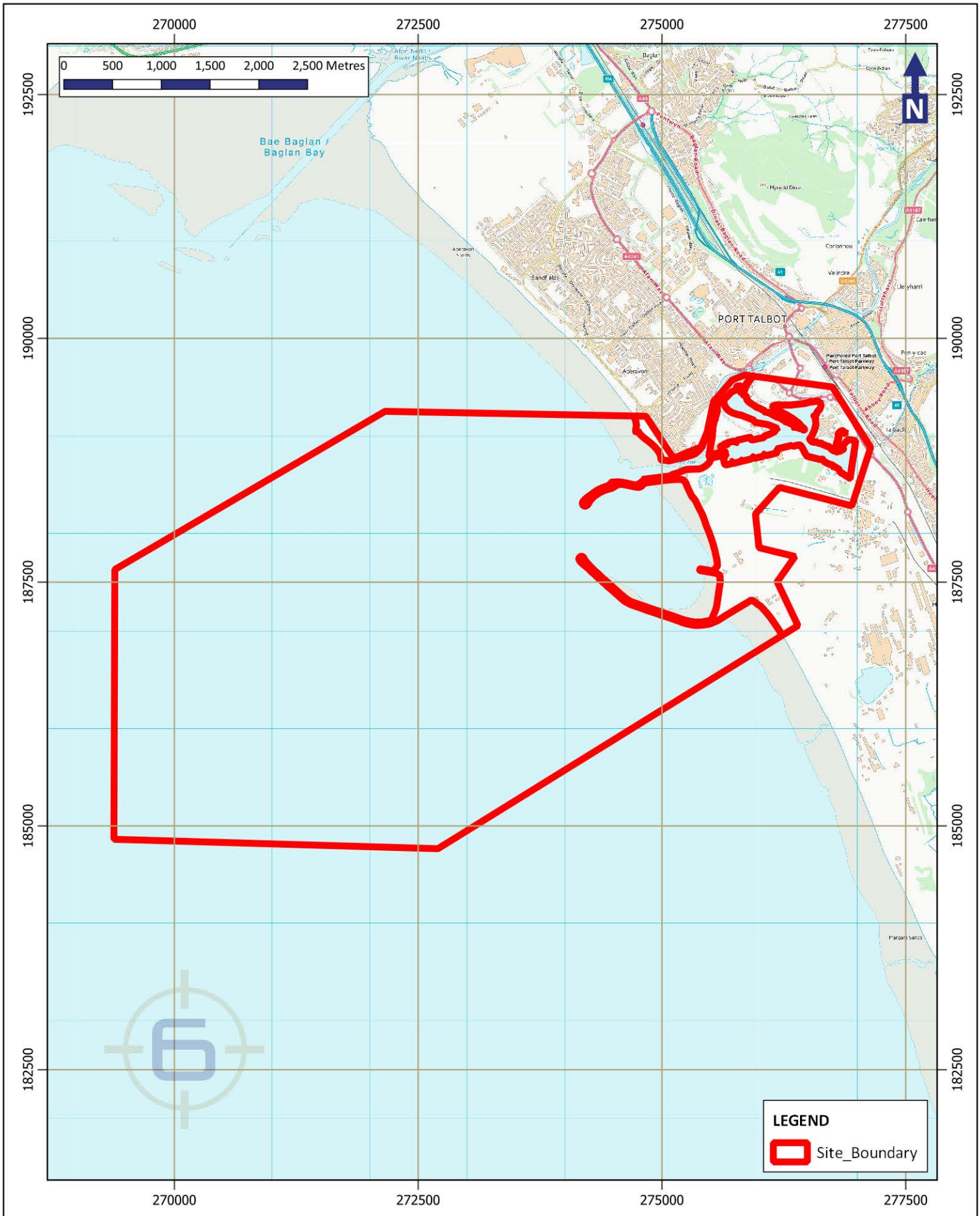
We recommend that the Client's next steps are focused upon phase four of the UXO Risk Management Framework namely, the detailed designs of the recommended proactive UXO risk mitigation measures as outlined above. The specifications are to be delivered and the UXO risk mitigation measures are to be executed in advance of the GI and construction phases of work, in order to warrant and to evidence that UXO risks can be mitigated and reduced to ALARP.

Appendices

British National Grid

Port Talbot

Site Boundary



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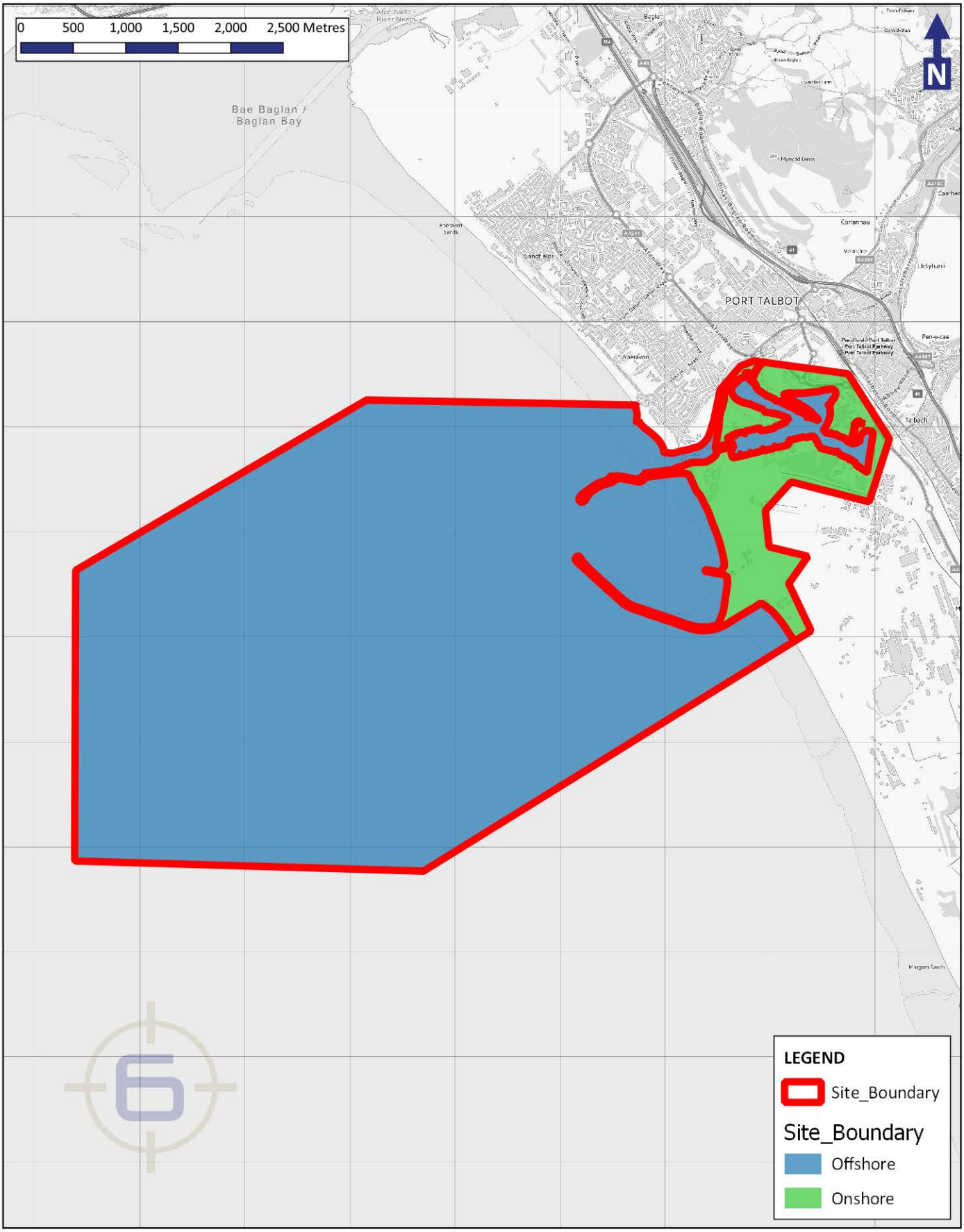
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Site Boundary: Onshore & Offshore



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Aerial Photography (Modern)



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WWII High Explosive Bomb Density

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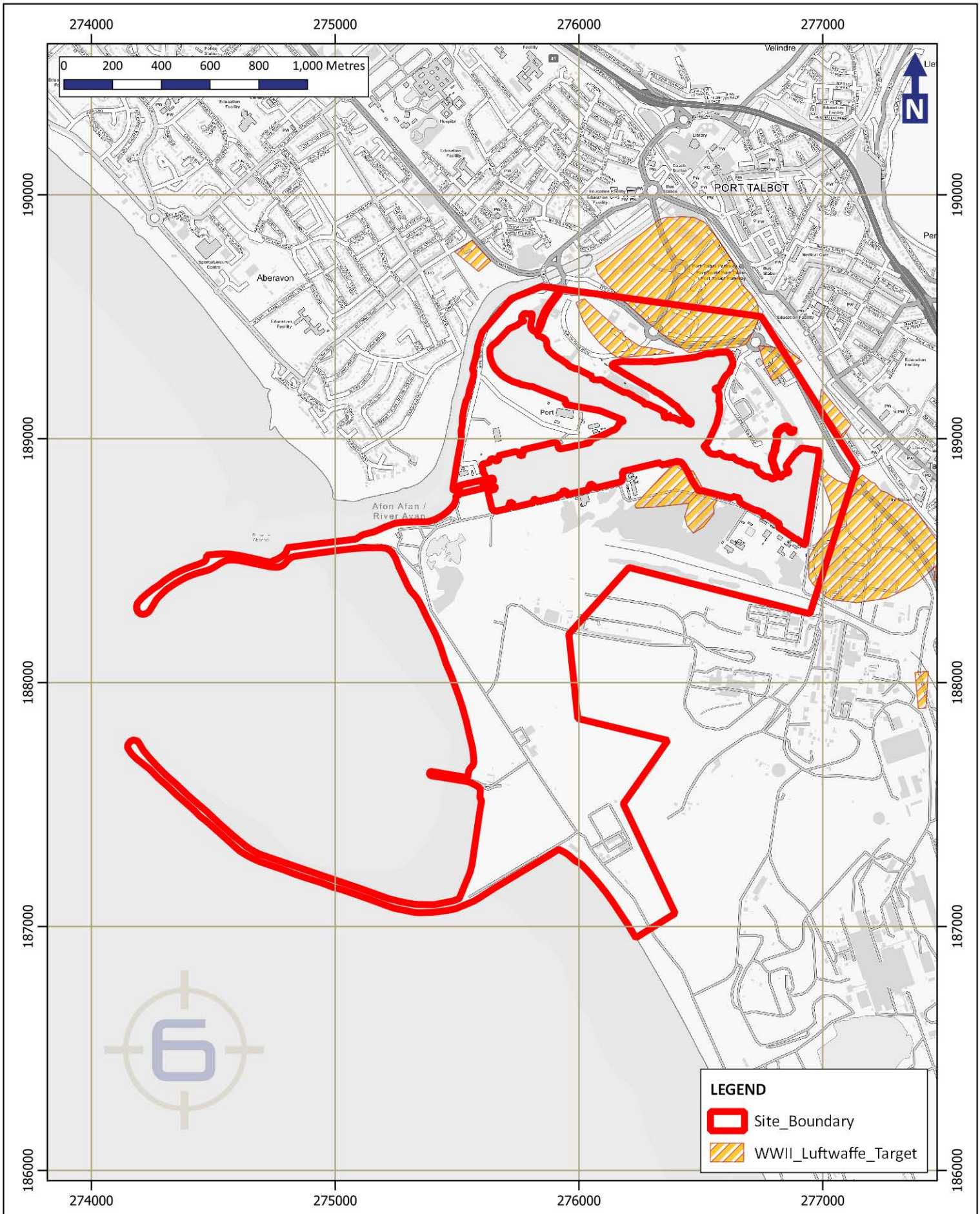
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WWII Luftwaffe Bombing Targets

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Extent of Former Tarmac Quarry (2006)

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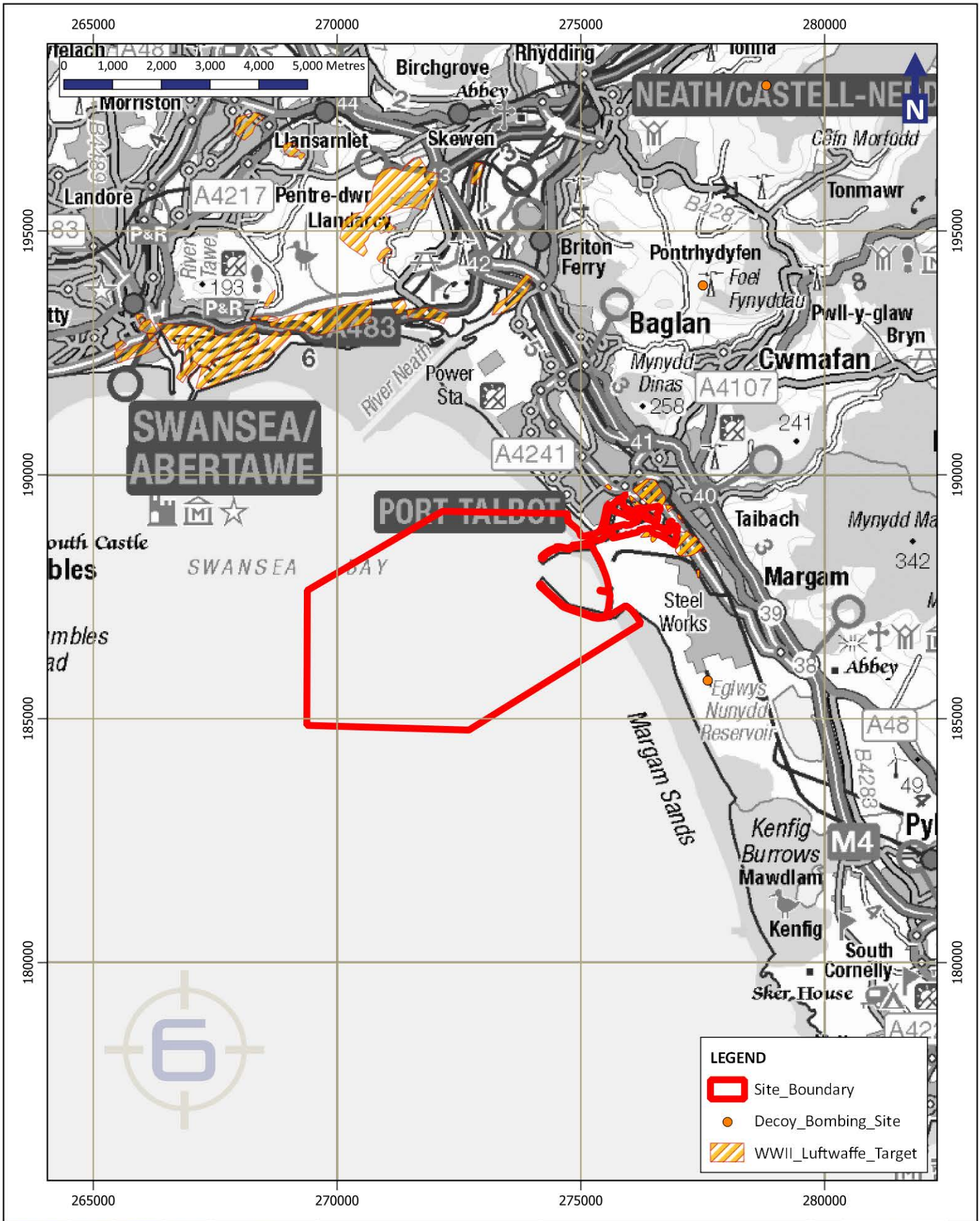


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WWII Aerial Bombing

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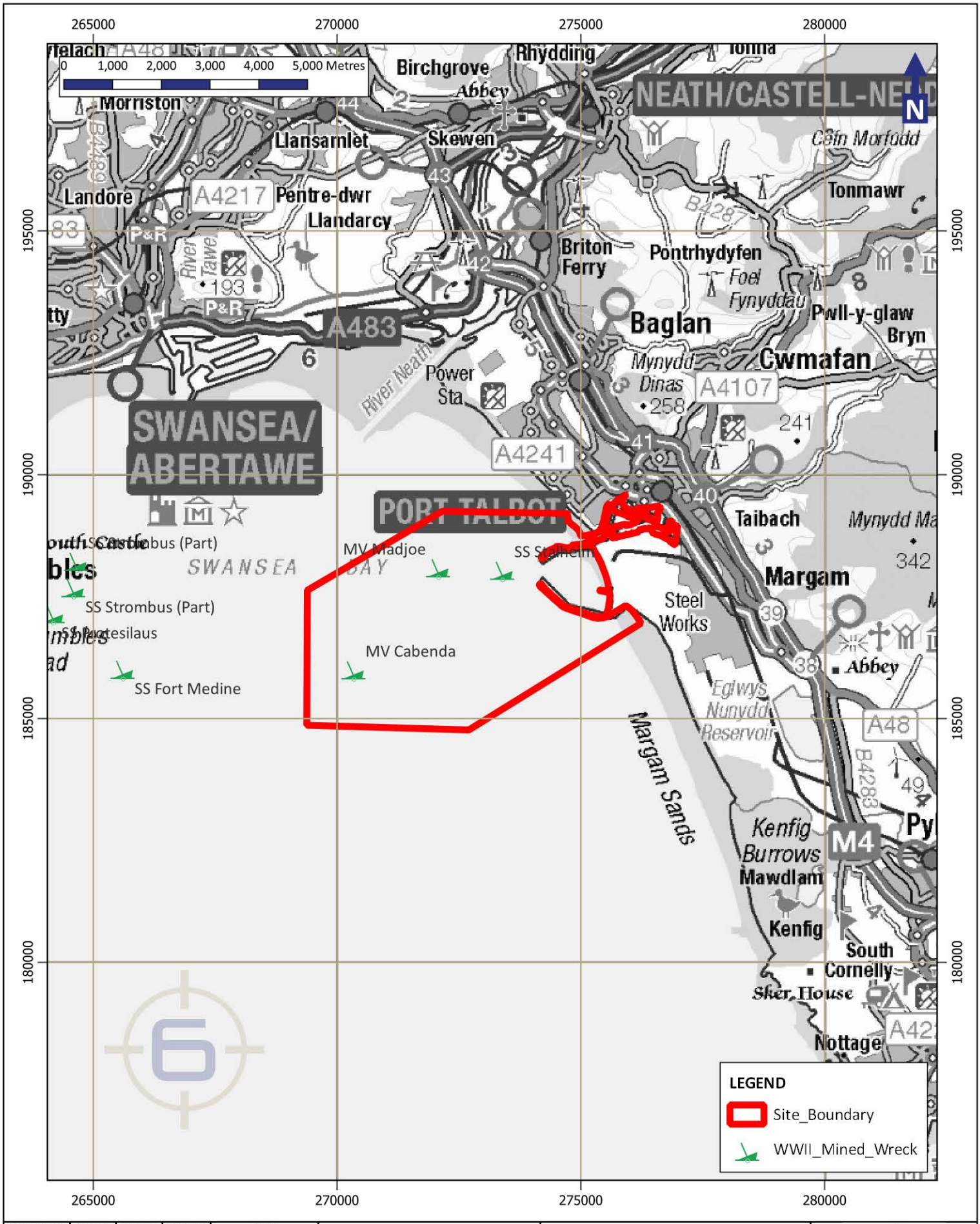
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WWII Minefields

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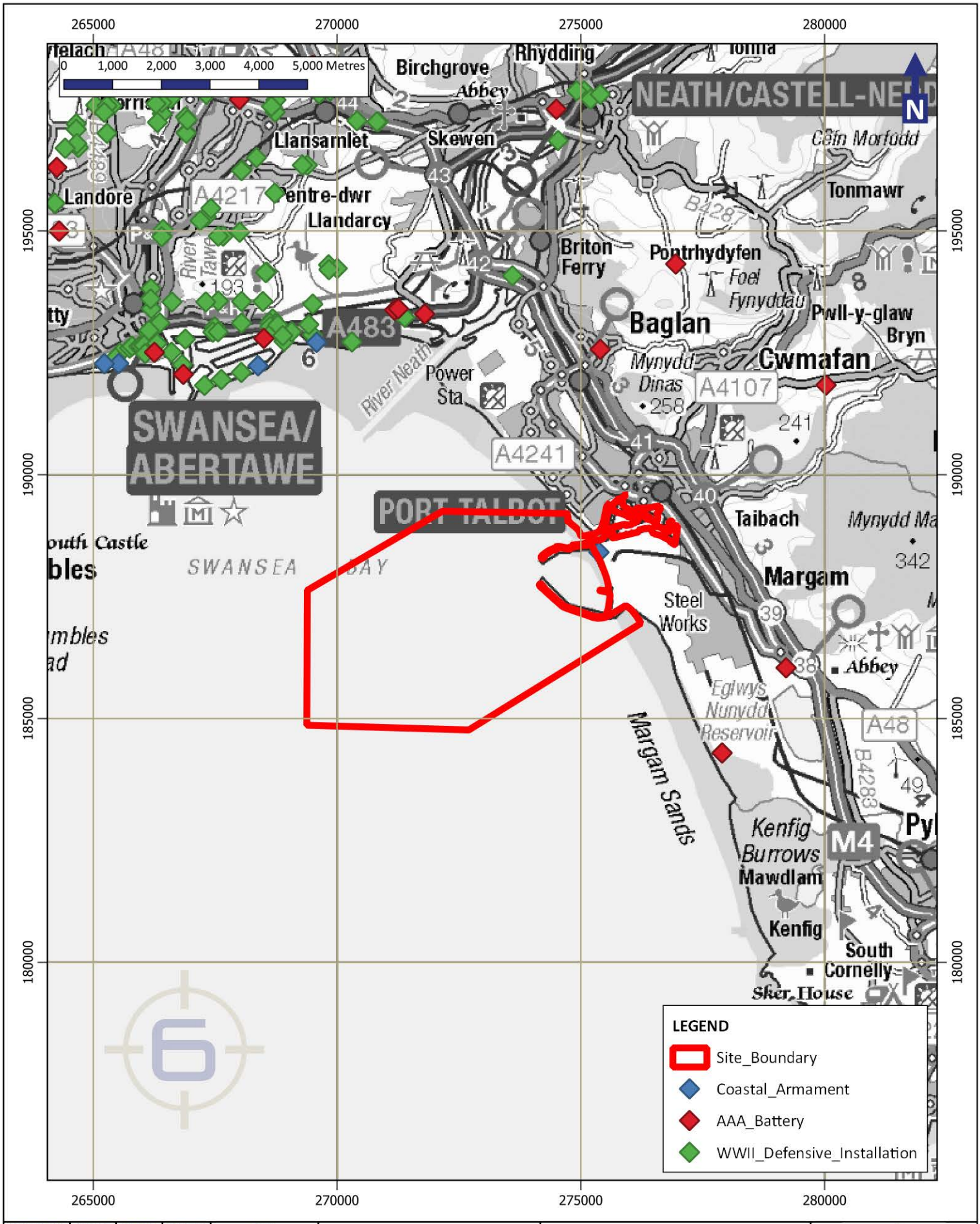
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Coastal Armaments

British National Grid

BOMB SEARCH



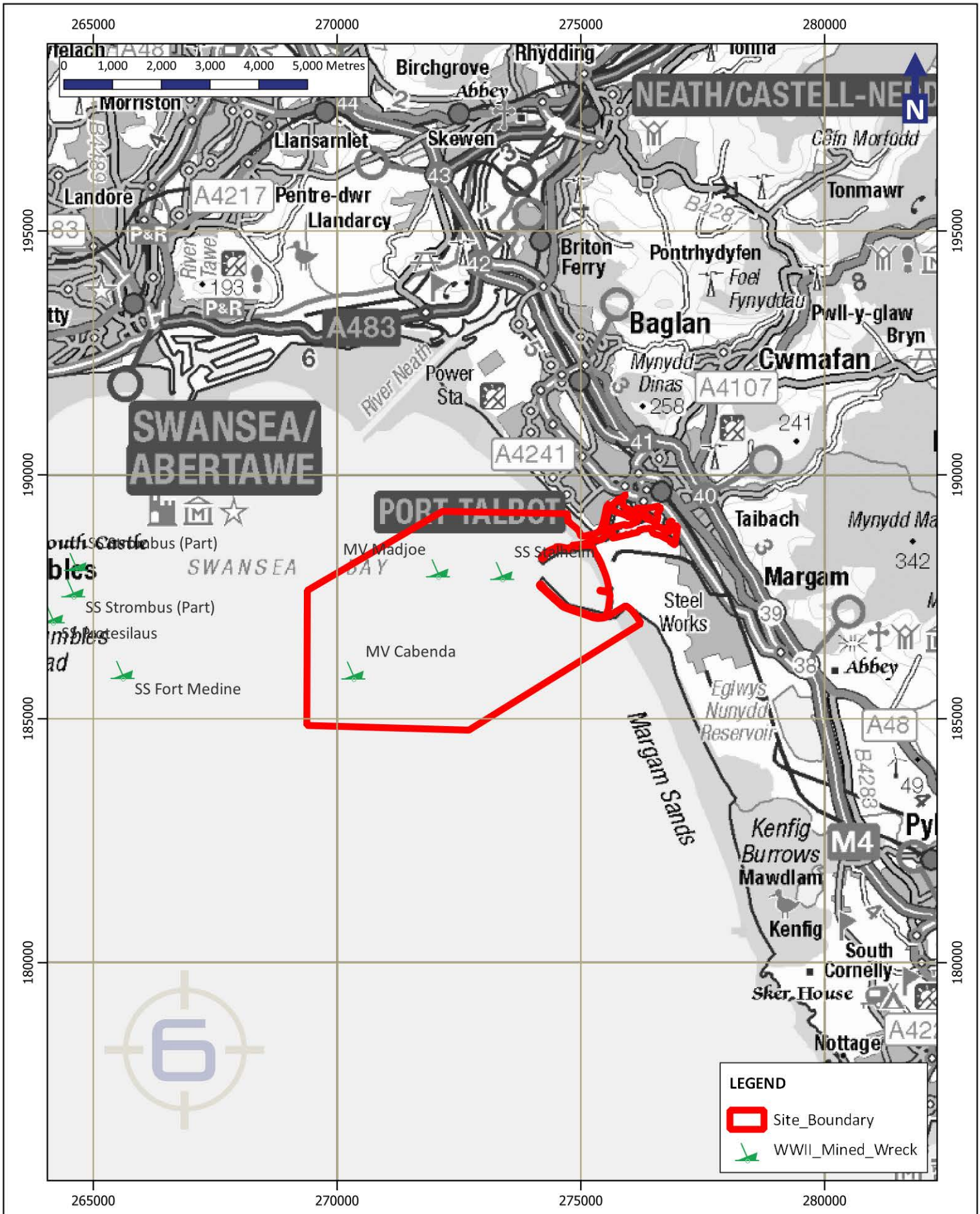
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Munitions Related Shipwrecks

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BOMB SEARCH



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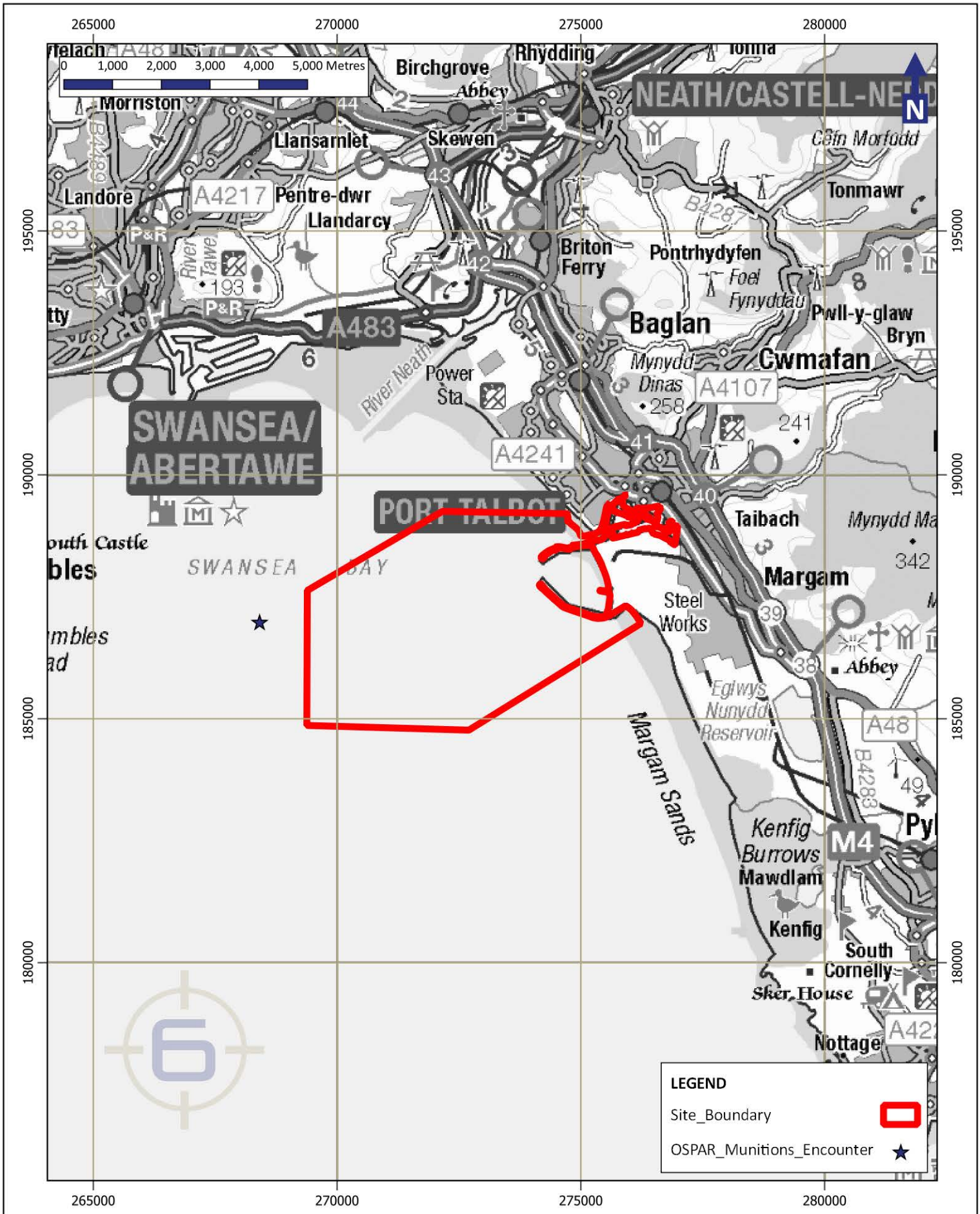
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Munitions Encounters

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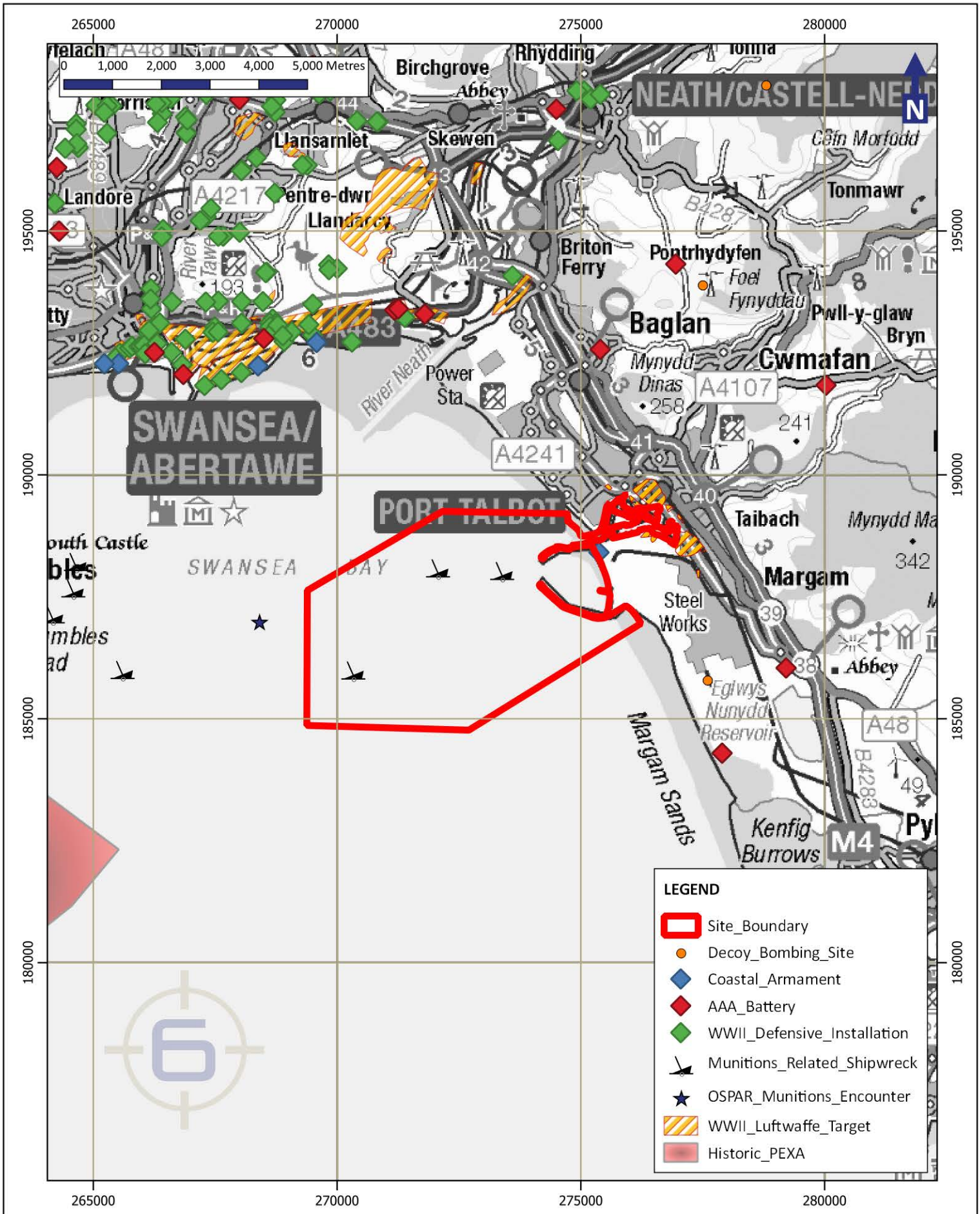


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Consolidated UXO Threat

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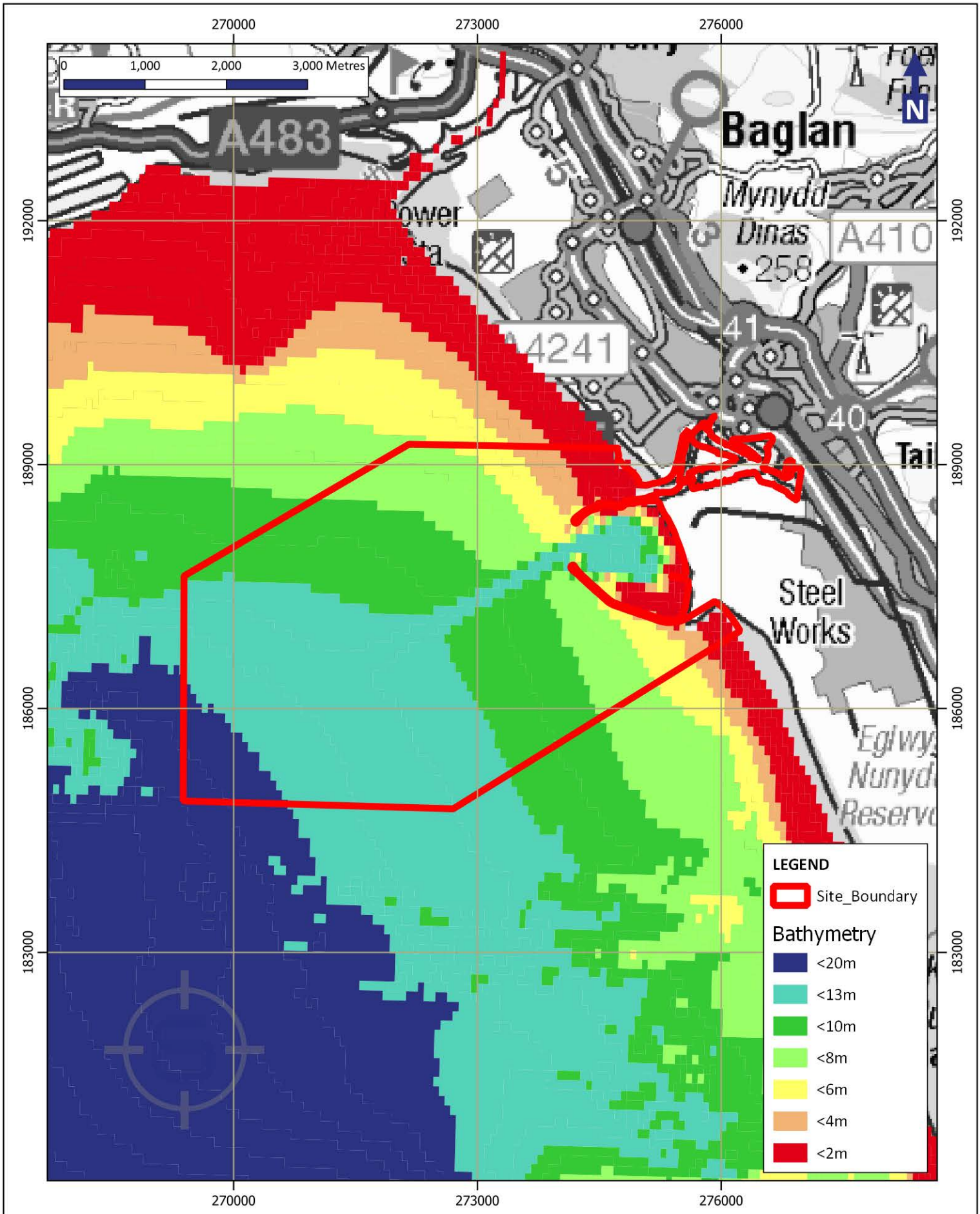
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Bathymetry

BOMB SEARCH



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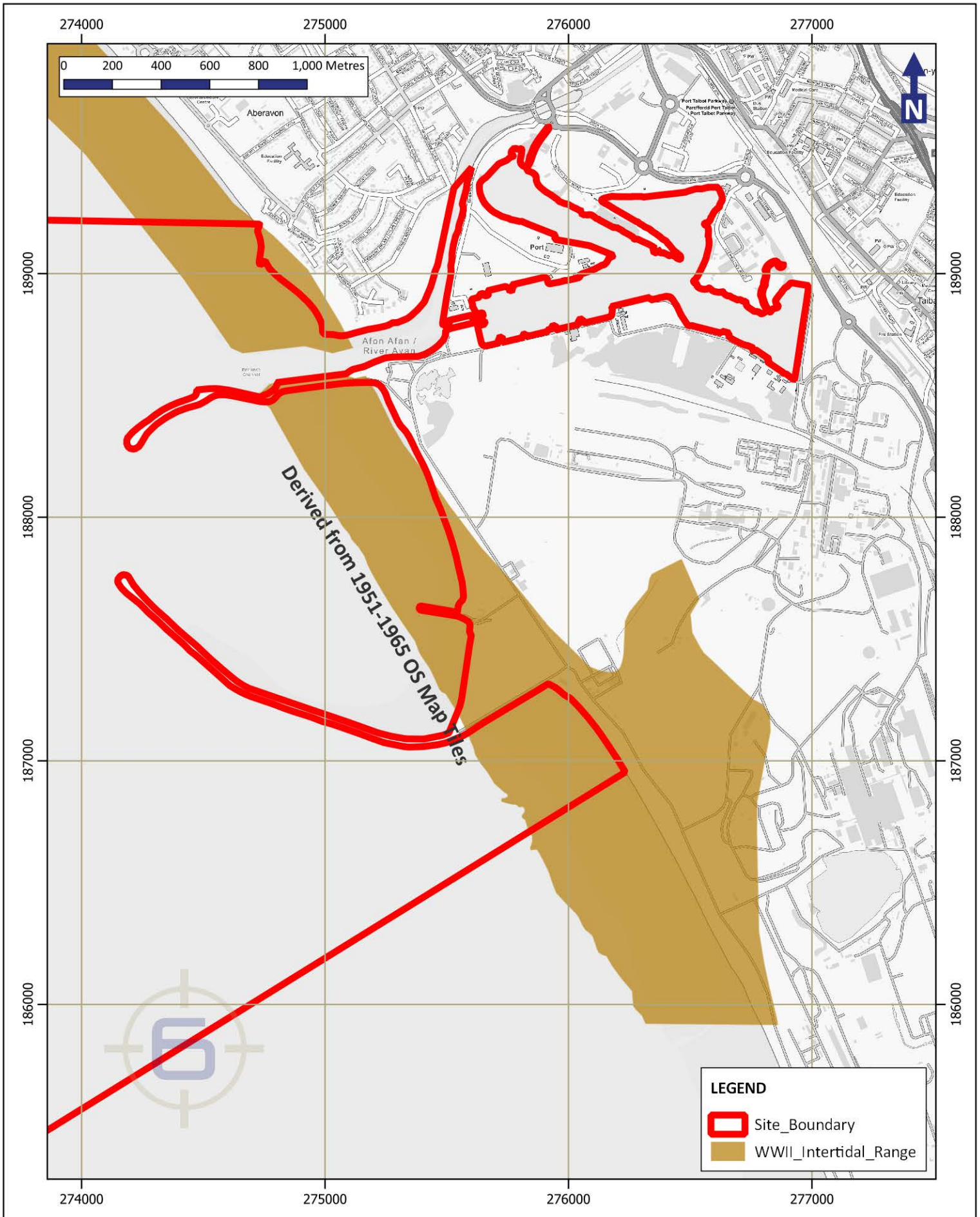
Port Talbot

Extent of Intertidal Zone (WWII)



British National Grid

BOMB SEARCH

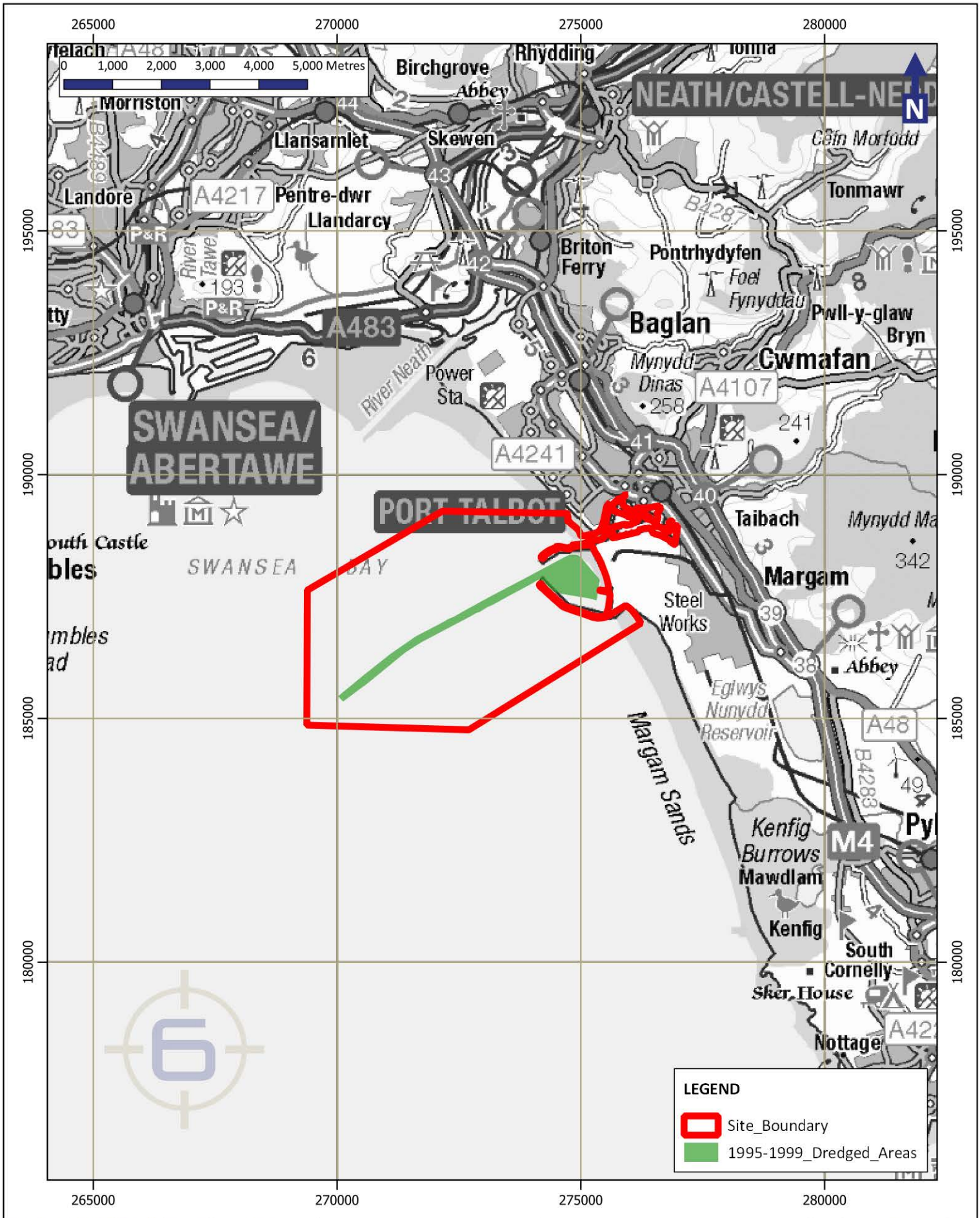


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Extent of Dredging (1995-1999)

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GI Operations

Activity	UXO Threat Item	Assessed NEQ (kg TNT)	UXO Risk to Vessel/Personnel			UXO Risk to Underwater Equipment		
			P	C	R	P	C	R
GI ~5m LAT	Large WWII Naval Mine	720	1	5	**5**	1	5	**5**
	Large WWII HE Bomb	220	2	5	**10**	2	5	**10**
	Small WWII Naval Mine	52	1	5	**5**	1	5	**5**
	Small WWII HE Bomb	25	2	5	**10**	2	5	**10**
	Medium WWII Projectile	6	2	5	**10**	2	5	**10**
	Small WWII Projectile	0.93	2	4	**8**	2	4	**8**
	WWII LSA	0.55	1	4	**4**	1	4	**4**
GI ~10m LAT	Large WWII Naval Mine	720	2	5	**10**	2	5	**10**
	Large WWII HE Bomb	220	2	5	**10**	2	5	**10**
	Small WWII Naval Mine	52	2	5	**10**	2	5	**10**
	Small WWII HE Bomb	25	2	5	**10**	2	5	**10**
	Medium WWII Projectile	6	2	4	**8**	2	5	**10**
	Small WWII Projectile	0.93	2	2	**4**	2	4	**8**
	WWII LSA	0.55	1	2	**2**	1	4	**4**

Activity	UXO Threat Item	Assessed NEQ (kg TNT)	UXO Risk to Vessel/Personnel			UXO Risk to Underwater Equipment		
			P	C	R	P	C	R
GI ~15m LAT	Large WWII Naval Mine	720	2	5	**10**	2	5	**10**
	Large WWII HE Bomb	220	2	5	**10**	2	5	**10**
	Small WWII Naval Mine	52	2	5	**10**	2	5	**10**
	Small WWII HE Bomb	25	2	4	**8**	2	5	**10**
	Medium WWII Projectile	6	2	3	**6**	2	5	**10**
	Small WWII Projectile	0.93	2	2	**4**	2	4	**8**
	WWII LSA	0.55	1	1	**1**	1	4	**4**

Harbour Construction Operations

Activity	UXO Threat Item	Assessed NEQ (kg TNT)	UXO Risk to Vessel/Personnel			UXO Risk to Underwater Equipment		
			P	C	R	P	C	R
Dredging ~5m LAT	Large WWII Naval Mine	720	2	5	**10**	2	5	**10**
	Large WWII HE Bomb	220	4	5	**20**	4	5	**20**
	Small WWII Naval Mine	52	2	5	**10**	2	5	**10**
	Small WWII HE Bomb	25	4	5	**20**	4	5	**20**
	Medium WWII Projectile	6	4	5	**20**	4	5	**20**
	Small WWII Projectile	0.93	4	4	**16**	4	4	**16**
	WWII LSA	0.55	3	4	**12**	3	4	**12**
Dredging ~10m LAT	Large WWII Naval Mine	720	4	5	**20**	4	5	**20**
	Large WWII HE Bomb	220	4	5	**20**	4	5	**20**
	Small WWII Naval Mine	52	4	5	**20**	4	5	**20**
	Small WWII HE Bomb	25	4	5	**20**	4	5	**20**
	Medium WWII Projectile	6	4	4	**16**	4	5	**20**
	Small WWII Projectile	0.93	4	2	**8**	4	4	**16**
	WWII LSA	0.55	2	2	**4**	2	4	**8**

Activity	UXO Threat Item	Assessed NEQ (kg TNT)	UXO Risk to Vessel/Personnel			UXO Risk to Underwater Equipment		
			P	C	R	P	C	R
Dredging ~15m LAT	Large WWII Naval Mine	720	4	5	**20**	4	5	**20**
	Large WWII HE Bomb	220	4	5	**20**	4	5	**20**
	Small WWII Naval Mine	52	4	5	**20**	4	5	**20**
	Small WWII HE Bomb	25	4	4	**16**	4	5	**20**
	Medium WWII Projectile	6	4	3	**12**	4	5	**20**
	Small WWII Projectile	0.93	4	2	**8**	4	4	**16**
	WWII LSA	0.55	1	1	**1**	1	4	**4**

Activity	UXO Threat Item	Assessed NEQ (kg TNT)	UXO Risk to Vessel/Personnel			UXO Risk to Underwater Equipment		
			P	C	R	P	C	R
Piling ~5m LAT	Large WWII Naval Mine	720	1	5	**5**	1	5	**5**
	Large WWII HE Bomb	220	3	5	**15**	3	5	**15**
	Small WWII Naval Mine	52	1	5	**5**	1	5	**5**
	Small WWII HE Bomb	25	3	5	**15**	3	5	**15**
	Medium WWII Projectile	6	3	5	**15**	3	5	**15**
	Small WWII Projectile	0.93	3	4	**12**	3	4	**12**
	WWII LSA	0.55	2	4	**8**	2	4	**8**
Piling ~10m LAT	Large WWII Naval Mine	720	3	5	**15**	3	5	**15**
	Large WWII HE Bomb	220	3	5	**15**	3	5	**15**
	Small WWII Naval Mine	52	3	5	**15**	3	5	**15**
	Small WWII HE Bomb	25	3	5	**15**	3	5	**15**
	Medium WWII Projectile	6	3	4	**12**	3	5	**15**
	Small WWII Projectile	0.93	3	2	**6**	3	4	**12**
	WWII LSA	0.55	1	2	**2**	1	4	**4**

Activity	UXO Threat Item	Assessed NEQ (kg TNT)	UXO Risk to Vessel/Personnel			UXO Risk to Underwater Equipment		
			P	C	R	P	C	R
Piling ~15m LAT	Large WWII Naval Mine	720	3	5	**15**	3	5	**15**
	Large WWII HE Bomb	220	3	5	**15**	3	5	**15**
	Small WWII Naval Mine	52	3	5	**15**	3	5	**15**
	Small WWII HE Bomb	25	3	4	**12**	3	5	**15**
	Medium WWII Projectile	6	3	3	**9**	3	5	**15**
	Small WWII Projectile	0.93	3	2	**6**	3	4	**12**
	WWII LSA	0.55	1	1	**1**	1	4	**4**

Activity	UXO Threat Item	Assessed NEQ (kg TNT)	UXO Risk to Vessel/Personnel			UXO Risk to Underwater Equipment		
			P	C	R	P	C	R
DP Vessels ~5m LAT	Large WWII Naval Mine	720	1	5	**5**	1	5	**5**
	Large WWII HE Bomb	220	1	5	**5**	1	5	**5**
	Small WWII Naval Mine	52	1	5	**5**	1	5	**5**
	Small WWII HE Bomb	25	1	5	**5**	1	5	**5**
	Medium WWII Projectile	6	1	5	**5**	1	5	**5**
	Small WWII Projectile	0.93	1	4	**4**	1	4	**4**
	WWII LSA	0.55	1	4	**4**	1	4	**4**
DP Vessels ~10m LAT	Large WWII Naval Mine	720	1	5	**5**	1	5	**5**
	Large WWII HE Bomb	220	1	5	**5**	1	5	**5**
	Small WWII Naval Mine	52	1	5	**5**	1	5	**5**
	Small WWII HE Bomb	25	1	5	**5**	1	5	**5**
	Medium WWII Projectile	6	1	4	**4**	1	5	**5**
	Small WWII Projectile	0.93	1	2	**2**	1	4	**4**
	WWII LSA	0.55	1	2	**2**	1	4	**4**

Activity	UXO Threat Item	Assessed NEQ (kg TNT)	UXO Risk to Vessel/Personnel			UXO Risk to Underwater Equipment		
			P	C	R	P	C	R
DP Vessels ~15m LAT	Large WWII Naval Mine	720	1	5	**5**	1	5	**5**
	Large WWII HE Bomb	220	1	5	**5**	1	5	**5**
	Small WWII Naval Mine	52	1	5	**5**	1	5	**5**
	Small WWII HE Bomb	25	1	4	**4**	1	5	**5**
	Medium WWII Projectile	6	1	3	**3**	1	5	**5**
	Small WWII Projectile	0.93	1	2	**2**	1	4	**4**
	WWII LSA	0.55	1	1	**1**	1	4	**4**

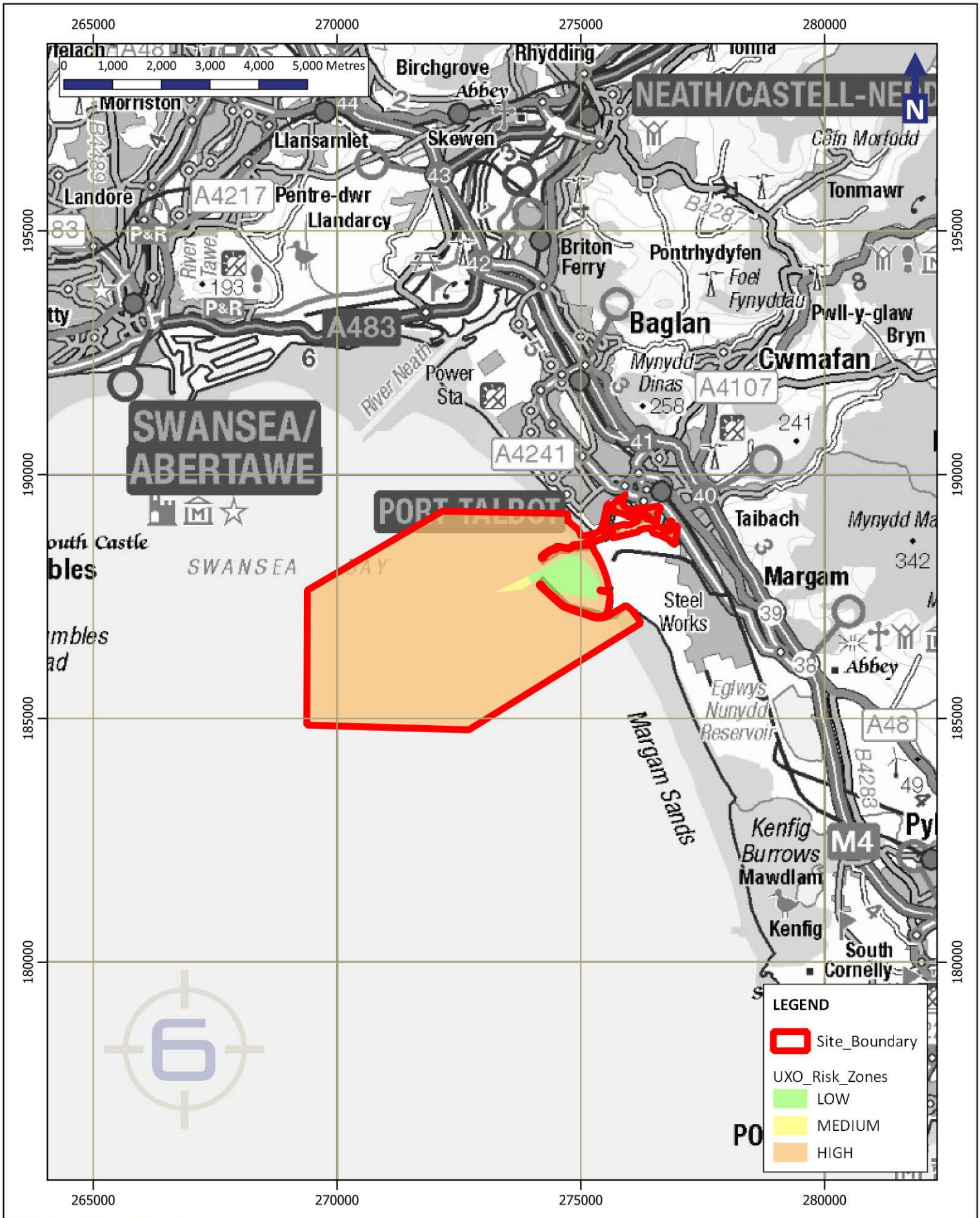
Activity	UXO Threat Item	Assessed NEQ (kg TNT)	UXO Risk to Vessel/Personnel			UXO Risk to Underwater Equipment		
			P	C	R	P	C	R
JUB Deployment ~5m LAT	Large WWII Naval Mine	720	1	5	**5**	1	5	**5**
	Large WWII HE Bomb	220	3	5	**15**	3	5	**15**
	Small WWII Naval Mine	52	1	5	**5**	1	5	**5**
	Small WWII HE Bomb	25	3	5	**15**	3	5	**15**
	Medium WWII Projectile	6	3	5	**15**	3	5	**15**
	Small WWII Projectile	0.93	3	4	**12**	3	4	**12**
	WWII LSA	0.55	2	4	**8**	2	4	**8**
JUB Deployment ~10m LAT	Large WWII Naval Mine	720	3	5	**15**	3	5	**15**
	Large WWII HE Bomb	220	3	5	**15**	3	5	**15**
	Small WWII Naval Mine	52	3	5	**15**	3	5	**15**
	Small WWII HE Bomb	25	3	5	**15**	3	5	**15**
	Medium WWII Projectile	6	3	4	**12**	3	5	**15**
	Small WWII Projectile	0.93	3	2	**6**	3	4	**12**
	WWII LSA	0.55	1	2	**2**	1	4	**4**

Activity	UXO Threat Item	Assessed NEQ (kg TNT)	UXO Risk to Vessel/Personnel			UXO Risk to Underwater Equipment		
			P	C	R	P	C	R
JUB Deployment ~15m LAT	Large WWII Naval Mine	720	3	5	**15**	3	5	**15**
	Large WWII HE Bomb	220	3	5	**15**	3	5	**15**
	Small WWII Naval Mine	52	3	5	**15**	3	5	**15**
	Small WWII HE Bomb	25	3	4	**12**	3	5	**15**
	Medium WWII Projectile	6	3	3	**9**	3	5	**15**
	Small WWII Projectile	0.93	3	2	**6**	3	4	**12**
	WWII LSA	0.55	1	1	**1**	1	4	**4**

Port Talbot

UXO Risk Zones (Overview)

British National Grid

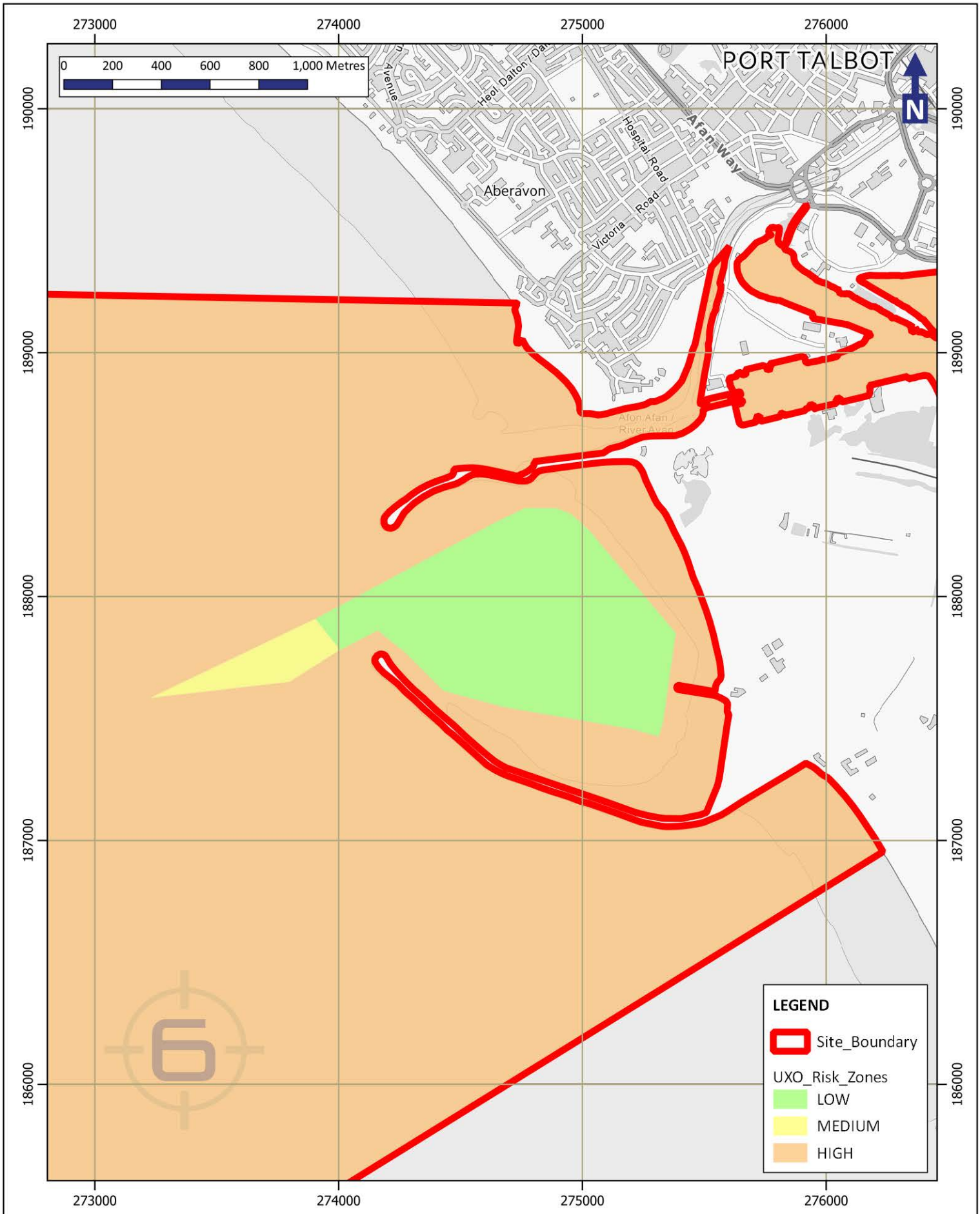


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Port Talbot

UXO Risk Zones (Low and Medium)

British National Grid



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Appendix C
Transboundary Effects Screening Matrix

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C Transboundary Effects Screening Matrix

1.1.1 Transboundary effects refer to the potential environmental impacts of a project that extend beyond national borders. In the context of Wales, this involves assessing the impacts on neighboring countries, particularly within the European Economic Area (EEA).

1.1.2 Regulation 56 of the EIA Regulations (Wales) 2017 requires the Welsh Government to notify the affected EEA states should a project in Wales is likely to have significant transboundary effects. Regulation 20A of The Marine Works (Environmental Impact Assessment) (Amendment) Regulations 2017 also applies.

1.1.3 The Planning Inspectorate has published advice on notification and consultation procedures governing NSIPs that may have transboundary impacts (Planning Inspectorate, 2024: https://www.gov.uk/guidance/nationally-significant-infrastructure-projects-advice-on-transboundary-impacts-and-process), and Annex 1 and Annex 2 contain the transboundary screening templates and relevant criteria.

1.1.4 Whilst the Project is not an NSIP, and the advice from the Planning Inspectorate is non-statutory, the screening process set out in the advice forms good practice. It is therefore considered relevant to use the screening process from Annex 1 provided by the Planning Inspectorate for a review of the potential transboundary effects relating to the Project.

1.1.5 In addition, the Habitats Regulations (The Conservation of Habitats and Species Regulations, 2017) and the Offshore Marine Conservation Regulations (The Conservation of Offshore Marine Habitats and Species Regulations, 2017) require an appropriate assessment to be undertaken by competent authorities where the plan or project is likely to have a significant effect on a European site or European Marine site (either alone or in combinations with other plans or projects). The consideration of transboundary effects relevant to the Habitats Regulations and Offshore Marine Conservation Regulations are referenced in the Planning Inspectorate Advice Note ten: Habitats Regulations Assessment.

1.1.6 An Habitats Regulations Assessment (HRA) Screening has been undertaken for the current ABP estate ownership and includes the Future Port Talbot (FPT) programme of which the floating offshore wind (FLOW) project is a part. The HRA Screening is consistent with this assessment. The HRA Screening report concluded that significant effects are likely in relation to the integrity of several Habitat Sites, and an appropriate assessment would be undertaken.

1.1.7 The following table (Matrix) sets out the considerations from Annex 1 and provides commentary on how they relate to potential transboundary effects arising as a result of construction, operation or maintenance of the Project.

1.1.8 Whilst the information at Scoping stage may be limited, as the Matrix is typically applied at the Environmental Statement stage, is it considered sufficient to inform the assessment of scoping for transboundary effects.

Table C-1: Screening Matrix for Possible Substantial Effects on the Environment of Another EEA State

Criteria and relevant considerations (Annex 1)	Commentary with regard to the Project
Characteristics of the development • Size of the development • Use of natural resources • Production of waste • Pollution and nuisance • Risk of accidents • Use of technologies	The Project involves a programme of works to develop the existing Port into a hub for the preparation of offshore wind energy turbines. This will require the expansion (including through land reclamation) and modification of areas within the Port, as well as the completion of ecological mitigation on areas located outside of the Port estate. The maximum extent of operational landside area required for would be up to 166ha. The material resources required for the construction of the Project are likely to be obtained from UK national and global markets. Materials are to be obtained locally wherever possible, in line with the Project's sustainability strategy. There is the potential for dredging of the approach channel to the tidal harbour to improve navigable access to the Port, and dredging within the tidal harbour to improve navigability, provide vessel and floating foundation access, float-off, temporary wet storage, turbine commissioning, and material import. Dredging may result in sediment deposit and underwater noise and vibration elevated above background levels which may impact marine species within Welsh protected areas (see HRA Screening report). The impacts will be assessed within the HRA appropriate assessment. Dredging will be undertaken either within or close to the Port, and disposal is expected to be at existing licensed sites. Wider activities to support primary FLOW operations include: delivery of materials by sea, vessel movements in/out of tidal harbour, potential transfer of components to Port of Swansea, use of the Port as a support facility for the operational phase of Celtic Sea FLOW (maintenance and repair of turbines, occasional return to port, decommissioning). The nature of the Project is such that waste, nuisances or accidents arising from construction or operation of the Project are unlikely to extend beyond the border of the UK. There are unlikely to be aqueous or aerial discharges from the operations of the Project. During construction, activities will be temporary and short term, with environmental impacts controlled through an agreed Construction Environmental Management Plan (CEMP) and related legislative controls. Piling is required during construction and there may be underwater noise and vibration elevated above background levels which may impact marine species within Welsh protected areas (see HRA screening report). The impacts will be assessed within the HRA appropriate assessment.

Criteria and relevant considerations (Annex 1)	Commentary with regard to the Project
	No novel technologies are proposed that have the potential for transboundary effects.
Location of development (including existing use) and Geographical area • What is the existing use? • What is the distance to other EEA states? (Name EEA state)? • What is the extent of the area of a likely impact under the jurisdiction of an EEA state?	The land being used for the Project is within the port of Port Talbot and includes new reclaimed land from within the Tidal Harbour. There will be a minimum of two additional sites for habitat mitigation in the form of compensatory habitats and enhancements. This includes both terrestrial and intertidal habitats. Historic land uses within the Port are associated with previous uses of the port and the land formerly used by Tata Steel works. Historic land uses at the Jersey Marine Site and Kenfig Marshaling Yard Site are described in more detail in Chapter 2 – Description of Development. The former has been undeveloped since the late 1890s prior to which it was used as a Copper Works, the Kenfig Marshalling Yard Site was formerly used as rail sidings. The closest EEA boundary to the Project is the Republic of Ireland, located approximately 100km to the west-northwest.
Environmental importance • Are particular environmental values (e.g. protected areas – name them) likely to be affected? • Capacity of the natural environment. • Wetlands, coastal zones, mountain and forest areas, nature reserves and parks, Natura 2000 sites, areas where environmental quality standards already exceeded, densely populated areas, landscapes of historical, cultural or archaeological significance.	There are no statutory designated sites present within or adjacent to the EIA Scoping Boundary. Kenfig Pool and Dunes Special Area of Conservation (SAC), marine SAC, National Nature Reserve and Local Nature reserve is located 4.3km south-east. International designations up to 30km from the site, designated for bird and marine features, include Camarthen Bay and Estuaries SAC (25km west), Bristol Channel Approaches SAC (35km west). *Marine Mammals* Harbour porpoise are present in Swansea Bay year-round, with the areas being important for foraging and potentially for calving / nursery. Grey seals are recorded as being in low numbers in Swansea Bay. *Intertidal and offshore ornithology* Offshore marine areas within the 5km Zone of Influence identified in the EIA Scoping report could support a diverse range of bird species. *Landscape, Seascape and visual* The study area for potential effects on landscape / seascape does not extend beyond UK waters.
Potential impacts and carrier • By what means could impacts be spread (i.e. what pathways)?	Potential transboundary environmental impacts include emissions of greenhouse gas (GHG). GHG emissions would be spread by atmospheric processes. The Project will result in the loss of subtidal habitats under the footprint of the reclamation area and rock revetement, and breakwater improvement and piling works to a lesser extent. There is potential for removal of benthic habitats from capital dredging which would remove marine sediments. Other effects include smothering of

Criteria and relevant considerations (Annex 1)	Commentary with regard to the Project
	seabed habitats from physical disturbance or disposal of dredged material, changes in water quality, and elevated underwater noise and vibration from dredging / dredge disposal or construction piling. Underwater noise and vibration has the potential to disturb marine mammals and fish. These impacts are scoped in to the EIA (marine ecology). Other impacts on marine mammals (collision risk, impacts to habitat, water quality or foraging habitat) are considered negligible and have been scoped out of the EIA). Impacts on fish (habitat, populations, water quality and sediment) are also scoped in. Underwater noise has the potential to affect benthic species. However, only behavioural responses are expected in close proximity to any piling with population level and mortality effects considered unlikely. No significant effects on benthic invertebrates are anticipated during maintenance dredging and dredge disposal. It is unlikely that impacts on the marine ecology receptors scoped in to the EIA would extend beyond the jurisdiction of the UK, with the exception of potential greenhouse gas emissions. The Project will include a carbon management plan to minimise carbon in design and emissions in operation. The inclusion of marine ecology in relation to transboundary effects is currently scoped out, but will be kept under review as more information becomes available from the surveys and assessments undertaken for the EIA.
Extent • What is the likely extent of the impact (geographical area and size of the affected population)?	The Project and its geographic context is shown in Figure 1.1 in Chapter 1 of the EIA Scoping report. The EIA Scoping boundary is presented in Figure 2.1, Appendix A of the EIA Scoping report. **GHG Emissions** GHG emissions are considered a potential transboundary environmental impact. GHG emissions are known to contribute to changes on climate on a global scale. However, it is not possible to apportion or identify any impact of an increase (or any particular level of increase) in GHG emissions in terms of environmental effects on any particular country or state. The EIA for the Project will include calculation of the likely greenhouse gas emissions from construction and operation. GHG impacts will be in the context of their impact on the UK's 5 year carbon budgets which set legally binding targets for GHG emissions. GHG emissions would be spread by atmospheric processes. Through design measures built into the Project, delivery of mitigation measures, and effective control by regulatory bodies. The assessment will present the GHG emissions and compare them with the UK national emissions

Criteria and relevant considerations (Annex 1)	Commentary with regard to the Project
	inventory; transboundary effects from GHG emissions will not be considered further in the EIA. Effects on marine ecology from underwater acoustics are considered a potential transboundary impact. However, it is anticipated that no underwater noise and vibration adverse effects will arise at distances greater than 15km from the EIA Scoping boundary. It is anticipated that fish, marine mammals, diving birds, and benthic species within the study area may be impacted by underwater noise and vibration. However, the likelihood of any transboundary impacts on other EEA States (e.g. smothering or disturbance) is low because of the likely distance between the activity and the EEN states. However, this will be kept under review as further information becomes available as part of the EIA studies.
Magnitude • What will the likely magnitude of the change in relevant variables relative to the status quo, taking into account the sensitivity of the variable?	Not evaluated.
Probability • What is the degree of probability of the impact? • Is the impact likely to occur as a consequence of normal conditions or exceptional situations, such as accidents?	Not evaluated.
Duration • Is the impact likely to be temporary, short-term or long-term? · Is the impact likely to relate to the construction, operation or decommissioning phase of the activity?	The duration of potential transboundary effects has not been evaluated. The Project will be delivered in phases, each comprising terrestrial and marine works. The spatial extent of each anticipated phase is shown in Figure 1.2 and 2.4 in Appendix A of the EIA Scoping report. Construction of the Project (Phase 1) is expected to begin no earlier than 2027 and last for 4 years. Later construction phases are also possible. The design life for the different physical assets of port infrastructure range between 25 and 100 years, which is the expected operational function of the asset before maintenance.
Frequency • What is likely to be the temporal pattern of the impact?	Not evaluated.
Reversibility • Is the impact likely to be reversible or irreversible?	Not evaluated.
Cumulative impacts • Are other major developments close by?	Other Proposed Developments will be taken into consideration in the EIA cumulative effects assessment, which has not been undertaken at this stage. Whilst underwater noise and vibration, sediment deposition and impacts on marine ecological

Criteria and relevant considerations (Annex 1)	Commentary with regard to the Project
	receptors are recognized as potential effects of the Project, possible transboundary effects have not been identified at scoping stage.

1.1.9 From the information available for the above screening matrix, it is not anticipated that there is potential for transboundary effects (and therefore any effects on important environmental receptors beyond the UK).

1.1.10 Notwithstanding the above screening, it is noted that the duty under Regulation 56 of the EIA Regulations (Wales) 2017 continues throughout the application process and therefore this screening matrix may be reviewed and revised at application stage.

1.1.11 The potential for significant effects relating to European designated sites will be accounted for in the Environmental Impact Assessment (EIA) and in the HRA screening and appropriate assessment reports.

Appendix D
Report to Inform a Habitats Regulations Assessment (HRA) Screening

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1 Introduction

1.1 Overview

1.1.1 Associated British Ports (ABP) is the Statutory Harbour Authority (SHA) for the Inner Harbour and Tidal (or Outer) Harbour at the existing port of Port Talbot (the Port). In its role as SHA, ABP intends to bring forward a transformative programme of works at the Port, known as “Future Port Talbot” (FPT, or the FPT programme). The FPT programme will support the diversification of the Port and associated infrastructure, to capitalise on emerging offshore wind energy and green industry opportunities. In turn, this will enable Wales to meet its renewable energy and carbon reduction targets, and deliver positive local, regional and national socio-economic benefits.

1.1.2 This report to inform Habitats Regulations Assessment (HRA) Screening will inform FPT projects specifically the floating offshore wind (FLOW) project (the Project), a proposal to expand the Port to allow for offshore wind energy industry related activities.

1.2 Site overview

1.2.1 Port Talbot is located on the south coast of Wales, on the east side of Swansea Bay as shown in **Figure 1.1**.

Figure 1.1: Port Talbot location in Swansea Bay



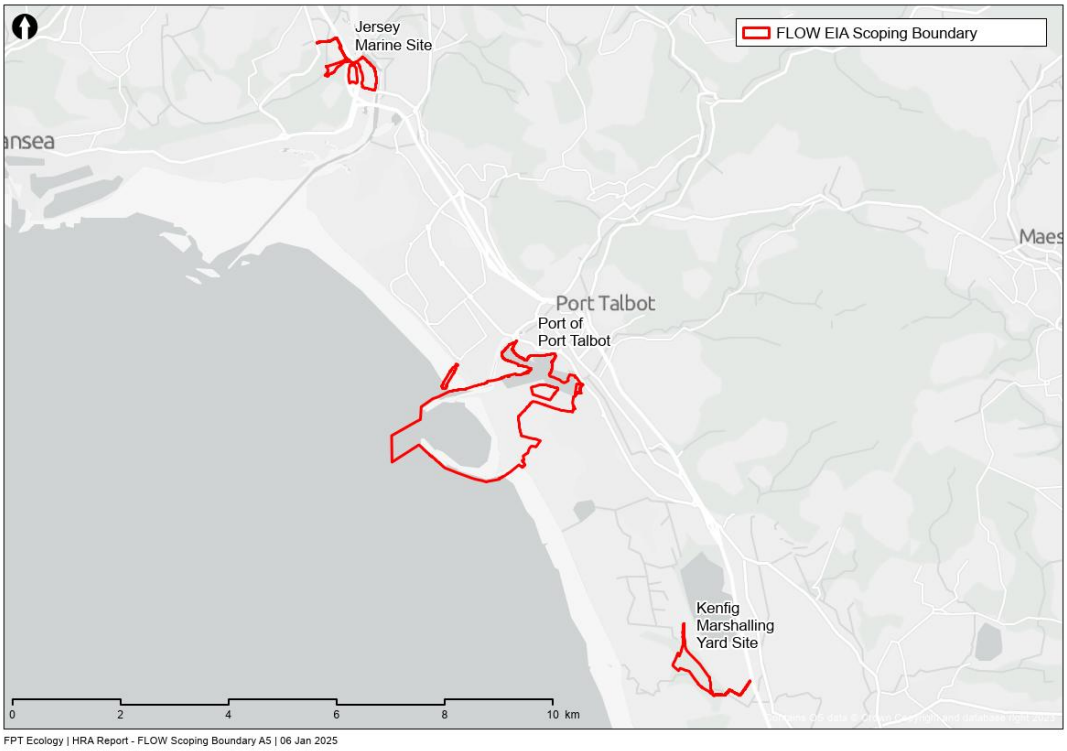
extracted from ArcGIS (Earthstar Geographics, Esri UK, Esri, HERE, Garmin, FAO, NOAA, USGS.)

Note: The red square represents the location of Port Talbot

1.2.2 The Project primarily concerns land within the Port in addition to at least two nearby land parcels to be used for the purpose of ecological mitigation and enhancements. There are two land parcels currently identified for the purpose of implementing ecological mitigation (compensation) that cannot be provided within the Port. These are land at Jersey Marine ('Jersey Marine Site') and land at Kenfig Marshalling Yard ('Kenfig Marshalling Yard Site'). The current FLOW boundary indicating the Port and these land parcels is shown in **Figure 1.2** below. The land within the Port broadly follows the ABP estate boundary.

1.2.3 The area within the port excludes a land parcel for a proposed development of an alternative aviation fuel facility (LanzaTech). For the purposes of this report, is excluded from the Project boundary as it is not part of the project proposals being assessed.

Figure 1.2: FLOW EIA Scoping Boundary



Source: Mott MacDonald 2024

1.3 Current ecological baseline and context

1.3.1 The Port is a working area with a mixture of industrial development alongside a mosaic of early colonising and coastal grassland habitats which collectively meet the criteria for the Environment (Wales) Act 2016 Section 7 priority habitat Open Mosaic Habitats on Previously Developed Land (OMHPDL). Other habitats present include the impounded dock (freshwater habitat but classified as a transitional waterbody), reedbeds, ponds, scrub, woodland and areas of hardstanding and buildings associated with existing infrastructure. Baseline survey work is currently underway but existing survey information available for part of the site has

identified that the site supports a range of wintering and breeding bird species, low levels of bat activity, reptiles, amphibians, invertebrates and rare plants (including the Schedule 8 species *Orobanche picridis*).

1.3.2 Surrounding the Port site is the River Afan to the north, the steelworks site and associated roads and infrastructure to the east, and the coastline and sea to the south and west.

1.3.3 Kenfig Marshalling Yard Site covers an area of approximately 24ha and comprises a mosaic of habitats including dune slack vegetation, lowland fen, reedbed, naturally regenerating grassland, coastal grassland and areas of ephemeral vegetation alongside areas of dense and scattered scrub, woodland and hardstanding.

1.3.4 Jersey Marine Site covers an area of approximately 24ha and is an area of undeveloped land crossed by the existing M4 and A48 with the River Neath to the east. The eastern part of the Jersey Marine Site is crossed by a surface pipeline as well as existing overhead lines. This Jersey Marine Site is accessed by a secondary road off the B4290. The access route into the site crosses the canal and over the railway line, passes through an industrial site and then into the north of the site via an existing bridge which is located under the elevated section of M4. Jersey Marine Site largely comprises a mixture of grassland, scrub and woodland habitats. In addition, some areas of remnant heath are present and a large area of saltmarsh in the northeast.

1.4 Structure and purpose of this report

1.4.1 This report has been prepared with the aim of providing the Competent Authority (CA) with sufficient information to inform their decision with regard to a HRA. It has been provided in the form of a shadow Stage 1 screening document following the relevant process required by the CA.

1.4.2 This report documents the assessment of the potential for “likely significant effects” of the Scheme on the National Sites Network (NSN) (formerly Natura 2000 sites), as required by Regulation 63(1) of the Conservation of Habitats and Species Regulations 2017 (as amended) (the Habitats Regulations) and which comprises Special Protection Areas (SPA) and Special Areas of Conservation (SAC) (both designated and proposed/candidate) located across the UK. In accordance with Planning Policy Wales1 (PPW) Ramsar sites are given the same protection as SACs and SPAs and have been considered as such in this assessment, collectively these sites are referred to as ‘Habitats Sites’. Habitats Sites relevant to this report to inform HRA Screening have been identified in accordance with the Study Area criteria noted in Section 3. These will be considered systematically through the stages of HRA. The HRA process is described in further detail in Section Approach to Habitats Regulations Assessment.

[1] Paragraph 6.4.31 Planning Policy Wales - Edition 12 (gov.wales)

2 Project Description

As a minimum the Project will require the construction of new landside and marine infrastructure to deliver the modifications required for a FLOW port. These modifications will be achieved through progressive build out in phases. At this stage it assumed that there would be two phases of development.

Phase 1 will provide facilities for integration (or staging) and commissioning of platforms and the assembly of floating foundations. Future optional phases comprises the construction of an expanded facility to enable floating foundation assembly and / or manufacturing of the FLOW foundations bases at the Port in addition to integration and commissioning functions.

A summary of the works is provided below. The Project is described in more detail in **Chapter 2 - Description of Development**.

2.1 Design elements of Phase 1

2.1.1 The potential features of the first stage of development involve both marine and landside works.

2.1.2 The marine works include:

- construction of new quay wall and land reclamation south of the existing iron ore jetty and dredging within the Tidal Harbour to create new areas of quayside and to ensure that water depths in the Tidal Harbour are suitable for port operations. This would provide:
  - Integration and import berths in the order of 310m and 320m in length respectively;
  - A commissioning berth in the order of 300m, in length;
  - A launch facility in the order of 250m in length;
  - Placement of stone blankets alongside the quay;
- additional operational land for turbine operational quayside. The height of the quay wall takes into account the dredge pocket requirements for the import and integration berths and the tidal range so that the height will be up to +8mAOD;
- a new pontoon berth for crew transfer activities;
- dredging to improve navigable access to the Port by larger vessels and facilitate the potential for temporary storage to support integration and commissioning activities, includes an expanded section of the navigation channel to provide sufficient widths to allow the tow-out of completed platforms;
- the designation of a wet storage area within the SHA for the mooring of floating platforms.
- a new marine offloading facility (‘MOLF’) within the inner dock used for the transfer of materials and equipment from ship to shore. This would

be subject to further study and design. It may instead be necessary to construct a MOLF elsewhere in the Port if the inner dock is unsuitable;

- changes to navigation marks within the Tidal Harbour;
- construction of separate platform maintenance mooring point within the Tidal Harbour (this could be multi use) – potentially a piled structure;
- new intertidal habitats and/or enhancements within the limits of the Port and off-site locations within land owned by ABP (including but not limited to the Jersey Marine Site and the Kenfig Marshalling Yard Site);
- main breakwater, Lee and Southern breakwater crest height improvements and armouring works.
- works such as (cathodic protection system, pile repairs, remediation to the deck structure, replacement/repair of safety equipment, replacement/repair fenders and moorings) to ensure future safety of the existing iron ore jetty (the exact nature of the works will be dependent on the findings of studies to understand the condition of the structure); and
- There are different options for the way that quay walls can be constructed. There are a number of factors that influence how the quay wall would be constructed including ground conditions, and market skills and availability, programme, to name a few. The current quay wall types under consideration are listed below and summarised in **Appendix N – Potential Quay Wall Design Options**. It should be noted that the final quay wall design could be one or a combination of different design options. The quay wall design options currently under consideration consist of:
  - Placement of stone blankets alongside the quay;
  - Combi-walls;
  - Secant pile walls;
  - Blockwork walls;
  - Suspended Deck / Slab Structures on Piles;
  - Cofferdam Walls;
  - Monolith Walls;
  - Counterfort Walls;
  - Caisson Walls;
  - Diaphragm Walls;
  - Contiguous Walls; and
  - Cellular Cofferdam.

2.1.3 The landside (including work to the topside of newly created quay areas) are:

new open operational area for the storage of turbine components prior to assembly;

- new open operational area for the storage of floating substructure components prior to assembly;
- new open area for the assembly of floating foundations prior to launch;

- new heavy lift area(s) within the quay for high-capacity cranes to support integration, foundation launch, and component import activities;
- mobilisation of operational equipment (such as mobile cranes/heavy lift equipment, and SPMTs);
- construction of section of road from access road to provide access to the existing waste water treatment facility;
- new main incoming electricity substation, and supply to downstream substations, and power distribution within the Port facility;
- other utility connections and diversions including drainage;
- construction of a port operations building of approximately 120m long x 60m wide x 20m high;
- An enclosed building for the assembly / painting activities of approximately 200m long x 120m wide x 30m high for the foundations;
- a building for offices and welfare facilities of approximately160m long x 60m wide x 20m high (it is expected that this would be a prefabricated structure allowing deconstruction and relocation elsewhere within the Port);
- A workshop for mechanical, electrical and EC&I fabrication, fitting and testing approximately 120m long x 60m wide x 20m high
- Up to 3 specialist supply chain, maintenance and/or warehousing buildings of approximately 120m long x 60m wide x 20m high;
- Up to 10 tracked type cranes ranging from 60 tons to 1200 tons capacity and 50m to 300m high, required for lifting, moving and assembling components around the Port;
- Lighting ranging from standard street lighting columns up to tower lighting scale around 60m high to all storage areas, working areas and access routes;
- car parking to accommodate the workforce and port operations staff;
- perimeter fencing, security structures;
- new terrestrial habitat areas within the Kenfig Marshalling Yard Site area and the Jersey Marine Site; and
- onsite terrestrial ecological mitigation and or enhancement features.

2.2 Design elements of optional future phase ('Phase 2')

2.2.1 A further phase or phases would be north of the Iron Ore Jetty and would involve similar works to the Phase 1 requiring additional areas of reclamation in the Tidal Harbour and additional extents of landside works. The extent of additional reclamation works would be dependent on the availability of additional land from within the Port.

2.2.2 Depending on the scale of development required for further phases, works may include:

- additional lengths of new quay wall located to the north of the existing iron ore jetty (these could be up to 1200m) to provide a combination of import berth, launch, and integration facilities;

- land reclamation in the northern extent of the Tidal Harbour a maximum extent of which is shown on Figure 1.2 in **Appendix A** of the Scoping Report;
- incorporation of more land from within the Port estate (the balance depends on the extent of land reclamation);
- addition of further mobile heavy lift cranes of up to 250m height;
- potentially repurposing launching facility from Phase 1 to provide an import berth (the eventual arrangement and reuse depends on ongoing design);
- Further high mast lighting of up to 60m height;
- manufacturing of steel foundation substructures, which would require the following areas and enclosed manufacturing buildings with overhead gantry crane facilities throughout:
    - office(s) of approximately 200m long x 60m wide x20m high;
    - Manufacturing buildings with their approximate sizes are envisaged to include:
    - Plate Cutting, Outfitting & Steel Forming 275m long x 100m wide x 36m high.
    - Profile cutting 120m long x 40m wide x 35m high
    - Flat panel assembly 200m long x 180m wide x 45m high
    - Sub-assembly 150m long x 180m wide x 45m high
    - Half Block and Top Block assembly 350m long x 100m wide x 60m high
    - Mid-Block and Top Block assembly 450m long x 160m wide x 80m high
    - Damping Box assembly 280m long x 160m wide x 50m high
    - Grand Panel assembly 280m long x 80m wide x 50m high
    - Brace assembly 250m long x 80m wide x 40m high
    - Paint Shop1 300m long x 80m wide x 80m high
    - Paint Shop2 200m long x 120m wide x 40m high
    - Rigging, Electrical and M&E 140m long x 60m wide x 30m high
    - Stores 160m long x 50m wide x 30m high
    - Pipe Shop 80m long x 30m wide x 15m high
    - Maintenance Shop 100m long x 30m wide x 15m high
    - Grand Assembly (outdoor) 600m long x 100m wide (components 50m high)
    - Grand Component Assembly (outdoor) 600m long x 100m wide (components 50m high)
    - Foundation Assembly Area (outdoor) 600m long x 400m wide (components 50m high)
    - Launch Trackway (outdoor) 600m long x 150m wide (components 50m high)

- Steel Stockyard (outdoor) 400m long x 100m wide (components 50m high)

- manufacturing of concrete foundation substructures would require the following areas and buildings:
  - office(s) of approximately 200m long x 60m wide x 20m high;
  - batching plant with a capacity of c.250 m^3/hr;
  - pre-cast yard for concrete foundations approximately 600m long x 600m wide (possibly covered to provide overhead gantry style craneage at 80m high);
  - Paint Shop 300m long x 80m wide x 70m high
  - Stores 160m long x 50m wide x 30m high
  - Pipe Shop 80m long x 30m wide x 15m high
  - Maintenance Shop 100m long x 30m wide x 15m high
  - A reinforcement prefabrication facility 400m long x 150m wide
  - Steel Stockyard 300m long x 150m wide
  - 24 Fixed concrete pumps to 70m height.
  - Plant Maintenance yard 250m long x 100m wide
  - Formwork prefabrication and maintenance building 300m long x 60m wide
  - Rigging, Electrical and M&E 140m long x 60m wide x 30m high
  - Launch Trackway (outdoor) 600m long x 150m wide (components 50m high)
  - possible conveyor for aggregate/cement import;
- on-site and off-site habitat mitigation and compensation and or enhancement features (including marine habitat enhancements). The extent to which and types (terrestrial and or marine) are dependant on the extents of land reclamation and existing landside areas incorporated into Phase 2; and
- utilities, lighting, fencing and habitat mitigation and compensation features.

2.3 Jersey Marine Site and Kenfig Marshalling Yard Site

2.3.1 Land at the Jersey Marine Site comprises three linked land parcels totalling 24 ha. The site is undeveloped with varying habitat types ranging from steep woodland / cliff, unimproved pasture with overgrown field margins. To the east adjacent to the tidal River Neath there are intertidal habitats with mudflat and saltmarsh.

2.3.2 The land at Kenfig Marshalling Yard is an area of former rail sidings with fragmented fen habitats. The site is approximately 24 ha in area and comprises predominantly undeveloped, vegetated land with areas of hardstanding and disused railway sidings near its eastern boundary and its north-western area.

2.3.3 Management plans are being developed for these two sites in order deliver habitat mitigation and enhancement. The works at the Jersey Marine Site may comprise the following:

- Creation of bunds to increase water retention by creating a localised inundation area within the saltmarsh to benefit botanical diversity and associated wetland species;
- Management of existing grassland to improve diversity and structure (potentially involving surface reprofiling, soil preparation and seeding) to benefit associated species;
- Woodland improvements which could include some thinning, scrub clearance, opening out of glades and supplementary planting to benefit a wide range of habitats and species;
- Provision of dead wood piles/wood chip piles;
- Improvements to support reptile relocation including creation of reptile hibernacula, grass snake egg laying heaps, and thermophilic reptile sites;
- Provision of seasonally wet scrapes / depressions including some small excavations and localised reprofiling;
- Works to remove any stands of non-native invasive species such as Japanese Knotweed; and
- Subject to further investigation, potential for reconnecting the cut-off creek in the south of the site with the estuary.

2.3.4 The works at the Kenfig Marshalling Yard Site may comprise the following:

- Breaking up of hardstanding and creation of new grassland areas;
- Provision of seasonally wet scrapes / depressions including some small excavations and localised reprofiling;
- Movement of soil material excavated from within the Port from areas identified as containing protected / rare and notable plant species;
- Varying the topography of the site to include bunds and sunny bare ground to benefit reptile and invertebrates;
- Managing existing habitats to increase botanical diversity and associated species;
- Provision of dead wood piles/wood chip piles; and
- Works to remove any stands of non-native invasive species such as Japanese Knotweed.

2.3.5 The two sites are described in more detail in the FPT FLOW EIA Scoping Report, Chapter 2 -Description of Development.

3 Approach to Habitats Regulations Assessment

3.1 Overview of approach

3.1.1 This report to inform HRA screening has been undertaken as a shadow assessment to provide information to inform the HRA undertaken by the CA.

3.1.2 This HRA will also be updated as and when new information is available which affects the assessment. The assessment will be updated when the proposed scheme design and methodology is finalised.

3.2 HRA framework

3.2.1 There is a requirement under the Conservation of Habitats and Species Regulations 2017 (as amended) ("the 2017 Regulations") to determine if a plan or project (either alone or in-combination) may affect the interest features and objectives of protected nature conservation sites at a European and International level (referred to in this report as Habitats Sites) prior to any consent or permission being determined. The process of undertaking this assessment is known as a Habitats Regulations Assessment (HRA).

3.2.2 The 2017 Regulations include measures to establish and maintain a network of sites to protect habitats which in themselves are valuable, and the species they support. These sites form a network that across Europe is known as Natura 2000, and domestically also known collectively as the National Site Network. Within the UK, this network consists of SPAs and SACs, together with proposed and candidate SPAs and SACs (pSPAs and cSACs). This network also extends to marine environments, with wetland sites of international importance (Ramsar sites2) also treated equally within this assessment framework, in accordance with PPW. These sites are collectively referred to in this document as 'Habitats Sites'.

3.2.3 The 2017 regulations are set out in Parts, with Part 2 including provisions for the selection and designation of sites and Part 6 providing provisions to ensure that assessment of plans and projects are fully considered before being granted consent or permission. They also define the nature of and roles of statutory bodies, competent authorities and the appropriate nature conservation body and the requirements for information to be submitted to these bodies to enable them to undertake the required assessments.

3.2.4 Although the 2017 Regulations have been amended by The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019, due to the UK's exit from the EU, the effect of these amendments is largely related to terminology/wording. Requirements and processes remain the same, as

[2] Designated via The Convention on Wetlands of International Importance especially as Waterfowl Habitat, as amended in 1982 and 1987 (the 'Ramsar Convention').

protection levels remain unchanged. As such existing EU guidance3 and preceding case law from the Habitats Court of Justice (ECJ)4 5 6remains valid as a source of direction and interpretation of the requirements of the legislation, although it should be noted that much case law has now been incorporated into guidance and/or best practice.

3.2.5 The HRA process consists of three stages, each stage being informed by the one preceding, to ensure an iterative and objective assessment. If the conclusion of Stage 1 is that there will be no likely significant effects (LSE) on any features of a Habitats Site, there is no requirement to undertake further stages. Similarly, if the Stage 2 Appropriate Assessment (AA) concludes there will be no adverse effect on integrity of the Habitats Site, then the assessment is concluded. The HRA stages are summarised within 3-1.

3-1: HRA Stages

Stage	Description
Screening (Stage 1)	Screening for LSEs of the plan or project (either alone or in-combination) on a Habitats Site prior to consideration of avoidance or reduction ('mitigation') measures. Screening is an iterative process and before moving to Stage 2 it can be repeated if required. The Habitats Sites identified at the screening stage as potentially experiencing LSE(s) will be taken forward to Stage 2 (Appropriate Assessment). Where mitigation is required to reduce or remove the risk of LSE(s), Stage 2 Appropriate Assessment will be required.
Appropriate Assessment (Stage 2)	This stage involves the consideration of the predicted adverse effects of the project or plan either alone, or in-combination with other projects or plans, on the integrity of the Habitats Site with respect to the site's structure, function, and conservation objectives. Additionally, where mitigation has been proposed to avoid or minimise LSEs, this stage includes assessment of the likely effectiveness of any mitigation applied. A key outcome of the Appropriate Assessment is to identify whether the integrity of the Habitat Site(s) is likely to be adversely affected by the plan/project.
Derogation (Stage 3)	If no suitable alternative solutions are available, Stage 3 requires an assessment of feasible alternative solutions or compensatory measures where, in the light of an assessment of Imperative Reasons of Overriding Public Interest ("IROPI"), it is considered that the project or plan should proceed. Where alternatives exist, these should be subjected to Stage 1 and Stage 2 assessments if required. When assessing IROPI, it is important to recognise that it will be appropriate to the likely scale, importance, and impact of the proposed project. If it is impossible to avoid or mitigate the adverse impact, it must be demonstrated that there is IROPI.

Mott MacDonald, 2023

3 Managing Natura 2000 Sites - The provisions of Article 6 of the 'Habitats' Directive 92/43/CEE (European Communities 2020)

4 Landelijke Vereniging tot Behoud van de Waddenzeecase/ Nederlandse Vereniging tot Bescherming van Vogels, European Court of Justice, Case C-127/02 'Waddenzee 2002'

5 Sweetman et al v An Bord Pleanala, European Court of Justice, Case C-258/11 'Sweetman 2011'

6 People over Wind/Sweetman v Coiltte Teorante, European Court of Justice Case C-323/17 'People over Wind 2017'

3.2.6 This screening assessment has been undertaken in an iterative and objective manner following Stage 1 of the process above, with reference to best practice guidance and relevant case law, notably that provided by the Waddenzee case (ECJ 2002) and Sweetman (ECJ 2011) to inform the interpretation and therefore correct application of the terms 'likelihood, 'significance' and 'in combination'.

3.3 Screening assessment methodology and consideration of impact pathways

3.4 Guidance

3.4.1 The below guidance documents have been referred to when undertaking this assessment. Whilst the Project is not strictly a highways or bridge development, the Design Manual for Roads and Bridges (DMRB) sets out a useful framework for undertaking HRA in respect of large infrastructure schemes as well as guidance for appropriate study areas. For this reason, this guidance has been used as part of the below references to inform the approach to this Project:

- Habitats Regulations Assessments: Protecting a European Site[7]
- Habitats Regulations Assessment Advice Note 10: Habitats Regulations Assessment relevant to nationally significant infrastructure projects[8;]
- Design Manual for Roads and Bridges (DMRB) LA 115 'Habitats Regulations Assessment (formerly HD44/09)[9].
- Highways England (2020) Design Manual for Roads and Bridges (DMRB) LA 113 'Road drainage and the water environment'[10]
- NRW Guidance PS006: NRW's Position on the Use of Marine Mammal Management Units for Screening and Assessment in Habitats Regulations Assessments for Special Areas of Conservation with Marine Mammal Features[11].In summary, this guidance advises that as a result of the mobile and wide-ranging nature of marine mammals and functional connectivity between SACs and also with marine areas outside of site boundaries, using the MMMUs as the spatial scale for screening is considered most appropriate.

3.5 Identification of Habitats Sites

3.5.1 The identification of Habitats Sites of relevance to the HRA screening has been undertaken based on professional judgement and consideration of

[7] DEFRA, WG, NE, NRW (2021) Habitats Regulations Assessment: Protecting a European Site available here

[8] Infrastructure Planning Commission (2011) Advice Note 10: Habitat Regulations Assessment relevant to Nationally Significant Infrastructure Projects available here.

[9] Highways England (2020) Design Manual for Roads and Bridges (DMRB) LA 115 'Habitats Regulations assessment (formerly HD44/09)'. Revision 1. [online] available here.

[10] Highways England (2020) Design Manual for Roads and Bridges (DMRB) LA 113 'Road drainage and the water environment' available

[11] NRW (2023): Marine mammal management units in habitat regulations assessments. https://naturalresources.wales/guidance-and-advice/business-sectors/marine/marine-mammal-management-units-in-habitat-regulations-assessments/?lang=en. Accessed May 2024.

potential impact pathways which varies according to the designation interests present.

3.5.2 For terrestrial Habitats Sites, in line with the most precautionary distance cited by DMRB, a “long list” of any Habitats Sites present within 30km was initially identified during a desk top review. These are summarised in the **Appendix D1**.

3.5.3 Based on the anticipated impact pathways (see Section 3.3.3), these Habitats Sites were then shortlisted to those that fit the below criteria:

- Habitats Sites that are within 2km or connected by functionally linked habitat (excluding sites which have birds as a qualifying feature or criteria);
- Habitats Sites that are located within 200m of major roads anticipated to receive increases in traffic exceeding 1,000 Annual Average Daily Traffic (AADT), as identified in the Air Quality chapter of the EIA Scoping Report;
- SACs within 30km where bats are noted as one of the qualifying interests;
- SPA or Ramsar sites that include bird criteria that are within 20km, with the exception of Severn Estuary SPA which has also been screened in on a precautionary basis. The distance has been determined on the basis that non-breeding waterbirds are unlikely to use functionally linked land outside of the tidal current ellipse for the associated supporting habitat. On average, the tidal current ellipse extends 10 - 15km from the high tide point[12];
- Habitats Sites that have surface water hydrological connectivity within 1 kilometres of the proposed scheme; and
- Habitats Sites containing Groundwater Dependent Terrestrial Ecosystem (GWDTEs) which have groundwater hydrological and hydrogeological connectivity within 1 kilometres of the proposed scheme.

3.5.4 The terrestrial Habitats Sites that met the above criteria and were taken forward into the screening assessment are summarised in **Error! Reference source not found.** and assessed in Section Assessment of Likely Significant Effects (LSE).

3.5.5 For marine Habitats Sites, this was not based on any distance criteria but instead based on connectivity. These distances were advised by marine ecology specialists.

3.5.6 Following the identification of Habitats Sites which met the broad criteria above, further information was gathered in order to inform the assessment;

- Potential impact pathway and associated effects resulting from the project or in combination with other projects or plans (if required)**;**

[12] Scottish Government (2018). Sectoral marine plan for offshore wind energy strategic habitat regulations appraisal pre-screening report. Consultation paper, Section 4. ISBN 9781788519632

- The Zone of Influence of these effects, noting this may extend some distance from the proposed scheme footprint itself and may differ between different impact pathways;
- The qualifying features of the Habitats Site(s) in question; and
- The conservation objectives of the Habitats Site(s), including any site sensitivities given within any supplementary advice; site improvement plan, or equivalent document published by the relevant nature conservation body.

3.6 Identification of Impact Pathways

3.6.1 To inform the HRA screening assessment, the relevant potential impact pathways have been defined based on the proposed scope of works and site characteristics.

3.6.2 Potential impact pathways for terrestrial Habitats Sites considered are:

- Areas where there will be land take from the Habitat Sites and/or direct loss of qualifying features or a reduction in species density;
- Areas where there is physical damage to the Habitat sites and/or their qualifying features;
- Areas where there is a risk of altering the hydrodynamic regime or a reduction in water quality;
- Areas where there is a risk of an increase in air, noise, vibration and/or light pollution; and
- Areas whereby fragmentation may occur because of any of the above identified impact pathways.

3.6.3 Potential impact pathways for marine Habitats Sites considered are:

- Direct loss to a qualifying or supporting marine habitat;
- Direct change to a qualifying or supporting marine habitat as a result of sediment removal, physical disturbance or sediment deposition;
- Indirect loss or change to qualifying or supporting marine habitat as a result of changes to hydrodynamic and sedimentary processes (such as through erosion, accretion and sediment transport etc);
- Water quality changes (such as due to elevated suspended sediment concentrations and the release of contaminants bound in sediments) on qualifying marine habitat and species; and
- Underwater noise causing potential mortality, injury or behavioural disturbance responses in qualifying marine mammal or migratory fish species.

3.7 Screening Assessment Approach

3.7.1 The above information was reviewed in respect of each feature of interest and potential development effect / impact pathway to inform an assessment of any LSE or adverse effects on integrity. Key aspects and terms used in this assessment are defined below:

- **Likelihood**: Where an effect is considered to be potentially significant, then the assessment of its occurrence is based on the likelihood of it occurring and not certainty that it would occur. Potential effects are scoped in unless there is evidence to the contrary demonstrating that they will not occur, e.g. there being no valid pathway, or the absence of the species in that area, at that time.
- **Significance**: The significance of any effect is considered objectively, against the scale and nature of the impact in relation to those of that particular feature or condition and in relation to the extent of that feature or condition over the entire designated site. A significant effect, within this assessment is one which, if it occurred, would lead to a decline in the quality or status of the habitats or distribution, abundance, etc. of feature(s) of interest.
- **In-combination**: An in-combination effect is that which is not significant alone, but when combined with effects from another proposal that is planned or underway, there could be a significant effect on the site's integrity. The assessment of in-combination effects considers those projects or plans which:

– Are currently in operation; and
– Those which are proposed - defined by being a valid live planning application, or any referenced with a local plan where there is a strong likelihood of them being undertaken within a reasonable time period, specified within that plan.

3.7.2 In line with relevant case law6, this assessment is undertaken in the absence of mitigation (including measures embedded into the scheme where these are intended for the avoidance of effects).

Where likely significant effects are identified the assessment would then be taken through to Appropriate Assessment Stage 2.

4 HRA Stage 1: Screening

4.1 Identification of Habitats Sites

4.2 Identification of Habitats Sites

4.2.1 The Habitats Sites identified as being within the Zone of Influence / having potential impact pathways from the Scheme, based on the designation type or which intersects the site are summarised in Table **Error! Reference source not found.** below.

4.2.2 This includes those which meet the criteria based on distance or are considered linked by functionally linked land. The location of these sites can be seen in **Appendix D2Error! Reference source not found.**. Full conservation information for the Habitats Sites is included in **Appendix D3**.

Table 4-1:Identified Habitats Sites relevant to the assessment

Name	Status	Reference	Details	Distance and Direction
Kenfig / Cynffig	SAC	UK0012566	Annex I habitats that are a primary reason for selection of this site: • "Fixed coastal dunes with herbaceous vegetation (""grey dunes"")" * Priority feature • Dunes with *Salix repens* ssp. *argentea* (*Salicion arenariae*) • Humid dune slacks • Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site: • Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) Annex II species that are a primary reason for selection of this site: • Petalwort *(Petalophyllum ralfsii)* • Fen orchid *(Liparis loeselii)*	Directly adjacent to the south east of Kenfig Marshalling Yard Site 4.22km south east of the Port of Port Talbot 11.74km south east of Jersey Marine Site
Cefn Cribwr Grasslands / Glaswelltiroedd Cefn Cribwr	SAC	UK0030113	Annex I habitats that are a primary reason for selection of this site: • Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) Annex II species present as a qualifying feature, but not a primary reason for selection of this site: • Marsh fritillary butterfly *Euphydryas (Eurodryas, Hypodryas) aurinia*	4.05km east of Kenfig Marshalling Yard 9.49km south east of the Port of Port Talbot 16.30km south east of Jersey Marine Site

Name	Status	Reference	Details	Distance and Direction
Limestone Coast of Southwest Wales SAC / Arfordir Calchfaen De Orllewin Cymru	SAC	UK0014787	Annex I habitats that are a primary reason for selection of this site: • Vegetated sea cliffs of the Atlantic and Baltic coasts • Fixed coastal dunes with herbaceous vegetation Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site: • European dry heaths • Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*) • Caves not open to the public • Submerged or partially submerged sea caves Annex II species that are a primary reason for selection of this site: • Greater Horseshoe Bat *(Rhinolophus ferrumequinum)* • Early Gentian (*Gentianella anglica*) Annex II species present as a qualifying feature, but not a primary reason for selection of this site: • Petal wort (*Petalophyllum ralfsii*)	21.50km north west of Kenfig Marshalling Yard 16.10km north west of the Port of Port Talbot 16.76km north west of Jersey Marine Site
Burry Inlet	Ramsar	UK14001	The Burry Inlet regularly supports large numbers of wildfowl and waders and is designated under the following criterion. • Ramsar Criterion 5: regularly supports 20,000 or more waterbirds. • Ramsar Criterion 6: regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds. Species utilising the site for either wintering or passage include the following: • Common greenshank *(Tringa nebularia)* • Spotted redshank *(Tringa erthropus)* • Dark bellied brent *(Branta bernicla bernicla)* • Little egret *(Egretta garzetta)* • Whimbrel *(Numenius phaeopus)* • Northern pintail *(Anas acuta)* • Northern shoveler *(Anas clypeata)* • Eurasian wigeon *(Anas penelope)* • Dunlin *(Calidris alpina alpina)* • Red knot *(Calidris canutus)* • Eurasian oystercatcher *(Haematopus ostralegus)* • Eurasian curlew *(Numenius arquata)* • Common shelduck *(Tadorna tadorna)* • Common redshank *(Tringa totanus)* • Ruddy turnstone *(Arenaria interpres)*	24.50km south west of Kenfig Marshalling Yard Site 18.08km north west of from the Port of Port Talbot 14.44km west of Jersey Marine Site
Burry Inlet	SPA	UK9015011	Over winter Burry Inlet regularly supports the following species: • Northern pintail *(Anas acuta)* • Northern shoveler *(Anas clypeata)* • Eurasian teal *(Anas crecca)*	24.50km south west of Kenfig Marshalling Yard Site

Name	Status	Reference	Details	Distance and Direction
			• Eurasian wigeon *(Anas penelope)* • Dunlin *(Calidris alpina alpina)* • Red knot *(Calidris canutus)* • Eurasian oystercatcher *(Haematopus ostralegus)* • Eurasian curlew *(Numenius arquata)*	18.08km north west of from the Port of Port Talbot
			• Grey plover *(Pluvialis squatarola* • Common shelduck *(Tadorna tadorna)* • Common redshank *(Tringa totanus)* • Ruddy turnstone *(Arenaria interpres)*	14.44km west of Jersey Marine Site
Carmarthen Bay and Estuaries SAC/ Bae Caerfyrddin ac Aberoedd	SAC	UK0020020	Annex I habitats that are a primary reason for selection of this site are: • Estuaries • Mudflats and sandflats not covered by seawater at low tide. • Atlantic saltmeadows *(Glauco-Puccinellietalia maritimae*) • *Salicornia* and other annuals colonising mud and sand • Large shallow inlets and bays • Sandbanks which are slightly covered by sea water all the time.	24.50km north west of Kenfig Marshalling Yard Site
			Annex II species that are a primary reason for selection of this site: • Twaite shad *(Alosa fallax)*	18.08km north west of from the Port of Port Talbot
			Annex II species present as a qualifying feature, but not a primary reason for site selection: • Sea lamprey *Petromyzon marinus)* • River lamprey *Lampetra fluviatilis* • Allis shad *Alosa alosa* • Otter *Lutra lutra*	14.44km north west of Jersey Marine Site
Bristol Channel Approaches / Dynesfeydd Môr Hafren	SAC	UK0030396	Annex II species that are a primary reason for selection of this site: • Harbour porpoise *Phocoena phocoena*	36.92km west of Kenfig Marshalling Yard Site
				30.72km west of from the Port of Port Talbot
				27.95km west of Jersey Marine Site

Name	Status	Reference	Details	Distance and Direction
Severn Estuary	Ramsar	UK11081	The Severn Estuary is designated under multiple Ramsar criteria as follows; Ramsar criterion 1 due to immense tidal range (second largest in world), this affects both the physical environment and biological communities. Ramsar criterion 3 due to unusual estuarine communities, reduced diversity, and high productivity. Ramsar criterion 4 and 8 due to the site being important for the run of migratory fish between sea and river via estuary: • Salmon *(Salmo salar)* • Sea trout *(S. trutta)* • Sea lamprey (*Petromyzon marinus*) • River lamprey (*Lampetra fluviatilis*) • Allis shad (*Alosa alosa)* • Twaite shad *(A. fallax),* • Eel (*Anguilla Anguilla)*. It is also of particular importance for migratory birds during spring and autumn. Ramsar criterion 5 and 6 as the site regularly supports 20,000 or more waterbirds and regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds. Species utilising the site for either wintering or passage include the following: • Common redshank (*Tringa tetanus)* • Northern shoveler *(Anas clypeata)* • Northern pintail *(Anas acuta)* • Eurasian teal *(Anas crecca)* • Gadwall *(Anas strepera)* • Eurasian wigeon *(Anas penelope)* • Common shelduck *(Tadorna tadorna)* • Tundra swan *(Cygnus columbianus bewickii)* • Little egret (*Egretta garzetta)* • Water rail (*Rallus aquaticus)* • Ringed plover (*Charadrius hiaticula)* • Dunlin (*Calidris alpina alpina)* • Ruff (*Philomachus pugnax)* • Common pochard (*Aythya farina)* • Spotted redshank (*Tringa erythropus)* • Common greenshank (*Tringa nebularia)* • European white-fronted goose (*Anser albifrons albifrons)* • Whimbrel (*Numenius phaeopus)* • Eurasian curlew (*Numenius arquata)* Species utilising the site for breeding include the following: • Lesser black-backed gull *(Larus fuscus)* • Herring gull (*Larus argentatus)*	39.69km south east of Kenfig Marshalling Yard Site 44.83km south east of the Port of Port Talbot 50.82km south east of Jersey Marine Site

Name	Status	Reference	Details	Distance and Direction
Severn Estuary / Mor Hafren	SPA	UK9015022	Internationally important populations of regularly occurring Annex I species that are a primary reason for selection of this site are: • Bewick's swan (*Cygnus columbianus bewickii*) Internationally important populations of regularly occurring migratory bird species that are the primary reason for selection of this site are: • European white-fronted goose (*Anser albifrons albifrons*) • Dunlin (*Calidris alpina alpina*) • Common redshank (*Tringa tetanus*) • Common shelduck (*Tadorna tadorna*) • Gadwall (*Anas strepera*) Internationally important assemblage (>20,000 waterfowl) that are the primary reason for selection of this site are: • Eurasian wigeon (*Anas penelope*) • Eurasian teal (*Anas crecca*) • Northern pintail (*Anas acuta*) • Common pochard (*Aythya farina*) • Tufted duck (*Aythya fuligula*) • Ringed plover (*Charadrius hiaticula*) • Grey plover (*Pluvialis squatarola*) • Eurasian curlew (*Numenius arquata*) • Whimbrel (*Numenius phaeopus*) • Spotted redshank (*Tringa erythropus*)	39.69km south east of Kenfig Marshalling Yard Site 44.83km south east of the Port of Port Talbot 50.82km south east of Jersey Marine Site
Severn Estuary / Mor Hafren	SAC	UK0013030	Annex I habitats that are a primary reason for selection of this site are: • Estuaries • Mudflats and sandflats not covered by seawater at low tide. • Atlantic saltmeadows *(Glauco-Puccinellietalia maritimae*) Annex I habitats that are a primary reason for selection of this site • Sandbanks which area slightly covered by sea water all the time • Reefs Annex II species that are a primary reason for selection of this site: • Sea lamprey *(Petromyzon marinus)* • River lamprey (*Lampetra fluviatilis)* • Twaite shad *(Alosa fallax)*	39.69km south east of Kenfig Marshalling Yard Site 44.83km south east of the Port of Port Talbot 50.82km south east of Jersey Marine Site
River Usk	SAC	UK0013007	Annex I habitats present as a qualifying feature but not a primary reason for selection of this site. • Water courses of plain to montane levels with the Ranunculion fluitantis and Callitrcho-Batrachion vegetation	38.09km east of Kenfig Marshalling Yard Site

Name	Status	Reference	Details	Distance and Direction
			Annex II species that are a primary reason for selection of this site. • Sea lamprey *(Petromyzon marinus)* • Brook lamprey *(Lampetra planeri)* • River lamprey (*Lampetra fluviatilis)* • Twaite shad *(Alosa fallax)* • Atlantic salmon *(Salmo salar)* • Bullhead *(Cottus gobio)* • Otter *(Lutra Lutra)* Annex II species present as a qualifying feature but not a primary reason for site selection. • Allis shad *(Alosa alosa)*	34.43km east of the Port of Port Talbot 30.45km east of Jersey Marine Site
Pembrokeshire Marine/ Sir Benfro Forol	SAC	UK0013116	Annex I habitats that are a primary reason for selection of this site: • Estuaries • Large shallow inlets and bays • Reefs Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site: • Sandbanks which are slightly covered by sea water all the time. • Mudflats and sandflats not covered by seawater at low tide Coastal lagoons. • Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) • Submerged or partially submerged sea caves. Annex II species that are a primary reason for selection of this site. • Grey seal *(Halichoerus grypus)* • Shore dock *(Rumex rupestris)* Annex II species present as a qualifying feature, but not a primary reason for site selection. • Sea lamprey (*Petromyzon marinus)* • River lamprey (*Lampetra fluviatilis)* • Allis shad *(Alosa alosa)* • Twaite shad (*Alosa fallax)* • Otter (*Lutra lutra)*	73.00km north west of Kenfig Marshalling Yard Site 67.64km north west of the Port of Port Talbot 65.97km north west of Jersey Marine Site
Lundy	SAC	UK0013114	Annex I habitats that are a primary reason for selection of this site: • Reefs Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site: • Sandbanks which are slightly covered by sea water all the time • Submerged or partially submerged sea caves	71.28km south west of Kenfig Marshalling Yard Site 68.75km south west of the Port of Port Talbot

Name	Status	Reference	Details	Distance and Direction
			Annex II species present as a qualifying feature, but not a primary reason for site selection • Grey seal *(Halichoerus grypus)*	71.94km south west of Jersey Marine Site
Cardigan Bay / Bae Ceredigion	SAC	UK0012712	Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site: • Sandbanks which are slightly covered by sea water all the time • Reefs • Submerged or partially submerged sea caves	84.14km north west of Kenfig Marshalling Yard Site
			Annex II species that are a primary reason for selection of this site: • Bottlenose dolphin *(Tursiops truncatus)*	77.78km north west of the Port of Port Talbot
			Annex II species present as a qualifying feature, but not a primary reason for site selection: • Sea lamprey *(Petromyzon marinus)* • River lamprey *(Lampetra fluviatilis)* • Grey seal *(Halichoerus grypus)*	71.45km north west of Jersey Marine Site
River Wye	SAC	UK0012642	Annex I habitats present as a qualifying feature but not a primary reason for selection of this site. • Water courses of plain to montane levels with the Ranunculion fluitantis and Callitrcho-Batrachion vegetation	57.25km east of Kenfig Marshalling Yard Site
			Annex I habitat present as a qualifying feature but not a primary reason for selection of the site. • Transition mires and quaking bogs	53.24km east of the Port of Port Talbot
			Annex II species that are a primary reason for selection of this site. • White-clawed crayfish *(Austropotamobius pallipes)* • Sea lamprey *(Petromyzon marinus)* • Brook lamprey *(Lampetra planeri)* • River lamprey (*Lampetra fluviatilis)* • Twaite shad *(Alosa fallax)* • Atlantic salmon *(Salmo salar)* • Bullhead *(Cottus gobio)* • Otter *(Lutra Lutra)*	48.75km east of Jersey Marine Site
			Annex II species present as a qualifying feature but not a primary reason for site selection. • Allis shad *(Alosa alosa)*	
West Wales Marine/ Gorllewin Cymru Forol	SAC	UK0030397	Annex II species that are a primary reason for selection of this site: • Harbour porpoise (*Phocoena phocoena)*	84.42km north west of Kenfig Marshalling Yard Site
				78.05km north west of the Port of Port Talbot

Name	Status	Reference	Details	Distance and Direction
				71.73km north west of Jersey Marine Site
Lleyn Peninsula and the Sarnau/ Pen Llŷn a'r Sarnau	SAC	UK0013117	Annex I habitats that are a primary reason for selection of this site: • Sandbanks which are slightly covered by sea water all the time • Estuaries • Coastal lagoons • Large shallow inlets and bays • Reefs	101.52km north west of Kenfig Marshalling Yard Site
			Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site: • Mudflats and sandflats not covered by seawater at low tide • Salicornia and other annuals colonizing mud and sand • Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) • Submerged or partially submerged sea caves	95.66km NW of the Port of Port Talbot
			Annex II species present as a qualifying feature, but not a primary reason for site selection: • Bottlenose dolphin (*Tursiops truncatus*) • Otter (*Lutra lutra*) • Grey seal (*Halichoerus grypus*)	89.37km north west of Jersey Marine Site
North Anglesey Marine/ Gogledd Môn Forol	SAC	UK0030398	Annex II species that are a primary reason for selection of this site: • Harbour porpoise (*Phocoena phocoena)*	196.94km north west of Kenfig Marshalling Yard Site
				191.05km north west of the Port of Port Talbot
				184.74km north west of Jersey Marine Site

MAGIC, 2024; JNCC, 2024, NRW 2024

4.3 Assessment of Likely Significant Effects (LSE)

4.3.1 The below tables document the screening exercise to assess if the project alone will result in a likely significant effect on any Habitats Sites. This assessment takes into consideration the identification of key features and conservation information (**Table 4-1** and **Appendix D3Error! Reference source not found.**).

4.4 Kenfig / Cynffig SAC

4.4.1 The assessment of effects for the Kenfig SAC is set out in **Table 4-2** below. The citation details and conservation objectives are included in **Appendix D3** and referenced below where relevant.

Table 4-2: Kenfig / Cynffig SAC – Screening Assessment

Qualifying feature	Assessment of Likely Significant Effect	Likely significant effects during construction	Likely significant effects during operation
"Fixed coastal dunes with herbaceous vegetation (""grey dunes"")" Dunes with *Salix repens* ssp. *argentea (Salicion arenariae*) Humid dune slacks Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp. Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) Petalwort *Petalophyllum ralfsii* Fen orchid *Liparis loeselii*	Sand dune and saltmarsh features of the SAC are not in the footprint of direct marine habitat loss (as a result of the reclamation, revetment and other marine works) or direct habitat change (due to sediment removal, physical disturbance and sediment deposition during capital or maintenance dredging or dredge disposal). It is considered likely that indirect loss or changes to SAC habitat features as a result of changes to physical processes (such as sediment transport, erosion and accretion) due to the marine works will be negligible. However, the results of further physical processes modelling and assessment as part of the EIA are required to confirm this. On this basis, the potential for a LSE cannot be ruled out has and as such this has been screened in on a precautionary basis.	Yes	Yes
Habitats as above	The site is situated directly adjacent to the M4 which is a key transport route likely to be utilised during construction and operation of the scheme (see EIA Scoping Report, Chapter 12 - Onshore Traffic and Transport). Increased traffic movements to and from the east may exceed 1000 AADT or 200HDV because of the scheme, however further modelling is required to fully understand this and any associated air quality impacts. On this basis, the potential for a LSE cannot be ruled out and as such this has been screened in on a precautionary basis.	Yes	Yes

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4.5 Limestone Coast of Southwest Wales SAC

4.5.1 The assessment of effects for the Limestone Coast of Southwest Wales SAC is set out in **Table 4-3** below. The citation details and conservation objectives are included in **Appendix D3** and referenced below where relevant.

Table 4-3: Limestone Coast of Southwest Wales SAC- Screening Assessment

Qualifying feature	Assessment of Likely Significant Effect	Likely significant effects during construction	Likely significant effects during operation
Vegetated sea cliffs of the Atlantic and Baltic coasts Fixed coastal dunes with herbaceous vegetation European dry heaths Semi-natural dry grasslands and scrubland facies: on calcareous substrates (Festuco-Brometalia) Caves not open to the public Submerged or partially submerged sea caves Early gentian (Gentianella anglica) Petalwort (Petalophyllum ralfsii)	The proposed development does not lie within or adjacent to the SAC. No direct loss or damage to habitats is considered likely to occur. There is no land-take, habitat removal or physical disturbance proposed to any areas within or adjacent to the SAC boundary. It is considered likely that indirect loss or changes to SAC habitat features because of changes to physical processes (such as sediment transport, erosion and accretion) due to the marine works will be negligible. However, the results of further physical processes modelling and assessment as part of the EIA are required to confirm this. On this basis, the potential for a LSE cannot be ruled out has and as such this has been screened in on a precautionary basis.	Yes	Yes
Greater horseshoe bat (Rhinolophus ferrumequinum)	Greater Horseshoe bats (GHB) utilise some of the larger sea caves as temporary roosts. In other caves, where temperatures are cooler and more stable, bats hibernate during winter. In addition bats are mobile species who may also utilise Functionally Linked Land (FLL) close to or within the RLB. Disturbance effects are possible because of an increase in air, noise, vibration and/or light pollution due to the increased movement of boats in the marine environment during the construction or operation of the scheme or if GHB bats associated with the SAC are utilising FLL located within or close to the RLB. Further information is required regarding boats movements and the use of area within the RLB by GHB to fully screen this impact pathway out. On this basis, the potential for a LSE cannot be ruled out has and as such this has been screened in on a precautionary basis.	Yes	Yes

4.6 Cefn Cribwr Grasslands SAC

4.6.1 The assessment of effects for the Cefn Cribwr Grasslands site is set out in **Table 4-4** below. The citation details and conservation objectives are included in **Appendix D3Error! Reference source not found.** and referenced below where relevant.

Table 4-4: Cefn Cribwr Grasslands - Screening Assessment

Qualifying feature	Assessment of Likely Significant Effect	Likely significant effects during construction	Likely significant effects during operation
Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*)	The site is situated 133m from the M4 which is a key transport route likely to be utilised during construction and operation of the scheme. Increased traffic movements to and from the east may exceed 1000 AADT or 200HDV as a result of the scheme, however further modelling is required to fully understand this and any associated air quality impacts. On this basis, the potential for a LSE cannot be ruled out and as such this has been screened in on a precautionary basis.	Yes	Yes
Marsh fritillary butterfly *Euphydryas (Eurodryas, Hypodryas) aurinia*	Marsh fritillary butterfly rely on suitable habitat that contains Devils bit Scabious (Succisa pratensis) as the main caterpillar foodplant. The site is situated within 200m of the M4 which is a key transport route likely to be utilised during construction and operation of the scheme. Increased traffic movements to and from the east may exceed 1000 AADT or 200HDV as a result of the scheme, however further modelling is required to fully understand this and any associated air quality impacts. On this basis, the potential for a LSE cannot be ruled out and as such this has been screened in on a precautionary basis.	Yes	Yes

4.7 Burry Inlet Ramsar

4.7.1 The assessment of effects for the Burry Inlet Ramsar site is set out in **Table 4-5** below. The citation details and conservation objectives are included in **Appendix D3** and referenced below where relevant.

Table 4-5: Burry Inlet Ramsar - Screening Assessment

Qualifying feature	Assessment of Likely Significant Effect	Likely significant effects during construction	Likely significant effects during operation
Ramsar Criterion 5: regularly supports 20,000 or more waterbirds. Ramsar Criterion 6: regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds.	The Burry Inlet Ramsar site regularly supports large numbers of wintering wildfowl and waders. The proposed development at the Port and compensation sites does not lie within nor is adjacent to the Ramsar site. There will be no land-take, habitat removal or physical disturbance to any areas within or adjacent to the Ramsar site boundary. Therefore, no direct impact pathways to supporting habitat within the Habitats Site have been identified during construction works. Potential indirect damage to supporting habitats within the Habitats site during construction that has been considered are changes in sediment loading from dredging works, exposure to pollution incidents and increased exposure to air pollution, causing deterioration of supporting habitat for qualifying waterbirds. However, due to the distance between the proposed development and differing tidal current ellipse between Burry Inlet and Port Talbot, indirect impacts during construction works are deemed to be negligible. There is potential for indirect impacts to qualifying waterbirds of the Burry Inlet Ramsar if supporting habitat within the proposed development (the Port) and associated compensation sites is used as functionally linked land (FLL) for feeding and roosting. Indirect impacts during construction include loss, deterioration and/or change in spatial extent of potential FLL and anthropogenic disturbance. Indirect impacts during operation of the proposed development (within the Port) include anthropogenic disturbance and increased collision risk at potential FLL. Due to uncertainty regarding whether the Port, Jersey Marine Site and Kenfig Marshalling Yard provide FLL to qualifying species of the Burry Inlet Ramsar, likely significant effects cannot be ruled out at this stage.	Yes	Yes

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4.8 Burry Inlet SPA

4.8.1 The assessment of effects for the Burry Inlet SPA site is set out in **Table 4-6** below. The citation details and conservation objectives are included in **Appendix D3** and referenced below where relevant.

Table 4-6: Burry Inlet SPA- Screening Assessment

Qualifying feature	Assessment of Likely Significant Effect	Likely significant effects during construction	Likely significant effects during operation
Northern pintail *(Anas acuta)* Northern shoveler *(Anas clypeata)* Eurasian teal *(Anas crecca)* Eurasian wigeon *(Anas penelope)* Dunlin *(Calidris alpina alpina)* Red knot *(Calidris canutus)* Eurasian oystercatcher *(Haematopus ostralegus)* Eurasian curlew *(Numenius arquata)* Grey plover *(Pluvialis squatarola* Common shelduck *(Tadorna tadorna)* Common redshank *(Tringa totanus)* Ruddy turnstone *(Arenaria interpres*	The Burry Inlet SPA regularly supports large numbers of wintering wildfowl and waders, with 12 species listed as qualifying species. There will be no land-take, habitat removal or physical disturbance to any areas within or adjacent to the SPA boundary. Therefore, no direct impact pathways to supporting habitat within the Habitats Site have been identified during construction works at the Port or the two compensation sites. Potential indirect damage to supporting habitats within the Habitats site during construction that has been considered are changes in sediment loading from dredging works, exposure to pollution incidents and increased exposure to air pollution, causing deterioration of supporting habitat for qualifying waterbirds. However, due to the distance between the proposed development at the Port and two compensation sites and differing tidal current ellipse between Burry Inlet and Port Talbot, indirect impacts during construction works are deemed to be negligible. There is potential for indirect impacts to qualifying waterbirds of the Burry Inlet SPA if supporting habitat within the proposed development (the Port) and associated compensation sites is used as FLL for feeding and roosting. Indirect impacts during construction include loss, deterioration and/or change in spatial extent of potential FLL and anthropogenic disturbance. Indirect impacts during operation of the proposed development (within the Port) include anthropogenic disturbance and increased collision risk at potential FLL. Due to uncertainty regarding whether the Port, Jersey Marine Site and Kenfig Marshalling Yard provide FLL to qualifying species of the Burry Inlet SPA, likely significant effects cannot be ruled out at this stage.	Yes	Yes

4.9 Carmarthen Bay and Estuaries SAC

4.9.1 The assessment of effects for the Carmarthen Bay and Estuaries SAC is set out in **Table 4-7** below. The citation details and conservation objectives are included in **Appendix D3** and referenced below where relevant.

Table 4-7: Carmarthen Bay and Estuaries SAC – Screening Assessment

Qualifying feature	Assessment of Likely Significant Effect	Likely significant effects during construction	Likely significant effects during operation
Estuaries. Mudflats and sandflats not covered by seawater at low tide. Atlantic saltmeadows *(Glauco-Puccinellietalia maritimae*) *Salicornia* and other annuals colonising mud and sand. Large shallow inlets and bays. Sandbanks which are slightly covered by sea water all the time.	Habitat features of the SAC do not overlap with the zone of influence of direct and indirect habitat loss/change and water quality changes associated with the proposed development which will be restricted to within the wider Swansea Bay region.	No	No
Twaite shad (Alosa fallax) Sea lamprey (Petromyzon marinus) River lamprey (Lampetra fluviatilis) Allis shad (Alosa alosa)	Migratory fish are a qualifying feature of this site and utilise both the marine and freshwater environment at different times. Populations of fish extend beyond the confines of the designated site boundary and utilise functionally linked areas for purposes such as feeding, migration and spawning. Sediment plumes resulting from the marine works (including dredging and dredge disposal during potential capital and maintenance dredging) would dissipate relatively rapidly and be immeasurable against background levels in a relatively localised area around the marine works (including dredge and disposal footprints). Sediment plumes would not extend into Carmarthen Bay and will not cause a barrier to qualifying migratory fish moving into rivers that enter the SAC or impede wider migratory movements in the Carmarthen Bay/Bristol Channel area. The SAC does not overlap with the zone of influence of potential underwater noise effects associated with the proposed development. Piling and other underwater noise associated with the proposed development will not cause a barrier to qualifying migratory fish moving into rivers that enter the SAC or impede wider migratory movements in the Carmarthen Bay region. However, given the mobile and transient nature of the migratory fish species, it is possible that fish from this SAC could pass through the wider Swansea Bay region. While it is likely that they will easily be able to avoid the zone of potential noise effects and swim away from this area, the potential for LSE cannot be ruled out and these qualifying migratory fish features have been screened in on a precautionary basis.	Yes	Yes

Qualifying feature	Assessment of Likely Significant Effect	Likely significant effects during construction	Likely significant effects during operation
Otter (Lutra lutra)	Coastal populations of otters utilise shallow, inshore marine areas for feeding but also require freshwater for bathing and terrestrial areas for resting and breeding holts. The otter population of the SAC does not overlap with the zone of influence of potential effects associated with the development which will be restricted to within the wider Swansea Bay region.	No	No

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4.10 Bristol Channel Approaches SAC

4.10.1 The assessment of effects for the Bristol Channel Approaches SAC is set out in **Table 4-8** below. The citation details and conservation objectives are included in **Appendix D3** and referenced below where relevant.

Table 4-8: Bristol Channel Approaches SAC – Screening Assessment

Qualifying feature	Assessment of Likely Significant Effect	Likely significant effects during construction	Likely significant effects during operation
Harbour porpoise *Phocoena phocoena*	The Bristol Channel Approaches SAC has been identified as a winter area of importance for the Celtic and Irish Seas Management Unit harbour porpoises. Piling is required during construction and will produce underwater noise above background conditions and at a level that may cause a risk of injury and behavioural changes to marine mammals. Elevated noise and vibration levels caused by the action of the dredger during construction and operation could also potentially affect marine mammals by inducing adverse behavioural reactions. This SAC has been screened in on the basis of NRW guidance (PS006) on using MMMUs in HRA. In summary, this guidance advises that as a result of the mobile and wide-ranging nature of marine mammals, using MMMUs as the spatial scale for screening is most appropriate. The proposed development overlaps with the Celtic and Irish Seas MMMU. On this basis, all Welsh SACs designated for harbour porpoise in this MMMU have been screened in.	Yes	Yes

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4.11 Severn Estuary Ramsar

4.11.1 The assessment of effects for Severn Estuary Ramsar site is set out in **Table 4-9** below. The citation details and conservation objectives are included in **Appendix D3Error! Reference source not found.** and referenced below where relevant.

Table 4-9: Severn Estuary Ramsar - Screening Assessment

Qualifying feature	Assessment of Likely Significant Effect	Likely significant effects during construction	Likely significant effects during operation
Ramsar criterion 1 due to immense tidal range (second largest in world), this affects both the physical environment and biological communities. Ramsar criterion 3 due to unusual estuarine communities, reduced diversity, and high productivity.	Habitat features of the Ramsar site do not overlap with the zone of influence of direct and indirect habitat loss/change and water quality changes associated with the proposed development which will be restricted to within the wider Swansea Bay region.	No	No
Ramsar criterion 4 and 8 due to the site being important for the run of migratory fish between sea and river via estuary: Salmon *(Salmo salar)* Sea trout *(S. trutta)* Sea lamprey (*Petromyzon marinus*) River lamprey (*Lampetra fluviatilis*) Allis shad (*Alosa alosa)* Twaite shad *(A. fallax),* Eel (*Anguilla Anguilla)*.	This site is important for the run of migratory fish between sea and river via estuary. The Severn Estuary is a key migration route to their spawning grounds in the many tributaries that flow into the estuary. Sediment plumes resulting from the marine works (including dredging and dredge disposal during potential capital and maintenance dredging) would dissipate relatively rapidly and be immeasurable against background levels in a relatively localised area around the marine works (including dredge and disposal footprints). Sediment plumes would not extend into the Severn Estuary and will not cause a barrier to qualifying migratory fish moving into rivers that enter the Ramsar or impede wider migratory movements in the Severn Estuary area. The Ramsar does not overlap with the zone of influence of potential underwater noise effects associated with the proposed development. Piling and other underwater noise associated with the proposed development will not cause a barrier to qualifying migratory fish moving into rivers that enter the Ramsar or impede wider migratory movements in the Severn Estuary region. However, given the mobile and transient nature of the migratory fish species, it is possible that fish from this	Yes	Yes

Qualifying feature	Assessment of Likely Significant Effect	Likely significant effects during construction	Likely significant effects during operation
	Ramsar could pass through the wider Swansea Bay region. While it is likely that they will easily be able to avoid the zone of potential noise effects and swim away from this area, the potential for LSE cannot be ruled out and these qualifying migratory fish features have been screened in on a precautionary basis.		
Ramsar Criterion 5: regularly supports 20,000 or more waterbirds. Ramsar Criterion 6: regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds. Common greenshank *(Tringa nebularia)* Spotted redshank *(Tringa erthropus)* Dark bellied brent *(Branta bernicla bernicla)* Little egret *(Egretta garzetta)* Whimbrel *(Numenius phaeopus)* Northern pintail *(Anas acuta)* Northern shoveler *(Anas clypeata)* Eurasian wigeon *(Anas penelope)* Dunlin *(Calidris alpina alpina)* Red knot *(Calidris canutus)* Eurasian oystercatcher *(Haematopus ostralegus)* Eurasian curlew *(Numenius arquata)* Common shelduck *(Tadorna tadorna)* Common redshank *(Tringa totanus)* Ruddy turnstone *(Arenaria interpres)*	The proposed development and associated compensation sites do not lie within or adjacent to the Ramsar. Therefore, no direct impacts to the Severn Estuary Ramsar have been identified during construction and operation of the proposed development (including proposed enhancement works at the two compensation sites. Additionally, no indirect impacts as a result of changes in sediment loading from dredging works, exposure to pollution incidents and increased exposure to air pollution are deemed likely due to the distance between the proposed development at the Port and two compensation sites and differing tidal current ellipse between the Severn Estuary and Port Talbot. There is potential for indirect impacts to qualifying waterbirds of the Severn Estuary Ramsar if supporting habitat within the proposed development (the Port) and associated compensation sites is used as FLL for feeding and roosting. Indirect impacts during construction include loss, deterioration and/or change in spatial extent of potential FLL and anthropogenic disturbance. Indirect impacts during operation of the proposed development (within the Port) include anthropogenic disturbance and increased collision risk at potential FLL. Based on currently available evidence13 and understanding of bird behaviour14, it is deemed unlikely that qualifying species of the Severn Estuary Ramsar are functionally linked to the Port, Kenfig Marshalling Yard Site and/or Jersey Marine Site. This is due to the distance between the proposed development and the Severn Estuary and previous monitoring, that showed that qualifying species of the Severn Estuary largely commute to inland functionally linked sites to the north and	No	No

[13] Natural England (2021). Identification of wintering and passage roosts on functionally linked land of the Severn Estuary – Gloucestershire and Worcestershire (Phase 5). Natural England Research Report. NECR401.

[14] Scottish Government (2018). Sectoral marine plan for offshore wind energy strategic habitat regulations appraisal pre-screening report. Consultation paper, Section 4. ISBN 9781788519632

Qualifying feature	Assessment of Likely Significant Effect	Likely significant effects during construction	Likely significant effects during operation
	north-east of the estuary15. Pochard and teal were recorded commuting west between the Severn Estuary and Burry Inlet. The regularity of this movement was unknown with pochard commuting this distance within winter and teal between winters. Due to the lack of suitable habitat present for pochard at Kenfig Marshalling Yard Site and Jersey marine and lack of species records during non-breeding bird surveys undertaken, no impact pathways to pochard have been identified. Additionally, due to the irregularity of teal commuting from the Severn Estuary to Burry Inlet18 and low number of records within the Port (2 individuals in 2023/24 only)16, impact likely significant effects to teal populations of the Severn Estuary Ramsar are anticipated. Therefore, direct and indirect impacts to the Ramsar and it's qualifying features are deemed unlikely.		

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4.12 Severn Estuary SPA

4.12.1 The assessment of effects for Severn Estuary SPA is set out in **Table 4-10** below. The citation details and conservation objectives are included in **Appendix D3** and referenced below where relevant.

Table 4-10: Severn Estuary SPA - Screening Assessment

Qualifying feature	Assessment of Likely Significant Effect	Likely significant effects during construction	Likely significant effects during operation
Bewick's Swan *(Cygnus columbianus bewickii)* Gadwall *(Anas strepera)* Greater White Fronted Goose *(Anser albifrons albifrons)* Dunlin *(Calidris alpina alpina)* Common shelduck *(Tadorna tadorna)*	The proposed development and associated compensation sites do not lie within or adjacent to the SPA. Therefore, no direct impacts to the Severn Estuary SPA have been identified during construction and operation of the proposed development (including proposed enhancement works at the two compensation sites. Additionally, no indirect impacts as a result of changes in sediment loading from dredging works, exposure to pollution incidents and increased exposure to air pollution are deemed likely due to the distance between the proposed development at the Port and two compensation sites	No	No

[15] Natural England (2021). Identification of wintering and passage roosts on functionally linked land of the Severn Estuary – Gloucestershire and Worcestershire (Phase 5). Natural England Research Report. NECR401.

[16] BSG ecology (2024). Port Talbot Foreshore, Baseline Ornithological Report 2023-2024. BSG ecology (in draft).

Qualifying feature	Assessment of Likely Significant Effect	Likely significant effects during construction	Likely significant effects during operation
Common redshank *(Tringa tetanus)* Eurasian wigeon (*Anas penelope*) Eurasian teal (*Anas crecca*) Northern pintail (*Anas acuta*) Pochard (*Aythya farina*) Tufted duck (*Aythya fuligula*) Ringed plover (*Charadrius hiaticula)* Grey plover (*Pluvialis squatarola*) Eurasian curlew (*Numenius arquata)*	and differing tidal current ellipse between the Severn Estuary and Port Talbot. There is potential for indirect impacts to qualifying waterbirds of the Severn Estuary SPA if supporting habitat within the proposed development (the Port) and associated compensation sites is used as FLL for feeding and roosting. Indirect impacts during construction include loss, deterioration and/or change in spatial extent of potential FLL and anthropogenic disturbance. Indirect impacts during operation of the proposed development (within the Port) include anthropogenic disturbance and increased collision risk at potential FLL. Based on currently available evidence[17] and understanding of bird behaviour[18], it is deemed unlikely that qualifying species of the Severn Estuary SPA are functionally linked to the Port, Kenfig Marshalling Yard Site and/or Jersey Marine Site. This is due to the distance between the proposed development and the Severn Estuary and previous monitoring, that showed that qualifying species of the Severn Estuary largely commute to inland functionally linked sites to the north and north-east of the estuary. Pochard and teal were recorded commuting west between the Severn Estuary and Burry Inlet. The regularity of this movement was unknown with pochard commuting this distance within winter and teal between winters. Due to the lack of suitable habitat present for pochard at Kenfig Marshalling Yard Site and Jersey marine and lack of species records during non-breeding bird surveys undertaken, no impact pathways to pochard have been identified. Additionally, due to the irregularity of teal commuting from the Severn Estuary to Burry Inlet[19] and low number of records within the Port (2 individuals in 2023/24 only)[20], impact likely significant effects to teal populations of the Severn Estuary SPA are anticipated. Therefore, direct and indirect impacts to the SPA and it's qualifying features are deemed unlikely.		

[17] Natural England (2021). Identification of wintering and passage roosts on functionally linked land of the Severn Estuary – Gloucestershire and Worcestershire (Phase 5). Natural England Research Report. NECR401.

[18] Scottish Government (2018). Sectoral marine plan for offshore wind energy strategic habitat regulations appraisal pre-screening report. Consultation paper, Section 4. ISBN 9781788519632

[19] Natural England (2021). Identification of wintering and passage roosts on functionally linked land of the Severn Estuary – Gloucestershire and Worcestershire (Phase 5). Natural England Research Report. NECR401.

[20] BSG ecology (2024). Port Talbot Foreshore, Baseline Ornithological Report 2023-2024. BSG ecology (in draft).

4.13 Severn Estuary SAC

4.13.1 The assessment of effects for Severn Estuary SAC is set out in **Table 4-11** below. The citation details and conservation objectives are included in **Appendix D3Error! Reference source not found.** and referenced below where relevant.

Table 4-11: Severn Estuary SAC Screening Assessment

Qualifying feature	Assessment of Likely Significant Effect	Likely significant effects during construction	Likely significant effects during operation
Estuaries Mudflats and sandflats not covered by seawater at low tide. Atlantic saltmeadows *(Glauco-Puccinellietalia maritimae*) Sandbanks which area slightly covered by sea water all the time Reefs	The proposed development does not lie within or adjacent to the SAC. No direct or indirect damage to habitats is considered likely to occur. There will be no land-take, habitat removal or physical disturbance to any areas within or adjacent to the SAC boundary. Habitat features of the SAC do not overlap with the zone of influence of direct and indirect habitat loss/change and water quality changes associated with the proposed development which will be restricted to within the wider Swansea Bay region.	No	No
Sea lamprey *(Petromyzon marinus)* River lamprey (*Lampetra fluviatilis)* Twaite shad *(Alosa fallax)*	This site is important for the run of migratory fish between sea and River Via estuary. The Severn Estuary is a key migration route to their spawning grounds in the many tributaries that flow into the estuary. Sediment plumes resulting from the marine works (including dredging and dredge disposal during potential capital and maintenance dredging) would dissipate relatively rapidly and be immeasurable against background levels in a relatively localised area around the marine works (including dredge and disposal footprints). Sediment plumes would not extend into the Severn Estuary and will not cause a barrier to qualifying migratory fish moving into rivers that enter the SAC or impede wider migratory movements in the Severn Estuary area. The SAC does not overlap with the zone of influence of potential underwater noise effects associated with the proposed development. Piling and other underwater noise associated with the proposed development will not cause a barrier to qualifying migratory fish moving into rivers that enter the SAC or impede wider migratory movements in the Severn Estuary region. However, given the mobile and transient nature of the migratory fish species, it is possible that fish from this SAC could pass through the wider Swansea Bay region. While it is likely that they will easily be able to avoid the zone of potential noise effects and swim away	Yes	Yes

Qualifying feature	Assessment of Likely Significant Effect	Likely significant effects during construction	Likely significant effects during operation
	from this area, the potential for LSE cannot be ruled out and these qualifying migratory fish features have been screened in on a precautionary basis.		

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4.14 River Usk SAC

4.14.1 The assessment of effects for the River Usk SAC is set out in **Table 4-12** below. The citation details and conservation objectives are included in **Appendix D3Error! Reference source not found.** and referenced below where relevant.

Table 4-12: River Usk SAC Screening Assessment

Qualifying feature	Assessment of Likely Significant Effect	Likely significant effects during construction	Likely significant effects during operation
Water courses of plain to montane levels with the Ranunculion fluitantis and Callitrcho-Batrachion vegetation	The proposed development does not lie within or adjacent to the SAC. No direct or indirect damage to habitats is considered likely to occur. There will be no land-take, habitat removal or physical disturbance to any areas within or adjacent to the SAC boundary. Due to the site location and the separation distance from the proposed project, there is unlikely to be any disruption, disturbance or fragmentation to the site.	No	No
Sea lamprey *(Petromyzon marinus)* River lamprey (*Lampetra fluviatilis)* Twaite shad *(Alosa fallax)* Atlantic salmon *(Salmo salar)* Allis shad *(Alosa alosa)*	The River Usk is an important spawning ground for migratory fish. Sediment plumes resulting from the marine works (including dredging and dredge disposal during potential capital and maintenance dredging) would dissipate relatively rapidly and be immeasurable against background levels in a relatively localised area around the marine works (including dredge and disposal footprints). Sediment plumes would not extend into the Severn Estuary and will not cause a barrier to qualifying migratory fish moving into rivers that enter the SAC or impede wider migratory movements in the Severn Estuary area. The SAC does not overlap with the zone of influence of potential underwater noise effects associated with the proposed development. Piling and other underwater noise associated with the proposed development will not cause a barrier to qualifying migratory fish associated with the SAC or impede wider migratory movements in the Severn Estuary region. However, given the mobile and transient nature of the migratory fish species, it is possible that fish from this SAC could pass through the wider Swansea Bay region. While it is likely that they will easily	Yes	Yes

Qualifying feature	Assessment of Likely Significant Effect	Likely significant effects during construction	Likely significant effects during operation
	be able to avoid the zone of potential noise effects and swim away from this area, the potential for LSE cannot be ruled out and these qualifying migratory fish features have been screened in on a precautionary basis.		
Brook Lamprey *(Lampetra planeri)* Bullhead (*Cottus gobio)*	Bullhead and brook lamprey are non-migratory freshwater species. Due to the site location and the separation distance from the proposed scheme, there is unlikely to be any loss, damage, disruption, disturbance, or fragmentation to this qualifying feature.	No	No
Otter *(Lutra lutra)*	Inland populations of otter utilise a range or running and standing freshwaters and associated suitable habitat such as vegetated riverbanks, islands, reedbeds and woodlands. Due to the site location and the separation distance from the proposed project, there is unlikely to be any disruption, disturbance, or fragmentation to the populations of otter, or their dependencies, because of the project proposals.	No	No

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4.15 River Wye SAC

4.15.1 The assessment of effects for the River Wye SAC is set out in **Table 4-13** below. The citation details and conservation objectives are included in **Appendix D3Error! Reference source not found.** and referenced below where relevant.

Table 4-13: River Wye SAC Screening Assessment

Qualifying feature	Assessment of Likely Significant Effect	Likely significant effects during construction	Likely significant effects during operation
Water courses of plain to montane levels with the Ranunculion fluitantis and Callitrcho-Batrachion vegetation	The proposed development does not lie within or adjacent to the SAC. No direct or indirect damage to habitats is considered likely to occur. There will be no land-take, habitat removal or physical disturbance to any areas within or adjacent to the SAC boundary. Due to the site location and the separation distance from the proposed project, there is unlikely to be any disruption, disturbance or fragmentation to the site.	No	No
Sea lamprey *(Petromyzon marinus)* River lamprey *(Lampetra fluviatilis)*	The River Wye is an important spawning ground for migratory fish. Sediment plumes resulting from the marine works (including dredging and dredge disposal during potential capital and maintenance dredging) would dissipate relatively rapidly and be immeasurable against background levels in a relatively localised area around the marine	Yes	Yes

Qualifying feature	Assessment of Likely Significant Effect	Likely significant effects during construction	Likely significant effects during operation
Twaite shad *(Alosa fallax)* Atlantic salmon *(Salmo salar)* Allis shad *(Alosa alosa)*	works (including dredge and disposal footprints). Sediment plumes would not extend into the Severn Estuary and will not cause a barrier to qualifying migratory fish moving into rivers that enter the SAC or impede wider migratory movements in the Severn Estuary area. The SAC does not overlap with the zone of influence of potential underwater noise effects associated with the proposed development. Piling and other underwater noise associated with the proposed development will not cause a barrier to qualifying migratory fish associated with the SAC or impede wider migratory movements in the Severn Estuary region. However, given the mobile and transient nature of the migratory fish species, it is possible that fish from this SAC could pass through the wider Swansea Bay region. While it is likely that they will easily be able to avoid the zone of potential noise effects and swim away from this area, the potential for LSE cannot be ruled out and these qualifying migratory fish features have been screened in on a precautionary basis.		
White-clawed crayfish (*Austropotamobius pallipes)* Brook Lamprey Bullhead	Bullhead and brook lamprey are non-migratory freshwater species. White-clawed crayfish also live in freshwater streams and rivers. Due to the site location and the separation distance from the proposed project, there is unlikely to be any loss, damage, disruption, disturbance, or fragmentation to these qualifying features.	No	No
Otter	Inland populations of otter utilise a range or running and standing freshwaters and associated suitable habitat such as vegetated riverbanks, islands, reedbeds and woodlands. Due to the site location and the separation distance from the proposed project, there is unlikely to be any disruption, disturbance, or fragmentation to the populations of otter, or their dependencies, because of the project proposals.	No	No

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4.16 Pembrokeshire Marine SAC

4.16.1 The assessment of effects for Pembrokeshire Marine SAC is set out in **Table 4-14** below. The citation details and conservation objectives are included in **Appendix D3Error! Reference source not found.** and referenced below where relevant.

Table 4-14: Pembrokeshire Marine SAC – Screening Assessment

Qualifying feature	Assessment of Likely Significant Effect	Likely significant effects during construction	Likely significant effects during operation
Estuaries Large shallow inlets and bays Reefs Sandbanks which are slightly covered by sea water all the time Mudflats and sandflats not covered by seawater at low tide Coastal lagoons Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) Submerged or partially submerged sea caves Shore dock (*Rumex rupestris)*	Habitat features of the SAC do not overlap with the zone of influence of direct and indirect habitat loss/change and water quality changes associated with the proposed development which will be restricted to within the wider Swansea Bay region.	No	No
Grey seal *(Halichoerus grypus)*	Piling is required during construction and will produce underwater noise above background conditions and at a level that may cause a risk of injury and behavioural changes to marine mammals. Elevated noise and vibration levels caused by the action of the dredger during construction and operation could also potentially affect marine mammals by inducing adverse behavioural reactions. This SAC has been screened in on the basis of NRW guidance (PS006) on using Marine MMMUs in HRA. In summary, this guidance advises that as a result of the mobile and wide-ranging nature of marine mammals, using MMMUs as the spatial scale for screening is most appropriate. The proposed development overlaps with the OSPAR Region III MMMU. On this basis, all Welsh SACs designated for grey seal in this MMMU have been screened in.	Yes	Yes
Sea lamprey (Petromyzon marinus) River lamprey (Lampetra fluviatilis) Allis shad (Alosa alosa) Twaite shad (Alosa fallax)	The lamprey and shad populations of the SAC do not overlap with the zone of influence of potential effects associated with the development (including underwater noise and water quality changes) which will be restricted to within the wider Swansea Bay region.	No	No

Qualifying feature	Assessment of Likely Significant Effect	Likely significant effects during construction	Likely significant effects during operation
Otter (Lutra lutra)	Coastal populations of otters utilise shallow, inshore marine areas for feeding but also require freshwater for bathing and terrestrial areas for resting and breeding holts. The otter population of the SAC does not overlap with the zone of influence of potential effects associated with the development which will be restricted to within the wider Swansea Bay region.	No	No

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4.17 Lundy SAC

4.17.1 The assessment of effects for Lundy SAC is set out in **Table 4-15** below. The citation details and conservation objectives are included in **Appendix D3** and referenced below where relevant.

Table 4-15: Lundy SAC Screening Assessment

Qualifying feature	Assessment of Likely Significant Effect	Likely significant effects during construction	Likely significant effects during operation
Reefs Sandbanks which are slightly covered by sea water all the time Submerged or partially submerged sea caves	Habitat features of the SAC do not overlap with the zone of influence of direct and indirect habitat loss/change and water quality changes associated with the proposed development which will be restricted to within the wider Swansea Bay region.	No	No
Grey seal *(Halichoerus grypus)*	Piling is required during construction and will produce underwater noise above background conditions and at a level that may cause a risk of injury and behavioural changes to marine mammals. Elevated noise and vibration levels caused by the action of the dredger during construction and operation could also potentially affect marine mammals by inducing adverse behavioural reactions. This SAC has been screened in on the basis of NRW guidance (PS006) on using Marine MMMUs in HRA. In summary, this guidance advises that as a result of the mobile and wide-ranging nature of marine mammals, using MMMUs as the spatial scale for screening is most appropriate. The proposed development overlaps with the OSPAR	Yes	Yes

Qualifying feature	Assessment of Likely Significant Effect	Likely significant effects during construction	Likely significant effects during operation
	Region III MMMU. On this basis, all Welsh SACs designated for grey seal in this MMMU have been screened in.		

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4.18 Cardigan Bay SAC

4.18.1 The assessment of effects for Cardigan Bay SAC is set out in **Table 4-16** below. The citation details and conservation objectives are included in **Appendix D3Error! Reference source not found.** and referenced below where relevant.

Table 4-16: Cardigan Bay SAC – Screening Assessment

Qualifying feature	Assessment of Likely Significant Effect	Likely significant effects during construction	Likely significant effects during operation
Sandbanks which are slightly covered by sea water all the time Reefs Submerged or partially submerged sea caves	Habitat features of the SAC do not overlap with the zone of influence of direct and indirect habitat loss/change and water quality changes associated with the proposed development which will be restricted to within the wider Swansea Bay region.	No	No
Bottlenose dolphin (Tursiops truncatus)	The proposed development does not overlap with the Irish Sea bottlenose dolphin MMMU (for which this SAC is within). Coastal bottlenose dolphins in the Irish Sea do not tend to move into Celtic Seas or beyond and are relatively constrained to the Irish Sea Management Unit with sightings of bottlenose dolphins in Swansea Bay considered very rare. On this basis and applying the NRW guidance (PS006) on using MMMUs in HRA, there is considered to be no potential for LSE on this feature.	No	No
Grey seal (Halichoerus grypus)	Piling is required during construction and will produce underwater noise above background conditions and at a level that may cause a risk of injury and behavioural changes to marine mammals. Elevated noise and vibration levels caused by the action of the dredger during construction and operation could also potentially affect marine mammals by inducing adverse behavioural reactions. This SAC has been screened in on the basis of NRW guidance (PS006) on using Marine MMMUs in HRA. In summary, this guidance advises that as a result of the mobile and wide-ranging nature of marine mammals, using MMMUs as the spatial scale for	Yes	Yes

Qualifying feature	Assessment of Likely Significant Effect	Likely significant effects during construction	Likely significant effects during operation
	screening is most appropriate. The proposed development overlaps with the OSPAR Region III MMMU. On this basis, all Welsh SACs designated for grey seal in this MMMU have been screened in.		
Sea lamprey (Petromyzon marinus) River lamprey (Lampetra fluviatilis)	The lamprey population of the SAC does not overlap with the zone of influence of potential effects associated with the development (including underwater noise and water quality changes) which will be restricted to within the wider Swansea Bay region.	No	No

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4.19 West Wales Marine SAC

4.19.1 The assessment of effects for West Wales Marine SAC is set out in **Table 4-17** below. The citation details and conservation objectives are included in **Appendix D3Error! Reference source not found.** and referenced below where relevant.

Table 4-17: West Wales Marine SAC – Screening Assessment

Qualifying feature	Assessment of Likely Significant Effect	Likely significant effects during construction	Likely significant effects during operation
Harbour porpoise (Phocoena phocoena)	Piling is required during construction and will produce underwater noise above background conditions and at a level that may cause a risk of injury and behavioural changes to marine mammals. Elevated noise and vibration levels caused by the action of the dredger during construction and operation could also potentially affect marine mammals by inducing adverse behavioural reactions. This SAC has been screened in on the basis of NRW guidance (PS006) on using Marine MMMUs in HRA. In summary, this guidance advises that as a result of the mobile and wide-ranging nature of marine mammals, using MMMUs as the spatial scale for screening is most appropriate. The proposed development overlaps with the Celtic and Irish Seas MMMU. On this basis, all Welsh SACs designated for harbour porpoise in this MMMU have been screened in.	Yes	Yes

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4.20 Lleyn Peninsula and the Sarnau SAC

4.20.1 The assessment of effects for Lleyn Peninsula and the Sarnau SAC is set out in **Table 4-18** below. The citation details and conservation objectives are included in **Appendix D3** and referenced below where relevant.

Table 4-18: Lleyn Peninsula and the Sarnau SAC – Screening Assessment

Qualifying feature	Assessment of Likely Significant Effect	Likely significant effects during construction	Likely significant effects during operation
Sandbanks which are slightly covered by sea water all the time Estuaries Coastal lagoons Large shallow inlets and bays Reefs Mudflats and sandflats not covered by seawater at low tide Salicornia and other annuals colonizing mud and sand Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) Submerged or partially submerged sea caves	Habitat features of the SAC do not overlap with the zone of influence of direct and indirect habitat loss/change and water quality changes associated with the proposed development which will be restricted to within the wider Swansea Bay region.	No	No
Bottlenose dolphin *(Tursiops truncatus)*	The proposed development does not overlap with the Irish Sea bottlenose dolphin MMMU (for which this SAC is within). Coastal bottlenose dolphins in the Irish Sea do not tend to move into Celtic Seas or beyond and are relatively constrained to the Irish Sea Management Unit with sightings of bottlenose dolphins in Swansea Bay considered very rare. On this basis and applying the NRW guidance (PS006) on using MMMUs in HRA, there is considered to be no potential for LSE on this feature.	No	No
Grey seal *(Halichoerus grypus)*	Piling is required during construction and will produce underwater noise above background conditions and at a level that may cause a risk of injury and behavioural changes to marine mammals. Elevated noise and vibration levels caused by the action of the dredger during construction and operation could also potentially affect marine mammals by inducing adverse behavioural reactions. This SAC has been screened in on the basis of NRW guidance (PS006) on using Marine MMMUs in HRA. In summary, this guidance advises that as a result of the mobile and wide-ranging nature of marine mammals, using MMMUs as the	Yes	Yes

Qualifying feature	Assessment of Likely Significant Effect	Likely significant effects during construction	Likely significant effects during operation
	spatial scale for screening is most appropriate. The proposed development overlaps with the OSPAR Region III MMMU. On this basis, all Welsh SACs designated for grey seal in this MMMU have been screened in.		
Otter (Lutra lutra)	Coastal populations of otters utilise shallow, inshore marine areas for feeding but also require freshwater for bathing and terrestrial areas for resting and breeding holts. The otter population of the SAC does not overlap with the zone of influence of potential effects associated with the development which will be restricted to within the wider Swansea Bay region.	No	No

Mott MacDonald 2024

4.21 North Anglesey Marine SAC

4.21.1 The assessment of effects for North Anglesey Marine SAC is set out in **Table 4-19** below. The citation details and conservation objectives are included in **Appendix D3** and referenced below where relevant.

Table 4-19: North Anglesey Marine SAC – Screening Assessment

Qualifying feature	Assessment of Likely Significant Effect	Likely significant effects during construction	Likely significant effects during operation
Harbour porpoise *(Phocoena phocoena)*	Piling is required during construction and will produce underwater noise above background conditions and at a level that may cause a risk of injury and behavioural changes to marine mammals. Elevated noise and vibration levels caused by the action of the dredger during construction and operation could also potentially affect marine mammals by inducing adverse behavioural reactions. This SAC has been screened in on the basis of NRW guidance (PS006) on using Marine MMMUs in HRA. In summary, this guidance advises that as a result of the mobile and wide-ranging nature of marine mammals, using MMMUs as the spatial scale for screening is most appropriate. The proposed development overlaps with the Celtic and Irish Seas MMMU. On this basis, all Welsh SACs designated for harbour porpoise in this MMMU have been screened in.	Yes	Yes

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4.22 Assessment of in-combination effects

4.22.1 In line with case law21, where the proposed development is found to have either a neutral effect (where no impact pathways exist) or no appreciable effect (in that it is indistinguishable from background variations), on Habitats Sites then it is reasonable to conclude this would not contribute to an in-combination effect and so can be screened out.

4.22.2 At the screening stage, an in-combination assessment is only required where a screening assessment has identified some de-minimis or negligible level of adverse impact from the proposed development that is not significant alone but when combined with effects from another development would result in a likely significant effect.

4.22.3 For this assessment, where no likely significant effect has been identified on the qualifying features of the Habitats Sites, these are because no impact pathways exist or because no appreciable effects are anticipated. No de-minimis or negligible effects have been identified for any Habitats Sites included in this assessment. These sites assessed as having no LSE are therefore not considered further in the HRA process.

4.22.4 Although an in-combination assessment is not required at this HRA screening stage, as impact pathways have been identified that could result in a likely significant effect on the qualifying features or supporting habitats of the Habitat Sites, then an in-combination assessment will be considered during the HRA stage 2, ‘appropriate assessment’.

[21] In the case of Sweetman C-258/11, Advocate–General Eleanor Sharpston, Paragraph 48.

5 Conclusions

5.1.1 Impact pathways have been identified that are likely to result in a significant effect on one or more of the qualifying features or supporting habitats of several Habitat Sites, these are detailed in the assessment tables contained within Section 4.2 and summarised as follows:

- Kenfig SAC
- Limestone Coast of Southwast Wales SAC
- Cefn Gribwr Grasslands SAC
- Burry Inlet Ramsar
- Burry Inlet SPA
- Carmarthen Bay and Estuaries SAC
- Bristol Channel Approaches SAC
- Severn Estuary RamsarSevern Estuary SAC
- River Usk SAC
- River Wye SAC
- Pembrokeshire Marine SAC
- Lundy SAC
- Cardigan Bay SAC
- West Wales Marine SAC
- Lleyn Penisula and the Sarnau SAC
- North Angelsey Marine SAC

5.1.2 On this basis an ‘appropriate assessment’ of the implications of the proposed scheme proposals is required to identify whether the integrity of the Habitats Sites is likely to be adversely affected by the proposed scheme.

5.1.3 This screening has been undertaken based on the most recent design and programme information which is currently being developed. The conclusions of the HRA Screening will be reviewed once the scheme design is finalised to ensure these remain appropriate.

6 APPENDICES D1 – D3

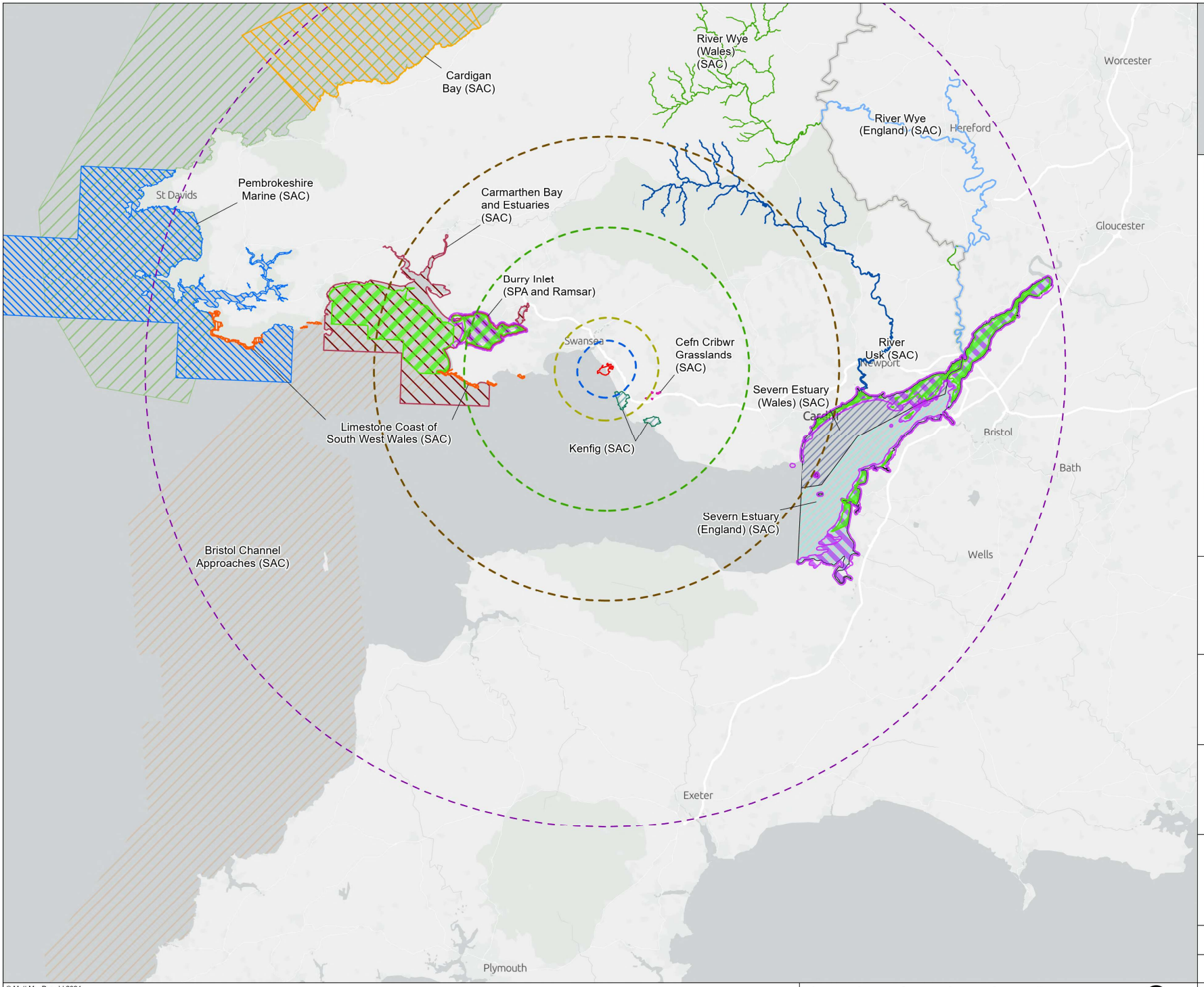
D1. List of Habitats Sites Considered

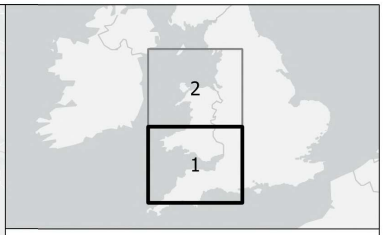
Sites Screened in/out (Items in green have been screened in)	Habitats Site Reference	Reason inclusion/ non-inclusion in screening assessment	Distance direction
RAMSAR SITES (WALES)			
Crymlyn Bog Ramsar	UK14006	Terrestrial habitats only, no FLL or anticipated impact pathways	5.8km NW
Burry Inlet Ramsar	UK14001	Variety of marine / estuarine birds, mobile features potential impact pathways	18.0km NW
Severn Estuary Ramsar	UK11081	Multiple criteria, mobile features, possible impact pathways.	41.0km
SPECIAL AREAS OF CONSERVATION (WALES)			
Kenfig / Cynffig	UK0012566	Coastal habitats plus adjacent to M4 and increased traffic movements – potential impact pathways	4.3km SE
Crymlyn Bog / Cors Crymlyn SAC	UK0012885	Terrestrial habitats only, no FLL or anticipated impact pathways	5.8km NW
Glaswelltiroedd Cefn Cribwr / Cefn Cribwr Grasslands SAC	UK0030113	Marsh fritillary – no suitable habitat in FPT Adjacent to M4 and increased traffic movements– potential air quality impacts	9.6km SE
Gower Ash Woods / Coedydd Ynn Gwyr SAC	UK0030157	Terrestrial habitats only, no FLL or anticipated impact pathways	14.5km W

Sites Screened in/out (Items in green have been screened in)	Habitats Site Reference	Reason inclusion/ non-inclusion in screening assessment	Distance direction
Blackmill Woodlands SAC	UK0030090	Terrestrial habitats only, no FLL or anticipated impact pathways	15.0km E
Gower Commons / Tiroedd Comin Gwyr SAC	UK0012685	Inverts: damselfly, marsh fritillary, no FLL or anticipated impact pathways	16.0km W
Limestone Coast of South West Wales SAC / Arfordir Calchfaen De Orllewin Cymru	UK0014787	Coastal habitats and GHS bat. Potential impacts	16.5km
Carmarthen Bay and Estuaries SAC/ Bae Caerfyrddin ac Aberoedd	UK0020020	Mobile features and marine habitats, possible impact pathways.	18.4km W
Dunraven Bay SAC	UK0030139	'Shore dock'/ single plant sp. No FLL or impact pathways.	18.8km NE
Coedydd Nedd a Mellte SAC	UK0030141	Terrestrial habitats only, no FLL or anticipated impact pathways.	22.5km N
Blaen Cynon SAC	UK0030092	Marsh fritillary designation, no suitable habitat, no FLL or anticipated impact pathways.	24.4km NE
Cwm Cadlan SAC	UK0013585	Terrestrial habitats only, no FLL or anticipated impact pathways.	27.0km NE
Caeau Mynydd Mawr SAC	UK0030105	Marsh fritillary designation, no FLL or anticipated impact pathways.	27.6km NW
Carmarthen Bay Dunes SAC / Twyni Bae Caerfyrddin	UK0020019	Coastal habitats. No FLL or anticipated impact pathways.	29.5km W
Bristol Channel Approaches SAC	UK0030396	Mobile features, possible impact pathways.	32.5km

Sites Screened in/out (Items in green have been screened in)	Habitats Site Reference	Reason inclusion/ non-inclusion in screening assessment	Distance direction
Severn Estuary	UK0013030	Mobile features, possible impact pathways.	50km
River Usk	Uk0013007	Mobile features, possible impact pathways.	57km
Pembrokeshire Marine	UK0013116	Mobile features, possible impact pathways.	68km
Lundy	UK0013114	Mobile features, possible impact pathways.	69km
Cardigan Bay	UK0012712	Mobile features, possible impact pathways.	78km
River Wye	UK0012642	Mobile features, possible impact pathways.	79km
West Wales Marine	UK0030397	Mobile features, possible impact pathways.	86km
Llyn Peninsula	UK0013117	Mobile features, possible impact pathways.	95km
North Anglesey	UK0030398	Mobile features, possible impact pathways.	194km
SPECIAL PROTECTION AREAS (WALES)			
Burry Inlet SPA	UK9015011	Mobile features, possible impact pathways.	18.0km NW
Carmarthen Bay SPA	UK9014091	Mobile features, separation distance makes impacts unlikely.	32.5km
Severn Estuary SPA	UK9015022	Mobile features, separation distance makes impacts unlikely.	50km

D2. Habitat Site Locations





- FLOW EIA Scoping Boundary - Port of Port Talbot
- Port of Port Talbot Site - 5km buffer
- Port of Port Talbot Site - 10km buffer
- Port of Port Talbot Site - 30km buffer
- Port of Port Talbot Site - 50km buffer
- Port of Port Talbot Site - 100km buffer

Special Area of Conservation (SAC)

- Cardigan Bay
- Carmarthen Bay and Estuaries
- Kenfig
- Limestone Coast of South West Wales
- Pembrokeshire Marine
- River Usk
- River Wye (England)
- River Wye (Wales)
- Severn Estuary (England)
- Severn Estuary (Wales)
- Cefn Cribwr Grasslands
- West Wales Marine
- Bristol Channel Approaches
- Ramsar Wetland
- Special Protection Area (SPA)

Coordinate system: British National Grid; Datum: OSGB 1936

Data sources:
Future Port Talbot site boundary: ABP/MDEC 2024
Future Port Talbot site boundary buffers: MMD 2024
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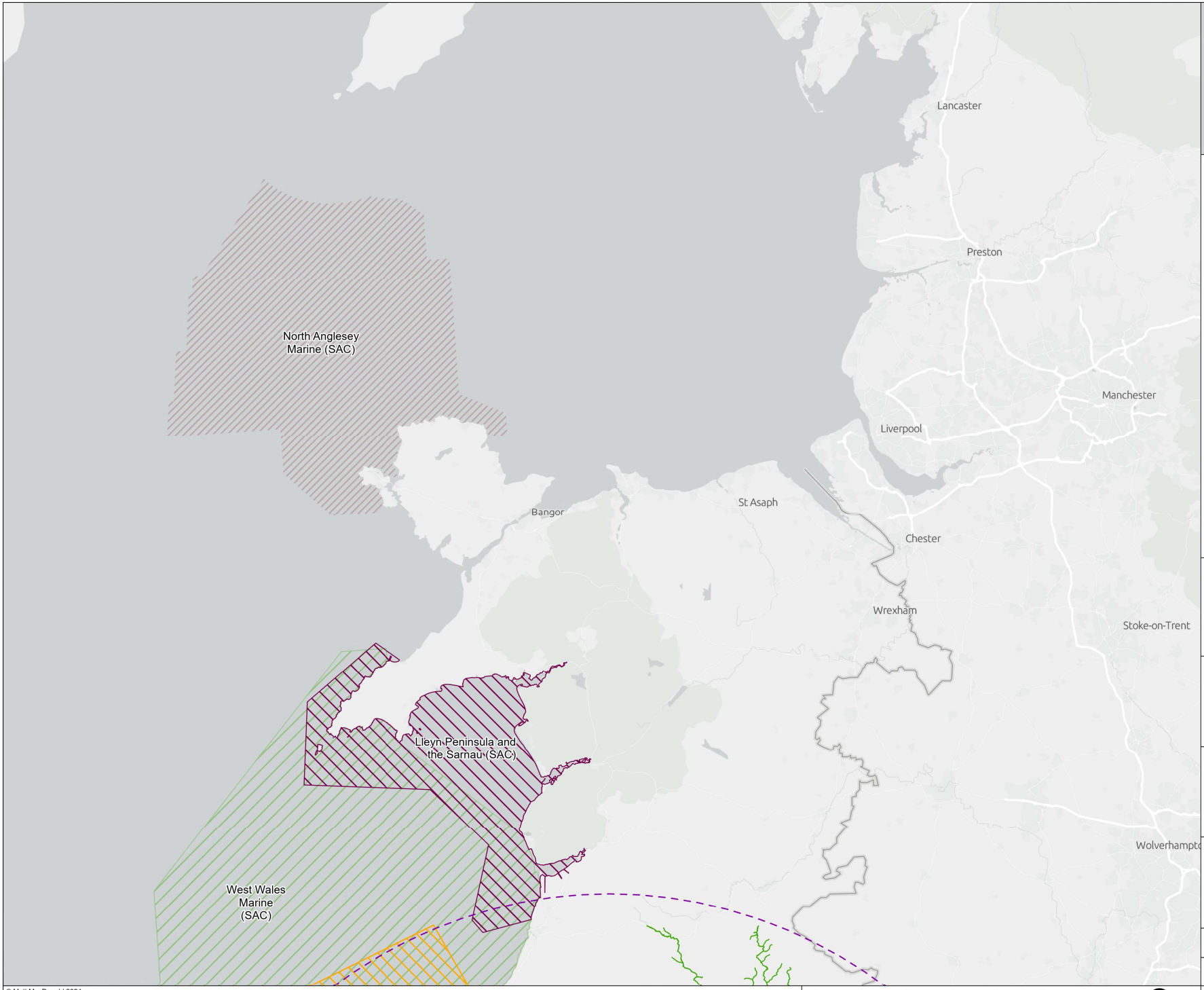
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Environmental Constraints
Port of Port Talbot Site
Sheet 1 of 2

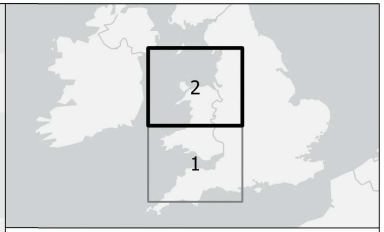
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0 10 20 30 40 50 km





Port of Port Talbot Site - 100km buffer

Special Area of Conservation (SAC)

- Cardigan Bay
- Lleyn Peninsula and the Sarnau
- North Anglesey Marine
- River Wye (Wales)
- West Wales Marine

Coordinate system: British National Grid; Datum: OSGB 1936

Data sources:
Future Port Talbot site boundary: ABP/MDEC 2024
Future Port Talbot site boundary buffers: MMD 2024
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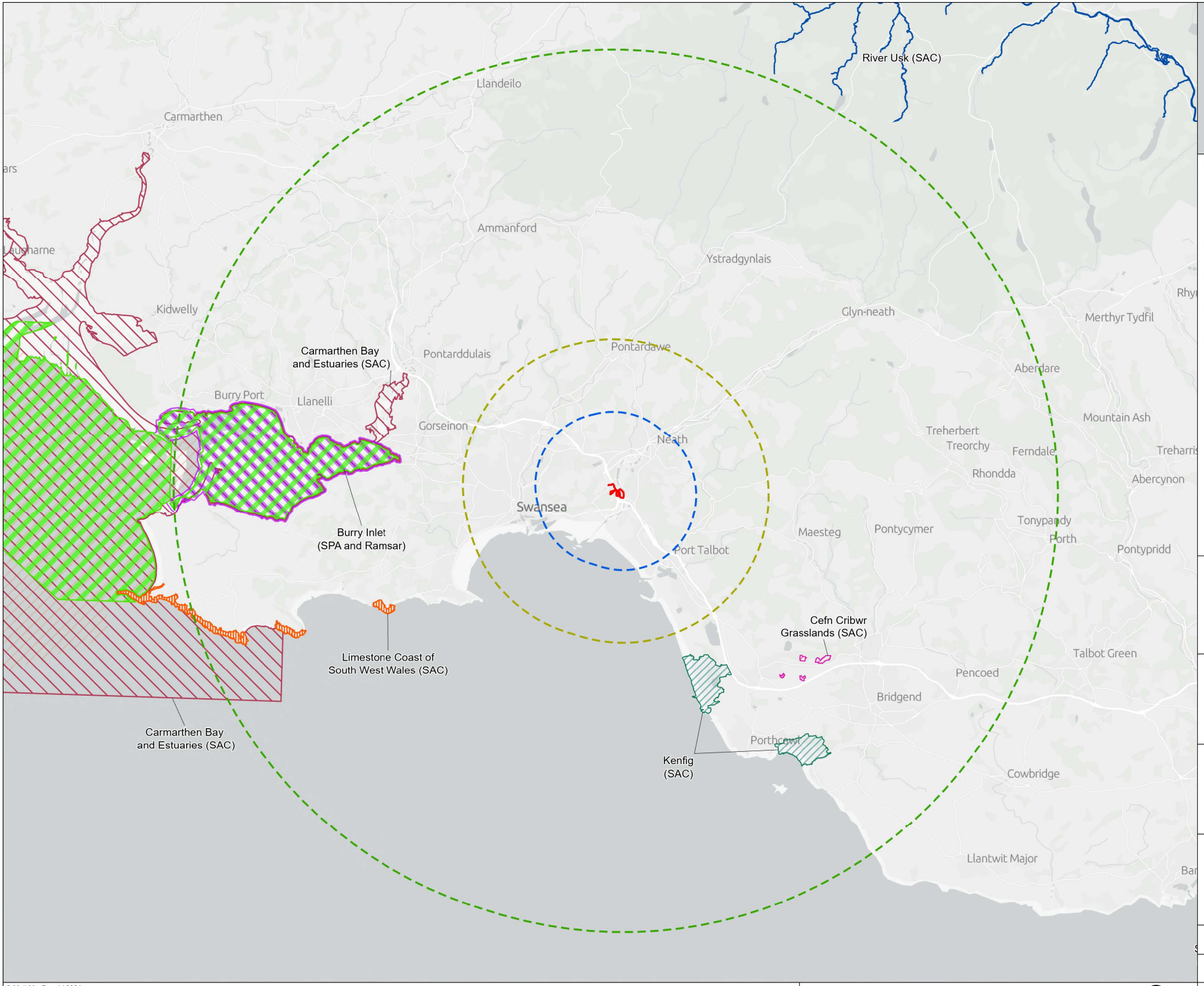
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Habitat Regulations Assessment
Environmental Constraints
Port of Port Talbot Site
Sheet 2 of 2

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- FLOW EIA Scoping Boundary - Jersey Marine Site
- Jersey Marine Site - 5km buffer
- Jersey Marine Site - 10km buffer
- Jersey Marine Site - 30km buffer

Special Area of Conservation (SAC)

- Carmarthen Bay and Estuaries
- Kenfig
- Limestone Coast of South West Wales
- River Usk
- Cefn Cribwr Grasslands
- Bristol Channel Approaches
- Ramsar Wetland
- Special Protection Area (SPA)

Coordinate system: British National Grid; Datum: OSGB 1936

Data sources.
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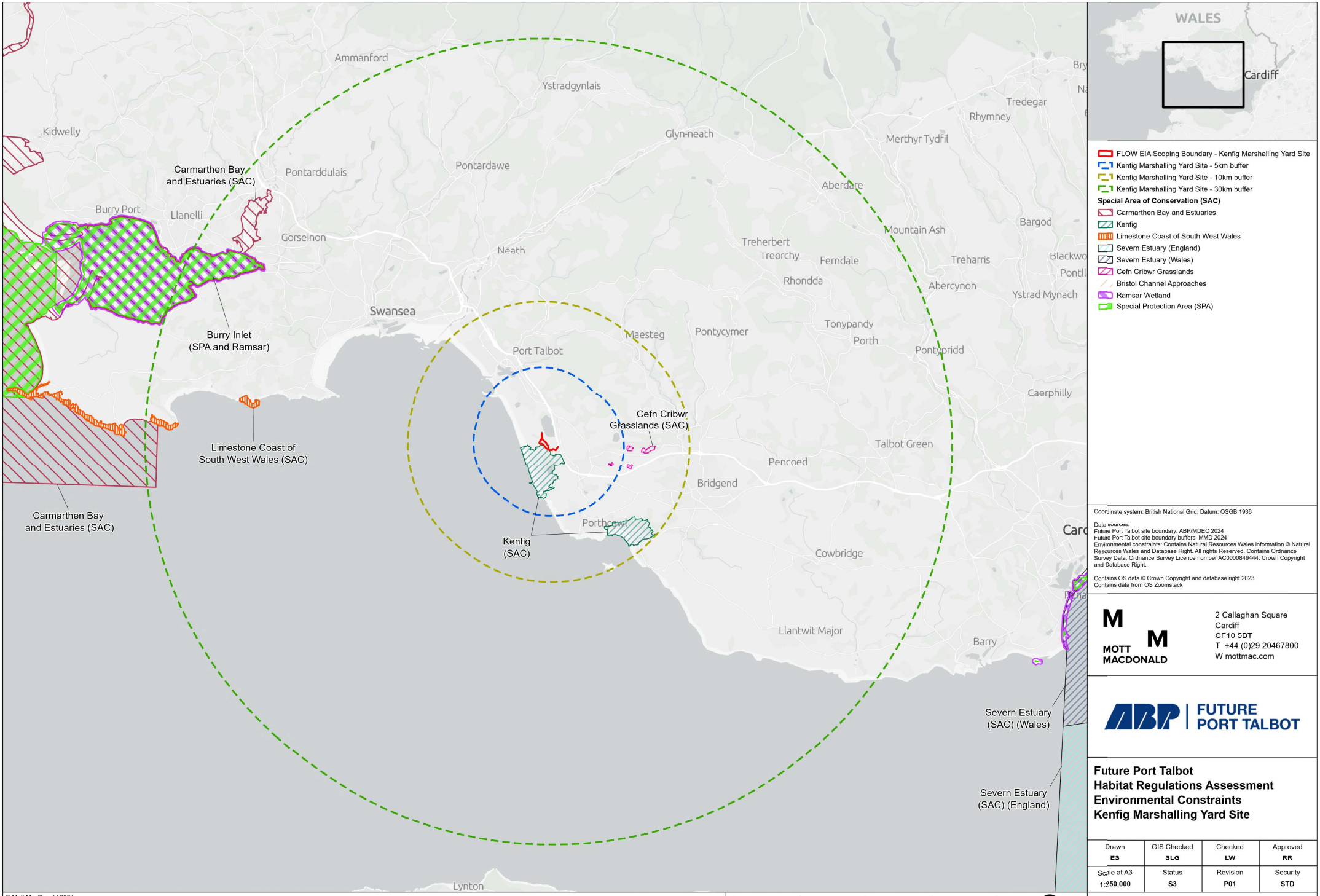
Future Port Talbot
Habitat Regulations Assessment
Environmental Constraints
Jersey Marine Site

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Future Port Talbot
Habitat Regulations Assessment
Environmental Constraints
Kenfig Marshalling Yard Site

Drawn	GIS Checked	Checked	Approved
ES	SLG	LW	RR
Scale at A3	Status	Revision	Security
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0 5 10 15 20 km

D3. Designated Site Details

Habitats Sites details are taken from Natural Resources Wales and Natural England designated site websites[1] and the JNCC summary spreadsheets[2]

The conservation objectives and qualifying information for each designation is publicly available data and so has not been reproduced in full below but instead the information of most relevance to this assessment is highlighted.

C.1 Kenfig SAC (UK0012566)

C.1.1 Conservation Objectives

The Kenfig SAC Core Management Plan[3] lists the conservation objectives for individual qualifying features. In summary, the overall aim for the SAC is that the natural coastal and dune-forming processes that determine the dynamics and proportions of habitats at Kenfig should be allowed to continue. Existing habitats should be maintained where possible by management of factors within human control.

- Where possible the area of qualifying/ important habitats should be maintained or increased.
- Nationally rare and scarce plants, such as petalwort (*Petalophyllum ralfsii*) and fen orchid (*Liparis loeselii*), should not reduce in range or lose the ability to reproduce and sustain themselves, through factors within human control.
- The inter-tidal communities should remain mainly undisturbed, with sustainable populations maintained by maritime influences, and tidal movement.
- Management of the site should promote the natural diversity of the sand dune and salt marsh habitats. Due to the nature of the site this will involve clearance of scrub, as natural seral progression would otherwise result in the dune system becoming dominated by scrub and woodland.

[1] Designated site information available at: Natural England and Natural Resources Wales

[2] UK Protected Area Datasets for Download | JNCC - Adviser to Government on Nature Conservation

[3] Kenfig SAC Core Management Plan (Including Conservation Objectives), Countryside Council for Wales (09/04/2008)

C.1.2 Qualifying features

The SAC contains the following Annex I habitats that are a primary reason for the selection of this site:

- 2130 Fixed coastal dunes with herbaceous vegetation ("grey dunes");
- 2170 Dunes with Salix repens ssp. argentea (*Salicion arenariae*);
- 2190 Humid dune slack, and;
- 3140 Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp.

The SAC also contains the following Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site:

- 1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae).

The SAC contains the following Annex II species that are a primary reason for selection of this site:

- 1395 Petalwort (*Petalophyllum ralfsii*), and;
- 1903 Fen orchid (*Liparis loeselii*).

C.1.3 Threats Pressures and activities with impacts on the site

The Kenfig SAC Core Management Plan24 provides details of threats, pressures and activities with potential for negative impacts to qualifying habitats and species. These include the following:

- Undergrazing, overgrazing and trampling of vegetation;
- Water quality and agricultural run-off including elevated levels of nutrients/ pollutants;
- Recreation and visitor pressure including off road motorcycling, horse riding and camping;
- Scrub encroachment;
- Airborne pollution including from industrial, transport and waste sources;
- Fishery management (including introduced carp for example), and;
- Introduced alien / exotic species.

C.1.4 Site improvement plan and management

The Kenfig SAC Core Management Plan24 provides a summary of proposed management activities to maintain or restore each qualifying feature. These include the following:

- Targeted destabilisation of dunes and excavation of blow outs;
- Manging grazing levels;
- Continued scrub clearance;
- Targeted mowing regimes - reducing the competitive advantage of coarse and woody growth;

- Protection the air and water quality;
- Maintenance of the natural hydrological regime;
- Management and wardening of inappropriate recreational activities;
- Fishery management to be aligned with best management for qualifying features;
- Vigilance /control of alien plant species, and;
- Water quality monitoring.

C.2 Glaswelltiroedd Cefn Cribwr / Cefn Cribwr Grasslands SAC

C.2.1 Conservation objectives

The Cefn Cribwr Grasslands Core Management Plan4 lists the conservation objectives for individual qualifying features:

Molinia meadows on calcareous, peaty or clayey-silt-laden soils *(Molinion caeruleae)*

The vision for this feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:

- eu-Molinion marshy grassland will occupy between 50% and 55% of the total site area;
- The remainder of the site will be other semi-natural habitat or areas of permanent pasture;
- The following plants will be common in the eu-Molinion marshy grassland: purple moor-grass Molinia caerulea; meadow thistle Cirsium dissectum; Carex hostiana; Carex pulicaris; devil's bit scabious Succisa pratensis; carnation sedge Carex panicea; saw wort Serratula tinctoria and; tormentil Potentilla erecta;
- Cross-leaved heath Erica tetralix and common heather Calluna vulgaris will also be common in some areas;
- Rushes and species indicative of agricultural modification, such as perennial rye grass Lolium perenne and white clover Trifolium repens will be largely absent from the eu-Molinion marshy grassland;
- Scrub species such as willow Salix (excluding Salix repens) and birch Betula will also be largely absent from the eu-Molinion marshy grassland, and;
- All factors affecting the achievement of the foregoing conditions are under control.

Marsh fritillary butterfly Euphydryas *(Eurodryas, Hypodryas) aurinia*

The vision for this feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:

- The site will contribute towards supporting a sustainable metapopulation of the marsh fritillary in the Cefn Cribwr area. This will require a minimum of 50ha of suitable habitat, of which at least 10ha must be in good condition, although not all is expected to be found within the SAC. Some will be on nearby land within a radius of about 2km;
- The population will be viable in the long term, acknowledging the extreme population fluctuations of the species;
- Habitats on the site will be in optimal condition to support the metapopulation;

[4] Cefn Cribwr Core SAC Plan 290108 English.doc (naturalresources.wales)

- At least 40ha within the SAC & associated SSSI will be marshy grassland suitable for supporting marsh fritillary, with *Succisa pratensis* present and only a low cover of scrub;
- At least 8ha will be marsh fritillary breeding habitat in good condition, dominated by purple moor-grass *Molinia caerulea*, with *S. pratensis* present throughout and a vegetation height of 10-20cm over the winter period;
- Suitable marsh fritillary habitat is defined as stands of grassland where *Succisa pratensis* is present and where scrub more than 1-metre-tall covers no more than 10% of the stands;
- Optimal marsh fritillary breeding habitat will be characterised by grassland where the vegetation height is 10-20 cm, with abundant purple moor-grass *Molinia caerulea*, frequent “large-leaved” devil’s-bit scabious *Succisa pratensis* suitable for marsh fritillaries to lay their eggs and only occasional scrub. In peak years, a density of 200 larval webs per hectare of optimal habitat will be found across the site;
- The marshy grassland will be well sheltered by hedgerows and mature trees, and;
- All factors affecting the achievement of the foregoing conditions are under control.

C.2.2 Qualifying Features

This site is designated for Annex I habitats that are a primary reason for selection of this site:

- 6410 Molinia meadows on calcareous, peaty or clayey-silt-laden soils *(Molinion caeruleae).*
- This site is also designated for Annex II species present as a qualifying feature, but not a primary reason for site selection:
- 1065 Marsh fritillary butterfly *Euphydryas (Eurodryas, Hypodryas) aurinia.*

C.2.3 Threats, pressures and activities with impacts on the site

The threats and pressures with negative impacts on this site have been collected from the Cefn Cribwr Grasslands SAC information sheet5:

- Human induced changes in hydraulic conditions;
- Grazing;
- Air pollution, air-borne pollutants;
- Invasive non-native species;
- Biocenotic evolution, succession;
- Forestry activities not referred to above, and;

[5] Cefn Cribwr Grasslands SAC information sheet UK0030113.pdf (jncc.gov.uk)

- Other ecosystem modifications.

Positive impacts include:

- Grazing, and;
- Restructuring agricultural land holding.

C.2.4 Site improvement plan and management

Management for the features are detailed within the Cefn Cribwr Grasslands SAC Core Management Plan and comprise the following:

- Molinia meadows on calcareous, peaty or clayey-silt-laden soils *(Molinion caeruleae)*
  - Habitat management through traditional farming practices.
  - Livestock grazing with an appropriate grazing regime to prevent scrub encroachment.
  - Scrub and rush control via grazing, scrub control, topping and fencing gates as required.
  - Better understanding of the Hydrology of the site.
  - Better understanding of the effects of off-site pollution e.g., release of lime dust.
-
- Marsh fritillary butterfly Euphydryas (Eurodryas, Hypodryas) aurinia
  - Habitat management associated with the management of the Eu-Molinion grassland will meet the requirements for marsh fritillary.
  - Further site-specific data is required to establish confidence in the influence of grazing levels on habitat condition for marsh fritillaries.
  - Annual monitoring of larval web densities and habitat condition are required until some confidence on these issues is achieved.

-

C.3 Limestone Coast of South West Wales SAC (UK0014787)

C.3.1 Conservation Objectives

The Limestone Coast of South-West Wales SACE Core Management Plan6 lists the conservation objectives for individual qualifying features and includes a vision for the feature and performance indicators. In summary, the vision is for the qualifying features to be in a favourable conservation status, whereby favourable conservation status is defined in the broadest of terms, meaning a feature is in satisfactory condition and all the things needed to keep it that way is in place for the foreseeable future.

C.3.2 Qualifying features

The SAC contains the following Annex I habitats that are a primary reason for the selection of this site:

- 1230 Vegetated sea cliffs of the Atlantic and Baltic Coasts
- 2130 "Fixed coastal dunes with herbaceous vegetation (""grey dunes"")" * Priority feature

The SAC also contains the following Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site:

- 4030 European dry heaths;
- 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites);
- 8310 Caves not open to the public, and;
- 8330 Submerged or partially submerged sea caves.

The SAC contains the following Annex II species that are a primary reason for selection of this site:

- 1304 Greater horseshoe bat *Rhinolophus ferrumequinum*, and;
- 1654 Early gentian *Gentianella anglica.*

The SAC also contains the following Annex II species that are present as a qualifying feature but not a primary reason for site selection:

- 1395 Petalwort *Petalophyllum ralfsii.*

C.3.3 Threats, pressures and activities with impacts on the site

The Limestone Coast of South Wales SAC Core Management Plan provides details of threats, pressures and activities with potential for negative impacts to qualifying habitats and species. These include the following:

- Undergrazing, overgrazing and trampling of vegetation;

[6] Limestone Coast of South West Wales English.doc (naturalresources.wales)

- Water quality and agricultural run-off including elevated levels of nutrients/ pollutants;
- Airborne pollution including from industrial, transport and waste sources;
- Excessive erosion of community types caused by over intensive military use, or through deposition of extraneous materials;
- Recreation and visitor pressure including cliff-climbing, vehicle use, trampling and erosion;
- Introduced alien / exotic species;
- Dune fires could lead to serious erosion of the dune vegetation impacting fixed and semi-fixed dune habitats, and;
- Scrub encroachment.

C.3.4 Site improvement plan and management

The Limestone Coast of South Wales SAC Core Management Plan provides a summary of proposed management activities to maintain or restore each qualifying feature. These include the following:

- Maintain horseshoe bats free of disturbance;
- Manging grazing levels;
- Continued scrub clearance;
- Targeted mowing regimes - reducing the competitive advantage of coarse and woody growth;
- Protection the air and water quality;
- Maintenance of the natural hydrological regime;
- Management and wardening of inappropriate recreational activities;
- Vigilance /control of alien plant species, and;
- Water quality monitoring.

C.4 Burry Inlet Ramsar (UK14001)

C.4.1 Conservation Objectives

There are no conservation objections for Ramsar sites and therefore the connecting Burry Inlet SPA conservation objectives will be used.

C.4.2 Qualifying features

The Burry Inlet regularly supports large numbers of wildfowl and waders and is designated under the following criterion.

- Ramsar Criterion 5: regularly supports 20,000 or more waterbirds.
- Ramsar Criterion 6: regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds.

Species utilising the site for either wintering or passage include the following:

- Common greenshank *(Tringa nebularia)*;
- Spotted redshank (*Tringa erthropus)*;
- Dark bellied brent *(Branta bernicla bernicla);*
- Little egret *(Egretta garzetta);*
- Whimbrel *(Numenius phaeopus);*
- Northern pintail *(Anas acuta);*
- Northern shoveler *(Anas clypeata)*;
- Eurasian wigeon *(Anas penelope);*
- Dunlin *(Calidris alpina alpina);*
- Red knot *(Calidris canutus);*
- Eurasian oystercatcher *(Haematopus ostralegus*);
- Eurasian curlew (*Numenius arquata);*
- Common shelduck (*Tadorna tadorna);*
- Common redshank *(Tringa totanus)*, and;
- Ruddy turnstone *(Arenaria interpres).*

C.4.3 Threats, pressures and activities with impacts on the site

Erosion has been identified on the RSIS Ramsar information for Burry Inlet[7]. Erosion of /loss of Salicornia zone is occurring – loss of this early successional vegetation is changing the overall saltmarsh habitat distribution on the site.

[7] UK Burry Inlet 14001 RIS 2005.doc (Ramsar.org)

C.4.4 Site improvement plan and management

No information of site improvement is noted on the RSIS Ramsar information for Burry Inlet[28].

C.5 Burry Inlet SPA (UK9015011)

C.5.1 Conservation Objectives

The Carmarthen Bay and Estuaries Especial Area of Conservation document[8], include the regulation to achieve favourable conservation status all the following, subject to natural processes, need to be fulfilled and maintained in the long-term.

- The numbers of all SPA bird species are stable or increasing;
- The abundance and distribution of suitable prey are sufficient and appropriate to support the numbers of all SPA bird species;
- All SPA birds are allowed to inhabit their feeding grounds and resting areas with minimum disturbance and are allowed to move unhindered between them, and;
- All states of the Conservation Objectives for the supporting habitats and species, subject to natural processes, are fulfilled and maintained in the long-term.

C.5.2 Qualifying features

The site qualifies under Article 4.2 of the Birds Directive EC79/209 for regularly supporting internationally important wintering populations of pintail *Anas acuta*, shoveler *Spatula clypeata*, teal *Anas crecca*, wigeon *Mareca penelope*, dunlin *Calidris alpina*, knot *Calidris canutus*, oystercatcher *Haematopus ostralegus*, curlew *Numenius arquata*, ringed plover *Pluvialis squatarola*, shelduck *Tadorna tadorna*, redshank *Tringa tetanus*.

It also qualifies under Article 4.2 of the Birds Directive EC79/209 for an internationally important assemblage of birds over winter when the area regularly supports 34962 waterfowl, including the species listed above.

C.5.3 Threats, pressures and activities with impacts on the site

The Burry Inlet SPA standard data form[9] provides details of threats, pressures and activities with potential for negative impacts to qualifying habitats and species. These include the following:

- Military use and civil unrest;
- Outdoor sports and leisure activities, recreational activities;
- Fishing and harvesting aquatic resources;
- Marine water pollution;
- Air pollution, air-borne pollutants, and;

[8] Carmarthen Bay and Estuaries Special Area of Conservation (Natural England)

[9] Burry Inlet SPA information UK9015011.pdf (jncc.gov.uk)

- Changes in abiotic conditions.
-

C.5.4 Site improvement plan and management

- The Burry Inlet SPA sheet information states[29] that the form of management and degree of protection necessary will vary spatially, temporally and from one feature component to another due to their differences in conservation importance and their sensitivity and susceptibility to change as a result of human action. Therefore, the conservation objectives require a risk-based approach to the identification, prioritisation and implementation of management action.

C.6 Carmarthen Bay & Estuaries SAC (UK0020020)

C.6.1 Conservation Objectives

The Carmarthen Bay and Estuaries SAC Natural Resources Wales (NRW) Advice10 the conservation objectives for individual qualifying features. In summary to achieve favourable conservation status all the following, subject to natural processes, need to be fulfilled and maintained in the long-term.

For qualifying habitat features:

- Range - the overall distribution and extent of the habitat features within the site, and each of their main component parts is stable or increasing;
- Structure and function - the physical biological and chemical structure and functions necessary for the long-term maintenance and quality of the habitat are not degraded, and;
- Typical species - the presence, abundance, condition and diversity of typical species is such that habitat quality is not degraded.
- For qualifying species features:
- Populations - the population is maintaining itself on a long-term basis as a viable component of its natural habitat;
- Range - the species population within the site is such that the natural range of the population is not being reduced or likely to be reduced for the foreseeable future, and;
- Supporting habitats and species - the presence, abundance, condition and diversity of habitats and species required to support this species is such that the distribution, abundance and populations dynamics of the species within the site and population beyond the site is stable or increasing.

C.6.2 Qualifying features

The SAC contains the following Annex I habitats that are a primary reason for the selection of this site:

- 1110 Sandbanks which are slightly covered by sea water all the time;
- 1130 Estuaries;
- 1140 Mudflats and sandflats not covered by seawater at low tide;
- 1160 Large shallow inlets and bays;
- 1310 Salicornia and other annuals colonizing mud and sand, and;
- 1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae).

[10] Carmarthen Bay and Estuaries- European Marine Site, Advice provided by Natural Resources Wales in fulfilment of Regulation 37 of the Conservation of Habitats and Species Regulations 2017 (March 2018)

The SAC contains the following Annex II species that are a primary reason for selection of this site:

- 1103 Twaite shad (*Alosa fallax*).

The following Annex II species are present as a qualifying feature but not a primary reason for site selection:

- 1095 Sea lamprey (*Petromyzon marinus*);
- 1099 River lamprey (*Lampetra fluviatilis*);
- 1102 Allis shad (*Alosa alosa*), and;
- 1355 Otter (*Lutra lutra*).

C.6.3 Threats, pressures and activities with impacts on the site

The Carmarthen Bay and Estuaries SAC Natural Resources Wales (NRW) Advice[31] provides a table of operations which may cause deterioration or disturbance to the SAC's qualifying features. These include the following:

- Activities associated with docks, marinas and shipping. For example, construction, shipping discharges / pollution and dredging;
- Civil engineering projects. These include land claim, coastal protection and energy generation projects;
- Waste disposal. This includes sewage, run-off, discharge of domestic and industrial refuge and agricultural runoff;
- Exploitation of living resources including trawling, dredging, netting and other forms of fishing;
- Cultivation of living resources including algae, molluscs and crustations;
- Exploitation of non-living resources including water abstraction, offshore wind, mineral extraction, oil & gas and renewable energy generation;
- Recreational and military activities;

C.6.4 Site improvement plan and management

The Carmarthen Bay and Estuaries SAC Natural Resources Wales (NRW) Advice[31] states that the form of management and degree of protection necessary will vary spatially, temporally and from one feature component to another due to their differences in conservation importance and their sensitivity and susceptibility to change as a result of human action. Therefore, the conservation objectives require a risk-based approach to the identification, prioritisation and implementation of management action.

Further information can be found in the Blue Carbon Potential of the Marine Protected Area Network in the Welsh Marine Environment document[11]

[11] Blue Carbon Potential of the Marine Protected Area Network in the Welsh Marine Environment (natural resourceswales.gov.uk)

C.7 Bristol Channel Approaches SAC (UK0030396)

C.7.1 Conservation Objectives

The Natura 2000 Standard Data Form for Bristol Channel Approaches SAC[12] and the Bristol Channel Approaches MPA[13] details the conservation objectives for the site which are to maintain integrity by ensuring:

1. Harbour porpoise is a viable component of the site;
2. There is no significant disturbance of the species, and;
3. The condition of supporting habitats and processes, and the availability of prey is maintained.

C.7.2 Qualifying features

The SAC contains the following Annex II habitats that are a primary reason for the selection of this site:

- 1351 Harbour porpoise *Phocoena phocoena.*

C.7.3 Threats, pressures and activities with impacts on the site

The Bristol Channel Approaches MPA provides details a summary of the medium to high pressures towards harbour purposes, these include the following:

- Entanglement/by catch resulting in mortality or injury;
- Contaminant resulting in effects on water and prey quality, bioaccumulation through contaminated prey ingestion;
- Anthropogenic underwater sound resulting in mortality, internal injury, disturbance leading to behavioural changes/habitat loss;
- Reduction in prey resource resulting in reduction in food availability, increased competition, displacement from natural range, and;
- Collision with vessels or installations resulting in mortality or injury.

C.7.4 Site improvement plan and management

porpoise-Post Consultation report highlight that “The data submitted for the Swansea Bay area may be used to inform wider species management measures and potentially the development of the harbour porpoise conservation plan”[14].

[12] UK0030396.pdf (jncc.gov.uk)

[13] Bristol Channel Approaches MPA | JNCC - Adviser to Government on Nature Conservation

[14] 2016 consultation on possible Special Areas of Conservation for harbour porpoise-Post Consultation report (jncc.gov.uk).

C.8 Severn Estuary Ramsar

C.8.1 Conservation Objectives

There are no conservation objections for Ramsar sites and therefore the connecting Severn Estuary SPA conservation objectives will be used.

C.8.2 Qualifying Features

This Ramsar site meets the Ramsar criterion 1,3,4,5,6, and 8.

Ramsar criteria 1

Habitats Directive Annex I features present on the pSAC include: H1110 Sandbanks which are slightly covered by sea water all the time H1130 Estuaries H1140 Mudflats and sandflats not covered by seawater at low tide H1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae).

Ramsar criteria 3

Due to unusual estuarine communities, reduced diversity and high productivity.

Ramsar criteria 4

This site is important for the run of migratory fish between sea and river via estuary. Species include Salmon Salmo salar, sea trout S. trutta, sea lamprey Petromyzon marinus, river lamprey Lampetra fluviatilis, allis shad Alosa alosa, twaite shad A. fallax, and eel Anguilla anguilla. It is also of particular importance for migratory birds during spring and autumn.

Ramsar criteria 8

The fish of the whole estuarine and river system is one of the most diverse in Britain, with over 110 species recorded. Salmon Salmo salar, sea trout S. trutta, sea lamprey Petromyzon marinus, river lamprey Lampetra fluviatilis, allis shad Alosa alosa, twaite shad A. fallax, and eel Anguilla anguilla use the Severn Estuary as a key migration route to their spawning grounds in the many tributaries that flow into the estuary. The site is important as a feeding and nursery ground for many fish species particularly allis shad and twaite shad which feed on mysid shrimps in the salt wedge.

Ramsar criteria 6

Species with peak counts in winter:

- Tundra swan, *Cygnus columbianus bewickii;*
- Greater white-fronted goose, *Anser albifrons albifrons;*
- Common shelduck, *Tadorna tadorna;*
- Gadwall, *Anas strepera strepera;*
- Dunlin, *Calidris alpina alpina;*

- Common redshank, *Tringa totanus tetanus;*
- Eurasian teal, *Anas crecca*, and;
- Northern pintail, *Anas acuta.*
- Species regularly supported during the breeding season:
- Lesser black-backed gull, *Larus fuscus graellsii.*
- Species with peak counts in spring/autumn:
- Ringed plove, *Charadrius hiaticula.*

C.8.3 Threats, Pressures and activities with impacts on the site

The Severn Estuary information sheet[15] provides details of threats, pressures and activities with potential for negative impacts to qualifying habitats and species. These include the following:

- Dredging;
- Erosion, and;
- Recreational/tourism disturbance.

C.8.4 Site improvement plan and management

The management of Ramsar sites in the UK is determined by either a formal management plan or through other management planning processes and is overseen by the relevant statutory conservation agency. However, there is no information available in the Severn Estuary information sheet[36].

[15] Severn Estuary information sheet untitled (jncc.gov.uk)

C.9 Severn Estuary SAC (UK0013030)

C.9.1 Conservation Objectives

The European Site Conservation Objectives for Severn Estuary SAC document[16] describes this area located between Wales and England in south-west Britain as the large estuary which has an extensive intertidal mudflats and sandflats, rocky platforms and islands. Also, saltmarsh fringes are found in the coast backed by ditches and occasional brackish ditches. The protection and management of the SAC in accordance with Article 6 of the Habitats Directive, including:

- The maintenance of the features in favourable condition for the for the estuaries, subtidal sandbanks, mudflats and sandflats, Atlantic salt meadow, reefs, river *lamprey Lampetra fluviatilis*, sea lamprey *Petromyzon marinus*, and twaite Shad *Alosa fallax* features of the Severn Estuary SAC;

C.9.2 Qualifying features

The protection and management of the SAC in accordance with Article 6 of the Habitat Directive

- H1130. Estuaries;
- H1110. Subtidal sandbanks which are covered by sea water all the time (subtidal sandbanks);
- H1140. Mudflats and sandflats not covered by seawater at low tide (mudflats and sandflats);
- H1330. Atlantic salt meadow;
- H1170. Reefs;
- S1099. River lamprey *Lampetra fluviatilis;*
- S1095. Sea lamprey *Petromyzon marinus;*
- S1103. Twaite shad *Alosa fallax;*

C.9.3 Threats, pressures and activities with impacts on the site

The sensitivity, exposure, and vulnerability of the Severn Estuary SAC to physical, chemical and biological pressures as follow:

- The estuary, sandbank, mudflats, sandflats and its associated biological communities are moderately to highly sensitive to physical loss and damage, toxic contamination, non-toxic contamination and biological disturbances;
- The Atlantic salt meadow and its associated biological communities are moderately to highly sensitive to physical loss and damage, toxic contamination, and non-toxic contamination;
- The reefs and its associated biological communities are moderately to highly sensitive to physical loss and physical damage, and;

[16] The European Site Conservation Objectives for Severn Estuary SAC (naturalengland.org.uk)

- The shad and lamprey are considered sensitive to physical loss and damage, toxic contamination, non-toxic contamination, and biological disturbances.

C.9.4 Site improvement plan and management

The Site Improvement Plans (SIPs)[17] developed for Severn Estuary both SAC and SPA include the priority issues and measurements including:

- Public access/disturbance measurement: identify and reduce impacts of disturbance to birds, and damage to habitats;
- Physical modification threat measurement: reduce, remove (where possible) and prevent barriers to migratory species;
- Impacts of development pressure measurement: inform strategic planning decisions to minimise impact of development;
- Coastal squeeze pressure measurement: Limit coastal squeeze, provide sustainable coastal defences, improve existing structures, deliver compensatory habitat;
- Change in land management pressure measurement: Maintain appropriate levels and timing of grazing, and management of intertidal saltmarsh habitat;
- Change in species distribution threat measurement: Understand/prepare for changes in species distribution (caused by climate change/other events);
- Water pollution pressure measurement: Identify any existing issues and prevent/reduce decline in water and sediment quality (applying relevant measures to all relevant tributaries in England and Wales);
- Air pollution (impact of atmospheric nitrogen deposition) pressure measurement: Develop a Site Nitrogen Action Plan;
- Marine consent and permits (mineral and waste) pressure measurement: Ensure in combination/cumulative impacts from aggregate extraction, maintenance dredging and disposal are fully considered;
- Fisheries (recreational marine and estuarine) pressure measurement: Establish levels and location of activity (recreational bait digging and recreational fishing/angling) and potential for impact;
- Fisheries (commercial marine and estuarine) threat measurement: Identify any threats to site features and habitats from commercial fisheries activity, and establish and ensure compliance with any necessary management measures;
- Invasive species threat measurement: Assess the risks from, and control the spread of invasive non-native species;
- Marine litter pressure/threat measurement: Investigate sources of marine litter and implement actions for removal/ shoreline clean up, and;

[17] Site Improvement Plan Severn Estuary (naturalengland.org.uk)

- Marine pollution incidents threat measurement: Minimise impact from marine pollution incidents and clean up response.
- Further information can be found in the Blue Carbon Potential of the Marine Protected Area Network in the Welsh Marine Environment document[18]

[18] Blue Carbon Potential of the Marine Protected Area Network in the Welsh Marine Environment (natural resourceswales.gov.uk)

C.10 River Usk SAC (UK0013007)

C.10.1 Conservation Objectives

The Core Management Plan Including conservation Objectives for River Usk SAC document[19]. shows the objectives required by the 1992 'Habitats' Directive (92/43/EEC) as implemented through the Conservation of Habitat and Species Regulations 2017

- The conservation objectives for habitat features include the extent stability, quality maintenance and improving, population maintenance and appropriate increasing, appropriate control of habitat quality and its typical species, and;
- The conservation objectives for species features include the size of the population should be stable or increasing, distribution maintenance of the population, sufficient quality habitat to support long time the population, and population affecting factor should be under control.

C.10.2 Qualifying features

The SAC contains the following Annex I habitats that are a primary reason for the selection of this site:

- 3260 Watercourses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation.

The SAC contains the following Annex II species that are a primary reason for the selection of this site:

- 1095 sea lamprey Petromyzon marinus;
- 1096 Brook lamprey Lampetra planeri;
- 1099 River lamprey Lampetra fluviatilis;
- 1103 Twaite shad Alosa fallax;
- 1102 Allis shad Alosa alosa;
- 1106 Atlantic salmon Salmo salar;
- 1163 bullhead Cottus gobio, and;
- 1355 European otter Lutra lutra

C.10.3 Threats, pressures and activities with impacts on the site

The core management plan for this SAC recognised the status of the different features as follow:

Sea lamprey *Petromyzon marinus*:

[19] Core Management Plan Including conservation Objectives for River Usk SAC (Natural Resources Wales)

- Flow depletion in the Usk river has been shown to have effects on sea lamprey nests and nursery habitats which are likely to have been exposed above the water level.

Brook lamprey *Lampetra planeri* and River lamprey *Lampetra fluviatilis*:

- Values from 2012 of biological General Quality Assessment for Biology, soluble reactive phosphorus, suspended solids failed the criterion for density in optimal habitat.

Twaite shad *Alosa fallax* and *Allis shad Alosa alosa*:

- Flow depletion in the Usk below established standards has resulted from a small number of major abstractions including Brecon canal and Prioress Mill public water supply;
- Noise/vibration e.g., due to impact piling or drilling within or in close proximity to the river can create a barrier to shad migration;
- Contamination from land on both sides of the river in Newport and pollution events (which could be shipping or industry related);
- Anglers fishing, taking large numbers of individuals, and;
- Commercial fishermen a by-catch, with whitebait and shrimp fishing being of particular concern.
- Atlantic salmon *Salmo salar*:
- Climate change may be a significant risk factor for salmon populations resulting from warming of river and sea temperatures affecting dissolved oxygen levels and hence juvenile and adult survival and prey availability at sea;
- Pollution and siltation from agriculture, including fertiliser run-off, livestock manure, silage effluent and soil erosion from ploughed land, and;
- The presence of artificially high densities of other fish can create unacceptably high levels of predatory and competitive pressure on juvenile salmon.
- Bullhead *Cottus gobio:*
- Bullhead densities have been found to be negatively correlated with densities of non-native crayfish, suggesting competitive and/or predator-prey interactions, and;
- Lethal pollution episodes in the habitat.

C.10.4 Site improvement plan management.

The core management plan for this SAC recognised the managements requirements of the different features as follow:

Sea lamprey *Petromyzon marinus*:

- Management to reduce or remove the effect of artificial barriers, and;

- The impact of acoustic (i.e., noise/vibration) and sediment/chemical barriers arising from plans or projects should be assessed though the Habitats Regulations Assessment process.

Brook lamprey *Lampetra planeri* and River lamprey *Lampetra fluviatilis:*

- Monitoring of a smaller sample on an annual basis to understand the variations in abundance.

Twaite shad *Alosa fallax* and Allis shad *Alosa alosa*:

- Barriers resulting from vibration, chemicals, low dissolved oxygen and artificially high sediment levels must be prevented at key times (generally March to June);
- Further research is necessary to define sustainable levels of angling, and;
- Changes in fishing methods need to be promoted to minimize captures, in addition anglers and trawler activities should be encouraged to return alive any individuals caught.

Atlantic salmon *Salmo salar;*

- Preventative measures can include surfacing of tracks and gateways, moving feeding areas, and separating clean and dirty water in farmyards;
- Advice to farmers under the banner of Catchment Sensitive Farming is helping to achieve positive change;
- Introduction of General Binding Rules as a regulatory mechanism to encourage more widespread implementation of pollution prevention and control measures;
- To promote salmon migration there may also be an element of releases from the reservoirs timed to compensate for their effects on natural spate flows, and;
- Controls on exploitation should include migratory passage to the SAC within territorial waters, including estuarine and coastal net fisheries, as well as exploitation within the SAC from rod fisheries.

Bullhead *Cottus gobio*:

- Non-native crayfish should ideally be absent from the SAC; however, this aim is difficult to complete, for that reason the implications for attainment of favourable conservation status need to be considered, and;
- New in-stream structures (for example., ford crossings) will be avoided, whilst the impact of existing artificial structures needs to be evaluated.

C11. River Wye SAC (UK0012642)

C.11.1 Conservation Objectives

The European Site Conservation Objectives for River Wye SAC document[20], on the border of England and Wales, is a large river with a geologically mixed catchment, including shales and sandstones designated to ensure the integrity of the site to:

- The extent and distribution of qualifying natural habitats and habitats of qualifying specie;
- The structure and function (including typical species) of qualifying natural habitats;
- The structure and function of the habitats of qualifying species;
- The supporting processes on which qualifying natural habitats and habitats of qualifying species rely;
- The populations of qualifying species, and;
- The distribution of qualifying species within the site.

C.11.2 Qualifying features

The site is designated under article 4(4) of the Directive (92/43/EEC) as it hosts the following habitats listed in Annex I:

- H3260. Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation; Rivers with floating vegetation often dominated by water-crowfoot, and;
- H7140. Transition mires and quaking bogs; Very wet mires often identified by an unstable `quaking` surface.

The site is designated under article 4(4) of the Directive (92/43/EEC) as it hosts the following species listed in Annex II:

- S1092. White-clawed (or Atlantic stream) crayfish *Austropotamobius pallipes*;
- S1095. Sea lamprey *Petromyzon marinus*;
- S1096. Brook lamprey *Lampetra planeri*;
- S1099. River lamprey *Lampetra fluviatilis*;
- S1102. Allis shad *Alosa alosa*;
- S1103. Twaite shad *Alosa fallax*;
- S1106. Atlantic salmon *Salmo salar*;
- S1163. Bullhead *Cottus gobio*, and;
- S1355. Otter *Lutra lutra*.

[20] European Site Conservation Objectives for River Wye Special Area of Conservation (Natural England)

C.11.3 Threats, pressures and activities with impacts on the site

The Site Improvement Plans (SIP)[21] developed for River Wye SAC include the following priority issues:

- Water pollution;
- Physical modification;
- Invasive species:
- Hydrological changes;
- Forestry and woodland management;
- Fisheries: freshwater;
- Fisheries: fish stocking;
- Water abstraction;
- Public access and disturbances;
- Air pollution: impact of atmospheric nitrogen deposition;
- Inappropriate scrub control;
- Undergrazing, and;
- Transportation and service corridors.

C.11.4 Site improvement plan and management

The Site Improvement Plans (SIP) developed for River Wye SAC include the following measurements:

- Water pollution: Reduce the inputs of sediment, nutrients and other pollutants and follow Defra's Codes of Good Practice;
- Physical modification: Implement the River Restoration Plans;
- Invasive species: Reduce and contain invasive non-native species (INNS);
- Hydrological changes: Promote sensitive catchment management and sustainable drainage systems;
- Forestry and woodland management: Adopt forestry, tree, woodland and deadwood management practices following the UK Forestry Standard and Biosecurity strategy;
- Fisheries: freshwater: Promote fisheries management that will enhance SAC features ;
- Fisheries: fish stocking: Gradually phase out fish stocking;
- Water abstraction: Improve the resilience of the river's water resources through mitigation and adaptation measures in drought plans;
- Public access and disturbances: Assess and mitigate the impact of river users on river habitat and species;
- Air pollution by impact of atmospheric nitrogen deposition: Investigate the impact of aerial nitrogen deposition on transition mire habitat;

[21] Site Improvement Plan: River Wye (Natural England)

- Inappropriate scrub control: Implement a programme of scrub control;
- Undergrazing: Implement an appropriate grazing regime, and;
- Transportation and service corridors: Manage Network Rail's assets so as to safeguard the SAC.

C.12 Pembrokeshire Marine SAC (UK0013116)

C.12.1 Conservation Objectives

The Pembrokeshire marine SAC document[22] have been recognised the marine conservation importance of the area, which have a high habitat and biological diversity importance throughout the site, identifying important characteristic including:

- Wide range of physical habitats;
- Distribution and extent of the physical entity of habitats;
- Wide array of habitat structures and functional (environmental) processes;
- Integrity of structures and functional (environmental) processes;
- Species diversity;
- Extent, sizes and integrity of species populations resulting from the relatively limited modification of distribution and extent of habitat and structure and functional (environmental) processes by human activity;
- Presence of specific habitats and species judged to be of particular importance because of their rarity, ecological importance or isolated position at the edge of population ranges.

C.12.2 Qualifying features

Pembrokeshire Marine SAC is a multiple interest site that has been selected for the presence of marine habitat under the Habitats Directive Annex I:

- 1160. Large shallow inlets and bays;
- 1130. Estuaries;
- 1170. Reefs, and;
- 1364. Grey sea *Halichoerus grypus*.

And species under Annex II:

- 1330. Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*);
- 1140. Mud-flats and sand-flats not covered by seawater at low tide;
- 1150. Coastal lagoons;
- 8330. Submerged or partially submerged sea caves;
- 1110. Sandbanks which are slightly covered by seawater all the time;
- 1102. Allis shad *Alosa alosa*;
- 1103. Twaite shad *Alosa fallax*;
- 1099. River lamprey *Lampetra fluviatilis*;
- 1095. Sea lamprey *Petromyzon marinus*;
- 1355. Otter *Lutra lutra*, and;

[22] Pembrokeshire Marine/ Sir Benfro Farol Special Area of Conservation (Natural Resources Wales)

- 1441. Shore dock *Rumex rupestris*.

C.12.3 Threats, pressures and activities with impacts on the site

The range and scale of natural and anthropogenic stressors on the marine habitats and species within the SAC have the potential to impose stresses on each habitat's structure and function. In addition, species populations may also be affected at many levels e.g. physiological, genetic, single organism, population and groups of species. Potential activities have been listed as follows:

- Dock, harbour and marinas structures construction;
- Dredging capital and maintenance;
- Shipping vessel traffic, mooring, anchoring, ballast water discharge, accidents and associated discharge;
- Construction of land claim, defence, barrages, artificial reefs, power stations, pipelines, power/communication cables;
- Waste disposal: effluent disposal, sludge dumping, wastes and debris, dredge spoil disposal, urban and industrial run-off, agricultural run-off;
- Exploitation of living resources: trawling, dredging, netting, potting, commercial line fishing, hand gathering, bait collection, collection for aquarium, grazing of saltmarsh, gathering algae and higher plants for human consumption;
- Cultivation of living resources: aquaculture;
- Exploitation of non-living resources: water abstraction, oil and gas exploration, alternative energy production, wave and tidal current;
- Pollution response: Oil spill response;
- Recreation: Angling, bait collection, recreational boating, casual shore recreation, vehicles on foreshore, light aircraft, wildfowling, marine wildlife watching;
- Military Activities, and;
- Miscellaneous operations and uses: marine archaeology and salvage, education and science, animal welfare operations and sanctuaries.

Taking into account the following aspects:

- Extent and distribution: Loss of / reduction in habitat extent, reduction in habitat distribution, particularly intertidal habitats, noise/visual disturbance effecting mobile species particularly mammals, modification to local hydrodynamic regime effecting exposure sensitive communities/species, local modification of physical processes; modification to biological processes including competition for space and food availability.
- Structure and function, modification of physical structure and morphology, mobilisation / addition of contaminants, introduction of anthropogenic material, noise/visual disturbance effecting mobile species particularly mammals, modification to local hydrodynamic regime effecting exposure sensitive communities/species, elevated suspended sediments and contaminants limiting growth of benthic flora,

smothering sessile benthic species and increasing likelihood of toxic bioaccumulation, modification to sediment transport leading to changes in local habitat structure, modification to biological processes including food contamination and availability, and changes to biological interactions due to modification to habitat and physical factors.

- Conservation status of typical species and species features: decrease in species diversity and effects to population dynamics, alteration/reduction in quality of communities/populations containing species sensitive to changes in turbidity, light, oxygen, smothering and toxic contaminants

C.12.4 Site improvement plan and management

The advice as to likely required action for the Pembrokeshire Marine SAC as follow:

- Consenting bodies ensure appropriate integration, inclusion and consultation;
- Review, revise or establish management practices and spatial, temporal & technical operational limits suitable to secure features at FCS;
- Develop long-term, wholeHaven maintenance dredging strategy;
- Treat as plan or project if appropriate;
- Continue to monitor shipping movement within port limits;
- Determine effects of vessel movement on sediment transport, mobilisation and turbidity;
- Secure appropriate management of vessels transiting coastal waters to minimise risk to features FCS;
- Treat new mooring developments as plan or project as appropriate;
- Secure appropriate management of moorings in open coastal locations (i.e. outwith MHPA port limits).;
- Apply existing legal mechanisms, monitor compliance and enforce, to secure features at FCS;
- Maintain, keep under review and improve as appropriate, shipping management and operational practices suitable to secure features at FCS; monitor compliance and enforce;
- Seek advice from relevant environmental agency (NRW);
- Provide environmental advice to salvage managers and salvors;
- Education & awareness raising;
- Continued surveillance and monitoring of inputs and water quality by NRW;
- Tooted dredging: This activity has been assessed and is not permitted within the site;
- Other trawling: To secure features at FCS, assess the impacts from the activity on the features of the site;
- To secure features at FCS, assess the impacts from the activity on the features of the site;
- Develop and maintain appropriate pollution response contingency plans;

- Inclusion and maintenance of information on site features and sensitivity to at-sea response activities in West Wales standing Environment Group pollution response advice contingency plan, and;
- Appropriate implementation of SSSI procedures & access byelaws.

In addition, the Pembrokeshire Marine SAC Relevant Authority Group Progress Report 2018-202023 highlight the actions achieved by each management objective as follow:

- Secure the resources necessary to implement the SAC Management Scheme: financial contributions from Relevant Authority Group (RAG) members and funding to take forward the work of the RAG in delivering conservation improvements for the SAC;
- To secure good quality relevant data on pollution sufficient to adequately inform SAC management: delivery of Surveying the Welsh Environment for Pollution Threats (SWEPT) project, gaining data on nitrate and phosphate levels and distribution and awareness of the impacts of nutrient run-off on the SAC;
- Raise level of awareness of recreational users and all vessel users of the site regarding the impact they might cause to SAC features and what actions they can take to reduce impacts: continue to raise awareness of recreational codes of conduct within the SAC and maximise opportunities for feature improvement;
- Ensure recreation management infrastructure is fit for the purpose of safeguarding SAC features: work towards ensuring that all current and future recreational activity within the SAC is carried out at sustainable levels;
- Secure the resources necessary to implement the SAC Management Scheme: continue to pursue resources to take forward the work of the RAG in delivering conservation improvements for the SAC;
- Effective/comprehensive knowledge of the effects of human activity in and upon the SAC: work with NRW to jointly identify and obtain to progress projects to improve site feature condition;
- Effective/comprehensive relevant and competent authority awareness and understanding of the SAC and its Management Scheme: work to ensure that RAG knowledge and experience can be used to benefit MPA management in Wales. Continue to contribute to the Welsh MPA Management Steering Group and seek to progress the recommendations of s Climate Change, Environment & Rural Affairs Committee (CCERA's) MPA inquiry, and;
- Utilise and build upon existing resources which contribute to implementing the SAC Management Scheme: liaise with others as appropriate across Wales and the UK and use collective knowledge to benefit management of the SAC.

[23] Pembrokeshire Marine SAC Relevant Authority Group Progress Report 2018-2020 (penbrokeshiremarinesac.org.uk)

Further information can be found in the Skomer, Skokholm and the Seas off Pembrokeshire MPA at JNCC webpage[24]

[24] Skomer, Skokholm and the Seas off Pembrokeshire MPA (jncc.org.uk)

C.13 Lundy SAC (UK0013114)

C.13.1 Conservation Objectives

Lundy SAC standard data form[25] and the [26] include the Conservation Objectives for Lundy SAC which ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;

- The extent and distribution of qualifying natural habitats and habitats of qualifying species;
- The structure and function (including typical species) of qualifying natural habitats;
- The structure and function of the habitats of qualifying species;
- The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely;
- The populations of qualifying species, and;
- The distribution of qualifying species within the site.

C.13.2 Qualifying features

Lundy SAC has been selected for the presence of marine habitat under the Habitats Directive Annex I:

- 1170 Reef.;

This SAC also has Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site:

- 1110 Sandbanks which are slightly covered by sea water all the time, and;
- 8330 Submerged or partially submerged sea caves.

Lundy SAC has Annex II species present as a qualifying feature, but not a primary reason for site selection:

- 1364 Grey Seal Halichoerus grypus.

C.13.3 Threats, pressures and activities with impacts on the site

provides details of threats, pressures and activities with potential for negative impacts to qualifying habitats and species. These include the following:

- Outdoor sports and leisure activities, recreational activities;
- Invasive non-native species;
- Fishing and harvesting aquatic resources;
- Interspecific floral relations, and;
- Reduced fecundity/ genetic depression.

[25] Lundy SAC UK0013114.pdf (jncc.gov.uk)

[26] Lundy European Marine Site document (naturalengland.org.uk)

C.13.4 Site improvement plan and management

The Site improvement Plan for Lundy SAC[27] includes:

- Low breeding success and poor recruitment threat on Reefs: Investigate low levels of recruitment, and the overall population health of Sunset cup coral, *Leptopsammia pruvoti;*
- Disease pressure and threat on Reefs: Investigate the population dynamics and the health of Pink sea fan, *Eunicella verrucosa*;
- Invasive species pressure and threat on Reefs: Investigate impacts of marine invasive species; Japanese wireweed, *Sargassum muticum* and Harpoon weed, *Asparagopsis armata;*
- Fisheries – commercial marine and estuarine pressure and threat on Reefs: Ensure continuing compliance with byelaws;
- Fisheries – commercial marine and estuarine pressure and threat on Subtidal sandbanks, Reefs, Sea caves and Gray seal: Complete assessments to establish whether management is required;
- Public access and disturbance pressure on Reefs: Investigate effects of recreational anchoring on the kelp forest and Pink sea fan, *Eunicella verrucosa;*
- Public access and disturbance threat on Gray seal: Investigate human interference and disturbance to Grey seal population;
- Changes in species distribution threat on Reefs: Investigate algal species richness
- Water pollution threat on Grey seal: Determine the degree of threat posed by pollution;
- Climate change pressure on Reefs and Gray seal: Investigate potential changes to flora and fauna resulting from predicted climatic changes, and;
- Energy production threat on Gray seal: Investigate potential threats to Grey seal as a result of renewable energy

Additional information can be found in the Lundy Special Area of Conservation SAC Monitoring Report 2017, Marine Protected Area (MPA) Monitoring Programme published in Abril 202428

[27] The Site improvement Plan for Lundy SAC (naturalengland.orghttps://publications.naturalengland.org.uk/publication/5948018322833408.uk)

[28] Lundy Special Area of Conservation SAC Monitoring Porgramme published in Abril 2024 (naturalengland.org.uk)

C.14 Cardigan Bay SAC (UK0012712)

C.14.1 Conservation Objectives

The Cardigan Bay SAC advice document[29] have been recognised that the favourable conservation status on this SAC natural processes, need to be fulfilled and maintained in the long-term. If these objectives are not met restoration measures will be needed to achieve favourable conservation status:

- The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term.
- There should be sufficient habitat, of sufficient quality, to support the population in the long term.

C.14.2 Qualifying features

Cardigan Bay has Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site:

- 1110 Sandbanks which are slightly covered by sea water all the time
- 1170 Reefs
- 8330 Submerged or partially submerged sea caves

There are also Annex II species that are a primary reason for selection of this site:

- Bottlenose dolphin *Tursiops truncates*

This SAC has Annex II species present as a qualifying feature, but not a primary reason for site selection:

- 1095 Sea lamprey Petromyzon marinus
- 1099 River lamprey Lampetra fluviatilis
- 1364 Grey seal Halichoerus grypus

C.14.3 Threats, pressures and activities with impacts on the site

The threats, pressures and impacts on Cardigan Bay SAC are found in the standard data form[30]. The negative impacts include:

- Soil pollution and solid waste (excluding discharges)
- Other human intrusions and disturbances
- Marine water pollution
- Fishing and harvesting aquatic resources
- Invasive non-native species

The positive impacts include:

- Interpretative centres
- Outdoor sports and leisure activities, recreational activities

[29] Cardigan Bay SAC advice document (naturalresources.wales)

[30] Cardigan Bay SAC standard data form UK0012712.pdf (jncc.gov.uk)

C.14.4 Site improvement plan and management

The site improvement plan[31] has management advice for:

- Docks, marinas and shipping
- Civil engineering
- Waste disposal
- Exploitation of living resources
- Cultivation of living resources
- Exploitation of non-living resources
- Pollution response
- Recreation
- Military activities
- Miscellaneous operations and uses

The West Wales Marine MPA overlaps other SACs including the Cardigan Bay SAC, additional information can be found in the West Wales Marine MPA at JNCC webpage32

[31] Cardigan Bay SAC improvement plan Microsoft Word - Cardigan Bay R33 Feb 2009.doc (naturalresources.wales)

[32] West Wales Marine MPA (jncc.gov.uk)

C.15 West Wales Marine SAC (UK0030397)

C.15.1 Conservation Objectives

The Natura 2000 Standard Data Form for West Wales Marine SAC[33] and the Inshore and Offshore SAC West Wales Marine/Gorllwin Cymru Forol Selection Assessment Document[34], contain information which ensure that the integrity of the site is maintained and that it makes the best possible contribution to maintaining Favourable Conservation Status (FCS) for Harbour Porpoise in UK waters In the context of natural change, this will be achieved by ensuring that:

- Harbour porpoise is a viable component of the site;
- There is no significant disturbance of the species; and
- The condition of supporting habitats and processes, and the availability of prey is maintained.

C.15.2 Qualifying features

This site is designated for Annex II species that are a primary reason for selection of this site:

- 1351 Harbour porpoise *Phocoena phocoena*

C.15.3 Threats, pressures and activities with impacts on the site

The threats and pressures of this site are listed in the West Wales marine SAC standard data form and the negative impacts include:

- Exploration and extraction of oil or gas
- Shipping lanes, ports, marine constructions
- Fishing and harvesting aquatic resources
- Military use and civil unrest
- Marine water pollution
- Renewable abiotic energy use

C.15.4 Site improvement plan and management

No site management is provided within the West Wales marine SAC standard data form[33] However, this SAC overlaps a number of other SACs including parts of the Pembrokeshire Marine SAC and the Pen Llŷn a'r Sarnau SAC, and encompasses the entire Cardigan Bay SAC [35]. Further information can be found in the West Wales Marine MPA- Relevant Documentation & Conservation Advice 2019[36]

[33] West Wales marine SAC standard data form UK0030397.pdf (jncc.gov.uk)

[34] Inshore and Offshore SAC West Wales Marine/Gorllwin Cymru Forol Selection Assessment Document (jncc.gov.uk)

[35] West Wales Marine MPA (jncc.gov.uk)

[36] West Wales Marine MPA- Relevant Documentation & Conservation Advice 2019 (jncc.org.uk)

C.16 Lleyn Peninsula and the Sarnau SAC

C.16.1 Conservation Objectives

The Natura 2000 Standard Data Form for Pen Lln a`r Sarnau/ Lleyn Peninsula and the Sarnau[37] and the Pen Lln a`r Sarnau/ Lleyn Peninsula and the Sarnau SAC Advice document[38] have been recognised that the favourable conservation on this SAC natural processes, need to be fulfilled and maintained in the long-term. If these objectives are not met restoration measures will be needed to achieve favourable conservation status.

C.16.2 Qualifying features

The SAC contains the following Annex I habitats that are a primary reason for the selection of this site:

- 1110 Sandbanks which are slightly covered by sea water all the time
- 1130 Estuaries
- 1150 Coastal lagoons * Priority feature
- 1160 Large shallow inlets and bays
- 1170 Reefs

The SAC also contains the following Annex I habitats present as a qualifying feature, but not a primary reason for the selection of this site:

- 1140 Mudflats and sandflats not covered by seawater at low tide
- 1310 Salicornia and other annuals colonizing mud and sand
- 1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)
- 8330 Submerged or partially submerged sea caves

The SAC contains the following Annex II habitats present as a qualifying feature, but not a primary reason for the selection of this site:

- 1349 Bottlenose dolphin *Tursiops truncatus*
- 1355 Otter *Lutra lutra*
- 1364 Grey seal *Halichoerus grypus*

C.16.3 Threats, pressures and activities with impacts on the site

The threats and pressures with negative impacts on this site have been collected from the Lleyn Peninsula and the Sarnau SAC information sheet:

- Pollution to surface waters (limnic & terrestrial, marine & brackish)
- Grazing
- Marine water pollution
- Invasive non-native species

[37]Lleyn Peninsula and the Sarnau SAC information sheet UK0013117.pdf (jncc.gov.uk)

[38] Pen Lln a`r Sarnau/ Lleyn Peninsula and the Sarnau SAC Advice document (naturalresources.wales)

- Human induced changes in hydraulic conditions
- Fishing and harvesting aquatic resources
- Changes in abiotic conditions
- Other human intrusions and disturbances
- Forest and Plantation management & use
- Outdoor sports and leisure activities, recreational activities
- Pollution to groundwater (point sources and diffuse sources)

Positive impacts to the SAC include:

- Sport and leisure structures
- Roads, paths and railroads
- Interpretative centres
- Grazing
- Sport and leisure structures

C.16.4 Site improvement plan and management

Security of management is provided in part by sections 48 to 53 of the 1994 Conservation Regulations, which require the assessment of plans and projects likely to have a significant effect on the site. Where there is a potential for a plan or project to undermine the achievement of the conservation objectives, CCW will consider the plan/project to be likely to have a significant effect and require appropriate assessment. Unless it is ascertained, following an appropriate assessment, that a plan or project will not undermine the achievement of the conservation objectives, the plan/project should be considered as having an adverse effect on the integrity of the site. Appropriate and secure management of activities may also be provided through a site management plan.

Further information can be found in the Blue Carbon Potential of the Marine Protected Area Network in the Welsh Marine Environment document[39].

[39] Blue Carbon Potential of the Marine Protected Area Network in the Welsh Marine Environment (natural resourceswales.gov.uk)

C.17 North Anglesey Marine SAC

C.17.1 Conservation Objectives

The Natura 2000 Standard Data Form for North Anglesey Marine SAC[40] and the North Anglesey Marine conservation advice and objectives document[41] list the Conservation Objectives that need to be designed to help ensure that the obligations of the Habitats Directive can be met. Article 6(2) of the Directive requires that there should be no deterioration or significant disturbance of the qualifying species or to the habitats upon which they rely. Therefore, the focus of the Conservation Objectives for harbour porpoise sites is on addressing pressures that affect site integrity and would include:

- killing or injuring harbour porpoise (directly or indirectly);
- preventing their use of significant parts of the site (disturbance / displacement);
- significantly damaging relevant habitats; or
- significantly reducing the availability of prey.

C.17.2 Qualifying features

The qualifying feature of the site is the Habitats Directive Annex II species:

- harbour porpoise (*Phocoena phocoena*)

C.17.3 Threats, pressures and activities with impacts on the site

The threats, pressures and activities for this site are found within the North Anglesey Marine conservation advice and objectives. These include:

- Removal of non-target species
- Contaminants
- Anthropogenic underwater sound
- Death or injury by collision
- Removal of target species

C.17.4 Site improvement plan and management

The site improvement plan and management plan are found within the North Anglesey Marine conservation advice and objectives document.

- Removal of non-target (bycatch) species:
- Mitigation may be required for bycatch/ fishery activities and need to be fully assessed based on local data. Detailed measures, if required, will be developed by the relevant management authority (European Commission/MMO/Defra/Welsh Government).

[40] The Natura 2000 Standard Data Form for North Anglesey Marine SAC (jncc.gov.uk)

[41] North Anglesey Marine SAC conservation objectives and advice North Anglesey Marine pSAC: Draft Conservation Objectives And Advice On Activities (naturalresources.wales)

- Contaminants:

  Human activities are the most likely cause of the re-release chemicals into the environment or for introduction of other contaminants of which the impacts are poorly known. Current sources of exposure have to be identified and further efforts to limit or eliminate discharges to the marine environment may still be needed.
- Anthropogenic underwater sound:

  - Shipping -Significant increases in vessel traffic, for example as may be associated with large-scale marine developments in the area,would be routinely assessed in HRA.
  - Pile driving - A European Protected Species (EPS) licence may be needed for any construction activity which carries the risk of significant disturbance or deliberate injury to cetaceans.
  - Dredging and disposal - New dredge and disposal projects (or licence renewals) are subject to HRA. Cumulative impacts will be considered within the HRA.
  - Aggregate extraction - can cause disturbance leading to changes to harbour porpoise behaviour as well as to their habitat and prey. New aggregate extraction projects (or licence renewals) are subject to HRA. Cumulative impacts will be considered within the HRA.
  - Geophysical surveys (including seismic) - Cumulative impacts of geophysical surveys will need to be considered further advice on assessment and management of noisy activities within the sites is being developed by the SNCBs in consultation with Regulators, industry and NGOs.
  - Recreational boating activity - Adherence to wildlife codes of conduct is already advocated: WiSe scheme; SeaWatch code of conduct; ZSL code of conduct; The RYA good practice guide - The Green Wildlife Guide for Boaters; Wild Seas Wales; Anglesey and Conwy Marine codes. UK SNCBs are looking at the option of developing an overarching wildlife watching code of conduct to sit alongside the Scottish code.
  - Acoustic deterrent/mitigation devices - Management/assessment would be required for use of devices in the site since they introduce noise to the environment and are designed to disturb marine mammals.
  - Pinger devices - The need for further management will need to be fully assessed based on local fisheries data. In addition, the impact of potential disturbance as a result of pinger use in the site may need to be assessed and the potential for other mitigation options such as alternative gear types or gear modifications considered.
  - Military activity - Activities take place under Range Standing Orders, command guidance and environmental risk management tools, which include measures to reduce the risk of killing, injury and disturbance of marine mammals (for example live firing trials are subject to confirmation that marine mammals are not present in the vicinity of targets).

- Unexploded ordnance (UXOs) - A combination of Marine Mammal Observers (MMO)s, Acoustic Deterrent Devices (ADD) and occasionally scare charges are used to ensure harbour porpoise and other marine mammals are a sufficient distance from the explosion to prevent death or injury.

- Death or injury by collision:
  - Recreational boating activity - Boats conducting recreational activity should adhere to wildlife codes of conduct to avoid risk of collision
  - Wet renewable energy installations - The use of ADDs is a possible mitigation tool to exclude animals from the vicinity of devices Potential future mitigation related to death or injury by collision will be based on new and emerging research and evidence.
- Removal of target (prey) species: Currently, most commercial species are managed at scales relevant for stock management via the Common Fisheries Policy (CFP), not at the site level.

Further MPA site monitoring information can be found in the North Anglesey Marine MPA at JNCC webpage[42]

[42] North Anglesey Marine MPA (jncc.gov.uk)

Appendix E
Preliminary Water Framework Directive (WFD) Assessment

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1 Introduction

1.1 Overview

1.1.1 The Project involves a programme of works to develop the existing Port of Port Talbot (‘the Port’) into a hub for the preparation of offshore wind energy turbines. This will require the expansion (including through reclamation) and modification of areas within the Port, as well as the completion of ecological mitigation on areas located outside of the Port estate.

1.1.2 The Project is principally concerned with land at the Port where the activities to develop an offshore marine renewables hub would be implemented.

1.1.3 There are two further land parcels currently identified for the purpose of implementing ecological mitigation. These are land at Jersey Marine ('Jersey Marine Site') and land at Kenfig Marshalling Yard ('Kenfig Marshaling Yard Site').

1.1.4 Figure 1 in **Appendix E1** shows the locations of these sites. The Project is described in more detail in Section 2 and **Chapter 2 Description of Development**.

1.1.5 A Water Framework Directive (WFD) Compliance Assessment will be completed to determine whether the Project complies with the objectives of the WFD. This Preliminary WFD Compliance Assessment sets out the scope of the assessment that will be undertaken to support the marine licence, planning application, and Harbour Revision Order (‘HRO’) for the Project.

1.2 WFD legislation

1.2.1 The WFD (2000/60/EC) came into force in 2000 and establishes a framework for the management and protection of Europe’s water resources. It was implemented in England and Wales through the Water Environment (WFD) (England and Wales) Regulations 2003 (the Water Framework Regulations). These Regulations were revoked and replaced in April 2017 by the Water Environment (WFD) (England and Wales) Regulations 2017[1].

1.2.2 The overall objective of the WFD is to achieve good status (GS) in all inland, transitional, coastal and ground waters by 2027, unless alternative objectives are set and there are appropriate reasons for time limited derogation.

1.2.3 The WFD divides rivers, lakes, lagoons, estuaries, coastal waters (out to one nautical mile from the low water mark), man-made docks and canals into a series of discrete surface water bodies. It sets ecological as well as chemical targets (objectives) for each surface water body. For a surface

[1] Following the UK leaving the EU, the main provisions of the WFD have been retained in English law through the Floods and Water (Amendment etc.) (EU Exit) Regulations 2019.

water body to be at overall GS, the water body must be achieving good ecological status (GES) and good chemical status (GCS). Ecological status is measured on a scale of high, good, moderate, poor or bad, while chemical status is measured as good or fail (i.e., failing to achieve good).

1.2.4 Each surface water body has a hydromorphological designation that describes how modified a water body is from its natural state. Water bodies are either undesignated (i.e., natural, unchanged), designated as a heavily modified water body (HMWB) or designated as an artificial water body (AWB). HMWBs are defined as bodies of water which, as a result of physical alteration by human use activities (such as flood protection and navigation) are substantially changed in character and cannot, therefore, meet GES. AWBs are artificially created through human activity. The default target for HMWBs and AWBs under the WFD is to achieve good ecological potential (GEP), a status recognising the importance of their human use while ensuring ecology is protected as far as possible.

1.2.5 The ecological status/potential of surface waters is classified using information on the biological (e.g., fish, benthic invertebrates, phytoplankton, angiosperms and macroalgae), physico-chemical (e.g., dissolved oxygen and dissolved inorganic nitrogen) and hydromorphological (e.g., hydrological regime) quality of the water body, as well as several specific pollutants (e.g., copper and zinc). Compliance with chemical status objectives is assessed in relation to environmental quality standards (EQS) for a specified list of ‘priority’ and ‘priority hazardous’ substances. These substances were first established by the Priority Substances Directive (PSD) (2008/105/EC) which came into force in January 2009.

1.2.6 The PSD sets objectives, amongst other things, for the reduction of these substances through the cessation of discharges or emissions. As required by the WFD and PSD, a proposal to revise the list of priority (hazardous) substances was submitted by the European Commission in 2012. Subsequently, an updated PSD (2013/39/EU) was published in 2013, identifying new priority substances, setting EQSs for those newly identified substances, revising the EQS for some existing substances in line with scientific progress and setting biota EQSs for some existing and newly identified priority substances. The updated PSD is transposed into UK legislation through the Water Environment (WFD) (England and Wales) (Amendment) Regulations 2015, which entered into force in September 2015, and explained in the WFD (Standards and Classification) Directions (England and Wales) 2015.

1.2.7 In addition to surface water bodies, the WFD also incorporates groundwater water bodies. Groundwaters are assessed against different criteria compared to surface water bodies since they do not support ecological communities (i.e., it is not appropriate to consider ecological status of a groundwater). Therefore, groundwater water bodies are classified as good or poor quantitative status in terms of their quantity (groundwater levels and flow directions) and quality (pollutant concentrations and conductivity), along with chemical (groundwater) status.

1.2.8 River Basin Management Plans (RBMPs) are a requirement of the WFD, setting out measures for each river basin district to maintain and improve quality in surface and groundwater water bodies where necessary. In 2009, the Environment Agency published the first cycle (2009 to 2015) of RBMPs for England and Wales, reporting the status and objectives of each individual water body. NRW subsequently published updated RBMPs for Wales as part of the second cycle (2015 to 2021), as well as providing water body classification results from 2015 and interim classifications via the Water Watch Wales website. The latest RBMPs cover the period from 2021 to 2027, reporting the status and objectives of each individual water body for cycle 3 including interim classifications in 2024.

1.2.9 The Port is located within the Swansea Bay coastal water body and the Afan Estuary Incl Docks transitional water body (see Figure 1 in **Appendix E1**). The Jersey Marine Site is located adjacent to the Neath Estuary transitional water body (see Figure 1 in **Appendix E1**). The Kenfig Marshaling Yard Site is located on the Kenfig - headwaters to tidal river water body.

1.2.10 The Swansea Bay (Outer) disposal site (LU130) also overlaps with the Bristol Channel Outer North coastal water body.

1.2.11 The Project, including the two land parcels, is located within the Swansea Carboniferous Coal Measures groundwater water body.

1.2.12 The surface and groundwater water bodies are situated within the Western Wales River Basin District which is reported in the Western Wales RBMP (NRW, 2022).

1.2.13 Consideration of WFD requirements is necessary for works which have the potential to cause deterioration in ecological, quantitative and/or chemical status of a water body or to compromise improvements which might otherwise lead to a water body meeting its WFD objectives. Therefore, it is necessary to consider the potential for the Project to impact WFD water bodies, specifically referring to the following environmental objectives, as set out in Section 13 (subsections 1 to 7) of the Water Framework Regulations:

- **For surface water bodies**, the objectives are to:
    - water;
    - Protect, enhance and restore each body of surface water (other than an artificial or heavily modified water body) with the aim of achieving good ecological status and (…) good surface water chemical status, if not already achieved (…);
    - Protect and enhance each artificial or heavily modified water body with the aim of achieving good ecological potential and (…) good surface water chemical status, if not already achieved (…); and
    - Aim progressively to reduce pollution from priority substances and aim to cease or phase out emissions, discharges and losses of priority hazardous substances.

- **For shellfish water protected areas**, in addition to the [above] objectives (…) for the surface water bodies in which they are located,

the objectives are such objectives as are necessary or desirable to improve or protect the shellfish water protected area in order to support shellfish life and growth and to contribute to the high quality of shellfish products suitable for human consumption as the appropriate authority may direct.

- **For groundwater bodies**, the objectives are to:
    - Prevent deterioration of the status of each body of groundwater;
    - Prevent or limit the input of pollutants into groundwater;
    - Protect, enhance and restore each body of groundwater, and ensure a balance between abstraction and recharge of groundwater, with the aim of achieving good groundwater chemical status and good groundwater quantitative statusy, if not already achieved (…); and
    - Reverse any significant and sustained upward trend in the concentration of any pollutant resulting from the impact of human activity in order to progressively reduce pollution of groundwater.

- For each protected area, other than a shellfish water protected area, the objective is to achieve compliance with any standards and objectives required by or under [the retained EU law] under which the area or body is protected:
    - By 22 December 2021, if not already achieved, or
    - If different, by any date for compliance set in [the relevant retained EU law].

1.2.14 Where two or more objectives set under this regulation apply to the same body of water, or the same part of a body of water, the most stringent objective applies.

2 Project Description

2.1.1 As a minimum the Project will require the construction of new landside and marine infrastructure to deliver the modifications required for a floating offshore wind (FLOW) port. These modifications will be achieved through progressive build out in phases. At this stage it assumed that there would be two phases of development.

2.1.2 Phase 1 will provide facilities for integration (or staging) and commissioning of platforms and the assembly of floating foundations. A future optional phase (hereinafter referred to as “Phase 2”) comprises the construction of an expanded FLOW facility to enable floating foundation manufacturing at the Port in addition to integration and commissioning functions.

2.1.3 A summary of the works is provided below. The Project is described in more detail in **Chapter 2 Description of Development**.

Design Elements of Phase 1

2.1.4 The potential features of the first stage of development involve both marine and landside works.

2.1.5 The marine works include:

- Construction of new quay wall (there are different options for the way that quay walls can be constructed);
- Reclamation south of the existing iron ore jetty and dredging within the Tidal Harbour to create new areas of quayside and to ensure that water depths in the Tidal Harbour are suitable for port operations;
- Additional operational land for turbine operational quayside;
- A new pontoon berth for crew transfer activities;
- Dredging to improve navigable access to the Port by larger vessels and facilitate the potential for temporary wet storage to support integration and commissioning activities;
- A new marine offloading facility (‘MOLF’) in the in the location of Phoenix Wharf East (in the Impounded Dock) used for the transfer of materials and equipment from ship to shore. This would be subject to further study and design. It may instead be necessary to construct a MOLF elsewhere in the Port if the Impounded Dock is unsuitable;
- Changes to navigation marks within the Tidal Harbour;
- Expanded section of the navigation channel to provide sufficient widths to allow the tow-out of completed platforms;
- Placement of stone blankets alongside the quay (should fixed- bottom turbine marshalling activities be brought forward);
- Construction of separate platform maintenance mooring point within the Tidal Harbour (this could be multi use) – potentially a piled structure;
- Creation or restoration of marine habitats and or enhancements within the limits of the Port and offsite locations within land owned by ABP;

- Main, Lee and Southern breakwater crest height improvements and armouring works;
- Works (such as cathodic protection system, pile repairs, remediation to the deck structure, replacement / repair of safety equipment, replacement/repair fenders and moorings) to ensure future safety of the existing iron ore jetty (the exact nature of the works will be dependent on the findings of studies to understand the condition of the structure); and
- Potential adaptation of the existing iron ore jetty to provide a function for the port operations such as creating a commissioning berth on the northern side.

2.1.6 It is considered likely that the existing lock gate to the Impounded Dock will continue to operate in line with current procedures (i.e. at slack water), although it may be used more frequently.

2.1.7 The landside works (including work to the topside of newly created quay areas) are:

- New open operational area for the storage of turbine components prior to assembly;
- New open operational area for the storage of floating substructure components prior to assembly;
- New open area for the assembly of floating foundations prior to launch;
- New heavy lift area(s) within the quay for high-capacity cranes to support integration, foundation launch, and component import activities;
- Mobilisation of operational equipment (such as mobile cranes/heavy lift equipment, and SPMTs);
- Construction of a section of road from an access road to provide access to the existing waste water treatment facility;
- New main incoming electricity substation, and supply to downstream substations, and power distribution within the Port facility;
- Other utility connections and diversions including drainage;
- Construction of a port operations building of up to 20m height;
- A building for the assembly activities for nacelles of up to 30m (this is based on a standard nacelle height of 15m and the provision of space above the nacelle for operation of cranes;
- A building for offices and welfare facilities of up to 20m height (it expected that this would be a prefabricated structure allowing deconstruction and relocation elsewhere within the Port);
- Maintenance and warehouse buildings of up to 20m height
- Several cranes of up to 150m required for lifting and moving components around the Port;
- High mast lighting of up to 60m height;
- Car parking to accommodate the workforce and port operations staff;
- Perimeter fencing, security structures;
- New terrestrial habitat areas within the Kenfig Marshalling Yard Site area and the Jersey Marine Site; and

- Onsite terrestrial ecological mitigation and or enhancement features.

Design Elements of Optional Future Phase ('Phase 2')

2.1.8 A further phase or phases would be north of the Iron Ore Jetty and would involve similar works to the Phase 1 requiring additional areas of reclamation in the Tidal Harbour and additional extents of landside works. The extent of additional reclamation works would be dependent on the availability of additional land from within the Port.

2.1.9 Depending on the scale of development required for further phases, works may include:

- Additional lengths of new quay wall located to the north of the existing iron ore jetty to provide additional import berth and new launch facility;
- Land reclamation in the northern extent of the tidal harbour;
- Incorporation of more land from within the Port estate (the balance depends on the extent of reclamation);
- Addition of further mobile heavy lift cranes of up to 150m height;
- Repurposing launching facility from Phase 1 to provide an import berth;
- High mast lighting of up to 60m height;
- For the manufacturing of steel foundation substructures the following areas and buildings may be needed:
  - Office(s)
  - A manufacturing building.
  - Storage building
  - Building for the fabrication, blasting and spraying of foundations
  - Steel storage yard
  - Outfitting building
- For the manufacturing of concrete foundation substructures the following areas and buildings may be needed:
  - Office(s)
  - Batching plant with a capacity of between 50 to 250 m3/hr
  - Paint spraying building
  - Pre-cast yard for concrete foundations
  - Possible conveyor for aggregate / cement import
- Onsite habitat mitigation and or enhancement features (including marine habitat enhancements); and
- Utilities, lighting, fencing.

Jersey Marine Site and Kenfig Marshalling Yard Site

2.1.10 Land at the Jersey Marine Site comprises three linked land parcels totaling 27 ha. The site is undeveloped with varying habitat types ranging from steep woodland / cliff, unimproved pasture with overgrown field margins. To the east adjacent to the tidal River Neath there are intertidal habitats with mudflat and saltmarsh.

2.1.11 The land at Kenfig Marshalling Yard is an area of former rail sidings with fragmented fen habitats. The site is approximately 24 ha in area and

comprises predominantly undeveloped, vegetated land with areas of hardstanding and disused railway sidings near its eastern boundary and its north-western area.

2.1.12 Management plans are being developed for these two sites in order deliver habitat mitigation and enhancement. The works at the Jersey Marine Site may comprise the following:

- Creation of bunds to increase water retention by creating a localised inundation area within the saltmarsh to benefit botanical diversity and associated wetland species;
- Management of existing grassland to improve diversity and structure (potentially involving surface reprofiling, soil preparation and seeding) to benefit associated species;
- Woodland improvements which could include some thinning, scrub clearance, opening out of glades and supplementary planting to benefit a wide range of habitats and species;
- Provision of dead wood piles/wood chip piles;
- Improvements to support reptile relocation including creation of reptile hibernacula, grass snake egg laying heaps, and thermophilic reptile sites;
- Provision of seasonally wet scrapes / depressions including some small excavations and localised reprofiling;
- Works to remove any stands of non-native invasive species such as Japanese Knotweed; and
- Subject to further investigation, potential for reconnecting the cut-off creek in the south of the site with the estuary.

2.1.13 The works at the Kenfig Marshalling Yard Site may comprise the following:

- Breaking up of hardstanding and creation of new grassland areas;
- Provision of seasonally wet scrapes / depressions including some small excavations and localised reprofiling;
- Movement of soil material excavated from within the Port from areas identified as containing protected / rare and notable plant species;
- Varying the topography of the site to include bunds and sunny bare ground to benefit reptile and invertebrates;
- Managing existing habitats to increase botanical diversity and associated species;
- Provision of dead wood piles/wood chip piles; and
- Works to remove any stands of non-native invasive species such as Japanese Knotweed.

2.1.14 The two sites are described in more detail in **Chapter 2 Description of Development**.

3 Assessment Methodology

3.1 Data sources

3.1.1 Information to define the existing baseline conditions has been obtained from the following sources:

- DataMapWales (Welsh Government, 2025);
- Water Watch Wales (NRW, 2025a);
- Western Wales River Basin Management Plan (RBMP) (NRW, 2022);
- GeoIndex Onshore, British Geological Survey (GeoIndex Onshore, 2024).

3.2 WFD assessment methodology

3.2.1 This Preliminary WFD Compliance Assessment has been undertaken to identify potential impacts that could affect the surface and ground water bodies within the defined zones of influence (Section 4.2). The assessment has been informed by a desk-based study using publicly available data.

3.2.2 The assessment methodology follows the Environment Agency 'Water Framework Directive assessment: estuarine and coastal waters' guidance, known as "Clearing the Waters for all" (Environment Agency, 2023), which is recommended for use by applicants by NRW (NRW, 2023). In addition, guidance from Planning Inspectorate 'Nationally Significant Infrastructure Projects: Advice on the Water Framework Directive' (Planning Inspectorate, 2024) has also informed the assessment methodology. Following the guidance, a three-stage approach is undertaken, as outlined below:

- Stage 1 – WFD Screening: to determine if there are any activities associated with the Project that may impact the water bodies within the vicinity, define the zone of influence, and identify the water bodies and protected areas.
- Stage 2 – WFD Scoping: to outline the baseline conditions of the identified water bodies, and identify if there are risks to these water bodies from the Project activities. The scoping questions outlined in this stage are informed by the guidance from the Environment Agency (estuarine and coastal waters). As there is no similar guidance for river or ground water bodies, the scoping questions have been developed based on professional judgement in order to determine the risk of compliance with relevant WFD objectives.
- Stage 3 – WFD impact assessment: to assess the scale of impact during construction and operation and the potential risk of these impacts to cause a deterioration in the WFD status/objectives, and/or identify mitigation measures to reduce this risk.

3.2.3 This preliminary report covers Stage 1 and Stage 2 of the WFD Compliance Assessment in order to gain feedback on the methodology and scope of the assessment. A full WFD Compliance Assessment will be

provided with the application for planning consent, marine licence application and HRO application.

4 Screening

4.1 Identification of relevant activities

4.1.1 The project activities identified as relevant to the WFD assessment cover all elements (including all locations) and all stages of the project and are broken down into construction and operational phases.

Works at the Port - Construction

4.1.2 Marine construction activities will include capital dredging, disposal of dredged material at sea, reclamation, piling, new pontoon berth installation, construction of the main quay wall, upgrades to the existing breakwater, construction of a permanent mooring dolphin and Installation of new navigation marks, quayside moorings and fenders. Potential impacts associated with these activities include disturbance to the seabed, changes to bathymetry, habitat loss, and elevated underwater noise levels. It may also lead to reductions in water quality as well as introduce invasive-non-native species (INNS). This has the potential to affect the biological, physico-chemical, hydromorphological and chemical quality elements of the coastal and transitional water bodies in which they will occur.

4.1.3 Construction activities on land such as demolition of existing buildings, excavation, construction of buildings and road infrastructure, remediation works, vehicle and/or plant movement, may, if not mitigated for, result in contaminated, uncontrolled surface water runoff into surrounding water bodies. This could result in a deterioration of water quality in the receiving water bodies and a knock-on reduction on the biological quality of the water body. In addition, there is a potential for in-channel works or works adjacent to watercourses to introduce INNS. This may result in a reduction in water quality and adversely affect aquatic species.

4.1.4 At this stage, the only known in-channel working will be during construction in the transitional water bodies. No activities have been identified which would directly affect hydromorphological or biological elements of the river water bodies, as there is no work planned within the water bodies themselves, although there may be potential for indirect effects (e.g. on migratory fish).

4.1.5 Piling and excavation works have the potential to create new pathways for mobilised contaminants/sediment to the groundwater which may result in a reduction in water quality. Piling activities along the shoreline have the potential to create pathways between coastal/transitional waters (high saline content waters) and the groundwater, resulting in saline intrusion. This could result in a change in the quality of groundwater (with potential indirect effects on abstractions) in the area.

4.1.6 It is not anticipated that there will be significant construction at depth below the water table, however at the Port some infrastructure such as large cranes are likely to be piled. Presence of these underground structures have the potential to alter the groundwater flow regime, and groundwater recharge into an aquifer. This could result in a deterioration in the quantitative element of a WFD groundwater body.

Works at the Port - Operation

4.1.7 Maintenance dredging and disposal within the marine environment has the potential to affect coastal and transitional water bodies. This will mainly occur through seabed disturbance and reductions in water quality. This could result in a deterioration in the ecological and chemical status/potential of a WFD coastal or transitional water body.

4.1.8 There is a potential for coastal, transitional and riverine water quality to be affected through contaminated surface water runoff discharging into WFD water bodies. These contaminants would usually be a result from runoff from the road network and consist of vehicle emissions, vehicle/plant wear and leakages, road surface erosion, and seasonal and regular maintenance practices. Possible contaminants include particulate solids, hydrocarbons (diesel, petroleum, lubricating oil leaks, and grease), metals (especially copper and zinc, but also cadmium, iron, lead and chromium in lesser amounts), oxides of nitrogen, sulphates, rubber, asbestos, tyre wear deposits including lead, zinc, and hydrocarbons, and de-icing during cold weather. All these contaminants have the potential to result in a deterioration of the water quality of the receiving water body.

4.1.9 No other activities during operation have been identified which would directly affect hydromorphological or biological elements of the river water bodies, as there is no work within the water bodies themselves, although there may be potential for indirect effects.

Works at Jersey Marine Site and Kenfig Marshalling Yard Site

4.1.10 At the Jersey Marine Site, construction works such as the creation of bunds, scrapes / depressions, reprofiling and reconnecting the cut-off creek have potential to affect water quality in transitional and riverine water bodies through mobilisation of contaminants and sediment.

4.1.11 At this stage, there is no planned in-channel working in water bodies at the Jersey Marine Site and no activities have been identified which would directly affect hydromorphological or biological elements of the river or transitional water bodies, as there is no work planned within the water bodies themselves, although there may be potential for indirect effects.

4.1.12 At the Kenfig Marshalling Yard Site there is no planned in-channel working in water bodies. There may be indirect effects on river water bodies from minor excavations, creation of scrapes and movement of soil with potential for mobilisation sediment into rivers.

Summary

4.1.13 Table 4-1 provides a summary of the activities to be screened-in and considered further at the scoping stage of the assessment.

4.1.14 The activities and screening assessment will be kept under review as the Project progresses, including in relation to the potential requirement for a marine disposal site and wet storage area.

Table 4-1: Summary of Project activities screening assessment

Activity	Screened in/out	Screening assessment
Works at the Port - Construction		
Capital dredging, disposal, reclamation	In	Potential to change hydromorphology of water bodies, directly impact seabed, reduce water quality, increase underwater noise, and introduce INNS. This may affect the ecological and chemical status/potential of coastal and transitional water bodies.
Piling and construction activities within water bodies	In	Potential to change hydromorphology of water bodies, directly impact seabed, reduce water quality, increase underwater noise, and introduce INNS. This may affect the ecological and chemical status/potential of coastal and transitional water bodies.
Construction activities on land such as demolition of existing buildings, excavation, construction of buildings and road infrastructure, and remediation works (including accidental spills and leakages of mobilisation of existing contaminants). InThere is a potential for a pathway to coastal, transitional and river water bodies due to uncontrolled surface water runoff resulting in mobilisation of contaminants/sediments. This may affect the ecological and chemical status/potential of surface water bodies. Construction activities on land such as demolition of existing buildings, excavation, construction of buildings and road infrastructure, and remediation works (including accidental spills and leakages of mobilisation of existing contaminants).	In	There is a potential for a pathway to be created to the groundwater body, and mobilisation of contaminants/sediments. There is a potential for a pathway to be created between coastal (high salt content) waters and groundwater body resulting in saline intrusion, particularly where piling is close to the shoreline. Any reduction in groundwater levels could also draw saline water into the groundwater body.
***Works at the Port* - Operation**		
Maintenance dredging and disposal	In	Potential for seabed disturbance, reductions in water quality, increases in underwater noise, and introduction INNS. This may affect the ecological and chemical status/potential of coastal and transitional water bodies.

Movement of plant and/or vehicles for operational purposes	In	Uncontrolled surface water runoff may become polluted from the road network which may result in a reduction of water quality from the receiving water body.
Prescence of underground structures	In	This could alter the groundwater flow regime.
Works at Jersey Marine Site		
Creation of bunds, scrapes / depressions, reprofiling and reconnecting the cut-off creek	In	There is a potential for a pathway to transitional and river water bodies due to uncontrolled surface water runoff resulting in mobilisation of contaminants/sediments. This may affect the ecological and chemical status/potential of surface water bodies.
Works at Kenfig Marshalling Yard Site		
Excavations, creation of scrapes and movement of soil	In	There is a potential for a pathway to river water bodies due to uncontrolled surface water runoff resulting in mobilisation of contaminants/sediments. This may affect the ecological and chemical status/potential of surface water bodies.

4.2 Defining zones of influence

4.2.1 To determine which water bodies could potentially be affected by the Project, all surface and groundwater bodies located within the Zone of Influence (ZoI) of the Project are recorded[2].

4.2.2 At this preliminary stage, the ZoI for coastal water bodies is taken as being the near-field region within the Tidal Harbour and the far-field region covering the remainder of Swansea Bay. These extents will be refined, as necessary, as the assessment of the Project progresses.

4.2.3 The ZoI for transitional and riverine water bodies has been defined as one kilometre radius of the Project FLOW EIA Scoping boundary for all quality elements, with the exception of migratory fish (see Paragraph below). Where the Project is located on a watercourse, this has been extended to one kilometre downstream. This is based on professional judgement on the assumption that effects on the water body, in particular effects on the chemical element, from contaminants would have dispersed and would not travel further downstream than one kilometre.

4.2.4 For migratory fish the ZoI is based on the migration route for each species. The downstream boundary is the point at which they leave the coast and enter the estuary, i.e. the downstream limit of Afan Estuary Incl Docks transitional water body (ID: GB541005800600). The upstream limit of the ZoI is the furthest point at which the species is known to be present, which may differ for individual species.

[2] The 'zone of influence' is defined in line with CIEEM guidelines as *"the area over which ecological features may be affected by biophysical changes as a result of the proposed project and associated activities"* (CIEEM, 2022).

4.2.5 The ZoI for the ground water body has been defined as the area within the Project FLOW EIA Scoping boundary, with groundwater protected areas considered within one kilometre of the FLOW EIA Scoping boundary.

4.2.6 The extents of the ZoI identified above will be kept under review as the Project progresses, including in relation to the potential requirement for a marine disposal site and wet storage area.

4.3 Identification of relevant WFD water bodies

Coastal and transitional water bodies

4.3.1 The Project directly overlaps with the Swansea Bay coastal water body (ID: GB641008260000), and some works are also planned in the Impounded Dock which falls within the Afan Estuary Incl Docks transitional water body (ID: GB541005800600).

4.3.2 The Jersey Marine Site is located adjacent to the Neath Estuary transitional water body (ID: GB541005800700).

4.3.3 The proposed dredge disposal site, the Swansea Bay (Outer) disposal site (LU130), also overlaps with the Bristol Channel Outer North coastal water body (ID: GB611008590001).

River water bodies

4.3.4 In terms of river water bodies, the Port is located within the Afan operational catchment, within the wider Tawe to Cadoxton management catchment. The following river WFD waterbodies and/or catchments have been identified within the study area:

- Ffrwd Wyllt – headwaters to tidal limit (ID: GB110058026100)): This waterbody flows from Bryngyrnos, culverted under the M4 and A4241 before discharging into the eastern section of the impounded docks area. There are no recorded Q95 levels for this watercourse.
- Afan – confluence with Pelenna to tidal limit (ID: GB110058026110): This waterbody is designated as a WFD river water body approximately 300 upstream from the Port on the River Afan (adjacent to the WFD transitional water body (Afan (ID: GB541005800600)). The majority of the Port is separated from this catchment by the A4241 and is separated from the transitional water body by Greenpark weir.
- Baglan Brook - headwaters to conf with River Neath (ID: GB110058026350): This water body is located approximately 4.18km north west of the EIA Scoping Boundary, however the catchment associated with this watercourse is located approximately 0.35 north east of the EIA Scoping Boundary.

4.3.5 Kenfig Marshalling Yard Site is located within the Kenfig operational catchment, within the Tawe to Cadoxton management catchment. The following river WFD water bodies and/or catchments have been identified within the study area:

- The Kenfig Marshalling Yard Site is located on the Kenfig - headwaters to tidal river water body (ID: GB110058026170). The River Kenfig is a designated WFD river water body (Kenfig – headwaters to tidal (GB110058026170)) which flows under the M4, discharging at the coast. The watercourse is designated as a coastal water body immediately downstream of the EIA Scoping Boundary. Although the watercourse is designated as coastal within Swansea Bay WFD water body (GB641008260000), it is above the mean high tide and may be partially freshwater.
- Nant Cwm Philip joins the River Kenfig approximately 0.9km upstream of the EIA Scoping Boundary. This watercourse is designated as a WFD river water body (Nant Cwm Philip – headwaters to conf with Kenfig (GB110058026190)).

4.3.6 Jersey Marine Site is also located within the Neath operational catchment, within the Tawe to Cadoxton management catchment. The following river WFD water bodies and/or catchments have been identified within the study area:

- Baglan Brook - headwaters to conf with River Neath (ID: GB110058026350): This water body and water body catchment is approximately 0.6km south of the EIA Scoping Boundary for the Jersey Marine Site.

Canal water bodies

4.3.7 The Jersey Marine Site Study Area encompasses two WFD canal waterbodies:

- The Tennant Canal (GB71010013) is a designated WFD canal water body that flows under the access road for the Jersery Marine Site. It originates from the Neath Canal at Aberdulais and flows alongside the River Neath and Neath Canal to the Neath Estuary where it diverts across Crymlyn Bog into Swansea Bay.
- The Neath Canal (GB71010012) is approximately 0.25km east of the EIA Scheme Boundary. The Neath Canal is a designated WFD canal water body, that originates in Glyneath. The Tennant and Neath Canals are linked at Aberdulais but, within the Study Area there is no direct link between them as they are separated by the Neath Estuary.

Lake water bodies

4.3.8 The Kenfig Marshalling Yard Site Study Area partially includes the Eglwys Nunydd Reservoir, which at its closest is approximately 280m from the EIA Scoping Boundary. This is a WFD lake water body Eglwys Nunydd Reservoir (GB31042079). The reservoir supply catchment is expected to be upstream of the EIA Scoping Boundary and the reservoir is separated from the EIA Scoping Boundary by the railway.

Groundwater

4.3.9 For groundwater, the Project, including the land at Jersey Marine and Kenfig Marshaling Yard is located within the Swansea Carboniferous Coal Measures operational area, within the wider Tawe to Cadoxton groundwater management area. The Project is underlain by the Swansea Carboniferous Coal Measures groundwater WFD body (ID: GB41002G201000). The bedrock underlying the study area is a high vulnerability Secondary A aquifer and is part of the Pennine Middle Coal Measures Formation and South Wales Middle Coal Measures Formation (undifferentiated) as well as the Pennine Lower Coal Measures Formation and South Wales Lower Coal Measures Formation (undifferentiated) in the south of the study area. Where published geology maps indicate the presence of superficial deposits, they are high vulnerability Secondary A and Secondary (undifferentiated) aquifers.

Summary

4.3.10 Table 4-2 identifies the water bodies that could be potentially affected by the relevant activities screened into the assessment (Table 4-1).

Table 4-2: Relevant WFD Water Bodies

Water body names	Water body ID	Water body type	Screened in/out	Justification
Swansea Bay	GB641008260000	Coastal	In	The Project directly overlaps with this WFD water body. There are potential impact pathways that could result in a deterioration in WFD status.
Bristol Channel Outer North	GB611008590001	Coastal	In	The proposed dredge disposal site, the Swansea Bay (Outer) disposal site (LU130), directly overlaps with this WFD water body. There are potential impact pathways that could result in a deterioration in WFD status.
Afan Estuary Incl Docks	GB541005800600	Transitional	In	The Project directly overlaps with this WFD water body. There are potential impact pathways that could result in a deterioration in WFD status.
Neath Estuary	GB541005800700	Transitional	In	The Jersey Marine site is adjacent to this water body. There are potential impact pathways that could

Water body names	Water body ID	Water body type	Screened in/out	Justification
				result in a deterioration in WFD status.
Ffrwd Wyllt – headwaters to tidal limit	GB110058026100	River	In	This WFD river water body is within the Study Area, upstream of the EIA Scoping Boundary. There is a potential impact pathway between the activities and the waterbody which has a potential to result in a deterioration in WFD status.
Afan – confluence with Pelenna to tidal limit	GB110058026110	River	In	The EIA Scoping Boundary is located 300m downstream of this WFD river waterbody. There is a potential impact pathway between the activities on the River Afan and the catchment/water body which has a potential to result in a deterioration in WFD status.
Baglan Brook - headwaters to conf with River Neath	GB110058026350	River	Out	The Study Area for the Port is partially located within this WFD river waterbody catchment, however it is separated from the EIA Scoping Boundary by the River Afan. The Study Area for the Jersey Marine is also partially located within this WFD river water body catchment, however it separated from the EIA Scoping Boundary by Neath Estuary. Therefore, it is not considered for there to be a credible impact pathway between the Project and this catchment, or associated water body.
Kenfig - headwaters to tidal	GB110058026170	River	In	This reiver water body traverses the EIA Scoping Boundary of

Water body names	Water body ID	Water body type	Screened in/out	Justification
				the Kenfig Marshalling Yard Site. There are potential impact pathways between the activities and the catchment/water body which has a potential to result in a deterioration in WFD status.
Nant Cwm Philip - headwaters to conf with Kenfig	GB110058026190	River	Out	This river waterbody is approximately 0.9km upstream of the Kenfig Marshalling Yard Site. Therefore, it is not considered for there to be a credible impact pathway between the Project and this catchment, or associated water body.
Tennant Canal	GB71010013	Canal	In	The Tennant Canal traverses the EIA Scoping Boundary for the Jersey Marine Site. There is a potential impact pathway between the Project and this catchment/water body which has a potential to result in a deterioration in WFD status.
Neath Canal	GB71010012	Canal	Out	The Jersey Marine Site is separated from this canal waterbody by the Neath Estuary. Therefore, it is not considered for there to be a credible impact pathway between the Project and this catchment, or associated water body.
Eglwys Nunydd Reservoir	GB31042079	Lake	Out	The EIA Scoping Boundary for the Kenfig Marshalling Yard Site is not hydraulically connected to the lake water body. The reservoir is not hydrologically connected to the River Kenfig and is surrounded by embankments.

Water body names	Water body ID	Water body type	Screened in/out	Justification
				Therefore, it is not considered for there to be a credible impact pathway between the Project and this catchment, or associated water body.
Swansea Carboniferous Coal Measures	GB41002G201000	Groundwater	In	The Project is underlain by this water body. There is a potential impact pathway between the catchment and the Project which has the potential to result in a deterioration in WFD status.

4.4 WFD Protected Areas

4.4.1 The WFD requires that activities are also in compliance with other relevant legislation, such as the Conservation of Habitats and Species Regulations 2017 (as amended), Bathing Water Regulations 2013 (as amended), Nitrate Pollution Prevention Regulations 2015 (as amended), Urban Waste Water Treatment (England and Wales) Regulations 1994 (as amended), and the provisions of the Shellfish Water Protected Areas (England and Wales) Directions 2016 (as amended).

Nature Conservation Designations

4.4.2 The Conservation of Habitats and Species Regulations 2017 (as amended) transpose the Habitats Directive (92/43/EEC) and Birds Directive (2009/147/EC) into English law. Article 3 of the Habitats Directive (92/43/EEC as amended) requires the establishment of a European network of important high-quality conservation sites known as Special Areas of Conservation (SAC) that will contribute to conserving habitats and species identified in Annexes I and II of the Directive. The listed habitat types and species are those considered to be most in need of conservation at a European level (excluding birds).

4.4.3 In accordance with Article 4 of the Birds Directive (2009/147/EC), Special Protection Areas (SPA) are strictly protected sites classified for rare and vulnerable birds (Annex I of the Directive), and for regularly occurring migratory species. Ramsar sites are wetlands of international importance designated under the Ramsar Convention (adopted in 1971 and came into force in 1975), providing a framework for the conservation and wise use of wetlands and their resources.

4.4.4 The are no international nature conservation sites within 2 km of the Project[3]. The nearest to the Project is Kenfig SAC (approximately 4.2 km south east of the Port and adjacent to the Kenfig Marshaling Yard site). The SAC is designated for saltmarsh and a variety of coastal sand dune habitats and species features.

4.4.5 The are no SACs within 2 km of the Port. Jersey Marine site is located approximately 0.4 km east of Crymlyn Bog and Pant Y Sais Nature Reserve and Crymyln Bog SAC which is designated for transition mires and quaking bogs and calcareous fens. Kenfig Pool and Dunes National Nature Reserve (SAC) is within the Study Area for the Kenfig Marshalling Yard Site, this is a predominately coastal site designated for the habitats provided by the dunes present.

Bathing Waters

4.4.6 The revised Bathing Water Directive (2006/7/EC) was adopted in 2006, updating the microbiological and physico-chemical standards set by the original Bathing Water Directive (76/160/EEC) and the process used to measure/monitor water quality at identified bathing waters. The revised Bathing Water Directive focuses on fewer microbiological indicators, whilst setting higher standards, compared to those of the Bathing Water Directive. Bathing waters under the revised Bathing Water Directive are classified as excellent, good, sufficient or poor according to the levels of certain types of bacteria (intestinal enterococci and *Escherichia coli*) in samples obtained during the bathing season (May to September).

4.4.7 The Bathing Water Directive was repealed at the end of 2014 and monitoring of bathing water quality has been reported against revised Bathing Water Directive indicators since 2015. The new classification system considers all samples obtained during the previous four years and, therefore, data has been collected for revised Bathing Water Directive indicators since 2012. The UK Government's target under the revised Bathing Water Directive is to achieve 'sufficient' for all bathing waters by 2015, as described under the Bathing Water Regulations 2013[4] (as amended) which transposes the revised Bathing Water Directive into UK law.

4.4.8 Aberafan designated bathing water is located within 1 km of the Port (Figure 2, **Appendix E1**). This was assessed as having ‘excellent’ bathing water quality in 2024, an improvement on the ‘good’ bathing water quality between 2022 and 2023, and ‘sufficient’ assessment in 2021 (NRW, 2025b).

[3] Only international nature conservation sites are relevant to the WFD Compliance Assessment. Impacts on Sites of Special Scientific Interest (SSSIs) are considered as part of the EIA.

[4] Following the UK leaving the EU, the main provisions of the Bathing Water Directive have been retained in English law through the Floods and Water (Amendment etc.) (EU Exit) Regulations 2019.

Shellfish Water Protected Areas

4.4.9 The Shellfish Waters Directive (2006/113/EC) was repealed in December 2013 and subsumed within the WFD. However, the Shellfish Water Protected Areas (England and Wales) Directions 2016 require NRW to endeavour to observe a microbial standard in all 'shellfish water protected areas'. The microbial standard is 300 or fewer colony forming units of E. coli per 100 ml of shellfish flesh and intravalvular liquid.

4.4.10 The Directions also requires NRW to assess compliance against this standard to monitor microbial pollution (75% of samples taken within any period of 12 months below the microbial standard and sampling/analysis in accordance with the Directions).

4.4.11 The Swansea Bay (East) Shellfish Water Protected Area (NRW, 2021c; Figure 2, **Appendix E1**) is directly adjacent to the Port and marine disposal site and 1.5 km downstream of the Jersey Marine Site. The Queen's Dock classification zone (within the Swansea Bay production area) is not currently classified (Food Standards Agency, 2024). Previously, the Queen's Dock classification zone was classified as Class B (long term) meaning shellfish must not exceed 4,600 Escherichia coli per 100 g flesh and 10% of samples must not exceed 46,000 E. coli per 100 g flesh.

Nitrate Vulnerable Zones

4.4.12 The Nitrates Directive (91/676/EEC), which is implemented in England by the Nitrate Pollution Prevention Regulations 2015 (as amended), aims to reduce water pollution from agricultural sources and to prevent such pollution occurring in the future (nitrogen is one of the nutrients that can affect plant growth). Under the Nitrates Directive, surface waters are identified if too much nitrogen has caused a change in plant growth which affects existing plants and animals and the use of the water body.

4.4.13 There are no Nitrate Vulnerable Zones (NVZs) in the vicinity of the Port, the marine disposal site or Jersey Marine. There is a NVZ located approximately 2.2 km south of Kenfig Marshaling Yard however it lies outside the river water body catchments.

Sensitive areas

4.4.14 The Urban Waste Water Treatment (England and Wales) Regulations 1994 (as amended) transpose the Urban Waste Water Treatment Directive (91/271/EEC) into English law. It aims to protect the environment from the adverse effects of the collection, treatment and discharge of urban waste water. It sets treatment levels on the basis of sizes of sewage discharges and the sensitivity of waters receiving the discharges.

4.4.15 In general, the Urban Waste Water Treatment Directive requires that collected waste water is treated to at least secondary treatment standards for significant discharges. Secondary treatment is a biological treatment process where bacteria are used to break down the biodegradable matter (already much reduced by primary treatment) in waste water.

4.4.16 Sensitive areas under the Urban Waste Water Treatment Directive are water bodies affected by eutrophication due to elevated nitrate concentrations and act as an indication that action is required to prevent further pollution caused by nutrients.

4.4.17 There are no Sensitive Areas (Eutrophic) designated under the Urban Waste Water Treatment Regulations in the vicinity of the Project.

Drinking Water Protected Areas

4.4.18 Swansea Carboniferous Coal Measures is designated as a groundwater drinking water protected area with risk.

5 Scoping

5.1 Coastal and transitional water bodies

5.1.1 Table 5-1, Table 5-2 and Table 5-3 identify the baseline conditions for the three screened-in coastal and transitional WFD water bodies:

- Swansea Bay coastal water body (ID: GB641008260000);
- Bristol Channel Outer North (ID: GB611008590001);
- Afan Estuary Incl Docks (ID: GB541005800600); and
- Neath Estuary (ID: GB541005800700).

Table 5-1: Swansea Bay coastal water body summary table

Water Body Name	Swansea Bay
Water Body ID	GB641008260000
Water Body Type	Coastal
Water Body Area	11019.7 ha
Hydromorphological Designation (Reasons for Designation)	HMWB (Coast protection use)
Protected Area Designations	Swansea Bay (East), Swansea Bay (South) and Swansea Bay (West) Shellfish Water Protected Area and bivalve mollusc production area Aberafan bathing water
Overall Status	Moderate
Ecological Potential	Moderate
Chemical Status	Moderate
Parameters not at Good Status/ Potential	Mitigation assessment, dissolved inorganic nitrogen (DIN), BDPE calc, mercury and its compounds, PAH
Reasons for not achieving good (RNAG)	DIN – sewage discharge Mercury - Atmospheric deposition, contaminated water body bed sediments.
Higher Sensitivity Habitats	Mussel beds, including blue and horse mussel Polychaete reef
Lower Sensitivity Habitats	Cobbles, gravel and shingle Intertidal soft sediment
Phytoplankton Status	Good
History of Harmful Algae	There is no known history of harmful algae (note that this information was not available from Water Watch Wales).

Source: NRW (2024, 2025a, 2025c)

Table 5-2: Bristol Channel Outer North coastal water body summary table

Water Body Name	Bristol Channel Outer North
Water Body ID	GB611008590001
Water Body Type	Coastal
Water Body Area	89962.5 ha
Hydromorphological Designation (Reasons for Designation)	Not heavily modified
Protected Area Designations	Swansea Bay (South) and Swansea Bay (West) Shellfish Water Protected Area Bathing waters
Overall Status	Moderate
Ecological Status	Moderate
Chemical Status	High
Parameters not at Good Status/ Potential	Dissolved inorganic nitrogen (DIN)
Reasons for not achieving good (RNAG)	DIN - Farm infrastructure, sewage discharge
Higher Sensitivity Habitats	Subtidal kelp beds Polychaete reef Mussel beds, including blue and horse mussel
Lower Sensitivity Habitats	Gravel and cobbles Subtidal rocky reef Rocky shore Intertidal soft sediment Subtidal soft sediment
Phytoplankton Status	Good
History of Harmful Algae	There is no known history of harmful algae (note that this information was not available from Water Watch Wales).

Source: NRW (2024, 2025a, 2025c)

Table 5-3: Afan Estuary Incl Docks transitional water body summary table

Water Body Name	**Afan Estuary Incl Docks**
Water Body ID	GB541005800600
Water Body Type	Transitional
Water Body Area	79 ha
Hydromorphological Designation (Reasons for Designation)	HMWB (Navigation, ports and harbours use)
Protected Area Designations	Swansea Bay (East) Shellfish Water Protected Area and bivalve mollusc production area
Overall Status	Moderate
Ecological Potential	Moderate
Chemical Status	High

Parameters not at Good Status/ Potential	Mitigation measures
Reasons for not achieving good (RNAG)	Hydrological regime - Unknown (pending investigation)
Higher Sensitivity Habitats	Mussel beds, including blue and horse mussel Polychaete reef Saltmarsh
Lower Sensitivity Habitats	Intertidal soft sediment
Phytoplankton Status	Not monitored
History of Harmful Algae	There is no known history of harmful algae (note that this information was not available from Water Watch Wales).

Source: NRW (2024, 2025a, 2025c)

Table 5-4: Neath Estuary transitional water body summary table

Water Body Name	Neath Estuary
Water Body ID	GB541005800700
Water Body Type	Transitional
Water Body Area	355.54 ha
Hydromorphological Designation (Reasons for Designation)	HMWB (Navigation, ports and harbours use)
Protected Area Designations	Swansea Bay (East)
Overall Status	Moderate
Ecological Potential	Moderate
Chemical Status	High
Parameters not at Good Status/ Potential	Mitigation assessment
Higher Sensitivity Habitats	Saltmarsh
Lower Sensitivity Habitats	Intertidal mudflats Estuarine rock
Phytoplankton Status (2016)	No information
History of Harmful Algae	There is no known history of harmful algae (note that this information was not available from Water Watch Wales).

Source: NRW (2024, 2025a, 2025c)

5.1.2 The “Clearing the Water for All” guidance provides a scoping template to record findings and consider potential risks for several key receptors, specifically:

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

5.1.3 Each receptor is considered in the following sections and summarised in a table. Potential risks that have been scoped into the assessment are highlighted in red, while those scoped out of the assessment are highlighted in green.

Hydromorphology

5.1.4 Hydromorphology is the physical characteristics of estuaries and coasts, including the size, shape and structure of the water body and the flow and quantity of water and sediment. Table 5-5 presents a summary of hydromorphological considerations and associated risk issues for the Project. As at least one hydromorphological consideration indicates that a risk could be associated with the Project, this receptor has been scoped into the impact assessment.

Table 5-5: Hydromorphology risk issues in coastal and transitional water bodies

Hydromorphology considerations	**Risk issue**			
	Swansea Bay	**Bristol Channel Outer North**	**Afan Estuary Incl Docks**	**Neath Estuary**
Consider if your activity could impact on the hydromorphology (for example morphology or tidal patterns) of a water body at high status?	No (morphology status not recorded). Impact assessment not required.	No (morphology status 'not high'). Impact assessment not required.	No (morphology status not recorded). Impact assessment not required.	No (morphology status not recorded). Impact assessment not required.
Consider if your activity could significantly impact the hydromorphology of any water body?	Yes (potential changes to hydromorphology as a result of Project). Requires impact assessment.	Yes (potential changes to hydromorphology as a result of Project). Requires impact assessment.	Yes (potential changes to hydromorphology as a result of Project). Requires impact assessment.	No (no works within the water body)
Consider if your activity is in a water body that is heavily modified for the same use as your activity?	No (heavily modified for coast protection use). Impact assessment not required.	No (water body not heavily modified). Impact assessment not required.	Yes (heavily modified for navigation, ports and harbours use). Requires impact assessment.	No (heavily modified for navigation, ports and harbours use). Impact assessment not required.

Biology (fish)

5.1.5 Activities occurring within an estuary could impact on normal fish behaviour such as movement, migration or spawning. Table 5-6 presents a summary of biology (fish) considerations and associated risk issues for the Project. As the biology (fish) considerations indicate that a risk could be associated with the Project, this receptor has been scoped into the assessment.

5.1.6

Table 5-6: Biology (fish) risk issues in coastal and transitional water bodies

Water quality considerations	Risk issue			
	Swansea Bay	**Bristol Channel Outer North**	**Afan Estuary Incl Docks**	**Neath Estuary**
Consider if your activity could affect water clarity, temperature, salinity, oxygen levels, nutrients or microbial patterns continuously for longer than a spring neap tidal cycle (about 14 days)?	No (while the project duration exceeds 14 days, the potential to affect water quality is intermittent and unlikely to persist continuously for greater than 14 days). Impact assessment not required.	No (while the project duration exceeds 14 days, the potential to affect water quality is intermittent and unlikely to persist continuously for greater than 14 days). Impact assessment not required.	No (while the project duration exceeds 14 days, the potential to affect water quality is intermittent and unlikely to persist continuously for greater than 14 days). Impact assessment not required.	Yes (works including creation of bunds to increase water retention and reconnecting the creek may result in a temporary increase in suspended sediment. Although the impacts are unlikely to persist continuously for greater than 14 days a precautionary approach is taken at this stage). Impact assessment required.
Consider if your activity is in a water body with a phytoplankton status of moderate, poor or bad?	No (phytoplankton classification is currently good). Impact assessment not required.	No (phytoplankton classification is currently good). Impact assessment not required.	No (phytoplankton classification not monitored). Impact assessment not required.	No (phytoplankton classification not monitored). Impact assessment not required.
Consider if your activity is in a water body with a history of harmful algae?	No (harmful algae history unknown). Impact assessment not required.	No (harmful algae history unknown). Impact assessment not required.	No (harmful algae history unknown). Impact assessment not required.	No (harmful algae history unknown). Impact assessment not required.
If your activity uses or releases chemicals (for example through sediment disturbance or building works) consider if the chemicals are on the Environmental Quality Standards	Yes (potential for sediment-bound chemicals above Cefas AL1 to be disturbed and dispersed during dredging, disposal and piling). Requires	Yes (potential for sediment-bound chemicals above Cefas AL1 to be disturbed and dispersed during dredge disposal). Requires	Yes (uncontrolled surface water runoff may become contaminated from mobilised sediment and discharge into the water body).	Yes (potential for sediment-bound chemicals above Cefas AL1 to be disturbed and dispersed if creek is reconnected).

Water quality considerations	Risk issue			
	Swansea Bay	**Bristol Channel Outer North**	**Afan Estuary Incl Docks**	**Neath Estuary**
Directive (EQSD) list?	impact assessment.	impact assessment.	Requires impact assessment.	Requires impact assessment.
If your activity uses or releases chemicals (for example through sediment disturbance or building works) consider if it disturbs sediment with contaminants above Cefas Action Level 1?				
If your activity has a mixing zone (like a discharge pipeline or outfall) consider if the chemicals released are on the Environmental Quality Standards Directive (EQSD) list?	No (not applicable). Impact assessment not required.	No (not applicable). Impact assessment not required.	No (not applicable). Impact assessment not required.	No (not applicable). Impact assessment not required.

Protected areas

5.1.7 Consideration should be made regarding whether WFD protected areas are at risk from your activity, including SACs and SPAs (European sites), as well as bathing waters, shellfish water protected areas, and nutrient sensitive areas. Table 5-7 presents a summary of protected area considerations and associated risk issues for the Project. As the protected areas considerations indicate that a risk could be associated with the Project, this receptor has been scoped into the impact assessment.

Table 5-7: Protected area risk issues in coastal and transitional water bodies

Protected area considerations	Risk issue			
	Swansea Bay	**Bristol Channel Outer North**	**Afan Estuary Incl Docks**	**Neath Estuary**
Consider if your activity is within 2 km of any WFD protected area?	Yes (adjacent to bathing waters and within Shellfish Water Protected Area). Impact assessment required.	No. Impact assessment not required.	Yes (adjacent to bathing waters and Shellfish Water Protected Area). Impact assessment required.	Yes (adjacent to Shellfish Water Protected Area). Impact assessment required.

Invasive non-native species (INNS)

5.1.8 Consideration should be made regarding whether there is a risk the activity could introduce or spread INNS. Risks of introducing or spreading INNS include materials or equipment that have come from, had use in or travelled through other water bodies, as well as activities that help spread existing INNS, either within the immediate water body or other water bodies. Table 5-8 presents a summary of INNS considerations and associated risk issues for the Project. As the INNS considerations indicate that a risk could be associated with the Project, this receptor has been scoped into the impact assessment.

Table 5-8: Invasive non-native species (INNS) risk issues in coastal and transitional water bodies

Protected area considerations	Risk issue			
	Swansea Bay	**Bristol Channel Outer North**	**Afan Estuary Incl Docks**	**Neath Estuary**
Consider if your activity could introduce or spread INNS?	Yes (potential for introduction or spread of INNS). Requires impact assessment.	Yes (potential for introduction or spread of INNS). Requires impact assessment.	Yes (potential for introduction or spread of INNS). Requires impact assessment.	Yes (potential for introduction or spread of INNS). Requires impact assessment.

5.2 River water bodies

The Port

5.2.1 Table 5-9 and Table 5-10 identify the baseline conditions for the two screened-in river WFD water bodies for the Port:

- Ffrwd Wyllt – headwaters to tidal limit (GB110058026100); and
- Afan – confluence with Pelenna to tidal limit (GB110058026110).

Table 5-9: Ffrwd Wyllt – headwaters to tidal limit river water body baseline conditions (Cycle 3, 2024)

Water Body Name	Ffrwd Wyllt – headwaters to tidal limit	
Water Body ID	GB110058026100	
Water Body Type	River	
Hydromorphological Designation	Heavily modified	
Driving element for status	Fish, Mitigation assessment	
Mitigation assessment	Moderate	
Reasons for not achieving good (RNAG)	Hydrological regime (2021)	Surface water abstraction (Industry, manufacturing and other business)
	Fish	Forestry Surface water abstraction Barriers to fish migration Ports and harbours - structures Abandoned mine
Protected Area Designations	No protected areas identified within catchment	
Status	**2024**	**Objectives**
Overall Status	Moderate	Moderate by 2027
Ecological Status	Moderate	Moderate by 2027
Chemical Status	High	High by 2027
Hydromorphological Supporting Elements	Moderate	Good by 2027

Source: NRW (2024, 2025a, 2025c)

Table 5-10: Afan - confluence with Pelenna to tidal limit river water body baseline conditions (Cycle 3, 2024)

Water Body Name	Afan – confluence with Pelenna to tidal limit	
Water Body ID	GB110058026110	
Water Body Type	River	
Hydromorphological Designation	Not designated as artificial or heavily modified	
Driving element for status	Invertebrates and Hydrology	
Mitigation assessment	Not applicable	
Reasons for not achieving good (RNAG)	Hydrological regime (2021)	Surface water abstraction (Industry, manufacturing and other business)
Protected Area Designations	No protected areas identified within catchment	
Status	**2024**	**Objectives**
Overall Status	Good	Good by 2027
Ecological Status	Good	Good by 2027
Chemical Status	High	Not defined

Hydromorphological Supporting Elements	Moderate	Good by 2027

Source: NRW (2024, 2025a, 2025c)

Kenfig Marshalling Yard Site

5.2.2 Table 5-11 identifies the baseline conditions for the screened-in river WFD water body for Kenfig Marshalling Yard Site:

- Kenfig – headwaters to tidal (GB110058026170)

Table 5-11: Kenfig – headwaters to tidal river water body baseline conditions (Cycle 3, 2024)

Water Body Name	**Kenfig – headwaters to tidal**	
Water Body ID	GB110058026170	
Water Body Type	River	
Hydromorphological Designation	Natural	
Driving element for status	Macrophytes and phytobenthos, hydrological regime, morphology	
Mitigation assessment	Not Applicable	
Reasons for not achieving good (RNAG)	Hydrological regime (2021)	Surface water abstraction (Industry, manufacturing and other business)
Protected Area Designations	No protected areas identified in the Study Area	
Status	**2024**	**Objectives**
Overall Status	Good	Good by 2027
Ecological Status	Good	Good by 2027
Chemical Status	High	High by 2027
Hydromorphological Supporting Elements	Moderate	Good by 2027

Source: NRW (2024, 2025a, 2025c)

Jersey Marine Site

5.2.3 There were no relevant WFD river water bodies identified during screening for this site.

Summary

5.2.4 The screened-in water bodies and activities identified in Section 4 have been assessed against the individual WFD elements to understand whether further assessment is required. See Table 5-12.

Table 5-12: River water body scoping assessment

	Water body		
Scoping question	**Ffrwd Wyllt – headwaters to tidal limit (GB110058026100)**	**Afan – confluence with Pelenna to tidal limit (GB110058026110)**	**Kenfig – headwaters to tidal (GB110058026170)**
Hydromorphological elements			
Are there any in-channel works within this water body?	No. Impact assessment not required.	No (any River Afan in-channel works associated with the Project are located approximately 1km downstream from this water body). Impact assessment not required.	No. Impact assessment not required.
Could the Project impact on the hydromorphology of a water body at high status?	No (the water body is designated as 'moderate' for hydromorphological supporting elements). Impact assessment not required.	No (the water body is designated as 'moderate' for hydromorphological supporting elements). Impact assessment not required.	No (the water body is designated as 'moderate' for hydromorphological supporting elements). Impact assessment not required.
Could the Project significantly impact the hydromorphology of any water body?	No (no in-channel working is anticipated within this water body). Impact assessment not required.	No (whilst the Project may include dredging within the River Afan channel for the pontoon construction, this is located 1km downstream of this water body. Therefore, it is not anticipated for the works to significantly change or impact this water body's hydromorphology). Impact assessment not required.	No (no in-channel working is anticipated within this water body). Impact assessment not required.
Is the Project within a water body heavily modified for the same use as your activity?	No (whilst the water body is heavily modified, the Project will not involve in-channel working and/or result in a change in the hydromorphology of this water	No (the water body is not designated as an artificial or heavily modified water body). Impact assessment not required.	No (the water body is not designated as an artificial or heavily modified water body). Impact assessment not required.

	Water body		
Scoping question	**Ffrwd Wyllt – headwaters to tidal limit (GB110058026100)**	**Afan – confluence with Pelenna to tidal limit (GB110058026110)**	**Kenfig – headwaters to tidal (GB110058026170)**
	body). Impact assessment not required.		
Is Hydromorphology scoped in for further assessment?	No	No	No
Biological elements			
Is the Project located within 1km of a protected area designated for biology (i.e. SPA, SCA, Ramsar)	No (there are no freshwater protected areas within 1km of the Project). Impact assessment not required.	No (there are no freshwater protected areas within 1km of the Project). Impact assessment not required.	Yes (the Project is upstream of the Kenfig Dunes and Pool Nature Reserve (SAC). Any construction impacts relating to uncontrolled, contaminated surface water runoff to this water body mitigated in accordance with the Adaptive Environmental Management Plan. There are unlikely to be substantial changes in water quality that could impact biological elements). No further assessment required.
Could the Project impact on normal fish behaviour like movement, migration or spawning (i.e. creating a physical barrier, noise, chemical change or a change in depth or flow)?	No (no in-channel working is anticipated within this water body). Impact assessment not required.	Yes (although no in-channel working is anticipated within this water body, it is directly upstream from the Project and therefore there is potential to impact on fish movement and migration through this water body due to the presence of a fish passage at Greenpark Weir). The likelihood of impacts on fish behavior will be reassessed	No (no in-channel working is anticipated within this water body). Impact assessment not required.

	Water body		
Scoping question	**Ffrwd Wyllt – headwaters to tidal limit (GB110058026100)**	**Afan – confluence with Pelenna to tidal limit (GB110058026110)**	**Kenfig – headwaters to tidal (GB110058026170)**
		following the outcome of the marine ecology EIA chapter.Impact assessment required.	
Is biology scoped in for further assessment?	No	Yes	No
Physico-chemical quality and chemical elements			
Could the Project affect water clarity, temperature, salinity, oxygen levels, nutrients or microbial patterns?	No (any construction impacts relating to uncontrolled, contaminated surface water runoff entering the river downstream, will be mitigated in accordance with the Adaptive Environmental Management Plan. There are no proposed works within this water body and therefore there are unlikely to be substantial changes to physico-chemical or chemical elements within this water body). Impact assessment not required.	No (any construction impacts relating to uncontrolled, contaminated surface water runoff entering the river downstream, will be mitigated in accordance with the Adaptive Environmental Management Plan. Greenpark weir further prevents upstream migration of any potential contaminants to this water body. There are no proposed works within this water body and therefore there are unlikely to be substantial changes to physico-chemical or chemical elements within this water body). Impact assessment not required.	No (any construction impacts relating to uncontrolled, contaminated surface water runoff to this water body, will be mitigated in accordance with the Adaptive Environmental Management Plan. Operation of the offsite ecological mitigation area is unlikely to cause substantial changes to physico-chemical or chemical elements within this water body). Impact assessment not required.
Is there a risk of release of chemicals into the water column though use of chemicals or disturbance of sediment?	No (any construction impacts relating to uncontrolled, contaminated surface water runoff entering the river downstream, will be mitigated in accordance with the	No (any construction impacts relating to uncontrolled, contaminated surface water runoff entering the river downstream, will be mitigated in accordance with the Adaptive	No (any construction impacts relating to uncontrolled, contaminated surface water runoff to this water body, will be mitigated in accordance with the Adaptive Environmental

	Water body		
Scoping question	**Ffrwd Wyllt – headwaters to tidal limit (GB110058026100)**	**Afan – confluence with Pelenna to tidal limit (GB110058026110)**	**Kenfig – headwaters to tidal (GB110058026170)**
	Adaptive Environmental Management Plan. There are no proposed works within this water body). Impact assessment not required.	Environmental Management Plan. Greenpark weir prevents upstream migration of any chemicals or disturbed sediment to this water body. There are no proposed works within this water body). Impact assessment not required.	Management Plan. During operation of the offsite ecological mitigation area, there is unlikely to be release of chemicals or disturbed sediment to this water body). Impact assessment not required.
Is water quality scoped in for further assessment?	No	No	No

5.3 Canal water bodies

5.3.1 Table 5-13 identifies the baseline conditions for the screened in canal water body.

Table 5-13: Tennant Canal water body baseline conditions (Cycle 3, 2024)

Water Body Name	Tennant Canal	
Water Body ID	GB71010013	
Water Body Type	Canal	
Hydromorphological Designation	Artificial	
Driving element for status	Mitigation measures assessment	
Mitigation assessment	Moderate	
Reasons for not achieving good (RNAG)	Not listed	
Protected Area Designations	No protected areas identified	
Status	**2024**	**Objectives**
Overall Status	Moderate	Good by 2027
Ecological Status	Moderate	Good by 2027
Chemical Status	High	
Expert Judgment	Moderate	Good by 2027
Supporting Elements	N/A	Good by 2027

Source: NRW (2025a, 2025c)

5.3.2 The screened-in water body and activities identified in Section 4 have been assessed against the individual WFD elements to understand whether further assessment is required. See Table 5-14.

Table 5-14: Canal water body scoping assessment

	Water body
Scoping question	**Tennant Canal (GB71010013)**
Biological elements	
Is the Project located within 1km upstream or 2km downstream of a protected area designated for biology (i.e. SPA, SCA, Ramsar)	Yes (Crymlyn Bog (Nature Reserve, SAC) is 400m from the EIA Scoping Boundary. Any construction impacts relating to uncontrolled, contaminated surface water runoff to this water body, will be mitigated in accordance with the Adaptive Environmental Management Plan. Operation of the offsite ecological mitigation area is unlikely to cause substantial changes in water quality that could impact biological elements). Impact assessment not required.

	Water body
Scoping question	**Tennant Canal (GB71010013)**
Biological elements	
Could the Project impact on normal fish behaviour like movement, migration or spawning (i.e. creating a physical barrier, noise, chemical change or a change in depth or flow)?	No (no in-channel working is anticipated within this water body). Impact assessment not required.
Is biology scoped in for further assessment?	No.
Physico-chemical quality and chemical elements	
Could the Project affect water clarity, temperature, salinity, oxygen levels, nutrients or microbial patterns?	No (any construction impacts relating to uncontrolled, contaminated surface water runoff to this water body, will be mitigated in accordance with the Adaptive Environmental Management Plan. Operation of the offsite ecological mitigation area is unlikely to cause substantial changes to physico-chemical or chemical elements within this water body). Impact assessment not required.
Is there a risk of release of chemicals into the water column though use of chemicals or disturbance of sediment?	No (any construction impacts relating to uncontrolled, contaminated surface water runoff to this water body, will be mitigated in accordance with the Adaptive Environmental Management Plan. During operation of the offsite ecological mitigation area, there is unlikely to be release of chemicals or disturbed sediment to this water body). Impact assessment not required.
Is water quality scoped in for further assessment?	No.

5.4 Ground water bodies

5.4.1 Table 5-15 outlines the baseline conditions for the screened-in groundwater body (Swansea Carboniferous Coal Measures groundwater WFD body (GB41002G201000)). As there was no updated interim classification provided in 2024, reference is made to the 2021 assessment.

Table 5-15: Swansea Carboniferous Coal Measures groundwater body

Water Body Name	Swansea Carboniferous Coal Measures	
Water Body ID	GB41002G201000	
Water Body Type	Groundwater	
Hydromorphological Designation	Natural	
Driving element for status	Groundwater / Surface water chemical	
Reasons for not achieving good (RNAG)	Chemical dependent surface water body status (2021)	Abandoned mine (Mining and quarrying)
Protected Area Designations	No protected areas identified within catchment	
Status	**2021**	**Objectives**
Overall Status	Poor	Good by 2027
Quantitative	Good	N/A
Chemical	Poor	N/A

Source: NRW (2021)

5.4.2 The screened-in water body and activities identified in Section 4 have been assessed against the individual WFD elements to understand whether further assessment is required. See Table 5-16.

Table 5-16: Swansea Carboniferous Coal Measures (GB41002G201000) groundwater body scoping assessment

Quantitative	
Will the Project result in changes in the groundwater flow and recharge?	Yes (presence of underground structures associated with the Project may result in localised changes to the direction of the flow, and the amount of recharge in underlying aquifers). Requires impact assessment.
Will the Project impact on any groundwater dependent terrestrial ecosystems (GWDTE)?	No (no GWDTEs were identified within the study area). Impact assessment not required.
Is quantitative scoped in for further assessment?	**Yes – there is a potential for the Project to result in a change in groundwater flow and recharge.**
Chemical	
Could the Project result in a change in ground water quality?	Yes (construction activities (piling and excavation) have the potential to create pathways to the groundwater for mobilised contaminants/sediment which may change the chemical status of the water body. Piling activities close to the shoreline may result create a pathway between groundwater and coastal/transitional water (high salt content waters) and result in saline intrusion. Any reduction in groundwater levels could also draw saline water into the groundwater body). Requires impact assessment.
Is the Project located within a protected area?	Yes (the Project is located within an area designated at risk for drinking water). Requires impact assessment.

Is chemical scoped in for further assessment?	**Yes – there is a potential for the Project to affect water quality.**

5.5 Summary

5.5.1 Table 5-17 presents a summary of the WFD quality elements/receptors that have been identified as having the potential to be affected by the proposed Project. These have therefore been scoped in for further assessment in the WFD Compliance Assessment.

5.5.2 The WFD quality elements scoped into the assessment will be kept under review as the Project progresses, including in relation to the potential requirement for a marine disposal site and wet storage area.

Table 5-17: Summary of WFD quality elements/receptors that have been scoped into further assessment for each water body

Water body	WFD quality elements/receptors scoped into assessment
Swansea Bay	Hydromorphology Biology (habitats) Biology (fish) Water quality Protected Areas INNS
Bristol Channel Outer North	Hydromorphology Water quality INNS
Afan Estuary Incl Docks	Hydromorphology Biology (habitats) Biology (fish) Water quality Protected Areas INNS
Neath Estuary	Water quality Protected Areas INNS
Afan – confluence with Pelenna to tidal limit	Biology (fish)
Swansea Carboniferous Coal Measures	Quantitative (all parameters except GWDTE) Chemical (all parameters except GWDTE)

6 Mitigation measures

6.1.1 There are three WFD water bodies which are classified as HMWB: Swansea Bay; Afan Estuary Incl Docks; and Neath Estuary.

6.1.2 The Western Wales RBMP identifies water body mitigation measures which once achieved will assist these water bodies in achieving overall good potential. The Water Watch Wales website provides a list of 'HMWB uses and mitigation measures' (updated in July 2022) (NRW, 2025a).These measures are outlined in Table 6-1.

Table 6-1: Summary of HMWB mitigation measures.

Water body	Mitigation measures and status
Swansea Bay	48. Indirect mitigation (Not in place - not yet identified) 21. Avoid the need to dredge (Not in place - not yet identified) 22. Dredging disposal strategy (Not in place - not yet identified) 23. Reduce impact of dredging (Not in place - not yet identified) 24. Reduce sediment resuspension (Not in place - not yet identified) 25. Retime dredging or disposal (Not in place - not yet identified) 26. Sediment management (Not in place - not yet identified) 27. Dredge disposal site selection (Not in place - not yet identified) 28. Manage disturbance (Not in place - not yet identified) 37. Retain habitats (Not applicable - not required in this water body) 16. Fish passes (Not applicable - not required in this water body) 19. Enhance ecology (Not in place - not yet identified) 20. Changes to locks etc (Not applicable - not required in this water body) 42. Access to feeder-streams (Not applicable - not required in this water body) 13. Realign flood defence (Not in place - not yet identified) 2. Remove obsolete structure (Not applicable - not required in this water body) 4. Remove or soften hard bank (Not in place - technical infeasibility) 5. Preserve or restore habitats (Not in place - not yet identified) 6. In-channel morph diversity (Not applicable - not required in this water body) 7. Bank rehabilitation (Not applicable - not required in this water body)
Afan Estuary Incl Docks	49. Modify vessel design (In Place) 50. Vessel Management (In Place) 21. Avoid the need to dredge (Not applicable - not required in this water body) 22. Dredging disposal strategy (In Place) 23. Reduce impact of dredging (In Place) 24. Reduce sediment resuspension (In Place) 25. Retime dredging or disposal (In Place) 26. Sediment management (In Place) 27. Dredge disposal site selection (In Place) 28. Manage disturbance (In Place) 14. Modify structure (Not in Place - not yet identified)

Water body	Mitigation measures and status
	15. Flow manipulation (Not in Place - not yet identified) 1. Modify channel (Not in Place - not yet identified) 2. Remove obsolete structure (Not in Place - not yet identified)
Neath Estuary	49. Modify vessel design (In Place) 50. Vessel Management (In Place) 21. Avoid the need to dredge (Not applicable - not required in this water body) 22. Dredging disposal strategy (In Place) 23. Reduce impact of dredging (In Place) 24. Reduce sediment resuspension (In Place) 25. Retime dredging or disposal (In Place) 26. Sediment management (In Place) 27. Dredge disposal site selection (In Place) 28. Manage disturbance (In Place) 14. Modify structure (Not in Place - Not Yet Identified) 15. Flow manipulation (Not in Place - Not Yet Identified) 1. Modify channel (Not in Place - Not Yet Identified) 2. Remove obsolete structure (Not in Place - Not Yet Identified)
Tennant Canal	No mitigation measures are identified by Natural Resources Wates (NRW, 2025a) for this water body.

6.1.3 The WFD Compliance Assessment will provide an assessment of whether the Project could compromise or prevent these measures from being achieved in the future.

7 Next Steps – Impact Assessment

7.1.1 Based upon the information presented within the screening and scoping stages of this Preliminary WFD Compliance Assessment, it is concluded that there are potential risks to a number of key WFD quality elements and water bodies as a result of the Project. Therefore, it is necessary to continue onto the impact assessment stage to consider the potential impacts of the Project on these water bodies. The impact assessment stage will be completed alongside the Environmental Statement for the Project.

7.1.2 The WFD water bodies and quality elements scoped into the impact assessment stage will be kept under review as the Project progresses.

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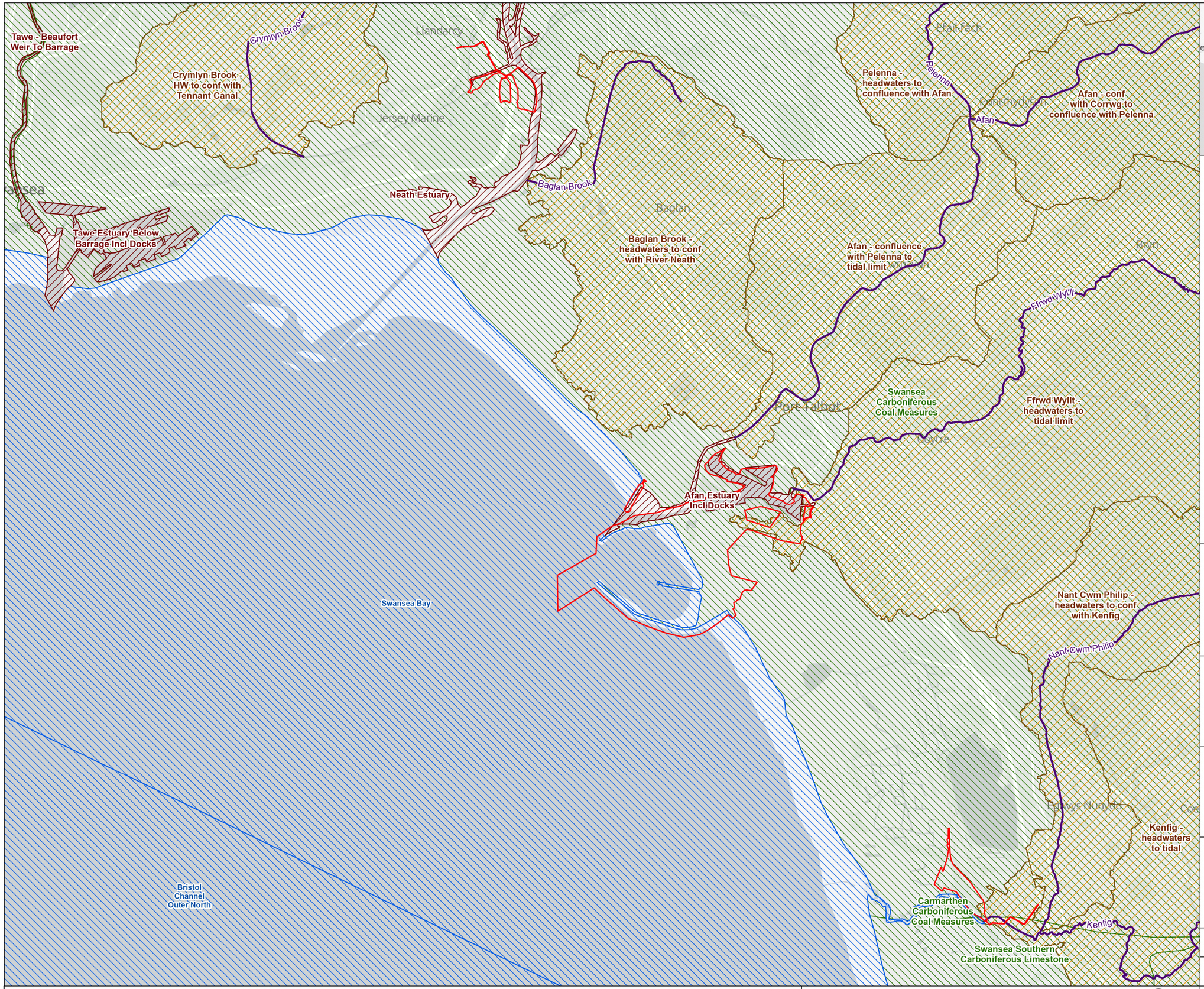
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E1. List of Abbreviations

ABP	Associated British Port
AWB	Artificial Water Body
EIA	Environmental Impact Assessment
EQS	Environmental Quality Standards
FLOW	Floating Offshore Wind
FPT	Future Port Talbot
GCS	Good Chemical Status
GES	Good Ecological Status
GEP	Good Ecological Potential
HMWB	Heavily Modified Water Body
INNS	Invasive Non-Native Species
NNB	Net Benefit of Biodiversity
NRW	Natural Resources Wales
NVZ	Nitrate Vulnerable Zone
PSD	Priority Substances Directive
RBMP	River Basin Management Plan
SAC	Special Area of Conservation
SPA	Special Protection Area
SPD	Supplementary Planning Document
SWIC	South Wales Industrial Cluster
UK	United Kingdom
WFD	Water Framework Directive
ZoI	Zone of Influence

E2. Figures



Coordinate system: British National Grid; Datum: OSGB 1936

Data Sources:
FLOW EIA Scoping Boundary: ABP/Mott MacDonald 2024.
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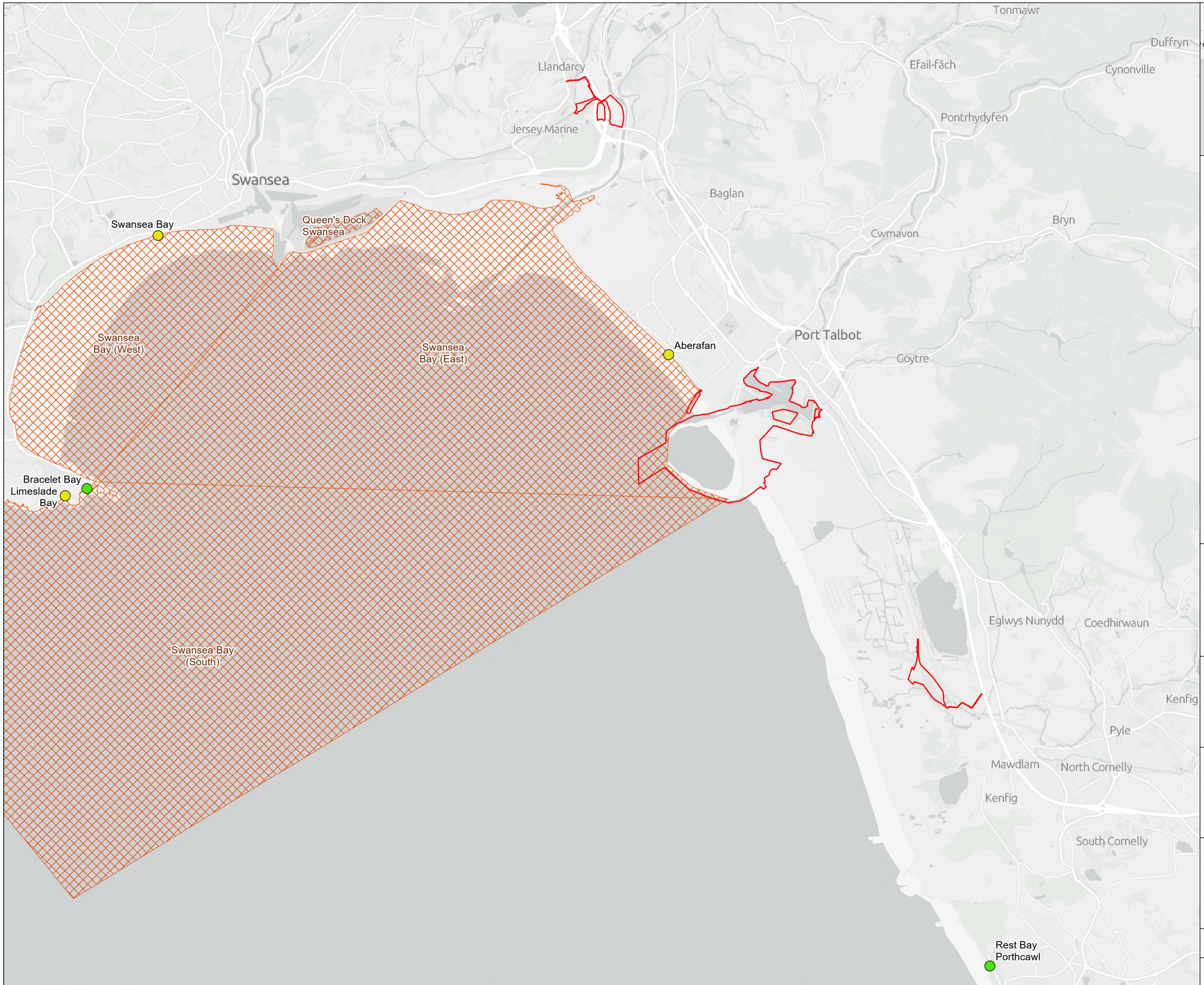
ABP | FUTURE PORT TALBOT

Future Port Talbot
FLOW EIA Scoping
Figure 1
Water Framework Directive (WFD) Waterbodies

Drawn	GIS Checked	Checked	Approved
OR	CO	JO	RR
Scale at A3	Status	Revision	Security
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ABP | FUTURE PORT TALBOT

Future Port Talbot
FLOW EIA Scoping
Figure 2
Water Framework Directive (WFD) Protected Areas

Drawn	GIS Checked	Checked	Approved
OR	CO	JO	RR
Scale at A3	Status	Revision	Security
1:70,000	S3	P01	STD

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Appendix F
Terrestrial Historic Environment Gazetteer

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F -Terrestrial Historic Environment Gazetteer

Screening Process

F.1 Port of Port Talbot

F.1.1 Designated Historic Assets

Appendix Table Error! No text of specified style in document..**1 List of Designated Historic Assets within the port of Port Talbot Study Area**

Record Number	Type	Name	Grade	Location	Broad Class
14160	Listed Building	Church of St Theodore	II*	Set within a rectangular walled churchyard, with memorial park to the R and vicarage and mission room to the L.	Religious, Ritual and Funerary
14174	Listed Building	Ebenezer Chapel	II*	In a prominent position in the square between the shopping centre and the Civic Centre, and backing onto the River Afan.	Religious, Ritual and Funerary
23256	Listed Building	War Memorial	II*	The focal point of the memorial park, in the centre of the main avenue.	Commemorative
14173	Listed Building	Aberavon Bridge (partly in Aberavon community)	II	The bridge crosses the River Afan and serves as the physical link between the shopping centres of Aberavon and Port Talbot, the former a development of the 1990s. The roadway is now pedestrianised.	Transport
22136	Listed Building	Plaza Cinema	II	On the corner with Eagle Street; to north-east of Parkway Station.	Recreational
22802	Listed Building	Church of St Mary	II	Located in a quadrangular churchyard, encircled by the high-level A48. Just to the south of Aberavon shopping centre.	Religious, Ritual and Funerary
22803	Listed Building	Church of St Joseph	II	Fronting the street, which continues as a path to the Aberavon shopping centre. The entrance is to the east and the chancel to the west.	Religious, Ritual and Funerary
22804	Listed Building	Aberavon Bridge (partly in Port Talbot community)	II	The bridge crosses the River Afan and serves as the physical link between the shopping centres of Aberavon and Port Talbot, the former a development of the 1990s. The roadway is now pedestrianised.	Transport
22805	Listed Building	Forecourt Walls, Railings and Gates to Ebenezer Chapel	II	Bounding the forecourt to Ebenezer Chapel and facing west.	Religious, Ritual and Funerary

Record Number	Type	Name	Grade	Location	Broad Class
22806	Listed Building	Gibeon Chapel	II	Prominently sited on the edge of a triangular green in the centre of Tai Bach. Forecourt to east and south bound by low walls with chamfered copings supporting iron railings. Large square piers to south-east angle flanking iron gates.	Religious, Ritual and Funerary
22807	Listed Building	Carnegie Free Library	II	Set back from the north side of the road behind a low forecourt wall of rock-faced grey stone with square capstones, those flanking the entrance with gabled faces.	Civil
22808	Listed Building	Milepost	II	Located on the pavement near the junction with Heol yr Orsedd.	Transport
22852	Listed Building	Plate-Girder Bridge	II	Spanning the River Afan just upstream of the navigable section, and linking Sandfields with the docks. The bridge is set at an angle to the river.	Transport
22853	Listed Building	War Memorial	II	Located in the centre of the park and the focal point. The main avenue approaches from the east.	Commemorative
23152	Listed Building	Harbour Court	II	Located at the corner of Oakwood Road and Cramic Way, to the south of the main railway line.	Commercial
23153	Listed Building	Plate-Girder Bridge	II	Spanning the River Afan just upstream of the navigable section and set at an angle to the river. Roads and tracks branch out to the east to buildings on the wharfside.	Transport
23154	Listed Building	Former Harbour House	II	Located on the north side of New Dock and accessed by a narrow road which lead south along the River Afan from Dock Road.	Maritime
23155	Listed Building	Harbour Watch-Tower	II	On the south side of the mouth of the River Afan, just to the west of the Harbour Master's Office.	Maritime
23248	Listed Building	Holy Cross Church	II	Located in a large triangular graveyard bounded to the south by the M4.	Religious, Ritual and Funerary
23249	Listed Building	Afan Masonic Temple	II	The temple fronts Forge Road; Tabernacle chapel adjoins on right.	Institutional
23251	Listed Building	Tabernacle Chapel	II	A narrow forecourt in front of the chapel faces the road and is bounded by stone gate piers and iron gates and railings.	Religious, Ritual and Funerary
23252	Listed Building	Bethany Chapel	II	In a prominent position in the centre of Port Talbot. The square is at the junction of Station Road and Forge Road.	Religious, Ritual and Funerary
23253	Listed Building	Dyffryn Chapel	II	Located at the south end of Ffrwdwyllt Cottages on the west side of the entrance road to the steelworks.	Religious, Ritual and Funerary
23254	Listed Building	Grove Place Chapel	II	Set behind a low snecked stone boundary wall, cut away to the north, with large square gate piers and cast iron gates with scrollwork.	Religious, Ritual and Funerary
23255	Listed Building	Gateway to Talbot Memorial Park	II	Fronting Talbot Road and with flanking lodges.	Commemorative

Record Number	Type	Name	Grade	Location	Broad Class
23257	Listed Building	Fountain in Honour of John Hopkin Davies	II	Located to the east of the main avenue and behind the war memorial.	Commemorative
23258	Listed Building	Bandstand	II	Located along the main avenue beyond the war memorial.	Recreational
23259	Listed Building	Lodge 2, Talbot Memorial Park	II	One of two matching lodges which are mirror images of each other. Adjoining the east end of the gateway to the park.	Domestic
23260	Listed Building	Lodge 1, Talbot Memorial Park	II	One of two matching lodges which are mirror images of each other. Adjoining the west end of the gateway to the park.	Domestic

Source: Cadw 2024

F.1.2 Non-designated Historic Assets

Appendix Table Error! No text of specified style in document.**.2 List of Non-designated Historic Assets within the port of Port Talbot Study Area**

Record Number	Name	Dataset	Type	Period	Summary
GGAT00674w	Aberavon Churchyard Cross	Heneb (GGA) HER	Churchyard Cross	Medieval	Only a badly eroded socket stone survives of the medieval churchyard cross.
GGAT00675w	Cross Slab, St. Mary's Church, Port Talbot	Heneb (GGA) HER	Cross Incised Stone	Early Medieval	Recumbant gravestone with incised cross, first noted in the churchyard of St Mary's church, Port Talbot.
GGAT00723w	Cross Slab, The Croft, Aberavon	Heneb (GGA) HER	Gravestone	Early Medieval	Part of a probable grave slab with incised cross found at the Croft, near Port Talbot, and now in the National Museum of Wales. There is a Latin inscription 'The cross of Christ. Geluguin [is buried here]'.
GGAT00725w	Grangia de Melis, Margam Moors	Heneb (GGA) HER	Grange	Medieval	Meles Grange belonged to Margan Abbey (Williams 2001, 305 no.85); confirmed in a bull of Urban III, dated 1186.
GGAT00729w	Chapel Dedicated to St Thomas (The Croft)	Heneb (GGA) HER	Chapel	Medieval	An EC monument (PRN 723w) and a piscina (now built into St Mary's Port Talbot), found when a farmstead called The Croft was demolished (OS card SS 78 NE 1).
GGAT00730w	Llanbugeilydd	Heneb	Grange	Medieval	Grange of Margam Abbey.

Record Number	Name	Dataset	Type	Period	Summary
	Grange, possibe site at Maes-y-court, Port Talbot	(GGA) HER			
GGAT00731w	Findspot, Aberavon Docks	Heneb (GGA) HER	Findspot	Prehistoric	Frontal part of a human skull, part of a second skull, and 'with it lay the sacrum of Irish elk, which was extinct in England before the introduction of bronze, say 3000 BC'.
GGAT00732w	Roman Road Milestone, Margam	Heneb (GGA) HER	Milestone	Roman	Milestone indicating the presence of a Roman Road following the inner edge of the Port Talbot/Aberavon coastal plain.
GGAT00803w	Roman Road milestone Margam	Heneb (GGA) HER	Carved Stone	Roman	One of 4 milestones marking the prescence of but not the course of a Roman Road following the inner edge of the Port Talbot/Aberavon coastal plain.
GGAT00961w	Findspot, Aberavon	Heneb (GGA) HER	Findspot	Neolithic	At Aberavon, a Neolithic axe head of urolithic gabbro, presumed to be of Cornish origin, was found on the foreshore. Part of the birchwood handle was still attached and has been preserved at NMW. Axe may have been washed up by the sea in a large mass.
GGAT01159w	Lower Court (yr Hen Gapel)	Heneb (GGA) HER	House	Medieval	Lower Court is a two-storeyed house with a single gable-ended chimney and putlog holes in the gable wall. The west side of the north wall shows three small square-headed windows, and to the east side is a square-headed doorway flanked by a small single point window.
GGAT01771w	Aberavon Castle	Heneb (GGA) HER	Castle	Medieval	Between 1876 & 1897 earthworks named 'Bailey Castell' were swept away and the area built up with terraced houses. Records mention a motte with traces of a masonry superstructure.
GGAT01947w	Capel Ifan Shw Daffydd, Aberavon	Heneb (GGA) HER	Chapel	Medieval	See O'Brien, J, 1929, Aberafan and Margam District Historical Soc.
GGAT02610w	Tai Bach	Heneb (GGA) HER	Quarry	Unknown	Rough earthworks which might be connected with quarrying noted only from aerial photographs.
GGAT03125w	Pilot's Rest Inn	Heneb (GGA)	Inn	Post Medieval	The Pilots Rest inn, depicted on the 1st edition OS map.

Record Number	Name	Dataset	Type	Period	Summary
		HER			
GGAT03126w	Rifle Range, Morfa Newydd, Port Talbot	Heneb (GGA) HER	Firing Range	Post Medieval	Rifle range visible on 1st ed. OS (1878), no longer identified on 2nd ed. OS (1899).
GGAT03821w	Port Talbot Parkway Railway Station	Heneb (GGA) HER	Railway Station	Post Medieval	Port Talbot Parkway railway station, South Wales Passenger Railway, in use 1998
GGAT04726w	Lighthouse, Port Talbot Docks	Heneb (GGA) HER	Lighthouse	Post Medieval	A post-medieval lighthouse, depicted on the 1st edition OS map.
GGAT05359w	House Platforms, Mynydd Brombil, Brombil Farm	Heneb (GGA) HER	House Platform	MEDIEVAL	A medieval house platform is located on the west-facing slope of Mynydd Brombil.
GGAT05360w	Terrace, Mynydd Brombil, Brombil Farm	Heneb (GGA) HER	House Platform	Post Medieval	A bracken-covered, slightly sunken platform on a terrace overlooking the coastal belt to the west. Possibly the northern-most of three sites recorded in this location.
GGAT05817w	Timber Railway Bridge, Newbridge Road	Heneb (GGA) HER	Railway Bridge	Post Medieval	Remains of two parallel lines of timber posts (one with evidence of bracing timber) partly crossing the River Afon immediately north of plate girder bridge. Shown as railway bridge on OS third edition map, 1917.
GGAT05868w	Forge Road Culvert	Heneb (GGA) HER	Culvert	Post Medieval	Culvert running down Forge Road, Neath PortTalbot. Site was visited by Jon Morgan and Judith Doyle of GGAT in 1986, during bank consolidation work.
GGAT07102w	Aberavon Drill Hall	Heneb (GGA) HER	Drill Hall	Modern	According to the 1895 Kelly's Directory, H Company 2nd Volunteer Battalion The Welsh Regiment was based in a drill hall in Aberavon, with an armoury located in Richard Street (Drill Hall Project). It is possible that the Drill Hall was located at the above.
GGAT07340w	Port Talbot Iron and Steel works	Heneb (GGA) HER	Steel Works	Modern	A pre-war iron and steel works converted to boost production during the First World War.
GGAT07429w	Drill Hall, Forge Road, Port Talbot	Heneb (GGA) HER	Drill Hall	Modern	A large Drill Hall and associated buildings first depicted on the Third Edition O.S. map of 1921. On the map it consists of a large, 'L' shaped building contained within a curtilage with at

Record Number	Name	Dataset	Type	Period	Summary
					least four rectangular ancilliary buildings placed around the edge.
GGAT07435w	Drill Hall, Gallipoli Row, Margam	Heneb (GGA) HER	Drill Hall	Modern	A Volunteer Hall is depicted on the First Edition O.S. map, and is still shown on the Second Edition map of 1901, labelled as a Drill Hall. It consisted of a rectangular building with an annexe to the north-east.
GGAT08046w	Supermarine Spitfire Mk I X4722 crash site	Heneb (GGA) HER	Air Crash Site	Modern	Crash site of Supermarine Spitfire Mk I X4722.
GGAT08211w	Vivian Camp, Aberavon, Port Talbot	Heneb (GGA) HER	Military Camp	Modern	A military camp is known to have been located in the Aberavon area of Port Talbot during the First World War. The location of the camp is not known with certainty but is likely to have been in the Vivian Park area of Aberavon (Crawford 2016).
GGAT08381w	Glan Afan Comprehensive School, Port Talbot	Heneb (GGA) HER	Secondary School	Modern	Glan Afan Comprehensive School survives as an example of a late Victorian school that has developed and expanded to meet the demands of a growing local population. The school was closed in December 2016.
GGAT08419w	Avon Vale Tinplate Works, Aberavon, Neath Port Talbot	Heneb (GGA) HER	Tinplate Works	Post Medieval	A late 19th century tinplate works industrial site.
GGAT08610w	Margam Copper Works	Heneb (GGA) HER	Copper Works	Post Medieval	Site of Margam Copper Works as shown on the 1st edition 1:2500 OS map of 1877. The works comprised a core works complex covering a roughly rectangular area of approximately 1.12 hectares, with outlying Coke Ovens to the north, and Limekilns to the north-west.
GGAT08612w	Wharf House (Site of), Port Talbot Docks, Sandfields East, Port Talbot	Heneb (GGA) HER	Building	Post Medieval	Site of 'Wharf House', Port Talbot Docks (Sandfields East, Port Talbot) as identified and depicted on the 1st edition 1:2500 OS map of 1876. The building had an L-shaped plan and comprised a two-unit core, main axis aligned north-north-east to south-south-west, with a long rectangular wing extending west-north-west of the north unit, and a narrow north-north-east to south-south-west aligned wing extending south-south-west of the south unit, in line with the east facade of the 2-unit

Record Number	Name	Dataset	Type	Period	Summary
					core. The building had associated enclosures to its south and south-east, the latter with deciduous trees set around the boundary.
GGAT08613w	Wharf Row (Site of), Port Talbot Docks, Sandfields East, Port Talbot	Heneb (GGA) HER	Terraced House	Post Medieval	A row of terraced houses identified as 'Wharf Row', located at Port Talbot Docks (Sandfields East, Port Talbot). Depicted on the 1st edition 1:2500 OS map of 1876 as a row of 15 properties associated linear yards extending to the south-west.
GGAT08614w	Burrows Tin Plate Works, Aberavon, Port Talbot	Heneb (GGA) HER	Tinplate Works	Post Medieval	Site of Burrows Tin Plate Works in Aberavon/Aberafan depicted on the 1st-4th edition Ordnance Survey maps (1876-1939).
GGAT08616w	Port Talbot Chemical Works, Aberavon, Port Talbot	Heneb (GGA) HER	Chemical Works	Post Medieval	Site of a post-medieval chemical works in Port Talbot. The site is shown on the 1st edition 1:2500 Ordnance Survey map of 1876 identified as 'Port Talbot Chemical Works'. Whilst the building appears on the 2nd ed. OS map, it is no longer identified.
GGAT08853w	Weir 1, River Avan, Aberavon	Heneb (GGA) HER	Weir	Post Medieval	Weir, Afon Vale Tinplate Works, Aberafon as shown on 1st ed. 1:2500 OS map, noted as 'Highest Point to which Ordinary Tides flow'. A linear northeast – south-west aligned weir, diverting water from the Afon Avan to flow into the Port Talbot Docks.
GGAT08854w	Weir 2, River Avan, Aberavon	Heneb (GGA) HER	Weir	Modern	Weir, River Avan (Afon Afan), Aberafon - modification or replacement of earlier weir (PRN 08553w), first depicted on 2nd ed. 1:2500 OS map of 1899, and unchanged on following editions.
GGAT08955w	Tai-bach Tinplate Works, Port Talbot	Heneb (GGA) HER	Tinplate Works	Post Medieval	Tinplate works site added during GGAT152 Cadw funded project.
GGAT08956w	Vivian Works (Blackplate)	Heneb (GGA) HER	Tinplate Works	Post Medieval	Tinplate works site added during GGAT152 Cadw funded project.
GGAT08960w	Ffrwd-wyllt Tin Plate Works, Tai-Bach, Port Talbot	Heneb (GGA) HER	Tinplate Works	Post Medieval	Tinplate works site added during GGAT152 Cadw funded project.
GGAT08962w	Margam Tin Plate	Heneb	Tinplate	Post Medieval	Tinplate works site added during GGAT152 Cadw funded

Record Number	Name	Dataset	Type	Period	Summary
	Works (Lower Forge), Port Talbot	(GGA) HER	Works		project.
GGAT08980w	Mansel Tin Plate Works, Margam and Mansel; Aberafan, Port Talbot	Heneb (GGA) HER	Tinplate Works	Post Medieval	Tinplate works site added during GGAT152 Cadw funded project.
GGAT08983w	Margam Iron and Steel Works, Taibach	Heneb (GGA) HER	Iron And Tinplate Works	Post Medieval	Tinplate works site added during GGAT152 Cadw funded project.
GGAT09021w	Coast Artillery Battery, Port Talbot	Heneb (GGA) HER	Coast Artillery Battery	Modern	Identified by the Pillbox study group as part of their database collection on modern defense sites.
GGAT09029w	Bethlehem Evangelical Church, Aberafan	Heneb (GGA) HER	Chapel	Post Medieval	Imposing traditional chapel built in stone, built 1914 on the site of the Sandfields Hall.
GGAT09030w	Former Fire Station, Aberafan	Heneb (GGA) HER	Fire Station	Post Medieval	Former Aberafan Fire Station. Stone construction with (later?) brick faÃƒ§ade dated 1912. Ground floor frontage altered to incorporate modern windows and door.
GGAT09089w	Pages DIY, Station Road, Port Talbot	Heneb (GGA) HER	Shop	Modern	Largely original 1930s commercial building with Art Deco elements including flat roofs and contrasting tiling frontage within traditional shopfronts.
GGAT09293w	Mission Room, Talbot Road, Port Talbot	Heneb (GGA) HER	Mission Hall	Post Medieval	Built next to the listed St Theodore's Church this ecclesiastical style 19th century mission hall is built of stone and slate with render detailing.
GGAT09294w	Former Vicarage, Talbot Road, Port Talbot	Heneb (GGA) HER	Vicarage	Modern	Large detached early 20th century house set in extensive grounds adjoining Talbot Memorial Park, originally the vicarage to St. Theodore's Church.
GGAT09295w	Former Lloyds Bank, 2-4 Station Road, Port Talbot	Heneb (GGA) HER	Bank (Financial)	Modern	Early 20th century elegant former bank premises on a corner plot at the entrance to the town centre.
GGAT09296w	Grove House, Grove Place, Port Talbot	Heneb (GGA) HER	Office	Modern	Stone construction office building with cream stone detailing and slate roof, situated adjacent to the former Lloyds Bank building.
GGAT09298w	St Oswalds	Heneb	Public	Post Medieval	Former public house building with stone frontage reflecting

Record Number	Name	Dataset	Type	Period	Summary
	Chambers, 6 Station Road, Port Talbot	(GGA) HER	House		adjacent bank building and domed windows providing architectural links to other Station Road buildings.
GGAT09299w	Barclays Bank, Station Road, Port Talbot	Heneb (GGA) HER	Bank (Financial)	Post Medieval	A largely original 19th century bank premises in a prominent position within the town centre forming a notable part of the shopping street.
GGAT09300w	Constitutional Club, Station Road, Port Talbot	Heneb (GGA) HER	Club	Post Medieval	Imposing three-storey 19th century building, red brick frontage with projecting first floor bay windows with central gable and stone detailing.
GGAT09301w	Former Glan Afan School main building, Station Road, Port Talbot	Heneb (GGA) HER	School	Post Medieval	Late 19th century well preserved building of traditional school design in an unusual location in the heart of the town centre.
GGAT09302w	Commercial Buildings, Talbot Road/Beverley Street, Port Talbot	Heneb (GGA) HER	Building	Modern	A prominent and striking early 20th century three-storey commercial building retaining most of its original architectural features on the upper floors.
GGAT09303w	Grand Hotel, Talbot Road, Port Talbot	Heneb (GGA) HER	Hotel	Modern	Eccentric and unusual large early 20th century hotel dominating a major gateway to the town centre opposite the railway station.
GGAT09304w	Romilly Building, Talbot Road, Port Talbot	Heneb (GGA) HER	Building	Modern	A prominent 3-storey commercial building dated 1924.
GGAT09305w	Riverside Baptist Church, Port Talbot	Heneb (GGA) HER	Chapel	Modern	Modern church of buff brick construction with prominent white barge boards and slate roof with central spire, constructed in 1974.
GGAT09306w	Lucania Buildings, Talcennau Road, Port Talbot	Heneb (GGA) HER	Building	Post Medieval	Red brick early 20th century building on the corner of Talcennau Road and Talbot Road with decorative features including buff string courses and headers.
GGAT09307w	Eagle House, Talbot Road, Port Talbot	Heneb (GGA) HER	Public House,Office	Post Medieval,Modern	19th century former Inn/hotel of stone construction with white stone features including quoins and windows.
GGAT09308w	Grange Street Independent Chapel, Port Talbot	Heneb (GGA) HER	Chapel	Modern	Traditional church building, stone construction with light stone features including quoins and windows, Unusual roof structure at rear.

Record Number	Name	Dataset	Type	Period	Summary
GGAT09309w	101 and 109 Pen y Cae Road, Port Talbot	Heneb (GGA) HER	Hospital,Dwelling	Post Medieval,Modern	Late 19th/early 20th century rustic Arts and Crafts style buildings, originally a cottage hospital, now dwellings.
GGAT09310w	Carmel Church, Riverside, Port Talbot	Heneb (GGA) HER	Church	Modern	Modern church of buff brick construction with prominent white barge boards and slate roof with central tower feature.
GGAT09317w	St Pauls Church, Aberafan	Heneb (GGA) HER	Church	Modern	St Paul's church is a handsome stone built church built in 1910 at the expense of Sir Arthur Vivian.
GGAT09318w	Margam Road Evangelical Reformed Church, Taibach	Heneb (GGA) HER	Church	Modern	A stone-built traditional church building with feature entrance and main window. Built in 1926 in the Gothic style, as a gable entry type.
GGAT09323w	Ffrwydwyllt House, Taibach	Heneb (GGA) HER	Local Government Office	Modern	Early C20 offices (inscription Margam Urban Council Offices on front/side elevation).
GGAT09327w	Our Lady of Margam R C Church, Margam Road, Taibach	Heneb (GGA) HER	Church	Modern	A modern ecclesiastical building built of dark brown brickwork, glass and flat roof with contrasting white fascias.
GGAT09328w	Wesley Chapel, Incline Row, Taibach	Heneb (GGA) HER	Chapel	Post Medieval	19th century chapel of rough faced stone construction, with light stone quoins and window surrounds and inscription on front elevation.
GGAT09329w	Taibach Rugby Club, Commercial Road, Taibach	Heneb (GGA) HER	Hotel,Club house	Post Medieval,Modern	Taibach Rugby Club is a prominent three-storey, three gabled red-brick building with brick and render detailing. Formerly the Talbot Arms Hotel.
GGAT09330w	Former Smyrna Chapel, Taibach	Heneb (GGA) HER	Multiple Dwelling,Chapel	Post Medieval,Modern	Smyrna Baptist Chapel was stone built in 1860, in the Simple Sub-Classical style with a gable entry plan. Now converted to apartments.
GGAT09339w	40 Commercial Road, Taibach	Heneb (GGA) HER	Terraced House,Shop	Post Medieval,Modern	Original shop front in largely unaltered building, which started life as the end of a terrace called Miner's Row.
GGAT09341w	Kash Superstore, Aberafan	Heneb (GGA)	Shop	Modern	Distinctive shop building with Art Deco style detailing. Built early 20th century.

Record Number	Name	Dataset	Type	Period	Summary
		HER			
GGAT09350w	Salem Church and Sunday School, Aberafan	Heneb (GGA) HER	Sunday School,Chapel	Post Medieval,Modern	A Sunday School was first erected on this site in 1814, but a chapel was not added until after 1913.
GGAT10015m	Railway Bridge, Tan-Y-Groes	Heneb (GGA) HER	Railway Bridge	Post Medieval	Potential river feature identified as part of GGAT and Cadw's GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10016m	Bridge, Tan-Y-Groes	Heneb (GGA) HER	Bridge	Unknown	Potential river feature identified as part of GGAT and Cadw's GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10018m	Footbridge, Conduit	Heneb (GGA) HER	Footbridge	Unknown	Potential river feature identified as part of GGAT and Cadw's GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10019m	Bridge, Ffrdd-Wyllt	Heneb (GGA) HER	Bridge	Unknown	Potential river feature identified as part of GGAT and Cadw's GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10020m	Railway Bridge, Mill Row	Heneb (GGA) HER	Railway Bridge	Unknown	Potential river feature identified as part of GGAT and Cadw's GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10021m	Bridge, Greenfield Row	Heneb (GGA) HER	Bridge	Unknown	Potential river feature identified as part of GGAT and Cadw's GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10031m	Railway Bridge, Aberavon	Heneb (GGA) HER	Railway Bridge	Unknown	Potential river feature identified as part of GGAT and Cadw's GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10033m	South Railway Bridge, Cattle Market, Aberavon	Heneb (GGA) HER	Railway Bridge	Unknown	Potential river feature identified as part of GGAT and Cadw's GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10034m	North Railway Bridge, Cattle Market, Aberavon	Heneb (GGA) HER	Bridge	Post Medieval	Potential river feature identified as part of GGAT and Cadw's GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10040m	Railway Bridge, Swansea Bay	Heneb (GGA) HER	Tramway Bridge	Unknown	Potential river feature identified as part of GGAT and Cadw's GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.

Record Number	Name	Dataset	Type	Period	Summary
GGAT10041m	Footbridge, Margam Sidings	Heneb (GGA) HER	Footbridge	Post Medieval	Potential river feature identified as part of GGAT and Cadw's GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10044m	Viaduct, Velindre	Heneb (GGA) HER	Viaduct	Post Medieval	Potential river feature identified as part of GGAT and Cadw's GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10061m	Footbridge, West End, Margam	Heneb (GGA) HER	Footbridge	Post Medieval	Potential river feature identified as part of GGAT and Cadw's GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10062m	Railway Bridge, Mill Row	Heneb (GGA) HER	Railway Bridge	Unknown	Potential river feature identified as part of GGAT and Cadw's GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10063m	Public Park Footbridge, Tai Bach	Heneb (GGA) HER	Footbridge	Post Medieval	Potential river feature identified as part of GGAT and Cadw's GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10064m	Footbridge, North Street	Heneb (GGA) HER	Footbridge	Post Medieval	Potential river feature identified as part of GGAT and Cadw's GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10107m	Railway Bridge, Tim Plate Works	Heneb (GGA) HER	Railway Bridge	Post Medieval	Potential river feature identified as part of GGAT and Cadw's GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10168m	Graveyard, Conduit Place	Heneb (GGA) HER	Cemetery	Unknown	Potential river feature identified as part of GGAT and Cadw's GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10171w	Terraced Houses, Aberavon	Heneb (GGA) HER	Terraced Housing	Post Medieval	A group of 8 19th century terraced houses and back yards, 6 of which front onto water Street and 3 which turn south-west.
GGAT10528w	Wern Chapel, Felindre	Heneb (GGA) HER	Chapel	Unknown	Chapel identified on 1st Edition historic OS map (1876).
GGAT10529w	Zion Chapel, Felindre	Heneb (GGA) HER	Chapel	Unknown	Chapel identified on 1st Edition historic OS map (1876).
GGAT10531w	Bethel Chapel,	Heneb	Chapel	Unknown	Chapel identified on 1st Edition historic OS map (1876).

Record Number	Name	Dataset	Type	Period	Summary
	Felindre	(GGA) HER			
GGAT10777m	Embankment South, Aberavon	Heneb (GGA) HER	Embankment	Unknown	Potential river feature identified as part of GGAT and Cadw's GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10778m	Navigation Light, Aberavon	Heneb (GGA) HER	Lighthouse	Post Medieval	Potential river feature identified as part of GGAT and Cadw's GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10779m	Signal Post, Aberavon	Heneb (GGA) HER	Signpost	Unknown	Potential river feature identified as part of GGAT and Cadw's GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10800m	Embankment East, Aberavon	Heneb (GGA) HER	Embankment	Unknown	Potential river feature identified as part of GGAT and Cadw's GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10804m	Crane, Aberavon	Heneb (GGA) HER	Crane	Post Medieval	Potential river feature identified as part of GGAT and Cadw's GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10805m	Revetment, Aberavon	Heneb (GGA) HER	Revetment	Post Medieval	Potential river feature identified as part of GGAT and Cadw's GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10806m	Bridge, Aberavon	Heneb (GGA) HER	Bridge	Post Medieval	Potential river feature identified as part of GGAT and Cadw's GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10868m	Tanks, North Bank	Heneb (GGA) HER	Storage Tank	Post Medieval	Potential river feature identified as part of GGAT and Cadw's GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10869m	Sturcture, Crown Preserved	Heneb (GGA) HER	Structure	Post Medieval	Potential river feature identified as part of GGAT and Cadw's GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10870m	Bridge, Ffrwydwllt	Heneb (GGA) HER	Bridge	Post Medieval	Potential river feature identified as part of GGAT and Cadw's GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10913m	Footbridge, Port Talbot Wharf	Heneb (GGA)	Footbridge	Post Medieval	Potential river feature identified as part of GGAT and Cadw's GGAT 160 Climate Change Adaptation Rivers and Riparian

Record Number	Name	Dataset	Type	Period	Summary
		HER			Environments project, visible on OS historic mapping.
GGAT10914m	Footbridge, Graving Dock, Port Talbot	Heneb (GGA) HER	Footbridge	Post Medieval	Potential river feature identified as part of GGAT and Cadw's GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10919m	Hoist, North Dock	Heneb (GGA) HER	Hoist	Post Medieval	Potential river feature identified as part of GGAT and Cadw's GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10962m	Embankment North, Aberavon	Heneb (GGA) HER	Embankment	Unknown	Potential river feature identified as part of GGAT and Cadw's GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT07713w	Buildings	Heneb (GGA) HER	Chapel	Post Medieval	N/A
GGAT04291.0w,05976w,06027m	Buffered linear	Heneb (GGA) HER	Chapel	Post Medieval	N/A
GGAT07352w	Dock feeder	Heneb (GGA) HER	Chapel	Post Medieval	N/A
GGAT06171w	Digitised from OS & buffered by 5m.	Heneb (GGA) HER	Chapel	Post Medieval	N/A
GGAT07459w	Balaclava Row	Heneb (GGA) HER	Chapel	Post Medieval	N/A
GGAT02610w, 01995w		Heneb (GGA) HER	Chapel	Post Medieval	N/A
GGAT05346w		Heneb (GGA) HER	Chapel	Post Medieval	N/A
RR60c-05a	Roman Road	Heneb (GGA) HER	Chapel	Post Medieval	N/A

Record Number	Name	Dataset	Type	Period	Summary
RR60c-06	Roman Road	Heneb (GGA) HER	Chapel	Post Medieval	N/A
GAT01701.0w	RHONDDA AND SWANSEA BAY RAILWAY	Heneb (GGA) HER	Chapel	Post Medieval	N/A
GAT01701.6w	PORT TALBOT BRANCH LINE	Heneb (GGA) HER	Chapel	Post Medieval	N/A
GAT01435.0m	PORT TALBOT RAILWAY	Heneb (GGA) HER	Chapel	Post Medieval	N/A
8860	Wern Welsh Independent Chapel, Wern Street, Aberafon,	NMRW	Chapel	Post Medieval	N/A
8862	Water Street English Baptist Church, Aberafon	NMRW	Chapel	Post Medieval	N/A
8865	Carmel Welsh Calvinistic Methodist Chapel, Talbot Street,Aberafon	NMRW	Dwelling	Post Medieval	N/A
8871	Sandfields Sunday School (Wesleyan Methodist), Sandfields Road, Aberafon	NMRW	Dwelling	Post Medieval	N/A
9848	Noddfa Welsh Independent Chapel, Commercial Road, Tai Bach, Port Talbot	NMRW	Town	Post Medieval	N/A
9850	Victoria Institute ((Temporary)), Port	NMRW	Railway Station	Post Medieval	N/A

Record Number	Name	Dataset	Type	Period	Summary
	Talbot				
9851	Calfaria, Tan-y-Groes Street, Port Talbot	NMRW	Railway Station	Post Medieval	N/A
9861	Grove Place Welsh Calvinistic Methodist Chapel, Grove Place, Port Talbot	NMRW	Bridge	Post Medieval	N/A
9862	Margam Road Calvinistic Methodist Chapel, Margam Road, Port Talbot	NMRW	Bridge	Post Medieval	N/A
9865	Wesley Hall English Wesleyan Methodist Chapel (Trinity), Ty Draw Street, Port Talbot	NMRW	Country House Garden	Post Medieval	N/A
9867	Trinity, Port Talbot	NMRW	Inscribed Stone	Post Medieval	N/A
13621	Chapel, Aberafon,	NMRW	Public Park	Post Medieval	N/A
13626	Hall, Port Talbot	NMRW	Milestone	Post Medieval	N/A
13628	Chapel, Bridge Street, Port Talbot,	NMRW	Town	Post Medieval	N/A
19313	Meles Grange	NMRW	Hospital	Medieval	N/A
19360	Morfa Mawr Farmhouse	NMRW	Steel Works	Post Medieval	N/A
33139	Pentyla Port Talbot	NMRW	Swimming Pool	Unknown	N/A
34769	Aberavon (Sea Side) Railway Station, Rhondda and Swansea Bay Railway, Aberafan	NMRW	Pleasure Garden	19th Century	N/A

Record Number	Name	Dataset	Type	Period	Summary
41415	Port Talbot Docks Railway Station, Rhondda and Swansea Bay Railway, Port Talbot	NMRW	Public Park	Post Medieval	N/A
43128	Aberafan Bridge	NMRW	Town	Post Medieval	N/A
43133	Halfpenny Bridge New	NMRW	Cinema	Post Medieval	N/A
265725	Glanafon, Garden, Tai Bach	NMRW	National School	Post Medieval	N/A
301398	Port Talbot Cylindrical Pillar Stone	NMRW	War Memorial	Medieval	N/A
301663	Talbot Memorial Gardens, Port Talbot	NMRW	Custom House	20th Century	N/A
307252	Platch-yr-Eglwys, Roman Milestone;New Cut, Roman Milestone	NMRW	Church	Medieval	N/A
401424	Aberavon: Medieval and Later Borough	NMRW	Signal Box	General	N/A
402927	Neath Port Talbot Hospital, Port Talbot	NMRW	School	Modern	N/A
409888	Port Talbot Steel Works, Port Talbot	NMRW	School	Modern	N/A
411767	Afan Lido, Aberavon	NMRW	Artefact Scatter	Modern	N/A
411768	Sunken Gardens, Aberavon	NMRW		Modern	N/A
412512	Aberavon Park	NMRW	Industrial Estate	Modern	N/A
415591	Port Talbot	NMRW	Gas Works	Multiperiod	N/A
417038	Regent Cinema,	NMRW	Gas Works	20th Century	N/A

Record Number	Name	Dataset	Type	Period	Summary
	Taibach				
419313	Former National School, Aberavon	NMRW	Gas Holder	19th Century	N/A
419433	Talbot Park War Memorial, Port Talbot	NMRW	Gas Works	20th Century	N/A
420777	Custom House, Eagle Street, Port Talbot	NMRW	Gas Holder	19th Century	N/A
421509	Our Lady of Margam Catholic Church, Port Talbot	NMRW	Gas Holder	20th Century	N/A
421824	Port Talbot Signal Box, Oakwood Road, Port Talbot	NMRW	Gas Holder	Modern	N/A
423198	Dyffryn Comprehensive (Lower School)	NMRW	Gas Holder	20th Century	N/A
423199	Central Junior School, Port Talbot	NMRW	School	19th Century	N/A
524727	Peat Deposit, Aberavon, Neath	NMRW	Artefact Scatter	Mesolithic	N/A
524766	Peat Deposit, Port Talbot	NMRW	Natural Feature	Mesolithic	N/A
705127	Harbourside Business Park, Port Talbot	NMRW	Industrial Estate	20th Century	N/A
710171	Margam Gas Works I	NMRW	Gas Works	19th Century	N/A
710172	Margam Gas Works II	NMRW	Gas Works	20th Century	N/A
710254	Gas Holder at British Iron & Steel Co. Ltd	NMRW	Gas Holder	19th Century	N/A

Record Number	Name	Dataset	Type	Period	Summary
710270	Aberavon Gas Works II	NMRW	Gas Works	19th Century	N/A
710316	Margam Steel Works Gas Holder	NMRW	Gas Holder	20th Century	N/A
710317	Gas Holder at the Northern Steel Working Site at Abbey Steel Works	NMRW	Gas Holder	20th Century	N/A
710318	Northern Site Gas Holder at Abbey Steel Works	NMRW	Gas Holder	20th Century	N/A
710335	Margam Steel Works Gas Holder	NMRW	Gas Holder	20th Century	N/A
913949	Port Talbot Docks	NMRW	Harbour	19th Century	N/A

Source: Heneb GGA HER; NMRW 2024

F.1.3 Previous Archaeological Events

Appendix Table Error! No text of specified style in document..**3 List of Previous Archaeological Events within the port of Port Talbot Study Area**

Record Number	Name	Event Type	Organisation	Year
GATE003718	Marlas-Raos Sewage Pipeline	Desk Based Assessment	GGAT	1992
GGATE000102	Casualties of War (Yr 4, GGAT 144)	Desk Based Assessment	Glamorgan-Gwent Archaeological Trust (GGAT)	N/A
GGATE000117	The Brunel Accumulator Tower, Briton Ferry Survey	Management Plan Monument	Site Archaeological Services	2007
GGATE000160	Kenfig Castle	Excavation	<Null>	1927
GGATE000452	Warren Hill, Watching Brief, 1987	Watching Brief	<Null>	1987
GGATE000492	Red Jacket Pill River Barge Lock, Llandarcy, Tennant Canal	Field Survey	Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW)	1976
GGATE000496	EARLSWOOD COLLIERY, BRITON FERRY, TRIAL EXCAVATION, 1991	Trial Excavation	<Null>	1991
GGATE001311	Field visit breakwater	Field Visit	Glamorgan-Gwent Archaeological Trust (GGAT)	2005
GGATE001314	Field visit Neath canal	Field Visit	Glamorgan-Gwent Archaeological Trust (GGAT)	2005
GGATE001403	Cwrt-y-Bettws, Neath	Watching Brief	Cardiff Archaeological Consultants	N/A
GGATE001622	M4 Baglan-Lon Las section	Geotechnical Investigation	Sir Owen Williams and partners	1989
GGATE002286	Neath Estuary (Improvement Scheme) DBA	Desk Based Assessment	Glamorgan-Gwent Archaeological Trust (GGAT)	1997
GGATE002288	Neath Estuary SPS Archaeological Assessment	Desk Based Assessment	Glamorgan-Gwent Archaeological Trust (GGAT)	1998
GGATE002544	Baglan Energy Park WB	Watching Brief	Cambrian Archaeological Projects (CAP)	2001
GGATE002650	Baglan Energy Park, Briton Ferry Dock, Baglan Bay DBA	Desk Based Assessment	Cambrian Archaeological Projects (CAP)	1999

Record Number	Name	Event Type	Organisation	Year
GGATE003163	Cwrt y Bettws	Watching Brief	Trysor	2009
GGATE003253	Organ situated in Holy Cross Church	Photographic Survey	Neath Port Talbot County Borough Council	2010
GGATE003260	Ty'n y Cellar Farm	Photographic Survey	Cardiff Archaeological Consultants	2004
GGATE003358	Hen Gastell, Briton Ferry excavations, 1991-92	Excavation	Glamorgan-Gwent Archaeological Trust (GGAT)	N/A
GGATE003490	The Barn, Ty'n-y-Cellar Farm, Margam	Building Survey	Cardiff Archaeological Consultants	2010
GGATE003493	Peripheral Distributor Road (stage 2), Port Talbot	Evaluation	No information available	2010
GGATE003549	Watching Brief, Port Talbot Parkway Station, Port Talbot	Watching Brief	Metro MOLA	2011
GGATE003603	Kenfig, Bridgend	Geophysical Survey	GSB Prospection (Geophysical Surveys of Bradford)	2011
GGATE003605	Kenfig, Bridgend	Evaluation	Wessex Archaeology	2011
GGATE003985	Cwrt Y Bettws, Plot 1	Watching Brief	Trysor	2012
GGATE004107	Aberavon Churchyard Cross	Field Visit	Glamorgan-Gwent Archaeological Trust (GGAT)	2011
GGATE004127	TATA New Stores, Neath Port Talbot DBA	Desk Based Assessment	Glamorgan-Gwent Archaeological Trust (GGAT)	2011
GGATE004287	Arfordir Coastal Heritage, Year 3 (GGAT103)	Project	Glamorgan-Gwent Archaeological Trust (GGAT)	2012-13
GGATE004766	The Church of Saint Mary, Llansawel, Briton Ferry, Glamorgan	Watching Brief	No information available	2003
GGATE004931	The Sinews of War (Yr 2, GGAT137)	Desk Based Assessment	Glamorgan-Gwent Archaeological Trust (GGAT)	2015
GGATE004932	The Sinews of War (Yr 2, GGAT137)	Field Visit	Glamorgan-Gwent Archaeological Trust (GGAT)	2015
GGATE004941	Merthyr Mawr, Kenfig and Margam Burrows	Historic Landscape Characterisation	Glamorgan-Gwent Archaeological Trust (GGAT)	2003
GGATE004973	The Call to Arms (Yr 3, GGAT137)	Desk Based Assessment	Glamorgan-Gwent Archaeological Trust (GGAT)	2015-16

Record Number	Name	Event Type	Organisation	Year
GGATE005059	Kenfig Industrial Estate ASIDOHL	Visual Impact Assessment	Archaeology Wales	2013
GGATE005347	Neath Port Talbot DIstributor Road	Watching Brief	Foundations Archaeology	2005
GGATE005426	Swansea Bay Coastal Village Study	Historic Area Assessment	<Null>	1988
GGATE005613	Glan Afan Comprehensive School, Station Road, Port Talbot	Photographic Survey	Archaeology Wales	2017
GGATE005905	Green Park, Aberavon, Neath Port Talbot	Excavation	Glamorgan-Gwent Archaeological Trust (GGAT)	2017
GGATE005906	Green Park, Aberavon, Neath Port Talbot	Watching Brief	Glamorgan-Gwent Archaeological Trust (GGAT)	2017
GGATE005994	Holy Cross Church, Taibach	Photographic Survey	Trysor	2017
GGATE006096	Glan Afan School, Port Talbot	Desk Based Assessment	Archaeology Wales	2015
GGATE006097	Glan Afan Comprehensive School, Station Road, Port Talbot	Watching Brief	Archaeology Wales	2017-2018
GGATE006098	Aberdare School for Girls, Cwmbach Road, Aber-nant, Aberdare	Building Survey	Archaeology Wales	2018
GGATE006100	GGAT150: Rapid Coastline Zone Assessment	Project	Glamorgan-Gwent Archaeological Trust (GGAT)	2018
GGATE006162	Green Park Street, Port Talbot	Watching Brief	Glamorgan-Gwent Archaeological Trust (GGAT)	N/A
GGATE006358	Former Cardonnel Tinplate Works, Llandarcy, Neath	Watching Brief	Glamorgan-Gwent Archaeological Trust (GGAT)	2012
GGATE006550	Cwrt-y-Bettws, Plot 2, Llandarcy	Watching Brief	Glamorgan-Gwent Archaeological Trust (GGAT)	2015
GGATE006551	Cwrt-y-Bettws, Plot 3, Llandarcy	Watching Brief	Cardiff Archaeological Consultants	2015
GGATE006590	Kenfig Dunes, Kenfig, Bridgend	Watching Brief	Trysor	2021
GGATE006818	Sewer Replacement Works, Jcn. St Marys Close & Church Street, Briton Ferry, Neath	Watching Brief	Dyfed Archaeological Trust (DAT)	2012
GGATE006900	Margam Survey, Neath Port Talbot	Desk Based Assessment	Glamorgan-Gwent Archaeological Trust (GGAT)	2013
GGATE006921	Green Park, Aberavon, Neath Port Talbot	Evaluation	Glamorgan-Gwent Archaeological Trust (GGAT)	2014

Record Number	Name	Event Type	Organisation	Year
GGATE007020	Margam M4 VE & VEA OHL Cable Installation	Desk Based Assessment	AMEC Earth & Environmental	2010
GGATE007021	Margam M4 VE & VEA OHL Cable Installation	Field Visit	AMEC Earth & Environmental	2009
GGATE007057	TATA New Stores, Neath Port Talbot	Watching Brief	Glamorgan-Gwent Archaeological Trust (GGAT)	2011
GGATE007151	Wern Works, Britton Ferry, Neath	Desk Based Assessment	Environmental Dimension Partnership (EDP)	2014
GGATE007152	Wern Works, Britton Ferry, Neath	Field Visit	Environmental Dimension Partnership (EDP)	2014
GGATE007242	High Status Settlement in Glamorgan and Gwent	Desk Based Assessment	Glamorgan-Gwent Archaeological Trust (GGAT)	2010
GGATE007293	Industrial Sites in South Wales: The Tinplate Industry	Desk Based Assessment	Glamorgan-Gwent Archaeological Trust (GGAT)	2019
GGATE007470	Port Talbot Transport Hub, Neath Port Talbot	Watching Brief	Glamorgan-Gwent Archaeological Trust (GGAT)	2017
GGATE007494	Burrows Yard, Aberavon, Neath Port Talbot	Desk Based Assessment	Glamorgan-Gwent Archaeological Trust (GGAT)	2016
GGATE007495	Burrows Yard, Aberavon, Neath Port Talbot	Field Visit	Glamorgan-Gwent Archaeological Trust (GGAT)	2016
GGATE007573	Plaza Cinema, Port Talbot	Building Survey	GWP Architecture	2019
GGATE007635	Arfordir Coastal Heritage Year 4 (GGAT103)	Project	Glamorgan-Gwent Archaeological Trust (GGAT)	2013-14
GGATE007637	Arfordir Coastal Heritage, Year 2 (GGAT 103)	Project	Glamorgan-Gwent Archaeological Trust (GGAT)	2011-12
GGATE007638	Arfordir Coastal Heritage Year 5 (GGAT103)	Project	Glamorgan-Gwent Archaeological Trust (GGAT)	2014-15
GGATE007771	Newland Farm, Margam, Neath Port Talbot	Historic Area Assessment	University of Leicester	2013
GGATE007819	Port Talbot Steelworks, Port Talbot	Watching Brief	Cotswold Archaeology	2015
GGATE007879	Glan Afan School, Port Talbot	Field Visit	Archaeology Wales	2015
GGATE007984	Ysgol Newydd (Margam), Port Talbot, Wales	Desk Based Assessment	Rubicon Heritage Services Ltd	2016
GGATE008060	Kenfig Nature Reserve	Evaluation	Kenfig Archaeological Trust	2014

Source: Heneb GGA HER 2024

F.2 Jersey Marine site

F.2.4 Designated Historic Assets

Appendix Table Error! No text of specified style in document.**.4 List of Designated Historic Assets within the Jersey Marine Study Area**

Record Number	Type	Name	Grade	Location	Broad Class
GM445	Scheduled Monument	Briton Ferry Dock Entrance	N/A	N/A	Dockyard
GM291	Scheduled Monument	Llandarcy Round Cairn	N/A	N/A	Round Cairn
GM290	Scheduled Monument	Gelli-Bwch Round Cairn	N/A	N/A	Round Cairn
23299	Listed Building	Dock walls and gate between inner dock and outer basin at Briton Ferry Docks	II*	On the south side of the elevated M4 400m east of the River Neath.	Maritime
23072	Listed Building	Boiler stack of former Cardonnel Tinplate Works	II	Situated in woodland east of Cwrt y Bettws farm and on the east side of the M4 and west of the Tennant Canal.	Industrial
23073	Listed Building	Bridge over Tennant Canal east of Cwrt y Bettws Farm	II	Spanning the Tennant Canal east of Cwrt y Bettws Farm and beside the Tennant Canal pumping station.	Transport
23074	Listed Building	River Lock and attached bridges at Red Jacket Pill	II	Beside a footpath on the east side of the Tennant Canal, south of the Jersey Marine Gas Works and west of the M4.	Transport
23077	Listed Building	Weir on east side of Tennant Canal at Red Jacket Pill	II	At Red Jacket Pill on north side of a modern concrete weir and immediately south of south-west corner of gas works.	Transport
23296	Listed Building	War Memorial, including revetments and steps	II	Sited directly opposite the church of St Clement.	Commemorative
23297	Listed Building	Rehoboth Baptist Chapel	II	Set back from Neath Road (A474) behind forecourt gates and approximately 150m north-east of the A48 roundabout.	Religious, Ritual and Funerary

Record Number	Type	Name	Grade	Location	Broad Class
23298	Listed Building	Hydro-accumulator tower at Briton Ferry Docks	II	Standing on the south-east flank of the dock at the junction of the dock and outer basin.	Industrial
23300	Listed Building	Briton Ferry Ironworks Engine House	II	On the north-west side of Briton Ferry docks and set back on the west side of an access road to Briton Ferry Industrial Estate immediately south of the elevated M4.	Industrial
23301	Listed Building	Church of St Mary	II	Set back on the north side of Church Street and immediately north of the elevated A48.	Religious, Ritual and Funerary
23302	Listed Building	Rehoboth Chapel Sunday School	II	Set back from Neath Road (A474) behind a railed forecourt and immediately south of Rehoboth Chapel.	Religious, Ritual and Funerary
23304	Listed Building	Roving Bridge over Neath Canal at Giant's Grave	II	Crossing the Neath Canal immediately west of the end of Giant's Grave Road.	Transport
23305	Listed Building	Salem Baptist Chapel	II	Set back behind a railed forecourt from Vernon Street on the west side of Neath Road.	Religious, Ritual and Funerary
23306	Listed Building	Church of St Clement	II	In the centre of Briton Ferry and set within a railed churchyard.	Religious, Ritual and Funerary
23307	Listed Building	Briton Ferry Library including attached Library House	II	Approximately 250m south of the parish church prominently sited north of the junction with Graig Road.	Institutional
23309	Listed Building	18,Neath Road,Briton Ferry, SA11 2YR	II	On Neath Road (A474) approximately 200m north-east of the A48 roundabout.	Commercial
23311	Listed Building	North jetty of outer tidal basin at Briton Ferry Docks	II	On the east bank of the River Neath 350m south-west of the entrance to the floating dock.	Maritime
82715	Listed Building	Workshops, stores and office at Briton Ferry Foundary	II	On the south side of the engineering works and immediately west of a disused railway line.	Industrial

Record Number	Type	Name	Grade	Location	Broad Class
84394	Listed Building	Former Steam Power House at Briton Ferry Docks	II	Behind the buildings along Dock Street and lying to north of the filled-in portion of the dock. The Power House occupies part of a triangular site between the main railway line and the railway sidings to the west side of the docks.	Industrial
87874	Listed Building	Catholic Church of Our Lady of the Assumption	II	Above Neath Road at its south end, near the roundabout with the A48.	Religious, Ritual and Funerary
WAL/NPT/3	Conservation Area	Llandarcy Village	n/a	Llandarcy Village	Settlement

Source: Cadw 2024

F.2.5 Non-designated Historic Assets

Appendix Table Error! No text of specified style in document..**5 List of Non-designated Historic Assets within the Jersey Marine Study Area**

Record Number	Name	Dataset	Type	Period	Summary
GGAT00595w	Cwrt-y-Bettys/Cwrt Betws Grange, Coedffranc	Heneb (GGA) HER	Grange	Medieval	Grange of Neath Abbey located by RCAHMW at or near Cwrt-y-bettws farmhouse (SS72349560); first mention at Dissolution?
GGAT00606w	Roman Coin Hoard, Coedffranc	Heneb (GGA) HER	Findspot	Roman	The site comprises a Roman coin hoard located within the community of Coedffranc. No further information is currently available.
GGAT00637w	Briton Ferry Site	Heneb (GGA) HER	Ferry	Medieval	The derivation of the placename Briton Ferry is uncertain, it has been claimed that 'Britain' is a corruption of 'Bridgetown' from the tradition that a bridge existed on the site during the Roman period.
GGAT00639w	Giants Grave	Heneb (GGA) HER	Chambered Tomb	Neolithic	Alleged site of burial chamber, seems to have been destroyed in building the canal. The name is one often associated with long cairns, but there is no supporting information relating to the size or disposition of the stones. Rejected RCAHMW site.
GGAT00643w	Cross Socket-stone,	Heneb	Cross	Medieval	A cross socket-stone, .7m square and .5m high, with an

Record Number	Name	Dataset	Type	Period	Summary
	St Marys Church, Briton Ferry	(GGA) HER			octagonal upper surface. The upper edge is chamfered.
GGAT00644w	Briton Ferry Castle (Hen Gastell)	Heneb (GGA) HER	Castle	Early Medieval	Possible Welsh Castle on the line of the proposed M4 scarping and ditching on south-west. Damaged by modern quarry. The site was excavated in 1991 by the Glamorgan Gwent Archaeological Trust prior to the construction of the M4 motorway bridge.
GGAT01027.0w	Linear Feature, Neath Canal	Heneb (GGA) HER	Canal	Post Medieval	The Neath and Tennant (01070.0w) Canals provided twenty-one miles of waterway from Aberdulais to Swansea and from Glynneath to Briton Ferry. The two canals were built separately, the Neath under Acts of Parliament of 1791 and 1793.
GGAT01027.9w	Neath Canal Company Wharf, Giant's Grave, Briton Ferry	Heneb (GGA) HER	Canal Wharf	Post Medieval	Site of Post Medieval coal wharfs on the north and south banks of former Giant's Grave's Pill, including the Tonmawr coal Wharf; apparently in use as such from at least the early 18th century.
GGAT01070.12w	Tennant Canal Pump House	Heneb (GGA) HER	Pump House	Post Medieval	Pump house on the Tennant Canal to the east of Jersey Marine, not shown on the 1st ed OS map of 1885.
GGAT01070.30w	Overbridge, Coedffranc	Heneb (GGA) HER	Canal Bridge	Post Medieval	Over bridge on the Tennant Canal between Jersey Marine and Llandarcy.
GGAT01070.31w	Overbridge, Jersey Marine, Tennant Canal	Heneb (GGA) HER	Canal Bridge	Post Medieval	Bridge abutments at the junction of the Tennant Canal and its Red Jacket branch.
GGAT01070.32w	Red Jacket branch, Tennant Canal (linear feature)	Heneb (GGA) HER	Canal	Post Medieval	Branch of Tennant Canal shown on First Ed. OS map, now mostly filled in.
GGAT01701.11w	Canal Overbridge, Jersey Marine (R&SB)	Heneb (GGA) HER	Bridge	Post Medieval	Late 19th century bridge carrying the Rhondda and Swansea Bay Railway over the Tennant Canal.
GGAT01701.4w	Neath Railway Tunnel	Heneb (GGA) HER	Railway Tunnel	Post Medieval	Work began in 1884 on a tunnel at Neath on the Rhondda and Swansea Bay Railway, but was discontinued at Baglan in April 1885 and at Swansea in the summer of 1885 due to lack of funds. Depression was filled in with sand and grass.

Record Number	Name	Dataset	Type	Period	Summary
GGAT01701.9w	Air vent, Crymlyn Burrows	Heneb (GGA) HER	Air Vent	Post Medieval	Air vent to serve the proposed Neath River railway tunnel for the Rhondda and Swansea Bay Railway, never completed.
GGAT01742w	Briton Ferry Ironworks	Heneb (GGA) HER	Iron Works	Post Medieval	Briton Ferry Ironworks, situated on the banks of the River Neath, was constructed in the 1840s, reconstructed in the 1890s (still functioning as an iron smelter) and closed in 1958.
GGAT01848w	Quarry, Coedffranc	Heneb (GGA) HER	Quarry	Post Medieval	The site comprises a Post-medieval quarry situated within the community of Coedffranc. No further information is currently available.
GGAT01968w	Vernon House (Briton Ferry House)	Heneb (GGA) HER	Country House	Post Medieval	The site comprises a Post-medieval country house entitled Vernon House (Briton Ferry House) situated within the community of Briton Ferry. No further information is currently available.
GGAT02197w	The Pump House, Briton Ferry	Heneb (GGA) HER	Engine House	Post Medieval	Probably never completed as part of the plans for the Neath floating dock.
GGAT02265w	Pill Box, Coedffranc	Heneb (GGA) HER	Pill Box	Modern	The site comprises a Modern pill box situated within the community of Coedffranc. No further information is currently available.
GGAT02266w	Block, Briton Ferry	Heneb (GGA) HER	Anti Tank Block	Modern	Twenty-six blocks (or 'coffins'? see Wills, p40).
GGAT02639w	Gelli Bwch	Heneb (GGA) HER	House	Post Medieval	The site comprises a Post-medieval house entitled Gelli Bwch situated within the community of Coedffranc. No further information is currently available.
GGAT02705w	Earlswood Colliery, Briton Ferry	Heneb (GGA) HER	Colliery	Post Medieval	Site of Earlswood colliery near Briton Ferry, as noted from the OS 1882 First Edition Map. Site now built over by a corporation depot.
GGAT02741w	Briton Ferry Warren	Heneb (GGA) HER	Rabbit Warren	Post Medieval	c 1578 Probably owned by the barrister Leyshon Price, Commissioner for Peace (1561-86), who built himself 'a fair new house' near the church there. May be significant that there's a site called Warren Hill (804W) nearby.
GGAT02776w	Mount Vernon	Heneb	Motte	Medieval	A possible medieval motte with post-medieval walls and

Record Number	Name	Dataset	Type	Period	Summary
	Earthwork	(GGA) HER			foundations superimposed over the earthwork, it is certainly not natural. Modern (1970s) housing encroaches onto the feature.
GGAT02822.0w	Swansea District Link with VoN Railway	Heneb (GGA) HER	Railway	Post Medieval	Swansea District Line link with the Swansea and Neath/Vale of Neath Railway. Opened between Lonlas Junction and Jersey Marine South Junction on 18 February 1912.
GGAT02856w	Canal Sluice, Coeffrnc	Heneb (GGA) HER	Sluice	Post Medieval	A post-medeival sluice associated with with the Tennant Canal.
GGAT02919w	Possible Motte and Bailey Castle, Briton Ferry	Heneb (GGA) HER	Motte	Medieval	It is possible that traces of the motte still remain, but so far the location has not been found. The most likely spot which shows a similarity to the motte formation is the hillock or mount to the E of Vernon House.
GGAT02920w	Building, Briton Ferry	Heneb (GGA) HER	Ferry	Medieval	Briton Ferry is a fairly extensive area. Name on OS 6" 1913-48 centred at SS 7375 9452.
GGAT02923w	Roman Coin Hoard, Coedffranc	Heneb (GGA) HER	Findspot	Roman	8 Roman bronze coins, C1st-C2nd, illegible. 7 dupondii, 1 sesturtius.
GGAT03145w	Briton Ferry Copper Works	Heneb (GGA) HER	Copper Works	Post Medieval	Copper works/PM Briton Ferry
GGAT03581w	NE 1 - Briton Ferry Ironworks	Heneb (GGA) HER	Iron Works	Post Medieval	Neath Estuary Improvement Scheme A412 Briton Ferry Iron Works built on the east banks of the Neath river in 1846 or 1847, first appearing on an estate map of 1853, which shows rolling mills, smithies and furnaces. Roberts 1997.
GGAT03582w	NE 2 - Rock House, Neath	Heneb (GGA) HER	Building	Post Medieval	Neath Estuary Improvement Scheme A412 Rock House Former residence of the Harbour master; became the home of Mr Joel Lean (a founder of the Briton Ferry Iron Works) in 1857 and subsequently the main office of the Briton Ferry Iron Works, now demolished.
GGAT03583w	NE 3 - Canal Bridge, Briton Ferry	Heneb (GGA) HER	Canal Bridge	Post Medieval	Neath Estuary Improvement Scheme A412 Bridge over Neath (Jersey) Canal shown on map of 1861 and on 1st and later edition OS 25" maps; the bridge is likely to be that indicated on the estate map of 1853 and probably

Record Number	Name	Dataset	Type	Period	Summary
					constructed c. 1846/1847.
GGAT03584w	NE 4 - Industrial Building	Heneb (GGA) HER	Industrial Building	Post Medieval	Neath Estuary Improvement Scheme A412 Fragmentary and overgrown masonry and brick walling probably connected with the Briton Ferry Iron Works, appears on the 1853 estate map as a small rectangular structure, enlarged on the 1st edition 25" OS map.
GGAT03585w	Old Briton Ferry Inn	Heneb (GGA) HER	Inn	Post Medieval	Neath Estuary Improvement Scheme A412 Old Briton Ferry Inn Probably removed by the construction of the Briton Ferry Iron Works in 1846/47 and as a result not shown on the estate map of 1853. A lease of 1846 indicates that the site was transferred.
GGAT03587.0w	NE 7 - Church Street, Briton Ferry	Heneb (GGA) HER	Road	Medieval	Neath Estuary Improvement Scheme A412 Church Street Route to ferry crossing at Briton Ferry, shown on estate maps of 1840 and earlier as leading to a ferry crossing point slightly further south at SS 7342 9407.
GGAT03588w	NE 8 - Limekiln, Briton Ferry	Heneb (GGA) HER	Lime Kiln	Post Medieval	Neath Estuary Improvement Scheme A412 Appears on estate map of 1853, named and details given on map of 1863 accompanying a lease from 1861, showing three kilns adjacent to the Neath (Jersey) Canal Basin, smiths shop and shipping stage on the river Neath.
GGAT03590w	NE 10 - Vernon Arms Hotel	Heneb (GGA) HER	Inn	Post Medieval	Neath Estuary Improvement Scheme A412 Vernon Arms Hotel Raised platform, surrounded by masonry and brick wall/revetment, now surrounding modern bungalow built on site of Vernon Arms Hotel. Hotel built to replace former Briton Ferry Inn (NE5) in 1847.
GGAT03591w	NE 11 - Houses	Heneb (GGA) HER	House	Post Medieval	Neath Estuary Improvement Scheme A412 On estate map of 1853 and all editions of 25" OS maps, demolished, site lying beneath modern Briton Ferry Road Bridge.
GGAT03592w	NE 12 - Possible Bridge Abutment, Neath	Heneb (GGA) HER	Bridge	Post Medieval	Neath Estuary Improvement Scheme A412 Possible remains of bridging place over jersey canal, at north end of basin on east bank of canal, in a very overgrown condition beneath modern Briton Ferry Road Bridge. Appears on 1853 map and 1st edition 25" OS map.
GGAT03593w	NE 13 - Limekilns, Briton Ferry	Heneb (GGA)	Lime Kiln	Post Medieval	Neath Estuary Improvement Scheme A412 Limekilns shown to the west of Rock house, on an estate map of 1826,

Record Number	Name	Dataset	Type	Period	Summary
		HER			probably those illustrated by visiting early 19th century artists such as Turner and Payne
GGAT03594w	NE 14 - Line of Copper Slag bank	Heneb (GGA) HER	Flood Defence	Post Medieval	Neath Estuary Improvement Scheme A412 Line of bank with associated wharfs first appears on map of 1840, named as copper slag bank of Messrs Price & Company, placed by Neath Trustees, shown in more detail on map of 1853. Roberts 1997.
GGAT03595.0w	NE 15 - Eaglesbush Colliery Horse Tramroad	Heneb (GGA) HER	Tramway	Post Medieval	Neath Estuary Improvement Scheme A412 Eaglesbush Colliery Horse Tramroad Shown on estate map of 1853, built to transport coal from the colliery to the wharfs at Briton Ferry and serving the Briton Iron Works.
GGAT03596w	Stone Dump, Briton Ferry	Heneb (GGA) HER	Feature	Post Medieval	Neath Estuary Improvement Scheme A412 Small enclosure adjoining George Row; probably part of that mentioned in a lease of 1826 "...land adjoining Briton Ferry Churchyard...used as a paddock, now as a slag heap for Esgyrn Collieries." Stone dump.
GGAT03597w	NE 17 - Garden Wall, Vernon House	Heneb (GGA) HER	Garden Wall	Post Medieval	Neath Estuary Improvement Scheme A412 Vernon House Masonry wall bounding western edge of former Vernon House gardens, shown on 1813 and 1826 estate maps, probably originally of 17th or 18th century date. Roberts 1997.
GGAT03598w	Wern Tinplate Workks, Formerly Earlswood Tin Plate Works	Heneb (GGA) HER	Plating Works	Post Medieval	Neath Estuary Improvement Scheme A412 Wern Tinplate Works Works started in c. 1890 as Jersey Tinplate Company. In 1891 the works comprised 2 hot rolling mills and a tinhouse furnished with 4 Taylor tinning machines.
GGAT03600w	NE 20, Dwelling House and Shed, Briton Ferry	Heneb (GGA) HER	House	Post Medieval	Neath Estuary Improvement Scheme A412 Shown on 1st (1875), 2nd and 3rd edition 25" OS maps and on lease with plan dating to 1884. Roberts 1997.
GGAT03601w	NE 21 - Landing Stage, Wern Tinplate Works	Heneb (GGA) HER	Landing Stage	Post Medieval	Neath Estuary Improvement Scheme A412 Wern Tinplate Works Remains of concrete and wooden post constructed stage, at present day river edge location; appears on 4th edition (1947) 25" OS map, though not on 1918 edition.
GGAT03602w	NE 22, Remains of Travelling Crane	Heneb (GGA) HER	Travelling Crane	Post Medieval	Neath Estuary Improvement Scheme A412 Concrete pillar supports for travelling crane survive; first shown on 4th edition (1947) 25" OS map.

Record Number	Name	Dataset	Type	Period	Summary
GGAT03603w	NE 23 - Customs House	Heneb (GGA) HER	House	Post Medieval	Neath Estuary Improvement Scheme A412 Customs Houses Terrace of three houses on 1st Edition (1875) 25" OS map, two of which survive; rendered, pebble-dashed elevation under pitched slate roof, gabled window bays to front.
GGAT03604w	NE 24 - Owens Row	Heneb (GGA) HER	House	Post Medieval	Neath Estuary Improvement Scheme A412 Owens Row Terrace first appears on estate map of 1853 along the Neath (Jersey) Canal; probably built as housing for workers at the nearby Briton Ferry Iron Works, they were demolished before 1970.
GGAT03606w	NE 26 - Branch Canal, Briton Ferry	Heneb (GGA) HER	Canal	Post Medieval	Neath Estuary Improvement Scheme A412 Site of branch canal which once lay between Owen's Row (NE24) and Pill Terrace (NE 27), shown on an estate map of 1853 separated by a bridge from the main Neath (Jersey) Canal.
GGAT03607w	NE27 - Pill Terrace	Heneb (GGA) HER	Building	Post Medieval	Neath Estuary Improvement Scheme A412 Pill Terrace Plans of 1849-1859 show the piecemeal way in which the terrace developed along the Neath (Jersey) canal, shown complete on the estate map of 1853 and on all editions of the 25" OS map.
GGAT03608w	Ne28 - Canal Bridge, Near Neath (jersey) Canal	Heneb (GGA) HER	Canal Bridge	Post Medieval	Neath Estuary Improvement Scheme A412 Modern brick and concrete bridge over Neath (Jersey) canal, first appears on the 4th edition 25" OS map of 1941.
GGAT03610w	NE 30 - Limekiln	Heneb (GGA) HER	Lime Kiln	Post Medieval	Neath Estuary Improvement Scheme A412 Site of limekiln at Giant's Grave, appears on estate maps from 1798 to 1853, a detailed plan is available from 1840; while it survives to appear on 1st edition (1875) OS map, removed by 1918 edition.
GGAT03611w	NE 31 - Store, Briton Ferry	Heneb (GGA) HER	Storehouse	Post Medieval	Neath Estuary Improvement Scheme A412 Site of small rectangular store adjacent to Bethesda Independent Chapel on maps of 1851, 1853, 1873 and on the 1st edition 25" OS map of 1875, demolishedF089 c.1888 by new level crossing arrangement.
GGAT03612w	NE 32 - Branch Railway Line	Heneb (GGA) HER	Railway	Post Medieval	Neath Estuary Improvement Scheme A412 Branch line to Briton Ferry Iron Works, shown on map of 1851 and named as a branch of the Vale of Neath Railway, also appears on maps of 1853, 1873 and 1888; on 1st, 2nd and 3rd edition

Record Number	Name	Dataset	Type	Period	Summary
					25" OS map.
GGAT03613w	NE 33 - Store, Briton Ferry	Heneb (GGA) HER	Storehouse	Post Medieval	Neath Estuary Improvement Scheme A412 Small rectangular building at north end of Briton Ferry Dock, named as a store shown on map of 1895. Replaced by larger building on a different alignment slightly to the north on OS map of 1941.
GGAT03614w	NE 34 - Building Footings	Heneb (GGA) HER	Building	Post Medieval	Neath Estuary Improvement Scheme A412 Linear arrangement of demolished railway side structures shown on 1st edition 25" OS map of 1875 and later editions.
GGAT03615w	NE 35 - Railway Sidings	Heneb (GGA) HER	Railway Siding	Post Medieval	Neath Estuary Improvement Scheme A412 Site of dockside sidings of the Great Western Railway on the north-east side of the Briton Ferry Docks; appears on all editions of the 25" OS map with associated dock-side features including cranes and goods sheds.
GGAT03643w	Sail makers' shed, Briton Ferry	Heneb (GGA) HER	Workshop	Post Medieval	Sail makers' shed shown on 1st edition OS map (1888). Removed in conjunction with railway expansion.
GGAT03644w	Briton Ferry Steel Works	Heneb (GGA) HER	Steel Works	Post Medieval	Briton Ferry Steel Works, founded in 1889 by Herbert Eccles and FF Card and situated on the west side of Briton Ferry Dock. Site has since been demolished and level.
GGAT03645w	Victoria Tinplate Works - Briton Ferry	Heneb (GGA) HER	Tinplate Works	Post Medieval	Victoria (Villiers) Tinplate Works built in 1888, first shown as 'New Tin Works Premises' on map of 1889 attached to lease of the same date. The site has been cleared and levelled, since its closure in 1951.
GGAT03646w	Gwalia Tinplate Works - Briton Ferry	Heneb (GGA) HER	Tinplate Works	Post Medieval	Gwalia Tinplate Works built in 1889, appears on 2nd edition 25" OS map and later editions on site of a former Brick and Pipe Works (03650w). Closed in 1953 and subsequently cleared.
GGAT03647w	Railway Sidings and 40ft Road	Heneb (GGA) HER	Railway Siding	Post Medieval	Site of GWR railway sidings (BRITON FERRY PIPELINE)
GGAT03648w	Cambrian Coke Works	Heneb (GGA) HER	Coking Works	Post Medieval	BRITON FERRY PIPELINE
GGAT03649w	Patent Fuel Works	Heneb (GGA)	Fuel Production	Post Medieval	BRITON FERRY PIPELINE

Record Number	Name	Dataset	Type	Period	Summary
		HER	Site		
GGAT03650w	former Brick and Pipe Works	Heneb (GGA) HER	Brick And Tilemaking Site	Post Medieval	BRITON FERRY PIPELINE
GGAT03651w	Shipping Place of Price & Company	Heneb (GGA) HER	Tramway Transport Site	Post Medieval	Shipping Place of Price & Company, Briton Ferry
GGAT03652w	Tramroad Briton Ferry	Heneb (GGA) HER	Tramway	Post Medieval	Site of tramroad belonging to the Neath Abbey Coal Company (JJ Price and Co), identified on estate plan of c. 1840, running from shipping place of the same company (03651w) on the River Neath to Price's Drift mine, below the traveller's Rest.
GGAT03653w	Ship Canal Briton Ferry	Heneb (GGA) HER	Canal	Post Medieval	Site of Ship Canal of the Neath Abbey Coal Company which connected Price's Drift Mine to the River Neath. The Canal was no longer in use and had been severed from the colliery by 1850 with the construction of Brunel's South Wales Railway.
GGAT05224w	Briton Ferry Churchyard	Heneb (GGA) HER	Churchyard	Medieval	The churchyard is largely quadrangular though with two rounded corners.
GGAT06159w	Barn at Cwrt-y-Bettws Grange	Heneb (GGA) HER	Barn	Medieval	Remains of a large medieval building with angle buttresses interpreted as a medieval barn associated with the former grange site at Cwrt-y-Bettws (00595w). Comparable examples are at Llantwit Major and Monknash Granges.
GGAT06617w	Red Jacket Coal Pit, near Llandarcy	Heneb (GGA) HER	Colliery	Post Medieval	Coal pit visible only on 1st (1882) and 2nd (1899) edition OS map, not visible on later or modern maps. Present condition unknown.
GGAT07097w	Red Jacket Copper Works	Heneb (GGA) HER	Copper Works	Post Medieval	Copper works shown on O.S. edition 1, disused on edition 2.
GGAT07106w	Drill Shed, Shelone Road, Britton Ferry	Heneb (GGA) HER	Drill Hall	Modern	The Second Edition O.S. map of 1901 shows two buildings with a single contained within a curtilage and labelled as a Drill Shed. The buildings appear to survive substantially intact although later buildings have been added within the curtilage.

Record Number	Name	Dataset	Type	Period	Summary
GGAT07306w	Albion Steelworks, Briton Ferry	Heneb (GGA) HER	Steel Works	Modern	The Albion Steelworks was a pre-war firm located in Briton Ferry. It was one of the firms forming part of the Western Group of producers organised under the Ministry of Munitions in early 1916 for essential war production (Nicholson 1919).
GGAT07318w	Taylor and Sons, Briton Ferry	Heneb (GGA) HER	Munitions Factory	Modern	A 19th Century engineering firm that was one of the first to convert to the production of munitions during the First World War.
GGAT08623w	Quarry, Brynhyfryd, Briton Ferry	Heneb (GGA) HER	Quarry	Post Medieval	A post-medieval quarry first depicted on 1st edition 1:2500 Ordnance Survey map of 1882. On later 2nd and 3rd ed. OS maps of 1899 and 1918, the site is labelled as 'Old quarry'. The site of the quarry is not indicated on 4th edition of 1941.
GGAT08624w	Quarry, North of Brynhyfryd, Briton Ferry	Heneb (GGA) HER	Quarry	Post Medieval	A post-medieval quarry, labelled as 'Old quarry' on 1st and 2nd edition 1:2500 Ordnance Survey maps of 1882 and 1899. On later OS maps of 1918 and 1941, it is given as 'Quarry', possibly indicating re-use.
GGAT08625w	Dry Dock, Neath Canal, North-Northwest of Giant's Grave	Heneb (GGA) HER	Dry Dock	Post Medieval	Site of post-medieval dry dock depicted on 1st and 2nd edition 1:2500 Ordnance Survey map of 1882 and 1899. The site is not depicted on later Ordnance Survey maps of 1918 and 1941.
GGAT08626w	Dry Dock, Neath Canal, Northwest of Giant's Grave	Heneb (GGA) HER	Dry Dock	Post Medieval	Site of post-medieval dry dock depicted on 1st and 2nd edition 1:2500 Ordnance Survey map of 1882 and 1899. The dock is depicted but not labelled as 'dry dock' on 3rd and 4th Ordnance Survey maps of 1918 and 1941. Probably disused at this time.
GGAT08627w	Dry Dock, Neath Canal, West of Giant's Grave	Heneb (GGA) HER	Dry Dock	Post Medieval	Site of post-medieval dry dock depicted on 1st and 2nd edition 1:2500 Ordnance Survey map of 1882 and 1899. The dock is depicted but not labelled as 'dry dock' on 3rd and 4th Ordnance Survey maps of 1918 and 1941. Probably disused at this time.
GGAT08628w	Hospital (Infectious Diseases), Giant's Grave, Briton Ferry	Heneb (GGA) HER	Infectious Diseases Hospital	Post Medieval	Site of post-medieval hospital fist depicted on 2nd edition 1:2500 Ordnance Survey map of 1899. Originally labelled as 'Hospital (Infectious Diseases). Later changed to 'Isolation Hospital (Briton Ferry U.D. Council)' as given on 3rd ed. OS map from 1918.
GGAT08629w	Ruins, Coed-yr-iarll-	Heneb	Structure	Post Medieval	Site of a ruined building, part of 'Coed-yr-iarll Isaf' farm

Record Number	Name	Dataset	Type	Period	Summary
	isaf, East of Pant-y-sais, Crymlyn	(GGA) HER			complex shown on 1st and 2nd edition 1:2500 Ordnance Survey maps of 1880 and 1899. Both the ruined building and the farmstead are no longer shown on later OS maps.
GGAT08630w	Air Shaft, Earlswood, Southwest of Briton Ferry	Heneb (GGA) HER	Ventilation Shaft	Post Medieval	An Air Shaft depicted on 1st, 2nd, 3rd and 4th edition 1:2500 Ordnance Survey maps of 1880, 1899, 1918 and 1937. Labelled as 'Old Air Shaft' on 2nd ed. OS map and later maps.
GGAT08631w	Coal Drift, Earlswood, Southwest of Briton Ferry	Heneb (GGA) HER	Drift Mine	Post Medieval	Site of coal drift depicted on 1st, 2nd and 3rd edition 1:2500 Ordnance Survey maps of 1880, 1899 and 1918, and given as 'Old Coal Drift' on all editions. The site is not shown on later OS mapping.
GGAT08851w	Canal Basin, Giant's Grave, Briton Ferry	Heneb (GGA) HER	Canal Basin	Post Medieval	A curved Canal Basin, located west of Giant's Grave, Briton Ferry, likely a re-purposed natural channel. The 1st ed. 1:2500 OS map shows a curving channel blocked at the southeast and accessed the north-east from the Neath Canal via a narrow entrance.
GGAT08871w	Royal Observer Corps Monitoring Post, Briton Ferry	Heneb (GGA) HER	Observation Post	Modern	Royal Observer Corps monitoring post. Built to provide information to both civil and military authorities in the event of military attack. The underground bunker was designed to provide satisfactory nuclear blast protection.
GGAT08957w	Vernon Tin Plate Works	Heneb (GGA) HER	Tinplate Works	Post Medieval	Tinplate works site added during GGAT152 Cadw funded project.
GGAT08981w	Baglan Bay Tin Plate Works, Briton Ferry	Heneb (GGA) HER	Tin Works	Post Medieval	Tinplate works site added during GGAT152 Cadw funded project.
GGAT09091w	Saltings Overbridge, Briton Ferry	Heneb (GGA) HER	Canal Bridge	Post Medieval	Stone arched road overbridge, with later modifications.
GGAT09093w	The Ferryman Public House, Briton Ferry	Heneb (GGA) HER	Public House	Modern	The Ferryman Public House is a striking early 20th century public house directly fronting Neath Road. A smaller 19th century pub, the Harp Inn, previously stood on the site.
GGAT09094w	Briton Ferry Working Mens Club	Heneb (GGA) HER	Working Mens Club	Modern	A prominent individual club building set on a street corner. Striking fenestration with intricate detailing including pilasters and insets panels.

Record Number	Name	Dataset	Type	Period	Summary
GGAT09100w	Former New Dock Hotel, Villiers Street, Briton Ferry	Heneb (GGA) HER	Hotel	-	Large former hotel in dominating position retaining original features including porch with cast iron columns.
GGAT09152w	Former Bank, 43 Neath Road, Briton Ferry	Heneb (GGA) HER	Bank (Financial)	Post Medieval	19th century former bank premises at the junction of Villiers Street and Neath Road.
GGAT09153w	Jerusalem Baptist Church, Briton Ferry	Heneb (GGA) HER	Chapel	Post Medieval	Jerusalem Baptist Chapel was built in 1883 and rebuilt/modified in 1907.
GGAT09161w	Horse Trough, Neath Road, Briton Ferry	Heneb (GGA) HER	Trough	Post Medieval	Stone horse trough set in stone roadside wall, originally fed by pipe from the rear.
GGAT09162w	Barn Cottages, Shelone Road, Giants Grave	Heneb (GGA) HER	Cottage	Post Medieval	A block of 5 cottages set back off Shelone Road. Shown as Shelonebarn Cottages on early maps. Likely to be one of the earliest buildings in this area.
GGAT09342w	English Independent Chapel Vestry, Briton Ferry	Heneb (GGA) HER	Chapel	Post Medieval	Small ecclesiastical style vestry building dated 1877.
GGAT09343w	Leighs Barbers Shop, 177 Main Rd, Briton Ferry	Heneb (GGA) HER	Shop	Post Medieval	Traditional shop front with windows on 2 elevations.
GGAT09344w	Briton Ferry Little Theatre, Neath Road, Briton Ferry	Heneb (GGA) HER	Club,Chapel	Post Medieval,Modern	Former Chapel and school room built in 1856, converted to a club by 1941.
GGAT09353w	Former Post Office, Briton Ferry	Heneb (GGA) HER	Post Office	Modern	Red brick building incorporating two shop units. Post office until 2015.
GGAT09354w	Former Chapel, Giants Grave	Heneb (GGA) HER	Chapel	Post Medieval	A distinctive traditional small church building constructed of stone and slate in gothic style. Now converted for residential use.
GGAT09481w	Railway Overbridge, Adjacent Llandarcy Gas Depot	Heneb (GGA) HER	Railway Bridge	Post Medieval	Railway overbridge with substantial stonework abutments crossing the canal and towpath.
GGAT09646w	Shelone Farmstead	Heneb	Farmstead	Post Medieval	Potential historic farmstead identified as part of GGAT and

Record Number	Name	Dataset	Type	Period	Summary
		(GGA) HER			Cadwâ€™s Historic Farmsteads project, visible on Second Edition OS mapping.
GGAT09692w	Coed-yr-iarll Uchaf Farmstead	Heneb (GGA) HER	Farmstead	Post Medieval	Potential historic farmstead identified as part of GGAT and Cadwâ€™s Historic Farmsteads project, visible on Second Edition OS mapping.
GGAT05273w	Cwrt-y-bettws Chapel	Heneb (GGA) HER	Chapel	Medieval	Chapel of Cwrt-y-Bettws grange; this is the traditional site of the chapel, where the remains presented no coherent plan (RCAHMW MG. Merrick (ed James 1983, 102), records it as a chapel.
GGAT00593.0w	Possible road near Cwrt-y-Betws Farm	Heneb (GGA) HER	Road	Medieval	There were formerly traces of a road in the field immediately S of Cwrt-y-Bettws farm. Context indicates probably medieval.
GGAT00804w	Warren Hill	Heneb (GGA) HER	Hillfort	Iron Age	Hillfort with rock-cut ditches. The summit is encircled by the remains of a strong bank and ditch, now reduced to a scarp with a terrace below. There seems also to be traces of a counterscarp bank. Defences are well preserved round the S and E sides.
GGAT03146w	Colliery, Coedffranc	Heneb (GGA) HER	Colliery	Post Medieval	Coalpit/PM Old coal pit and old coal level on 1st ed OS
GGAT00640w	Cairn, Gelli-bwch Farm 1	Heneb (GGA) HER	Cairn	Bronze Age	One of a pair (PRN 5066w) of cairns (with 641w), badly damaged to the SE, where is it crossed by an ENE-WSW wall. To the N of this wall, the remains of the cairn can be made out as an earthwork demarcating approximately half a circle.
GGAT02331.0w	Glan-y-wern Canal	Heneb (GGA) HER	Canal	Post-Medieval	N/A
GGAT01701.0w	RHONDDA AND SWANSEA BAY RAILWAY	Heneb (GGA) HER	Railway	Post-Medieval	N/A
GGAT07395w	Coal Pit	Heneb (GGA) HER	Colliery	Post-Medieval	N/A
GGAT07349w	Structure	Heneb	Kiln	Post-Medieval	N/A

Record Number	Name	Dataset	Type	Period	Summary
	Associated with Kilns	(GGA) HER			
GGAT07507w	Well	Heneb (GGA) HER	Well	Post-Medieval	N/A
GGAT07450w	Structure	Heneb (GGA) HER	Structure	Post-Medieval	N/A
GGAT07414w	Garnet Colliery	Heneb (GGA) HER	Colliery	Post-Medieval	N/A
GGAT07413w	Tramroad, Coedffranc	Heneb (GGA) HER	Tramway	Modern	N/A
GGAT07403w	Old Coal Drift, Coedffranc	Heneb (GGA) HER	Drift Mine	Modern	N/A
GGAT07344w	Sand Pit	Heneb (GGA) HER	Sand Pit	Post-Medieval	N/A
GGAT07343w	Tramroad	Heneb (GGA) HER	Road	Post-Medieval	N/A
GGAT01849w	Cardonnel Tin Plate Works	Heneb (GGA) HER	Tin Works	Post-Medieval	N/A
GGAT07735w	Earlswood House	Heneb (GGA) HER	Estate	Unknown	N/A
GGAT07722w	South Wales Railway	Heneb (GGA) HER	Railway	Post-Medieval	N/A
GGAT07721w	Old Colliery	Heneb (GGA) HER	Colliery	Post-Medieval	N/A

Record Number	Name	Dataset	Type	Period	Summary
GGAT07347w	Tramroad	Heneb (GGA) HER	Road	Post-Medieval	N/A
GGAT02819.0w	VALE OF NEATH RAILWAY - SWANSEA NEATH EXTENSION	Heneb (GGA) HER	Railway	Post Medieval	N/A
RR60d-04	Roman Road	Heneb (GGA) HER	Roman Road	Roman	N/A
RR60c-06	Roman Road	Heneb (GGA) HER	Roman Road	Roman	N/A
9713	Bethesda Welsh Independent Chapel, Church Street, Briton Ferry	NMRW	Chapel	Post Medieval	N/A
9715	Hoo Street Independent Chapel;Bethesda Mission;Bethesda Schoolroom, Briton Ferry	NMRW	Chapel	Post Medieval	N/A
9721	Bethel Welsh Calvinistic Methodist Chapel, Bethel Street, Briton Ferry	NMRW	Chapel	Post Medieval	N/A
9725	Zoar Welsh Calvinistic Methodist Chapel;Zoar Prebyterian Chapel, Giant's Grave, Briton Ferry	NMRW	Chapel	Post Medieval	N/A

Record Number	Name	Dataset	Type	Period	Summary
9726	Primitive Methodist, Briton Ferry	NMRW	Chapel	Post Medieval	N/A
13651	Sunday School;Victoria (Salem Schoolroom;Mission Room,), Victoria Street, Briton Ferry,	NMRW	Chapel	Post Medieval	N/A
18094	Vernon House, Briton Ferry	NMRW	House	Post Medieval	N/A
18497	Cwrt-y-Bettws	NMRW	Dwelling	Post Medieval	N/A
18498	Cwrt-y-Bettws Grange	NMRW	Dwelling	Post Medieval	N/A
18722	Gelli-Bwch	NMRW	Dwelling	Post Medieval	N/A
34451	Neath Canal: near Briton Ferry	NMRW	Canal	Post Medieval	N/A
41435	Briton Ferry Station	NMRW	Railway Station	Post Medieval	N/A
91602	A48 Road, Neath By-Pass, Briton Ferry	NMRW	Road	Modern	N/A
91604	A48 Road Bridge over Briton Ferry Dock, Neath By-Pass, Briton Ferry	NMRW	Road Bridge	Modern	N/A
91662	Neath Canal: Giant's Grave and Briton Ferry (Jersey) Canal	NMRW	Canal	Post Medieval	N/A
265690	Vernon House, Garden, Briton Ferry	NMRW	Garden	Post Medieval	N/A
270438	Anti Tank Block, Neath	NMRW	Anti Tank Block	Post Medieval	N/A

Record Number	Name	Dataset	Type	Period	Summary
270443	Pillbox, Neath	NMRW	Pillbox	Post Medieval	N/A
275862	Llandarcy Round Cairn	NMRW	Round Cairn	Prehistoric	N/A
307240	Warren Hill, Warren	NMRW	Rabbit Warren	Unknown	N/A
309213	Briton Ferry Ironworks, Briton Ferry	NMRW	Iron Works	Post Medieval	N/A
400995	Neath River Ship Lock	NMRW	Lock	Post Medieval	N/A
401406	Hen Gastell	NMRW	Castle	Multiperiod	N/A
405027	Neath Canal: Terminal Basin, Briton Ferry	NMRW	Canal Basin	Post Medieval	N/A
405030	Neath Canal: Giant's Grave Footbridge	NMRW	Footbridge	Post Medieval	N/A
405114	Neath Canal: Giant's Grave Pill Bridges	NMRW	Bridge	Modern	N/A
405142	Neath Canal: Basin Bridge Abutments	NMRW	Bridge	Post Medieval	N/A
405145	Neath Canal: Giant's Grave Secondary Terminus Overbridge	NMRW	Bridge	Post Medieval	N/A
405146	Neath River Navigation: Derelict Barge in Saltings Alongside Canal Dock	NMRW	Wreck	Post Medieval	N/A
405194	Neath Canal: Giant's Grave	NMRW	Canal Dock	Post Medieval	N/A

Record Number	Name	Dataset	Type	Period	Summary
	Terminal Secondary Transhipment Docks				
405209	Giant's Grave Secondary Terminus, Dry Dock 3	NMRW	Dry Dock	Post Medieval	N/A
405210	Giant's Grave Secondary Terminus, Dry Dock 4	NMRW	Dry Dock	Post Medieval	N/A
405211	Giant's Grave Secondary Terminus, Transhipment Dock 1	NMRW	Dock	Post Medieval	N/A
405212	Giant's Grave Secondary Terminus, Transhipment Dock 2	NMRW	Dock	Post Medieval	N/A
405213	Giant's Grave Secondary Terminus, Transhipment Dock 3	NMRW	Dock	Post Medieval	N/A
405214	Giant's Grave Secondary Terminus, Transhipment Dock 4	NMRW	Dock	Post Medieval	N/A
405226	Probable Quarrying Features East of Llandarcy	NMRW	Quarry	Unknown	N/A
405227	Neath Canal: Cwrt	NMRW	Culvert	Post Medieval	N/A

Record Number	Name	Dataset	Type	Period	Summary
	Sart Pill Culvert				
415107	Briton Ferry	NMRW	Town	Multiperiod	N/A
418650	Earlswood, Possible Defended Enclosure	NMRW	Defended Enclosure	Unknown	N/A
419709	Albion Steel Works, Briton Ferry	NMRW	Steel Works	Post Medieval	N/A
419710	Whitford Steel Sheet and Galvanising Works, Briton Ferry	NMRW	Steel Works	19th Century	N/A
420695	School Chapel, Giant's Grave, Briton Ferry	NMRW	Chapel	19th Century	N/A
710106	Briton Ferry Gas Works	NMRW	Gas Works	19th Century	N/A
710155	E.M.Edwards Gas Works	NMRW	Gas Works	20th Century	N/A
91603	A48 Road Bridge over River Neath;Cleveland Bridge, Neath By-Pass, Briton Ferry	NMRW Maritime	Road Bridge	Modern	The western bridge, known as the Cleveland Bridge (after the contractors, the Cleveland Bridge & Engineering Co. Ltd.), of the A48 Neath by-pass road (nprn 91602) crosses the River Neath Navigation (nprn 91663), Neath Canal (nprn 34444) and various minor railways and roads . The bridge consists of a 17-span steel viaduct some 585m long, carried on steel and concrete piers. It was completed in 1955. The river navigation is crossed by the central span of 91m. (see Aerofilms WAW034036).

Source: Heneb GGA HER; NMRW 2024

F.2.6 Previous Archaeological Events

Appendix Table Error! No text of specified style in document..**6 List of Previous Archaeological Events within the Jersey Marine Study Area**

Record Number	Name	Event Type	Organisation	Year
GGATE000117	The Brunel Accumulator Tower, Briton Ferry Survey	MANAGEMENT PLAN MONUMENT	Site Archaeological Services	2007
GGATE000102	Casualties of War (Yr 4, GGAT 144)	DESK BASED ASSESSMENT	Glamorgan-Gwent Archaeological Trust (GGAT)	N/A
GGATE000452	WARREN HILL, WATCHING BRIEF, 1987	Watching brief	No informatuion available	1987
GGATE000492	Red Jacket Pill River Barge Lock, Llandarcy, Tennant Canal	FIELD SURVEY	Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW)	1976
GGATE000496	EARLSWOOD COLLIERY, BRITON FERRY, TRIAL EXCAVATION, 1991	Trial excavation	No informatuion available	1991
GGATE001314	Field visit Neath canal	Field visit	Glamorgan-Gwent Archaeological Trust (GGAT)	2005
GGATE001403	Cwrt-y-Bettws, Neath	Watching Brief	Cardiff Archaeological Consultants	N/A
GGATE001622	M4 Baglan -Lon Las section	Geotechnical Investigation	Sir Owen Williams and partners	1989
GGATE002286	Neath Estuary (Improvement Scheme) DBA	Desk Based Assessment	Glamorgan-Gwent Archaeological Trust (GGAT)	1997
GGATE003163	Cwrt y Bettws	Watching brief	Trysor	2009
GGATE003358	Hen Gastell, Briton Ferry excavations, 1991-92	Excavation	Glamorgan-Gwent Archaeological Trust (GGAT)	N/A
GGATE003985	Cwrt Y Bettws, Plot 1	Watching brief	Trysor	2012
GGATE004766	The Church of Saint Mary, Llansawel, Briton Ferry, Glamorgan	WATCHING BRIEF	No informatuion available	2003
GGATE004931	The Sinews of War (Yr 2, GGAT137)	DESK BASED ASSESSMENT	Glamorgan-Gwent Archaeological Trust (GGAT)	2015

Record Number	Name	Event Type	Organisation	Year
GGATE004932	The Sinews of War (Yr 2, GGAT137)	FIELD VISIT	Glamorgan-Gwent Archaeological Trust (GGAT)	2015
GGATE006358	Former Cardonnel Tinplate Works, Llandarcy, Neath	WATCHING BRIEF	Glamorgan-Gwent Archaeological Trust (GGAT)	2012
GGATE007020	Margam M4 VE & VEA OHL Cable Installation	DESK BASED ASSESSMENT	AMEC Earth & Environmental	2010
GGATe001623	M4 motorway Baglan - Briton Ferry section	Report map	Sir Owen Williams and Partners	1989
GGATE005403	Baglan Bay Gas Pipeline	Report Map	Network Archaeology	2000
GGATE007152	Wern Works, Britton Ferry, Neath	Report Map	Environmental Dimension Partnership (EDP)	2014
GGATE007151	Wern Works, Britton Ferry, Neath	Report Map	Environmental Dimension Partnership (EDP)	2014
GGATE007021	Margam M4 VE & VEA OHL Cable Installation	Report Map	AMEC Earth & Environmental	2009
GGATE006818	Sewer Replacement Works, Jcn. St Marys Close & Church Street	Report map	Dyfed Archaeological Trust (DAT)	2012
GGATE006551	Cwrt-y-Bettws Plot 3	Report map	Cardiff Archaeological Consultants	2015
GGATE006550	Cwrt-y-Bettws, Plot 2	Report Map	Cardiff Archaeological Consultants	2015
GGATE007242	High Status Settlement in Glamorgan and Gwent	Report map	Glamorgan-Gwent Archaeological Trust (GGAT)	2010
GGATE005431	The Rural Settlement of Roman Britain	Report Map	University of Reading	2015
GGATE006100	GGAT150: Rapid Coastline Zone Assessment	Report map	GGAT	2018
GGATE006338	Leiros Park, Neath	Grid Reference	Archaeology Wales	2016
GGATE002334	Neath Abbey Wharf (AA)	Report	Glamorgan-Gwent Archaeological Trust (GGAT)	2001
GGATE002650	Baglan Energy Park, Briton Ferry Dock, Baglan Bay DBA	Report	Cambrian Archaeological Projects Ltd.	1999

Record Number	Name	Event Type	Organisation	Year
GGATE002544	Baglan Energy Park WB	GRID REFER	Cambrian Archaeological Projects Ltd.	2001
GGATE002288	Neath Estuary SPS Archaeological Assessment	Report	Glamorgan-Gwent Archaeological Trust (GGAT)	1998
GGATE002947	Baglan Bay gas pipeline. DBA	DBA	Glamorgan-Gwent Archaeological Trust (GGAT)	1999

Source: Heneb GGA HER 2024

F.3 Kenfig Marshalling Yard site

F.3.7 Designated Historic Assets

Appendix Table Error! No text of specified style in document.**.7 List of Designated Historic Assets within the Kenfig Marshalling Yard Study Area**

Record Number	Type	Name	Grade	Location	Broad Class
GM042	Scheduled Monument	Kenfig Castle & Medieval Town	N/A	N/A	Defence
GM179	Scheduled Monument	Ty'n-y-Cellar Standing Stone	N/A	N/A	Religious, Ritual and Funerary
23289	Listed Building	Granary at Ty'n y Cellar	II	Part of the farm complex at Ty'n y Cellar. The south gable end of the range faces the lane which leads to Kenfig industrial estate. The house is to the east.	Agriculture and Subsistence
23290	Listed Building	Former Cow-house at Ty'n y Cellar	II	Located on the north side of the farm complex with the house to the east.	Agriculture and Subsistence
23291	Listed Building	Ty'n y Cellar and adjoining Barn	II	Set back from Water Street at the junction of a lane which leads to Kenfig Industrial Estate.	Domestic
23292	Listed Building	Cart Shed, Stable and Cow-House at Ty'n y Cellar	II	The stable is located in the centre of the north side of the farm complex. Its NW angle is abutted by the L-shaped cow-house and cart shed, which enclose the cattle yard.	Agriculture and Subsistence
87691	Listed Building	Morfa Bach Access Underbridge (West)	II	Accessed from an unclassified road to the south of Kenfig Industrial Estate.	Transport

87692	Listed Building	Morfa Bach Access Underbridge (East)	II	Accessed from an unclassified road to the south of Kenfig Industrial Estate.	Transport
23289	Listed Building	Granary at Ty'n y Cellar	II	Part of the farm complex at Ty'n y Cellar. The south gable end of the range faces the lane which leads to Kenfig industrial estate. The house is to the east.	Agriculture and Subsistence
23290	Listed Building	Former Cow-house at Ty'n y Cellar	II	Located on the north side of the farm complex with the house to the east.	Agriculture and Subsistence
23291	Listed Building	Ty'n y Cellar and adjoining Barn	II	Set back from Water Street at the junction of a lane which leads to Kenfig Industrial Estate.	Domestic
23292	Listed Building	Cart Shed, Stable and Cow-House at Ty'n y Cellar	II	The stable is located in the centre of the north side of the farm complex. Its north-west angle is abutted by the L-shaped cow-house and cart shed, which enclose the cattle yard.	Agriculture and Subsistence

Source: Cadw 2024

F.3.8 Non-designated Historic Assets

Appendix Table Error! No text of specified style in document.**.8 List of Non-designated Historic Assets within the Kenfig Marshalling Yard Study Area**

Record Number	Name	Dataset	Type	Period	Summary
GGAT00083m	Tool artefacts, Kenfig	Heneb (GGA) HER	FINDSPOT	Prehistoric	Flint scrapers, pottery, pot boilers, fragments of samian ware, medieval arrowheads, and a bearing for a potters wheel, all found in this area.
GGAT00084m	Neolithic Axe, Margam	Heneb (GGA) HER	FINDSPOT	Neolithic	A polished axe of felsite, probably originally of rhyolitic ash, which may have come from 'halfway between the Markers Hut.
GGAT00139m	St James's Church, Kenfig	Heneb (GGA) HER	Church	Medieval	Church of St James lay 300 yards to the south of the castle, the walls of the cemetery adjoining the castle bailey; erected about the same time as Margam Abbey or soon after (1147-54).
GGAT00149m	Kenfig Grange, Margam	Heneb (GGA) HER	Grange	Medieval	Besanded ruins near Kenfig Castle interpreted by Jones and Soulsby as those of a 16th Cnt farmhouse, on the basis that Leland had reported a little village surviving on the east side of Kenfig.

Record Number	Name	Dataset	Type	Period	Summary
GGAT01062m	St Thomas' Chapel, Kenfig	Heneb (GGA) HER	Chapel	Medieval	The existence of a chapel in Kenfig dedicated to St. Thomas is mentioned in a document of the mid-12th Cnt. but its location is not known.
GGAT01063m	Guildhall, Cynffig	Heneb (GGA) HER	Guildhall	Medieval	This building is mentioned in the Ordinances of 1330 but no further details are known.
GGAT01138m	Ffynnon Lygad	Heneb (GGA) HER	Holy well	Medieval	Ffynnon Lygad, near Kenfig Castle, is a natural spring within a hollow, choked with weeds and reeds: cured eye diseases.
GGAT01190m	Roman Hoard, Kenfig Town	Heneb (GGA) HER	FINDSPOT	Roman	Roman finds, including Red ware mortarium and a sherd of Central Gaulish samian with a stamp of Atepomarus ii, coins and jewellery.
GGAT02026w	Findspot, Kenfig Industrial Estate	Heneb (GGA) HER	FINDSPOT	Post Medieval	PRN created to cover finds discovered in a W/B, see FI file.
GGAT02072w	Berwes Warren (Kenfig Warren)	Heneb (GGA) HER	Rabbit warren	Medieval	There are two references to a rabbit warren in the county of Kenfig. Both sources may refer to the same one. The first, the earliest evidence for rabbit farming, dates from 1316 as an account of Kenfig town and castle, furnishing the information about a rabbit warren located in the coastal dune. The second reference consists of a grant of 1344 as the cuniculary of Berwes (or Burrows), where Hugh le Despenser, Lord of Glamorgan, gave the right of free warren to the Abbot and Convent of Margam. The delimitation are given as the rivers Afan to the north, the river Kenfig to the south, the sea to the west and the via regalis (between the towns of Aberavan and Kenfig) to the east (RCAHM 1982). This area is now the site of Margam steelworks. Rabbit farming is suggested to have been active in the area for at least six centuries: Mansel family, the successors to the Abbot and Convent, maintained a rabbit warren at Margam listed by Merrick in ca. 1578. In 1707, John Leyson, who was an estate worker, was employed full-time in the warren (RCAHM 1982).
GGAT06435m	Shingle Pit, near remains	Heneb (GGA)	pit	Unknown	This shingle pit is depicted on the First Edition

Record Number	Name	Dataset	Type	Period	Summary
	of Kenfig Castle	HER			Ordinance Survey mapping.
GGAT07406m	Quadrant Tower, RAF Stormy Down	Heneb (GGA) HER	WATCH TOWER	Modern	A tall rectangular two-storey concrete quadrant tower.
GGAT08052w	Supermarine Spitfire Mk F22 PL132 crash site	Heneb (GGA) HER	AIR CRASH SITE	Modern	Crash site of Supermarine Spitfire Mk F22 PL132
GGAT08434w	Morva Bach Uchaf	Heneb (GGA) HER	COTTAGE	Post Medieval	Post medieval farm.
GGAT09754w	Morfa Bach Farmstead	Heneb (GGA) HER	FARMSTEAD	Post Medieval	Potential historic farmstead identified as part of GGAT and Cadwâ€™s Historic Farmsteads project, visible on Second Edition OS mapping.
GGAT11784m	Railway Bridge, Felin-newydd	Heneb (GGA) HER	RAILWAY BRIDGE	UNKNOWN	Railway Bridge identified on 1st Edition OS map (1876).
GGAT06439m	Shingle Pit, Cynffig	Heneb (GGA) HER	pit	Unknown	Shingle pit visible on 1st edition OS mapping.
RR60c-05a	Roman Road	Heneb (GGA) HER	Roman Road	Roman	Roman Road.
19101	Kenfig Grange	NMRW	BUILDING	Post Medieval	N/A
401297	Margam Marshalling Yard, Margam Moors	NMRW	MARSHALLING YARD	Modern	N/A
401427	Earthwork Features South of Morfa Bach	NMRW	EARTHWORK	Unknown	N/A
401428	Kenfig Burrows;Kenfig National Nature Reserve	NMRW	NATURAL FEATURE	Post Medieval	N/A
402096	South Wales Railway;Great Western Railway South Wales Main Line	NMRW	RAILWAY	Post Medieval	N/A
402654	Modern Industrial Estate, Pyle	NMRW	INDUSTRIAL ESTATE	Modern	N/A
414947	Eglwys Nunydd Reservoir, Margam	NMRW	RESERVOIR	Modern	N/A

Record Number	Name	Dataset	Type	Period	Summary
413706	Morfa Margam	NMRW	NATURAL FEATURE	General	N/A
421806	Margam Abbey Works East Signal Box, Margam Abbey Works	NMRW	SIGNAL BOX	Modern	N/A
421807	Margam Sorting Sidings Signal Box, Margam Traction Maintenance Depot	NMRW	SIGNAL BOX	Modern	N/A

Source: Heneb GGA HER; NMRW 2024

F.3.9 Previous Archaeological Events

Appendix Table Error! No text of specified style in document.**.9 List of Previous Archaeological Events within the Kenfig Marshalling Yard Study Area**

Record Number	Name	Event Type	Organisation	Year
GGATE007262	Lakeside Driving Range, Margam, Neath Port Talbot	Desk Based Assessment	Cotswold Archaeology	2015
GGATE007984	Ysgol Newydd (Margam), Port Talbot, Wales	Desk Based Assessment	Rubicon Heritage Services Ltd	2016
GGATE006590	Kenfig Dunes, Kenfig, Bridgend	Watching Brief	Trysor	2021
GGATE007242	High Status Settlement in Glamorgan and Gwent	Desk Based Assessment	Glamorgan-Gwent Archaeological Trust (GGAT)	2010
GGATE006100	GGAT150: Rapid Coastline Zone Assessment	Project	Glamorgan-Gwent Archaeological Trust (GGAT)	2018
GGATE007638	Arfordir Coastal Heritage Year 5 (GGAT103)	Project	Glamorgan-Gwent Archaeological Trust (GGAT)	2014-15
GGATE007635	Arfordir Coastal Heritage Year 4 (GGAT103)	Project	Glamorgan-Gwent Archaeological Trust (GGAT)	2013-14
GGATE004287	Arfordir Coastal Heritage, Year 3 (GGAT103)	Project	Glamorgan-Gwent Archaeological Trust (GGAT)	2012-13
GGATE007637	Arfordir Coastal Heritage, Year 2 (GGAT	Project	Glamorgan-Gwent Archaeological Trust (GGAT)	2011-12

Record Number	Name	Event Type	Organisation	Year
	103)			
GGATE004931	The Sinews of War (Yr 2, GGAT137)	Desk-Based Assessment	Glamorgan-Gwent Archaeological Trust (GGAT)	2015
GGATE004932	The Sinews of War (Yr 2, GGAT137)	Field Visit	Glamorgan-Gwent Archaeological Trust (GGAT)	2015
GGATE000102	Casualties of War	Desk Based Assessment	Glamorgan-Gwent Archaeological Trust (GGAT)	2016-17
GGATE003358	Hen Gastell, Briton Ferry excavations, 1991-92	Excavation	Glamorgan-Gwent Archaeological Trust (GGAT)	1991-92
GGATE001314	Field visit Neath canal	Field Visit	Glamorgan-Gwent Archaeological Trust (GGAT)	2005
GGATE000117	The Brunel Accumulator Tower, Briton Ferry Survey	Survey	Site Archaeological Services	2007
GGATE000496	EARLSWOOD COLLIERY, BRITON FERRY, TRIAL EXCAVATION	Trial Excavation	No information available	1991
GGATE000452	WARREN HILL, WATCHING BRIEF, 1987	Watching Brief	No information available	1987
GGATE003163	Cwrt y Bettws	Watching Brief	Trysor	2009
GGATE001403	Cwrt-y-Bettws, Neath WB	Watching Brief	Cardiff Archaeological Consultants	2006-2008
GGATE000492	RED JACKET PILL RIVER BARGE LOCK, LLANDARCY, TENNA	Survey	RCAHMW	1976
GGATE008060	Kenfig Nature Reserve	Evaluation	Kenfig Archaeological Trust	2014
GGATE003605	Kenfig, Bridgend	Evaluation	Wessex Archaeology	2011
GGATE003603	Kenfig, Bridgend	Geophysical Survey	GSB Prospection	2011
GGATE003490	The Barn, Ty'n-y-Cellar Farm, Margam	Building Recording	Cardiff Archaeological Consultants	2010
GGATE003260	Ty'n y Cellar Farm	Photographic Survey	Cardiff Archaeological Consultants	2004
GGATE000160	KENFIG CASTLE, PARTIAL EXCAVATION, 1927	Partial Excavation	No information available	1927
GGATE005059	Kenfig Industrial Estate ASIDOHL	Desk Based Assessment	Archaeology Wales	2013
GGATE003718	Marlas-Raos Sewage Pipeline	Desk Based Assessment	Glamorgan-Gwent Archaeological Trust (GGAT)	1992

Record Number	Name	Event Type	Organisation	Year
GGATE004941	Merthyr Mawr, Kenfig and Margam Burrows	Historic Landscape Characterisation	Glamorgan-Gwent Archaeological Trust (GGAT)	2003
GGATE005426	Swansea Bay Coastal Village Study	Historic Area Assessment	No information available	1988

Source: Heneb GGA HER 2024

Appendix G
Geo-Environmental Baseline Report

MOTT MACDONALD

Geo-Environmental Baseline Report (MDEC-G01)

Future Port Talbot Multi Disciplinary Engineering Consultant (MDEC) Services

October 2024

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Geo-Environmental Baseline Report (MDEC-G01)

Future Port Talbot Multi Disciplinary Engineering Consultant (MDEC) Services

October 2024

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1 Introduction

1.1 General

The future vision for Port Talbot comprises of transitioning to a new, zero-carbon system by introducing facilities for manufacturing floating offshore wind (FLOW) units that will be deployed into the Celtic Sea. Mott MacDonald has been engaged by Associated British Ports (ABP) as the MDEC (Multi-Disciplinary Engineering Consultant) with Royal Haskoning DHV as their prime subcontractor. The scope of the MDEC services is to provide the strategic definition and overall technical masterplan for Future Port Talbot, followed by the RIBA Stage 1 and 2 design and preparation of the scope of services for the subsequent RIBA Stage 3 design and input for the FLOW facilities. The services support the consents and licences applications being prepared by the client and others for the proposed programme of works at Port Talbot in South Wales.

1.2 Scope

The purpose of this report is to summarise the spatial extent, quality and technical coverage of existing information. The report covers both the marine and terrestrial environment and provides a strategy for the optimum deployment of ground investigation campaigns to inform the different design phases.

This report provides a review of available information including historical maps, historical ground investigations, photographs, published literature and as-built information and describes potential geotechnical and geo-environmental constraints on the proposed development arising from the anticipated ground conditions. It sets out the geotechnical and geo-environmental baseline at the site, defining areas where:

- ground investigation information is available, to inform the scope of any future ground investigation that may be required;
- Identify areas where potential geotechnical risks may be present including but not limited to soft or compressible ground, buried structures, shallow or artesian groundwater, and aggressive ground conditions; and
- ground contamination may be present that has the potential to pose a risk to human health or controlled waters and hence requires consideration as part of the development.

As part of this geo-environmental baseline report Mott MacDonald have carried out a review of the two available detailed unexploded ordnance (UXO) risk assessment reports undertaken by others to determine the likely risk and identify areas that have not been subject to an UXO risk assessment.

Due to the size and complex nature of the site, which includes onshore and offshore areas the site has been divided into eight areas (Areas A – H) based approximately on the extents of the future developments.

Excluded from this report are particular recommendations for specific investigations necessary for feasibility and concept design of the proposed works. Proposals for ground investigations to support the development of the works are detailed in the following two reports:

- ABP_WSSP_23_0559_MDEC-MMD-ZC-XX-REP-GT-000001 Landside Ground Investigation Scoping Report; and
- ABP_WSSP_23_0559_MDEC-MMD-ZA-XX-REP-GT-000002 Marine Ground Investigation Scoping Report.

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This review considers the risks associated with the proposed use of the site only. This report should not be relied upon by any other third party.

2 Background

2.1 Site Location

Port Talbot is located on the southern coast of Wales, on the east side of Swansea Bay. The site is located some 5.6km to the south-west of the town of Port Talbot and some 10.5km to the south-east of Swansea. The site is also located directly adjacent to the Port Talbot steel works which borders the site to the south and east.

The site is centred at National Grid Reference SS 75556 87995. Formally used as a metalworking and coal export facility, the current site lies largely unoccupied and is crossed by a series of roads that provide access to the dock that services the current steel works to the west.

The site is irregular in shape with the on-shore areas covering an area of approximate 247 hectares and a further 580 hectares located offshore including the intertidal areas within the harbour, parts of which are expected to be reclaimed as part of the proposed development.

Due to the size of the site, existing data available for review has been subdivided geographically into the eight areas as presented below.

The site extents including the sub-division into the areas above is shown on Figure 2.1, with details of their historical land uses in Section 4 and topography in Section 5.1.

2.1.1 Area A: Tidal Harbour

This area is approximately circular and comprises the Tidal Harbour located on the coastline some 200m to the west of the existing Tata steelworks. The area is bounded to the north and south by breakwaters some 0.94km and 1.60km in length respectively with the centre of the site comprising the intertidal harbour. There is a jetty used to import raw materials to the steelworks via ships which extends into the area from the eastern boundary.

2.1.2 Area B: Sounder Triangle Redevelopment

This triangular area is located to the south-east of Area A and currently comprises a generally undeveloped parcel of land. The area is bounded to the south and west by intertidal areas with rock armour sea defences. The only notable developments in the area comprise a wind turbine and telecommunications mast in the south-east corner and a conveyor system used to transport materials from Area A to the Steel Works facility to the north-east.

2.1.3 Area C: Harbourside

This irregularly shaped area is located in the approximate centre of Port Talbot and is bounded to the north by Areas D and H, the Tata steelworks to the east and south and Area A to the west. This area is generally clear of structures but has historically been used for mineral extraction (sand quarry) and industrial purposes including railway.

2.1.4 Area D: Talbot Wharf

This irregularly shaped area is located immediately to the north of Areas C and H and comprises the northern boundary of the wider Port Talbot site. The site is generally clear of structures however there is evidence of previous structures with only three industrial style buildings located on the south of the area with smaller ancillary structures in their vicinity. There is evidence of other structures occupying the site historically evidenced by the presence of floor slabs across the area.

2.1.5 Area E: Lock and approach channel

This approximately rectangular area is located within an inter-tidal area immediately to the north of Area A and comprises the approach channel for the Impounded Docks (Area H). The area is orientated in an approximately east-west direction and is understood to comprise a dredged channel through which ships may pass to access and egress the impounded docks. Additionally, the River Afan flows through the site before discharging into Swansea Bay.

2.1.6 Area F: Port Talbot Harbour Limit

This irregularly shaped area is located entirely within the marine environment and comprises the marine boundaries of the port's limitations. The area is located to the west of all sites.

2.1.7 Area G: Main Channel

This approximately rectangular area is located fully within the marine environment and to the south-west of Area A.

The area comprises the dredged approach channel which feeds into the Tidal Harbour (Area A) and the Impounded Docks (Area H) and is orientated in an approximately northeast-southwest direction.

2.1.8 Area H: Impounded docks

This irregularly shaped area comprises the impounded dock of the original Port Talbot Docks. Access for ships is via a set of lock gates located to the west, which are used to maintain sufficient water level during low tides.

Figure 2.1: Illustration of areas within the Future Port Talbot site



Source: extracted from ArcGIS (Earthstar Geographics)

Note: The red line represents ABP land ownership boundaries, the white line/areas represent the areas identified in section

2.2 Proposed Site Development

The Future Port Talbot programme aims to deliver:

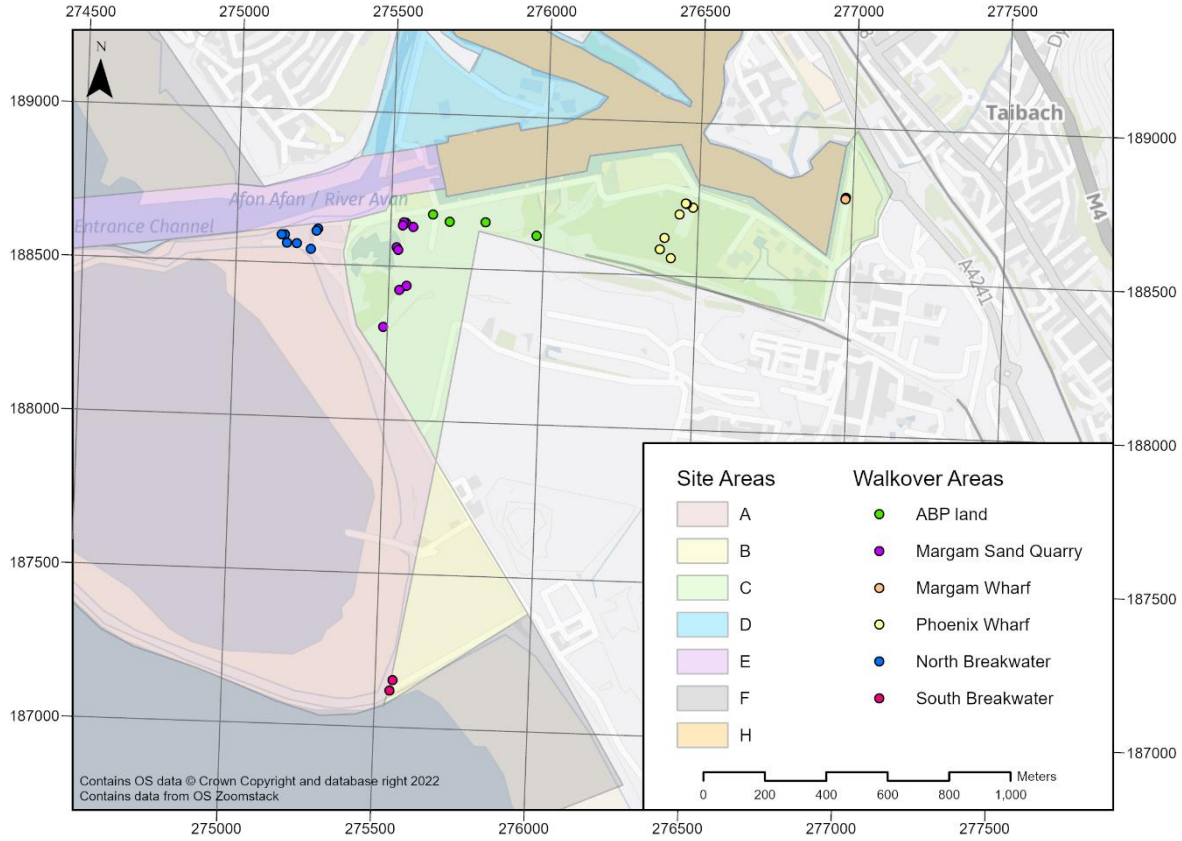
- a base for the manufacture, assembly, load-out, commissioning and storage of FLOW turbines – to support wind farms to be developed in the Celtic Sea from the year 2030 onwards;
- production and export facilities for sustainable aviation fuel;
- on-site renewable energy generation;
- enabling of decarbonisation of the Port Talbot Steelworks by Tata Steel;
- environmental enhancements;
- strengthening of community engagement with the port; and
- development of a thriving economic eco-system based around zero carbon industries – a modern industrial revolution for Port Talbot, with benefits felt across South Wales and the UK.

2.3 Site Walkover

A site walkover with ABP was undertaken on the 28th June 2023 to observe the existing ABP land at Port Talbot docks. The visit was focussed on Areas B and C being the main landward areas of the site. Area D was not accessible. The marine areas A, E and H were observed from the land. Areas F and G are fully marine and were not within the scope of the site visit. The site walkover allowed identification of some of the major constraints to the planned development with a summary of key observations from the walkover presented below, with particular locations noted shown on Figure 2.2.

Full site walkover notes can be found in Appendix B.

Figure 2.2: Locations of notes taken during site walkover (28th June 2023)



Source: ArcGIS and Survey 123

2.3.1 Area A: Tidal Harbour

2.3.1.1 North Breakwater

A Grade II listed harbour-watch tower is present at the eastern end of the north breakwater. The ABP building Puckey House is also located in this area.

Slag is apparent at the top of the rock armour along both sides of the breakwater, ranging from cobble- to boulder-sized pieces. Some areas of cracking along the edge of the tarmac road above the beach area are evident along the crest of the rock armour protection on the south side of the breakwater. This may be due to undercutting by seawater at high tide however, due to the proximity to the edge of the rock protection, an exact cause could not be identified during the walkover. A section of road has collapsed along the top of the beach area presumably caused by erosion from high tides.

2.3.1.2 South Breakwater

The south-east corner of the tidal harbour comprises a sand beach with rock armour which extends along the northern face of the southern breakwater. The southern face of the breakwater is protected along its full length by concrete armour blocks. The land to the east of south breakwater is part of Area B, Sounder Triangle Redevelopment.

2.3.2 Area B: Sounder Triangle Redevelopment

2.3.2.1 South Breakwater

The land behind the rock armour is sandy at surface. According to the ABP representative on site, this area of land was reclaimed in the 1960s/1970s after the 1964 Harbour Act, as also shown on historical mapping (also see Section 4.1.2Area B: Sounder Triangle Redevelopment). The tidal harbour and south breakwater were also constructed during this time.

2.3.3 Area C: Harbourside

The site walkover within Area C was undertaken across the following sub-areas: Margam Sand Quarry, Phoenix Wharf, Margam Wharf and the ABP land next to ore piles.

2.3.3.1 Margam Sand Quarry

Several existing boreholes were noted on site. The borehole covers were observed to be rusted with no markers or labels. Some boreholes with open covers contained groundwater or gas monitoring pipes however, some of the borehole covers were rusted shut.

Large areas of flat ground were noted in this area. These appear to be areas where molten material had been poured out onto the ground and rapidly cooled.

Areas of dumped material were also noted across the site which had a white, outer crust which is likely to have formed from rapid cooling and a dark inside.

Large areas where vegetation had been removed or flattened to form trackways were noted. There are areas of the quarry which have not been infilled and were observed to be filled with water.

2.3.3.2 Phoenix Wharf

Several boreholes were found within this area during the site walkover. Some of these boreholes had labels attached showing borehole IDs. Labels were found for boreholes WS07, WS11 and BH108, which appear to be from the Tweedie Evans Consulting Phoenix Wharf 2022 ground investigation[23]. Other boreholes, potentially related to earlier phases of ground investigation, were not labelled and the relevant ground investigation could therefore not be identified. Groundwater and gas monitoring pipes were observed in the majority of the boreholes as the covers were unlocked and could be opened.

A disused railway line runs along the southern edge of the Phoenix Wharf area located on an embankment.

The ground in the area was noted to be sandy with slag and rock fragments at surface.

2.3.3.3 Margam Wharf

Numerous spoil heaps were apparent across the area. These heaps contained various types of manmade material including refractory brick and vesicular slag. No additional visual or olfactory evidence of contamination was observed during the site walkover.

A raised area along the edge of the dock was noted as evidence of the previous use of the area as a wharf and docking area.

2.3.3.4 ABP land next to ore piles

A fence indicates the boundary between the ABP land and the TATA Steel land as well as the southern boundary of Area C. This fence is located near a set of ore piles located on Tata Steel land. The ground was noted to be sandy at surface. According to the ABP representative on

site, the material underneath the surface layer is mostly sand. Several pieces of artificial material were found on the ground in this area including porous slag and coal. No additional visual or olfactory evidence of contamination was observed during the site walkover.

3 Sources of Information

3.1 Historical Ordnance Survey Maps

The following sources of information have been used as part of the historical map review process:

- National Library of Scotland Side-by-Side Map Viewer[1];
- Google Earth Pro[2]; and
- historic Ordnance Survey maps[3].

3.2 Geological Maps

The following sources of information have been used to determine the geological conditions underlying the site:

- British Geological Society GeoIndex Onshore[4];
- British Geological Society GeoIndex Offshore[5];
- British Geological Survey Sheet 247 Swansea (1:50,000) Bedrock and Drift[6];
- British Geological Survey National Grid Series Sheet SS78NE (1:10,560) Bedrock and Drift[7];
- BGS Lexicon of Named Rock Units[8]; and
- Coal Authority Interactive Map Viewer[9].

3.3 Previous Desk Studies and Ground Investigations

3.3.1 Area A: Tidal Harbour

At the time of writing, a single ground investigation is known to have been carried out in this area, as presented in the following report:

- Fugro Limited, Marine and Geotechnical Site Investigation Report, Port Talbot Tidal harbour, Wales (1995)[10];
- Port Talbot Harbour: planning and design (1970)[11];
- George Wimpey & Co, Lab ref no. S/1617 (April 1958)[12];

[1] Side by side georeferenced maps viewer - Map images - National Library of Scotland (nls.uk) (Accessed July 2023).

[2] Earth Versions – Google Earth (Accessed July 2023).

[3] AECOM Land at Harbourside, July 2022 Geo-Environmental and Geotechnical Desk Study Ref: 60666960/5.1 Rev 2.

[4] GeoIndex (onshore) - British Geological Survey (bgs.ac.uk) (Accessed July 2023).

[5] GeoIndex (offshore) - British Geological Survey (bgs.ac.uk) (Accessed July 2023).

[6] British Geological Survey (2011). 1:63,360/1:50,000 geological map series, sheet number 247, solid and drift. Swansea.

[7] British Geological Survey (1970). 1:10,560/1:10,000 geological map series. Sheet SS78NE. Solid and drift.

[8] British Geological Survey (2023). Lexicon of Named Rock Units (https://www.bgs.ac.uk/Lexicon/).

[9] Interactive Map Viewer | Coal Authority (bgs.ac.uk) (Accessed July 2023).

[10] Fugro Limited, Marine and Geotechnical Site Investigation Report, Port Talbot Tidal harbour, Wales, November 1995, Ref: 55090-1.

[11] Port Talbot Harbour: planning and design. D.G. McGarey and P.M. Fraenkel. (1970).

[12] George Wimpey & Co, Consulting Engineers Final Report, Lab ref no. S/1617, April 1958.

- George Wimpey & Co, Lab ref no. S/2333 (May 1960)[13];
- George Wimpey & Co, Lab ref no. S/2475 (January 1961) - Shown on Rendell, Palmer & Tritton, Port Talbot Harbour – Drawings[14];
- George Wimpey & Co, Lab ref no. S/5052 (February 1966)[15]; and
- George Wimpey & Co, Lab ref no. S/5273 (July 1966)[16].

3.3.2 Area B: Sounder Triangle Redevelopment

The following reports have been reviewed:

- Sinclair Knight Merz, Port Talbot Renewable Energy Plant, Environmental Desk Study Report (2006)[17];
- Tweedie Evans Consulting Ltd ABP Margam Sands Desk Study (2021)[18];
- Tweedie Evans Consulting Ltd ABP Margam Sands Land Contamination Assessment (2022)[19];
- Costain BGS boreholes (1997)[4];
- Earlswood Materials Laboratory (1994)[4]; and
- George Wimpey & Co, Lab ref no. S7701 (June 1970) - Shown on Rendell, Palmer & Tritton, Port Talbot Harbour – Drawings[20].

3.3.3 Area C: Harbourside

The following reports have been reviewed:

- AECOM, Land at Harbourside, Geo-Environmental and Geotechnical Desk Study (2022)[21];
- Tweedie Evans Consulting Ltd 2022 Phoenix Wharf, Port Talbot Desk Study (2021)[22];
- Tweedie Evans Consulting Ltd, 2022 Phoenix Wharf, Port Talbot Ground Investigation Report (2022)[23];
- Sinclair Knight Merz, Port Talbot Renewable Energy Plant, Environmental Desk Study Report (2006)[24];
- Apex Drilling, Tata Steel Boreholes (2020)[25];

[13] George Wimpey & Co, Report on Site Investigation for Proposed Development at Port Talbot Docks, Lab ref no. S/2333, May 1960.

[14] George Wimpey & Co, Proposed New Harbour at Port Talbot Glamorgan, Lab ref no. S/2475, January 1961.

[15] George Wimpey & Co, Proposed New Harbour at Port Talbot Glamorgan, Lab ref no. S/5052, February 1966.

[16] George Wimpey & Co, Proposed New Harbour at Port Talbot Glamorgan, Lab ref no. S/5273, July 1966.

[17] Sinclair Knight Merz, Port Talbot Renewable Energy Plant, Environmental Desk Study Report, May 2006, Ref: EE10239.

[18] Tweedie Evans Consulting Ltd 2021 ABP Margam Sands Desk Study, November 2021, Ref: 2109014.001.01.

[19] Tweedie Evans Consulting Ltd, ABP Margam Sands Land Contamination Assessment, March 2022, Ref: 2109014.002.01.

[20] George Wimpey & Co, Proposed New Harbour at Port Talbot Glamorgan, Lab ref no. S/7701, June 1970.

[21] AECOM, Land at Harbourside, July 2022, Geo-Environmental and Geotechnical Desk Study, Ref:60666960/5.1 Rev 2.

[22] Tweedie Evans Consulting Ltd 2022 Phoenix Wharf, Port Talbot Desk Study, June 2022, Ref: 2111006.002.01.

[23] Tweedie Evans Consulting Ltd, Phoenix Wharf, Port Talbot Ground Investigation Report, June 2022, Ref: 2111006.003.01.

[24] Sinclair Knight Merz, Port Talbot Renewable Energy Plant, Environmental Desk Study Report, May 2006, Ref: EE10239.

[25] Apex Drilling Percussion Drilling Log, Tata Steel, July 2020.

- Sinclair Knight Merz, Port Talbot Renewable Energy Plant, Phase II Geo-Environmental Investigation (2007)[26];
- Soil Mechanics, Port Talbot Renewable Energy Plant, Port Talbot Docks (2009)[27];
- Terra Firma (South), Factual Ground Investigation Report, Proposed Quarry Infilling, Margam Sand Quarry, Port Talbot Docks (2014)[28]; and
- George Wimpey & Co, Port Talbot Development (May 1960)[29].

3.3.4 Area D: Talbot Wharf

In addition to the borehole records available through BGS GeoIndex[4], the following reports have been reviewed:

- Wardell Armstrong, Talbot Wharf, Port Talbot Docks, Phase 1 Geo-environmental and geotechnical desk study (July 2016)[30]; and
- Mott MacDonald, Talbot Wharf Vegetation Clearance Ecology Strategy Technical Note (September 2023)[31].

3.3.5 Area E: Lock and Approach Channel

At the time of writing, a single ground investigation report is known to have been carries out in this area, as presented in the following report, along with borehole records available through BGS GeoIndex[4]:

- George Wimpey & Co, Lab ref no. S/1617 (April 1958) [32]

3.3.6 Area F: Port Talbot Harbour Limit

At the time of writing Mott MacDonald are not aware of any desk studies or ground investigations that have been carried out in this area, nor are there any publicly available borehole records in the area.

3.3.7 Area G: Main Channel

At the time of writing, a single ground investigation is known to have been carried out in this area, as presented in the following report:

- Fugro Limited, Marine and Geotechnical Site Investigation Report, Port Talbot Tidal harbour, Wales[33]; and

[26] Sinclair Knight Merz (SKM), Port Talbot Renewable Energy Plant, Phase II Geo-Environmental Investigation, May 2007, Ref: EE10239.
[27] Soil Mechanics, Port Talbot Renewable Energy Plant, Port Talbot Docks, March 2009, Ref: H8090.
[28] Terra Firma (South), Factual Ground Investigation Report, Proposed Quarry Infilling, Margam Sand Quarry, Port Talbot Docks, June 2014, Ref: 2014.
[29] George Wimpey & Co, Port Talbot Development, Lab No. S/2333, May 1960.
[30] Wardell Armstrong, Talbot Wharf, Port Talbot Docks, Phase 1 Geo-environmental and geotechnical desk study, July 2016, Ref: CA11017.
[31] Mott MacDonald, Talbot Wharf Vegetation Clearance Ecology Strategy Technical Note, September 2023, Ref: SSP_23_0559_MDEC-MMD-ZD-XX-REP-EN-000001 P02.
[32] George Wimpey & Co, Consulting Engineers Final Report, Lab ref no. S/1617, April 1958.
[33] Fugro Limited, Marine and Geotechnical Site Investigation Report, Port Talbot Tidal harbour, Wales, November 1995, Ref: 55090-1.

3.3.8 Area H: Impounded Dock

At the time of writing Mott MacDonald are not aware of any desk studies or ground investigations that have been carried out in this area, nor are there any publicly available borehole records in the area.

3.4 Environmental

In addition to the sources detailed above, the following publicly available sources of information have been reviewed with regards to environmentally protected areas:

- Data Map Wales Interactive Viewer[34]; and
- Defra Magic Map[35].

Additionally, the following reports / drawings have been reviewed:

- Mott MacDonald, Ecology Constraints and Next Steps (CE23-01) (October 2023)[36];
- ExCal, Knotweed Management Plan (November 2022)[37]; and
- ABPmer, drawing of Section 7 habitats in the intertidal area (August 2024)[38].

3.5 Unexploded Ordnance

To date, two detailed UXO risk assessments that have been carried out by others that cover areas of the Port Talbot site:

- 6Alpha Associates (On behalf of AECOM), Detailed Unexploded Ordnance (UXO) Threat and Risk Assessment and Risk Mitigation Strategy – Port Talbot, June 2023[39]; and
- Brimstone Site Investigation, Stage 2 Detailed UXO Risk Assessment, April 2023[40].

It should be noted that these reports provide a risk assessment for Areas A, E, F, G and H and a section of Area C only.

[34] New map | DataMapWales (gov.wales) (Accessed July 2023)

[35] Magic Map Application (defra.gov.uk)

[36] Mott MacDonald, Ecology Constraints and Next Steps (CE23-01), Dated: October 2023, Ref: ABP_WSSP_23_0559_MDEC-XX-XX-REP-EN-000003

[37] ExCal, Knotweed Management Plan, Dated: November 2022, Ref: 238-08-01.R1.

[38] ABPmer, Section 7 Habitats, Dated: August 2024, Project number: 5143

[39] 6Alpha Associates, Detailed Unexploded Ordnance (UXO) Treat and Risk Assessment and Risk Mitigation Strategy – Port Talbot, June 2023, Ref:10296 V3.0

[40] Brimstone Site Investigation, Stage 2 Detailed UXO Risk Assessment, April 2023 Ref: DRA-23-1532-TWEE89R-ProjectDragon,PortTalbot

4 Site History

4.1 Historical Development

4.1.1 Area A: Tidal Harbour

Prior to its development into the tidal harbour of Port Talbot, Area A comprised an undeveloped intertidal area. The earliest maps, dating back to circa 1876, show a breakwater some circa 350m long along the northern area boundary, aligning well with the landward end of the current day breakwater. North of the breakwater is an entrance channel to the impounded dock, referred to as the 'New Dock'.

On the southern side of the current tidal harbour, the 1876 historic map shows marshland separated by the 'Old River' that discharges into the sea. Along the alignment of the current beach area (referred to as Margam Sands), the coastline is shown extending circa 600 metres west of the marsh ground and the high water level.

Between 1876 and circa 1897 to 1900, there was little development of the tidal harbour area, noting a modest extension to the northern breakwater out towards the low water line. The southern side of the tidal harbour area showed little change from preceding 1876 map.

From 1900 through to the 1949 there is little change in the landform/topography, noting the alignment of the 'Old River' had migrated to the south. Running perpendicular to the coastline and then parallel to the coast line before turning west towards the coastline.

Thereafter, significant change is noted on the 1972 historic map, with the presence of the southern breakwater, an extension to the northern breakwater and the construction of the jetty with a 'travelling crane' designated. The 'Old River' no longer discharged into the tidal harbour with the sounder triangle having been reclaimed and a beach having been formed between the northern and southern breakwaters.

Since 1972 the historic maps show development within the tidal harbour up to present conditions.

4.1.2 Area B: Sounder Triangle Redevelopment

The historic development of Area B, the Sounder Triangle is linked to the development of Area A, the Tidal Harbour. From the earliest historic map of circa 1876, the area was a mix of marsh land, an intertidal area and the discharge point of the 'Old River'.

Development of the area is shown from the 1962-1965 historic map with the infilling and reclamation of the land across which the 'Old River' flowed through the site to the coastline. Further reclamation is shown on the 1972 historic map, likely associated with the construction of the southern breakwater.

These reclamation works were completed at least by the late 1970s or early 1980's with the mapping dated 1980-1982 showing the entire site lying onshore and above the high tide line. Additionally, a conveyor system is noted to be present in the north, likely being used to transport raw materials from the harbour to the steel works site located to the north-east of Area B.

The only other significant change to the site since this time is the construction of a wind turbine and telecommunications mast in the south-east corner between 2013 and 2014 on a site measuring circa 0.2 ha in area.

4.1.3 Area C: Harbourside

There are a number of existing desk studies and ground investigations available for review covering Area C. These have generally focussed on either the Phoenix Wharf area as investigated by TEC in their Phase I Desk Study[22] and Ground Investigation report [23] in the east, or the Margam Sand Quarry in the west, investigated by SKM as presented in their Phase I Desk Study[24] and Ground Investigation report[26]. As such, Area C is split into 'east' and 'west' in this chapter for clarity over the information reviewed.

4.1.3.1 East

The earliest historic maps for the site show the site to be underlain by tidal flats with the high-water mark running approximately north-south through the centre of the site with the eastern half comprising marsh and osier.

The site remained undeveloped in 1899 however railway lines are recorded running to the south of the site in an east-west orientation. This portion of the site was first developed circa 1917 when the 'Crown Preserved Coal Works' were constructed in the central area alongside railway tracks which crossed the area. The southern half of the site remained undeveloped and labelled as 'Sand'. The coal works were replaced circa 1939 by a 'Metal Refining Works' with associated smaller buildings in the vicinity including to the east referred to as the 'Phoenix Briquetting Works' and existing railway lines were rearranged in a different layout. By 1949 the 'Metal Refining Works' were called the 'Steel Ceiling Factory' with ponds and stockpiles in the west and a warehouse in the east. During the 1960s the main works became a 'Wagon Repair Shop' with additional warehouses in the east. By the 1970s the warehouses had been demolished and replaced by square buildings with associated hoppers and a road leading to the east alongside a new Liquid Oxygen Plant an expansion of the railway network across the site. From 1980 to 1982 the site was mostly cleared leaving only the main factory building and a single building in the east, the ponds and stockpiles having also been cleared. A small electrical substation was constructed circa 1999 and remained in place until the site was cleared of all structures by 2009.

4.1.3.2 West

The historical mapping determined that the western section of the site was originally located below the high-water mark meaning that it would have been inundated by the tide with the remainder of the site comprising sand dunes and rough pasture. Even in the earliest maps dating to 1885 the breakwater at the mouth of the River Afan is shown to be present with a lighthouse located on the landward end of the breakwater.

The first evidence of development in the western section of Area C was recorded in 1899 when railway lines were recorded along its easternmost area (what is now the centre of Area C, running to the north and connecting to the wider railway network to the coast. It is assumed that these lines were used to import materials which were then used to infill the intertidal areas that were originally present.

By 1940 no areas of the site were recorded as lying below the high-water mark, suggesting that infilling and land reclamation works had been completed with the extents corresponding with the growing network of railway lines recorded in the area.

A 'Sand Pit' is first recorded on site from circa 1919 with undulating topography apparent on the mapping indicating that mineral extraction was potentially already occurring on site from this date.

By 1900 the lighthouse located on the landwards side of the breakwater was noted as being disused however a new lighthouse was noted on the seaward end of the breakwater by 1921. From this point the original lighthouse was recorded as an 'HM Coastguard Lookout Station'.

Following completion of the reclamation works circa 1940, the site has been occupied by a number of structures over the years. The purpose of many of these structures is unknown as not recorded on available historic maps.

The site remained generally undeveloped, with only limited evidence of the former sand pits recorded. Dunes with roads/tracks are shown to be present until 1993 when a structure labelled as 'Works' is shown.

The historic mapping also indicates 'Works' present in the north-west of the site from 1993. These likely refer to the sand quarrying known to have been carried out in this area of the site.

4.1.4 Area D: Talbot Wharf

Area D has remained generally unchanged throughout the site's history, with it being part of the original Port Talbot Docks which have been present since at least 1885. These earliest maps show that the site was occupied by a combination of railway lines, wharves and dock stations with coal tips and dolphins recorded immediately to the south. By the 1960's fewer wharves and additional railway lines were recorded on site and the dolphins and coal tips to the south appear to have been removed. Included within the 2016 Wardell Armstrong desk study[30], a constraints plan identifies various locations of reclaimed land. The northern edge of Area D was reclaimed by 1947/1949 (according to historic mapping). Towards the south the dry dock was reclaimed by 1980/1982 and a strip of land along the southern edge was reclaimed by 1897/1900.

Historic mapping from 1980-1982 shows that all of the railway lines have been removed and the site is occupied by structures marked simply as 'Works'. These structures remained in place until circa 2006 when aerial imagery shows that the site had been generally cleared of structures. The aerial imagery from this time shows the site to have an undulating landscape with foundation slabs apparent in several locations delineating the former location of buildings.

The review of aerial imagery dated from 2022 shows that the current site uses comprise sailing clubs, a steel reinforcement manufacturer and a mechanical engineering company.

4.1.5 Area E: Lock and Approach Channel

The current lock was built between 1885 and 1900 and replaced a smaller lock structure that was shown to be present on the 1885 OS edition to the east of the current lock. At this time the New Dock immediately behind the new lock was created. The dredged shipping channel is shown connecting the dock with the open sea. Area E has remained largely unchanged since 1900.

4.1.6 Area F: Port Talbot Harbour Limit

As this area is predominately underwater, available historical mapping is limited.

Available mapping show that over time the coastline has changed, primarily through the deposition of materials in and around the Port Talbot Docks for land reclamation as well as likely the follow-on impacts on the natural depositional environment along the coast. The Detailed Unexploded Ordnance risk assessment reports carried out by both Brimstone UXO[40] and 6Alpha Associates[39] indicate that there are several shipwrecks in the area.

4.1.7 Area G: Main Channel

A review of the available historical maps has provided little information regarding the history of this area, primarily due to it being located offshore and below the low water mark.

Bathymetric maps from 2019 indicate that the site has been subject to dredging works which were likely required to maintain a suitable channel depth for the size of ships using the harbour.

4.1.8 Area H: Impounded Docks

A review of the available historical mapping shows that this area has comprised an impounded dock since the first historical maps dating back to 1885. The mapping from this time shows that the area had already undergone industrial development indicating that the dock was already an established feature in the area at the time. Sections of the northern docks were infilled between 1892 and 1914 with the land being used for railway sidings which formed part of the Port Talbot Dock Railway with infilling works beginning in the east. Expansion works were carried out between 1907 and 1937 along the central southern boundary with the removal of land including an inn in this area. In the early 1900s the entry route for the dock expanded significantly with the construction of the New Dock in the south-west allowing the access and egress of large ships. The area has remained generally unchanged since this point with the exception of suspected sediment deposition in the north and east evidenced by the presence of vegetated but otherwise undeveloped areas of land.

4.2 Existing Services and Utilities

Information regarding buried services has been provided by ABP. This is in the form of services plan general arrangement drawings[41] dated March 2011.

Given the date of the drawings, the available information on existing services/utilities is considered likely to be outdated. It is recommended that up-to-date information is obtained and reviewed in advance of any works undertaken at the site.

The following sections summarise the existing services/utilities records from the 2011 general arrangement drawings.

4.2.1 Area A: Tidal Harbour

The general arrangement drawing shows the presence of a high voltage electric supply and a potable water supply running along the length of the iron ore jetty. There is also a high voltage electric supply leading to a substation as well as a freshwater supply near to the northern extent of the site, in the area labelled “Puckey House”. A foul water drainage channel labelled “6” also lies in this area.

4.2.2 Area B: Sounder Triangle Redevelopment

The high voltage electric supply and fresh water supply present on the iron ore jetty within Area A above are shown to continue into the northern region of Area B and along the eastern extent of this area to the pumping station adjacent to the eastern corner of the area.

4.2.3 Area C: Harbourside

The general arrangement drawings show a storm water culvert labelled “18” in the south-west, crossing through the boundary into Area E (see below). The high voltage electric supply

mentioned by “Puckey House” (refer to Area A section) continues along the northern boundary of Area C before entering Area E. A freshwater supply and low voltage electric supply run along the northern boundary of Area C. A high voltage electric supply runs along the perimeter of the area labelled “Rio Tinto Wharf”. The south-east corner of this area also contains an existing foul water drain labelled “5”. Slightly east of this is a series of surface water drains numbered “11-17” on the general arrangement drawing.

4.2.4 Area D: Talbot Wharf

The general arrangement drawings show that a fresh water supply follows the perimeter of the Talbot Wharf region, with a number of linear features, likely pipework continuing through the site. There is also a freshwater supply present along the length of the North Bank and two small surface water drainage channels labelled “8” and “9” near the centre of the southern boundary. A soakaway is present to the east of the drainage channels. A high voltage electrical supply runs along the north boundary of the Area D, leading to a small substation. Three existing foul water drainage channels lie along the southern boundary of the site, labelled “2”, “3” and “51”.

4.2.5 Area E: Lock and Approach Channel

The high voltage electric supply in Area C continues into Area E, travelling through the lock into the pumping station. There is also a network of freshwater supply pipes around the perimeter of the lock. There is an existing foul water drainage channel on the northern side of the lock, labelled “1”. The storm water culvert, “18”, mentioned in Area C also continues into this area.

4.2.6 Areas F, G and H: Port Talbot Harbour Limit, Main Channel and Impounded Docks

There are no known records of services or utilities in these areas as they are all marine environments. As such it is unlikely that services or utilities would be present in these areas.

4.3 Unexploded Ordnance

As presented in section 3.5, two detailed Unexploded Ordnance (UXO) risk assessment reports have been carried out to determine the likely risk of UXO on site. One was carried out by Brimstone UXO[40] in April 2023 and covered three sites, located in the eastern section of Area C and including a small section of Area H as shown in Figure 4.1

Figure 4.1: Extents of the UXO risk assessment report undertaken by Brimstone UXO



Source: Brimstone UXO risk assessment report[40]

Brimstone UXO concluded that the risk of encountering Unexploded Ordnance within the assessment boundary is low to moderate and moderate, with the highest risks being present in the northern half of Site A and in the entirety of Site B.

The other detailed UXO risk assessment report was undertaken by 6Alpha Associates[39] in May 2023 and included a large swathe of the offshore environment encompassing the areas referred to as Areas E, F and G as well as the intertidal area of Area A and sections of the onshore land including Areas B and C as shown in Figure 4.2.

Figure 4.2: Extents of the RXO risk assessment undertaken by 6Alpha Associates



Source: 6Aplha Associates UXO risk assessment report[39]

The 6Alpha Associates report determined the offshore areas outside of the main Port Talbot Harbour to be high risk in relation to the potential of encountering UXOs, with these, if present, buried at depths of between 2m and 7m within the sediment offshore and up to 16m below ground level on shore. 6Alpha noted that a minimum of 7.2m of seabed was dredged during the construction of the harbour and as such the risk in this area is considered to be low as the dredging works were carried out after the end of World War II.

In the areas where land has been reclaimed and the redevelopment of industrial facilities at the port has occurred between 1965 and 1982, the risk is considered to be low as any munitions present were likely identified and remediated. 6Aplha Associates concluded that *'in most areas, it is not possible to prove that the associated development works have involved the disturbance of ground down to the likely average UXO burial depth of 7m bgl and therefore, a risk zoning diagram could not be provided.'* As such 6Alpha Associates was unable to fully assess the risk for the onshore areas.

4.4 Environmental Protected Areas

In order to determine whether any of the areas are located partially or wholly within an environmental protection area, the previous desk studies[17,18,21,22], and the sources stated in Section 3.4 were reviewed. Environmentally sensitive land uses include:

- Sites of Special Scientific Interest;
- Special Protected Areas;
- Special Areas of Conservation;
- Groundwater Source Protection Zones;
- Nitrate Vulnerable Zones;
- Section 7 Habitats; and
- Ecologically sensitive areas.

4.4.1 All areas

Multiple protected species have potential to be present on-site including, but not limited to:

- Bats;
- Birds;
- Reptiles and
- Amphibians including GCN.

4.4.2 Area A: Tidal Harbour

Within the intertidal area of Area A multiple Section 7 habitats are noted in a drawing by ABPmer (August 2024)[38], these include:

- Small spots of Sabellaria alveolata;
- A linear area of Intertidal Boulder Communities along the revetment north of the Jetty;
- Intertidal mudflats predominantly south of the Jetty; and
- Large area of peat and clay exposures along the beach north of the Jetty.

The peat and clay exposures are the mostly highly protected of these habitats.

4.4.3 Area B: Sounder Triangle Redevelopment

Small areas of the protected species Orobranche Picridis are confirmed to be located south of Area B (along the breakwater) and in the northmost corner.

4.4.4 Area C: Harbourside

Area C is not located within any designated areas of an environmentally sensitive nature, with only a single area of Ancient Woodland being located 1km to the east.

Small areas of the protected species Orobranche Picridis are confirmed within Area C, with larger areas found in the northeast-most extent of Area C and west of Area C's western boundary (along the coast).

Japanese Knotweed is present within Area C, predominantly within the Pheonix Wharf area and anecdotally identified within the reedbed area east of Phoenix Wharf.

4.4.5 Area D: Talbot Wharf

Japanese Knotweed has been identified in multiple locations within Area D.

4.4.6 Area E: Lock and Approach Channel

Area E is not located within any designated areas of an environmentally sensitive nature, nor are there any located within 1km of the area.

4.4.7 Area F: Port Talbot Harbour Limit

Area F is not located within any designated areas of an environmentally sensitive nature, nor are there any located within 1km of the area. The area is however recorded on DataMapWales[34] as being located within a Shellfish Waters Protected Area.

4.4.8 Area G: Main Channel

Area G is not located within any designated areas of an environmentally sensitive nature, nor are there any located within 1km of the area. The area is however recorded on DataMapWales[34] as being located within a Shellfish Waters Protected Area.

4.4.9 Area H – Impounded Docks

Area H is not located within any designated areas of an environmentally sensitive nature, nor are there any located within 1km of the area.

5 Ground Conditions

5.1 Topography

5.1.1 Area A: Tidal Harbour

A bathymetric survey carried out in 2018 by OWC[42] found that the centre of the area is generally flat and level at a depth of -11mOD rising steeply around the perimeter to a level of 2m to 3m AOD along the northern and eastern boundaries. In the vicinity of the wharf, the levels drop to between -6mOD and -18mOD.

5.1.2 Area B: Sounder Triangle Redevelopment

At the time of writing Mott MacDonald is not aware of a topographic survey of this area having been carried out. From the available aerial imagery and topography data available through Google Earth[2], the area appears to be generally flat and level at an elevation of between 8m and 9m AOD.

5.1.3 Area C: Harbourside

A topographic survey carried out by AP Land Surveys[43] in 2021 indicates that Area C is generally flat and level at between 9m AOD and 10m AOD in the west and between 9m AOD and 7m AOD in the east. The location of the former Margam Sand Quarry in the north-west is noted to undulate in level from between 5mAOD to 10mAOD likely representing the historic quarrying works that were carried out in this area. Within the central northern section, a raised area, located at 12m AOD is recorded, likely indicating embankments associated with the historic railway lines that are known to have traversed the area. The east is also generally flat and level at an elevation of between 7m AOD and 9m AOD.

5.1.4 Area D: Talbot Wharf

At the time of writing, Mott MacDonald are not aware of a topographic survey of this area having been carried out. From the available aerial imagery and topography data available through Google Earth[2], the area appears to be generally flat and level at an elevation of between 8m AOD and 9m AOD.

5.1.5 Area E: Lock and Approach Channel

Area E is located within the intertidal area. No topographic or bathymetric survey covering this area has been made available.

Aerial imagery[2] shows that the centre of Area E remains underwater at low tide as would be expected with the main channel of the River Afan continuing to carry water and sediment into Swansea Bay. Additionally, erosion channels can be seen draining the banks to the north and south likely caused by a combination of groundwater flow and surface runoff as the tide recedes. These are likely to be ephemeral in nature and will likely change and migrate over time.

[42] OWC, Port Talbot Bathymetry Draft, Ref: 922032021 Dated: May 2022

[43] AP Land Surveys, ABP Port Talbot Topographic Survey Site Overview December 2021, Ref: APLS-1174-001

5.1.6 Area F: Port Talbot Harbour Limit

Area F is located offshore. Bathymetric surveys[44] covering this area show that, as would be expected, the seabed to decrease with distance from the shore.

5.1.7 Area G: Main Channel

Area G is located offshore. This area comprises the approach channel for both the Port Talbot Docks and Harbour and is known to have been subject to dredging works. Available bathymetric data[44] confirm a general decreasing of ground elevation in this area.

5.1.8 Area H: Impounded Docks

A bathymetric survey carried by UK Dredging in 2023[45] shows that the deepest part of the area is located in the centre of the dock and extends towards the dock gates to the south-west. The dock spurs to the north, north-east and east are generally shallower indicating an accumulation of sediment in these areas. The water depth within the impounded dock is understood to be maintained at an elevation of typically +5.6mOD.

5.2 Mining and quarrying

The South Wales Coal Measure Formation which underlie the site are known to have been historically been mined in and around Port Talbot.

As such, a preliminary of review mining data for the site (all Areas) has been undertaken using the Coal Authority Interactive Viewer[9].

This review has confirmed that the site (all Areas) is located within a Coal Mining Reporting Area. Other key observations include:

- the site (all Areas) is not located within a development high risk area;
- there are no records of surface of potential shallow coal mining being carried out on site;
- there are no known coal seams outcropping on site; and
- no mine entries are located within 1km of the site, with the nearest mine entry recorded some 2km to the south-east.

A review of the published geology (also refer to section 5.3) has indicated the presence of the inferred 2ft9 coal seam within the South Wales Middle Coal Measures in Areas A and B. No dip information or inclinations are given in the published geological maps and it is noted that the area is heavily faulted. However, from review of the local geology, the South Wales Middle Coal Measures strata are anticipated to dip towards the north-east and as such are deepening beneath the site.

Coal tips are indicated at wharfs along the edges of Areas C, D and H on historical maps[21] however, due to their location they are most likely to be machinery associated with the loading of coal onto ships. There are no apparent colliery spoil tips on the site according to the historical maps[21].

It should be noted that the Morfa Colliery is located some 2km to the south-east of the site which is known to have been advanced 767m below ground level. There are no records of colliery waste being deposited on site but the presence of colliery waste being present cannot be discounted.

[44] UK Dredging Bathymetric Survey Drawing, January 2023, Ref: PTS017/PD/20.10

[45] UK Dredging Bathymetric Survey Drawing, January 2023, Ref: PTS018/PD/23.01

Based on the geology at the site, the presence of deep, unrecorded mine workings cannot be discounted. It is noted that with the 2022 TEC Desk Study report[22] indicated that investigation works '*found coal beds at varying depths between 31 and 47.2mbgl in 10 exploratory holes, with one of the boreholes described by the drillers as having a coal seam between 34 and 36mbgl followed by backfilled workings of coal'.* These boreholes are located within Area C.

The AECOM Phase 1 Geo-Environmental Desk Study from July 2022[21] includes a "CON29M Coal Mining Report" from the Coal Authority which identifies a historic working a probable worked seam at a depth of 750 m to 770 metres depth, last worked in 1906. The report states that any coal mining activity associated with these workings should have stopped by now.

From a review of the above information and considering the nature of the proposed works, particularly the loads associated with the manufacture, assembly, and storage of FLOW turbines, the risk of existing coal mining beneath the site negatively affecting the development proposals cannot be discounted. As such, it is recommended a detailed Coal Authority mining risk assessment report is acquired for all areas and the risk to the development proposals reviewed upon completion of any additional ground investigations undertaken at the site and once the site proposals have been further developed.

5.3 Published Geology

5.3.1 Overall Published Geology and Hydrogeology

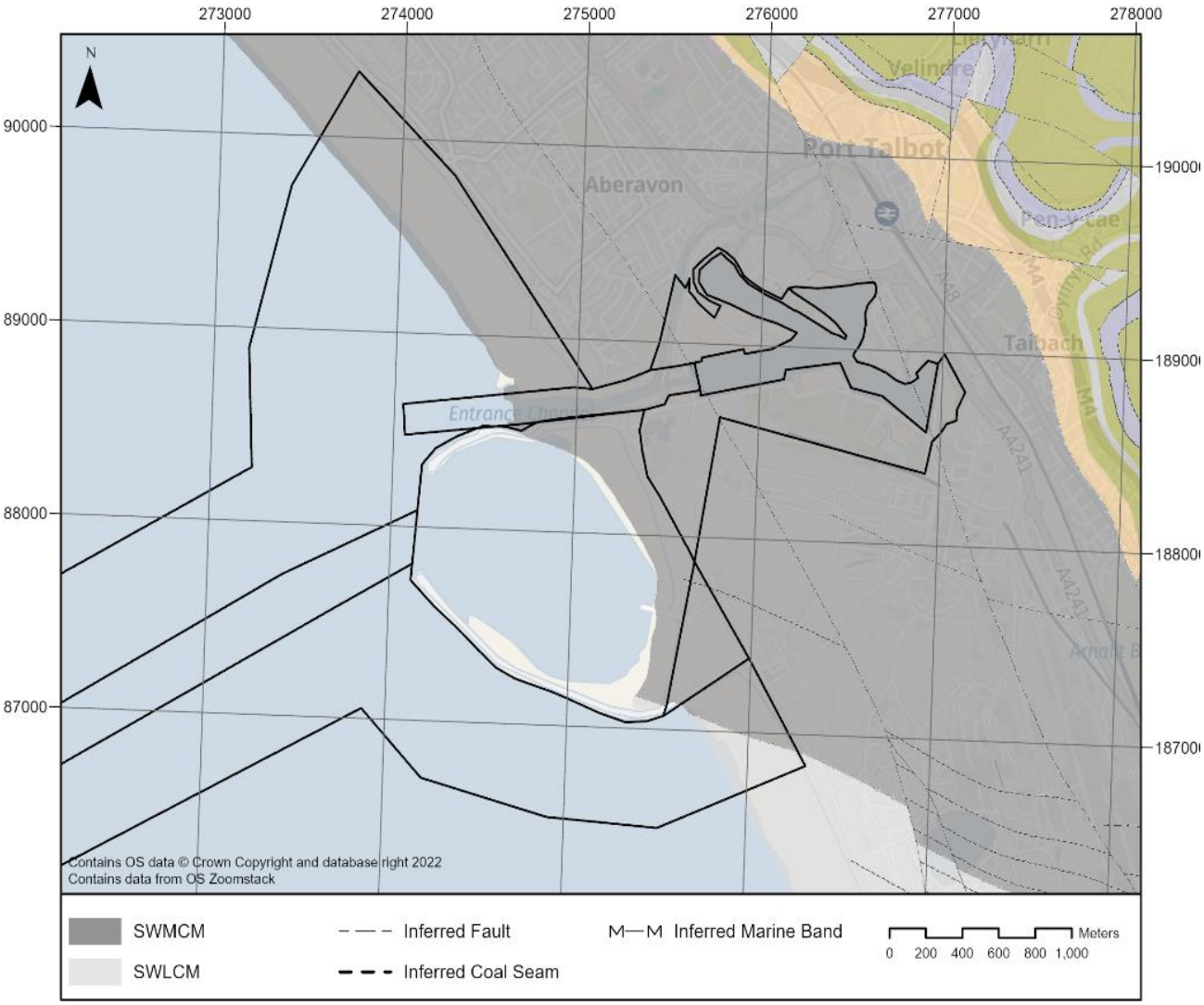
Table 5.1 outlines the geological and hydrogeological units indicated underlying each area in published maps. The location and lateral extents of these units are shown in Figure 5.1 and Figure 5.2.

Table 5.1: Geological units shown on published maps

Unit	Description
Superficial materials	
Made Ground (undivided)	Where the pre-existing land surface is raised by artificial deposits
Landscaped Ground (Undivided)	Where the land surface has been extensively remodelled. Variable composition
Storm Beach Deposits	Low rounded ridge of coarse materials (gravel, cobbles and boulders) piled up by very powerful storm waves at the inland margin of a beach, above the level reached by normal spring tides
Blown Sand	Sand
Tidal Flat Deposits	Unconsolidated sediment, mainly mud and/or sand
Marine Beach Deposits	Intertidal zone deposits consisting mainly of sands with subsidiary gravels. Shell fragments may be present. Shingle, sand, silt and clay; may be bedded or chaotic.
Bedrock	
South Wales Middle Coal Measures Formation	Grey, (productive) coal-bearing mudstones/siltstones, with seatearths and minor sandstones. Moderately productive aquifer. Regional, cyclic multi-layered aquifer with moderate yields from sandstones and many springs. Mine water quality poor but elsewhere reasonable.
South Wales Lower Coal Measures Formation	Grey, (productive) coal-bearing mudstones/siltstones, with seatearths and minor sandstones. Moderately productive aquifer. Regional, cyclic multi-layered aquifer with moderate yields from sandstones and many springs. Mine water quality poor but elsewhere reasonable.

Information included in sections 5.3.2 to 5.3.9 has been obtained from review of the BGS GeoIndex[4] and Sheet 247[6], unless otherwise stated. Note, the presence of Glacial Deposits is not identified on the geological maps and is not included in the table above.

Figure 5.1: Bedrock Geology underlying the site

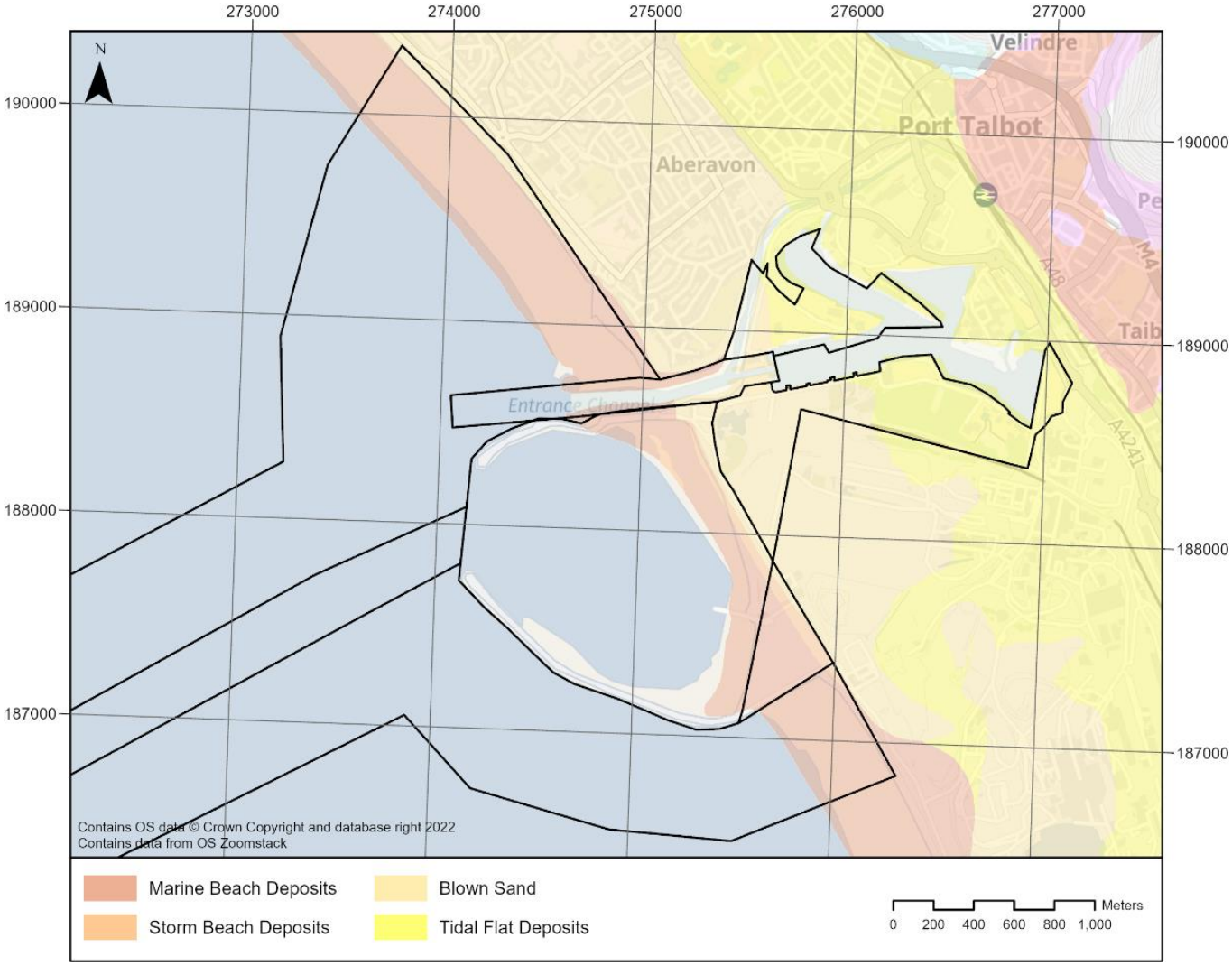


Source: ArcGIS

SWMCM – South Wales Middle Coal Measures

SWLCM – South Wales Lower Coal Measures

Figure 5.2: Superficial Geology at the site



Source: ArcGIS

5.3.2 Area A: Tidal Harbour

5.3.2.1 Published Geology

The bedrock underneath Area A comprises strata of the South Wales Middle Coal Measures Formation with a small area of the South Wales Lower Coal Measures Formation in the south of the area. These two formations appear to be separated by the Vanderbeckei (Amman) Marine Band (VMB). The mapped extent of the 2ft9 coal seam appears to extend into the area from the east.

The superficial deposits along the coastline of Area A are formed of Marine Beach Deposits with thin bands of Storm Beach Deposits and Blown Sand. The breakwaters and the centre dock are shown as Made Ground whereas the land along the coastline is shown as Landscaped Ground.

The bedrock underlying the area is a high vulnerability Secondary A aquifer and is part of the Pennine Middle Coal Measures Formation and South Wales Middles Coal Measures Formation (undifferentiated) as well as the Pennine Lower Coal Measures Formation and South Wales Lower Coal Measures Formation (undifferentiated) in the south. The superficial deposits

underlying the site are high vulnerability Secondary A and Secondary (undifferentiated) aquifers.

5.3.3 Area B: Sounder Triangle Redevelopment

The bedrock underlying Area B comprised South Wales Middle Coal Measures. The 2ft9 coal seam is shown to underlie the site through the northern corner of the area, in an approximately west-north-west to east-south-east direction. Marine Beach Deposits are indicated across the majority of the area with a band of Storm Beach Deposits running approximately northwest – southeast and a small area of Blown Sand shown along the north-eastern boundary.

Most of the area is shown to be covered in Landscaped Ground with just the area leading to the breakwater shown as Made Ground however it is expected the significant deposits of Made Ground will be present across the site.

The bedrock underlying the area is a high vulnerability Secondary A aquifer and is part of the Pennine Middle Coal Measures Formation and South Wales Middles Coal Measures Formation (undifferentiated). The superficial deposits underlying the site are high vulnerability Secondary A and Secondary (undifferentiated) aquifers.

5.3.4 Area C: Harbourside

South Wales Middle Coal Measures underlie Area C. The Giant's Grave Fault is shown running through the area near to the lock, striking approximately south-south-east to north-north-west.

The superficial deposits in the area are formed of Blown Sand and Tidal Flat Deposits with Landscaped Ground indicated also. Although Made Ground is not recorded on site by the BGS it is expected that Made Ground will be present across the majority of the site given its history of development, mineral extraction and infilling/reclamation works.

The bedrock underlying the area is a high vulnerability Secondary A aquifer and is part of the South Wales Middles Coal Measures Formation (undifferentiated). The superficial deposits underlying the site are high vulnerability Secondary A and Secondary (undifferentiated) aquifers.

5.3.5 Area D: Talbot Wharf

The bedrock underlying Area D comprises the South Wales Middle Coal Measures. The Giant's Grave Fault is shown, striking approximately south-south-east to north-north-west through the west side of the area.

The superficial deposits underneath the area are shown as Blown Sand and Tidal Flat Deposits and the artificial ground is shown as Landscaped Ground. Made Ground is not recorded by the BGS, however it is expected that Made Ground will be present across the majority of the site given its history of development.

The bedrock underlying the area is a high vulnerability Secondary A aquifer and is part of the South Wales Middles Coal Measures Formation (undifferentiated). The superficial deposits underlying the site are high vulnerability Secondary A and Secondary (undifferentiated) aquifers.

5.3.6 Area E: Lock and Approach Channel

The bedrock underlying Area E comprises the South Wales Middle Coal Measures.

There are no recorded superficial deposits in this area however fine-grained sediments are expected to be present having been deposited by the River Afan which flows through the area as well as tidal beach deposits due to its location on the coast.

5.3.7 Area F: Port Talbot Harbour Limit

The coastal areas in Area F either side of the tidal harbour are underlain by bedrock of the South Wales Middle Coal Measures and South Wales Lower Coal Measures, likely overlain by marine beach deposits.

The bedrock underlying the area is a high vulnerability Secondary A aquifer and is part of the South Wales Middles Coal Measures Formation (undifferentiated) and the South Wales Lower Coal Measures Formation (undifferentiated) in the south. The superficial deposits underlying the site are a high vulnerability Secondary (undifferentiated) aquifer.

5.3.8 Area G: Main Channel

According to the BGS GeoIndex (Offshore)[5], Area G is underlain by mudstones and sandstones, likely part of the South Wales Lower Coal Measures. Significant thicknesses of marine deposits are anticipated in this area similar to those in Areas A and F.

The bedrock underlying the area is not considered to be an aquifer. As such, no aquifer classification or vulnerability designation is provided.

5.3.9 Area H: Impounded Docks

The bedrock underlying Area H comprises strata of the South Wales Middle Coal Measures.

There are no recorded superficial deposits in the area however fine-grained sediments are expected to be present deposited by water flowing into the former dock from the land and through the inflow of sediment-laden seawater when the lock gates are opened to allow ships to enter and leave.

5.4 Previous Ground Investigation

5.4.1 Area A: Tidal Harbour

5.4.1.1 Tidal Harbour Soil Investigations

According to Port Talbot Harbour: planning and design several different soil investigations were carried out during the development stage of planning the new tidal harbour. In the area which now encompasses the tidal harbour the strata consisted of "*silts and clays with lenses of peat, all overlying a layer of dense fine sand and gravel which in turn overlies mudstone*".[11]

Also, from borings carried out in the locations of the present-day ore berth, a depression was apparent in the firm strata found in the area. This was confirmed during the installation of piles, during the construction of the ore berth. This likely coincides with the previous location of the River Afan underneath the site.[11]

5.4.1.2 Fugro Limited – 1995

A geotechnical and geophysical survey was carried out by Fugro Limited[10] in 1995 on the harbour pocket, turning circle and channel of the Tidal Harbour, to inform the design of future dredging operations. The geotechnical survey comprised of the following:

- 19 Vibrocores at 16 locations across areas A and G (0.00 – 5.00mbgl):
  - of these locations, 10 were located within Area A and 6 within Area G.
- 10 'Seascout' seabed Piezocone Penetration Tests (PCPT's) to 5.0m below the seabed at 8 locations across areas A and G:
  - of these locations 6 were located within Area A and 2 in Area G

A summary of the materials encountered during the 1995 Fugro GI is presented in Table 5.2.Table 5.25

Table 5.2: Fugro – GI Summary

Strata	Description	Depth from (mbgl)	Depth to (mbgl)
Clay	Very soft to soft	0.00 – 1.80	0.10 – 1.90
Sand	Fine	0.00 – 1.90	0.30 – 1.90
Gravel	Medium to coarse	1.30	1.40

Note: Strata descriptions taken from borehole logs.

5.4.1.3 George Wimpey & Co, Lab ref no. S/1617 (April 1958)

A ground investigation undertaken by George Wimpey & Co in October and November 1957 comprised of the following:

- 8 window samples to maximum depth 18 ftbgl (5.5 mbgl); and
- 10 boreholes to maximum depth 75 ftbgl (22.9 mbgl).

The exploratory holes in this investigation are located across both Area A and Area E. The exploratory holes specific to Area A comprised of the following:

- 4 window samples to maximum depth 17 ftbgl (5.2mbgl).

The ground conditions encountered during these works were described as comprising the following:

Table 5.3: George Wimpey & Co (April 1958) – GI Summary

Strata	Description	Depth from (mbgl)	Depth to (mbgl)
Sand	Grey fine SAND	0.00	5.2

Note: Strata descriptions taken from borehole logs.

5.4.1.4 George Wimpey & Co, Lab ref no. S/2333 (May 1960)

A ground investigation undertaken by George Wimpey & Co in 1960 comprised of the following:

- 7 cable percussion boreholes to maximum depth 130 ftbgl (39.6 mbgl); and
- 23 wash boring boreholes to maximum depth 21 ftbgl (6.4 mbgl).

The exploratory holes in this investigation are located across both Area A and Area C. The exploratory holes specific to Area A comprised of the following:

- 3 cable percussion boreholes to maximum depth 129 ftbgl (39.3 mbgl); and
- 8 wash boring boreholes to maximum depth 21 ftbgl (6.4 mbgl).

The ground conditions encountered during these works were described as comprising the following:

Table 5.4: George Wimpey & Co (May 1960) – GI Summary

Strata	Description	Depth from (mbgl)	Depth to (mbgl)
Sand	Medium dense brown SAND	0	5.60 - 9.40
Clay and Silt	Firm CLAY and SILT with occasional peat	5.60 - 9.40	21.60 - 24.40
Gravel and Cobbles	Dense sandy GRAVEL and COBBLES	21.60 - 24.40	29.30 - 32.00

Strata	Description	Depth from (mbgl)	Depth to (mbgl)
Clay	Very hard silty CLAY with grey siltstone.	29.30 - 32.00	37.5
Bedrock	Grey SILTSTONE	37.5	>39.3

Note: Strata descriptions taken from borehole logs.

5.4.1.5 George Wimpey & Co, Lab ref no. S/2475 (January 1961) - Shown on Rendell, Palmer & Tritton, Port Talbot Harbour – Drawings

A ground investigation undertaken by George Wimpey & Co in January 1961 comprised of the following:

- 6 boreholes to maximum depth 136.5 ftbgl (41.6mbgl); and
- 6 window samples to maximum depth 60.5 ftbgl (18.4 mbgl).

The ground conditions encountered during these works were described as comprising of the following:

Table 5.5: George Wimpey & Co (January 1961) – GI Summary

Strata	Description	Depth from (mbgl)	Depth to (mbgl)
Sand	Brown SAND with shell fragments	0	0.6 - 6.1
Clay / Silt	Silty CLAY or clayey SILT with lenses of peat	0.6 - 6.1	0.7 - 9.4
Sand	Loose grey, silty SAND becoming clayey	0.7 - 9.4	4.0 - 13.9
Clay	Firm grey silty CLAY with traces of peat. Some shell fragments	4.0 - 13.9	7.3 - 16.2
Sand and Gravel	Very dense layers of SAND and GRAVEL with some cobbles	7.3 - 16.2	20.4 - 28.3
Clay	Very stiff CLAY with fragments of shale and siltstone and traces of coal.	20.4 - 28.3	23.8 - 27.4
Bedrock	Laminated grey SILTSTONE with bands of grey silty clay	23.8 - 27.4	>41.6

Note: Strata descriptions taken from borehole logs.

5.4.1.6 George Wimpey & Co, Lab ref no. S/5052 (February 1966)

A ground investigation undertaken by George Wimpey & Co in February 1966 comprised of the following:

- 6 cable percussion boreholes to maximum depth 116 ftbgl (35.4 mbgl).

The ground conditions encountered during these works were described as comprising of the following:

Table 5.6: George Wimpey & Co (February 1966) – GI Summary

Strata	Description	Depth from (mbgl)	Depth to (mbgl)
Sand	Medium dense SAND	0	7.9 - 13. 7
Peat	Soft laminated mottled brown PEAT with partings of grey silty fine sand and soft grey clay	7.9	8.5
Silt	Firm grey clayey SILT	8.5	11.6
Sand and Clay	Alternating layers of loose grey silty fine SAND and firm to stiff laminated CLAY	11.6	24.9
Sand and Gravel	Dense to very grey silty SAND and GRAVEL with occasional cobbles	24.9	31.4

Strata	Description	Depth from (mbgl)	Depth to (mbgl)
Clay	Very stiff sandy CLAY with some gravel	31.4	32.3
Bedrock	Well cemented dark grey MUDSTONE	32.3	>35.4

Note: Strata descriptions taken from borehole logs.

5.4.1.7 George Wimpey & Co, Lab ref no. S/5273 (July 1966) .

A ground investigation undertaken by George Wimpey & Co in July 1966 comprised of the following:

- 2 cable percussion boreholes to maximum depth 117 ftbgl (25.7 mbgl).

The ground conditions encountered during these works were described as comprising of the following:

Table 5.7: George Wimpey & Co (July 1966) – GI Summary

Strata	Description	Depth from (mbgl)	Depth to (mbgl)
Sand	Very dense brown SAND with shell fragments with occasional layers of clayey silt	0	13.6 - 14
Silt	Firm grey clayey SILT with traces of organic matter	13.6 - 14	18.6 - 20.4
Gravel and Clay	Layers of sandy silty CLAY with some gravel and sandy GRAVEL with occasional cobbles	18.6 - 20.4	28.7 - 30.7
Clay	Hard grey shaly CLAY with some mudstone fragments	28.7 - 30.7	29.6 - 32
Bedrock	Well cemented grey MUDSTONE with weathered bands of grey shaly clay	29.6 - 32	>35.2

Note: Strata descriptions taken from borehole logs.

5.4.2 Area B: Sounder Triangle Redevelopment

5.4.2.1 Tweedie Evans Consulting – ABP Margam Sands – 2022

A ground investigation was carried out by Tweedie Evans Consulting (TEC) in March 2022 to supplement a previous GI in the area undertaken by Ground Investigation in 2014. No information regarding this 2014 GI has been made available for review.

The 2022 TEC GI comprised four window sample boreholes which were advanced to a maximum depth of 3.45 mbgl. All boreholes were terminated before reaching their target depth due to refusals within the Made Ground. The ground conditions encountered during these works were described as comprising the following:

Table 5.8: Tweedie Evans Consulting – ABP Margam Sands – GI Summary

Strata	Description	Depth from (mbgl)	Depth to (mbgl)
Made Ground	Grey mottled brown silty gravelly sand with occasional rootlets, gravels of slag, siltstone and mudstones	0.00	0.30
	Greyish brown becoming brown mottled light brown silty gravelly sand. Gravels are siltstone, mudstone, and rare slag.	0.30	3.45

Note: Strata descriptions taken from borehole logs.

In a single window sample (WS02) the materials encountered comprised '*Light grey locally mottled brown, slightly gravelly sandy silt. Gravel of siltstone*.'

5.4.2.2 Costain BGS boreholes (1997)

BGS borehole records identify Costain undertook a ground investigation in 1997. This investigation comprised:

- 12 cable percussion boreholes to maximum depth 30.5 mbgl;
- 8 rotary openhole boreholes to maximum depth 44.35 mbgl; and
- 7 trial pits to maximum depth 4 mbgl.

The ground conditions encountered during these works were described as comprising of the following:

Table 5.9: Constain BGS Boreholes (1997) – GI Summary

Strata	Description	Depth from (mbgl)	Depth to (mbgl)
MGR	Medium dense SAND and gravel of slag sometimes with hard compacted slag	0	0.6 - 8.5
Sand	Medium dense yellowish brown SAND	0.6 - 8.5	9.6 - 15. 9
Silt	Soft to firm clayey SILT with occasional peat pockets	9.6 - 15. 9	24.5 - 27
Gravel	Dense fine to coarse slightly sandy sandstone GRAVEL with occasional cobbles	24.5 - 27	30 - 34
Bedrock	Dark grey thinly laminated MUDSTONE	30 - 34	>41.8

Note: Strata descriptions taken from borehole logs.

5.4.2.3 Earlswood Materials Laboratory BGS boreholes (1994)

BGS borehole records identify Earlswood Materials Laboratory undertook a ground investigation in 1994. This investigation comprised of the following:

- 6 cable percussion boreholes to maximum depth 40.6 mbgl.

The exploratory holes relevant to Area B comprised of the following:

- 4 cable percussion boreholes to maximum depth 40 mbgl.

The ground conditions encountered during these works were described as comprising of the following:

Table 5.10: Earlswood Materials Laboratory BGS Boreholes – GI Summary

Strata	Description	Depth from (mbgl)	Depth to (mbgl)
MGR	Sandy slag, cobbles and boulders	0	0.9 - 4.1
Sand	Medium dense brown SAND	0.9 - 4.1	7.1- 8.6
Peat	Brown compact fibrous PEAT	7.1- 8.6	8.9 -9.1
Clay	Soft grey silty CLAY	8.9 -9.1	12
Sand	Loose to medium-dense grey SAND with clayey pockets	12	16.8 -19.3
Clay	Firm to stiff CLAY	16.8 -19.3	23.4 -26.4
Gravel	Dense sandy GRAVEL with cobbles and boulders	23.4 -26.4	31.7
Clay	Stiff grey brown CLAY with cobbles	31.7	32.6
Bedrock	Dark grey MUDSTONE	32.6	>40

Note: Strata descriptions taken from borehole logs.

5.4.2.4 George Wimpey & Co, Lab ref no. S7701 (June 1970) - Shown on Rendell, Palmer & Tritton, Port Talbot Harbour – Drawings

A ground investigation undertaken by George Wimpey & Co in June 1970 comprised of the following:

- 8 cable percussion boreholes to maximum depth 45 ftbgl (13.7 mbgl).

The ground conditions encountered during these works were described as comprising of the following:

Table 5.11: George Wimpey & Co (June 1970) – GI Summary

Strata	Description	Depth from (mbgl)	Depth to (mbgl)
Sand	Loose to medium dense SAND with bands of grey silty CLAY	0	5.8 -8.4
Sand	Medium dense to dense SAND with some shell fragments	5.8 -8.4	>13.1

Note: Strata descriptions taken from borehole logs.

5.4.3 Area C: Harbourside

Area C has been subject to several Phase I Desk Studies and Ground Investigations including by SKM[17,26] between 2006 and 2009, Soil Mechanics[27] in 2009, Terra Firma[28] in 2014 and TEC[22,23] in 2022. These reports have been reviewed and summarised below.

5.4.3.1 Sinclair Knight Merz (SKM) – Renewable Energy Plant – 2006-2009

Following completion of the Phase I Desk study[17], an intrusive ground investigation was carried out in 2007 with the aim of determining the ground conditions underlying the site. These works comprised the following:

- 4 cable percussion boreholes to a maximum depth of 12.45 mbgl;
- 8 sonic boreholes to a depth of 28.95 mbgl with combined groundwater and ground gas monitoring installations; and
- 25 trial pits to a maximum depth of 3.00 mbgl.

A summary of the ground conditions encountered can be found in Table 5.12.

Table 5.12: Sinclair Knight Merz – Renewable Energy Plant – GI Summary

Strata	Description	Depth from (mbgl)	Depth to (mbgl)
Topsoil	Grass-covered sandy topsoil	0.00	0.05 – 0.40
Made Ground	Compact Iron slag Sandy soil Clay Gravel fill Tarmac onto limestone	0.00 – 0.20	0.30 – 5.50
Iron Slag	Fully cemented	0.20 – 2.10	1.40 – 2.10
Alluvium	Gravelly Sand Silty Sand Fine to very fine sand often wet Very soft to firm silt Soft to stiff clay	0.30 – 0.50	23.70
Peat	Fibrous	8.50 – 22.00	8.90 – 22.50

Strata	Description	Depth from (mbgl)	Depth to (mbgl)
Sands and Gravels	Possible weathered bedrock	23.70	>28.95

Note: Strata descriptions taken from borehole logs.

5.4.3.2 Soil Mechanics – Renewable Energy Plant – 2009

In 2009 Soil Mechanics carried out a ground investigation for a proposed renewable energy plant supplementing the 2007 SKM GI. The works comprised:

- 10 cable percussion boreholes;
- 3 rotary open hole boreholes, extended by coring (max depth 42.80 mbgl);
- 52 machine excavated trial pits (max depth 4.4 mbgl); and
- 14 rotary open hole boreholes, extended by coring (max depth 44.00 mbgl).

A summary of the ground conditions encountered during GI is presented in Table 5.13.

Table 5.13: Soil Mechanics – Renewable Energy Plant – GI Summary

Strata	Description	Depth from (mbgl)	Depth to (mbgl)
Made Ground	Subangular to subrounded fine to coarse gravel Fine to coarse sand Subangular to subrounded cobbles and boulders of slag Fused slag	0.00	1.50 – 5.60
Sand	Fine to coarse	0.00 – 20.20	5.00 – 33.70
Clay	Soft to very stiff	5.00 – 24.60	3.50 – 25.20
Alluvium	Driller's description	6.60 – 11.90	16.10 – 18.60
Peat	Firm and fibrous	8.40 – 22.10	9.2 – 23.00
Gravel	Subangular to rounded fine to coarse of sandstone and quartzite Subrounded to rounded of sandstone with high cobble content	19.90 – 24.80	24.10 – 33.80
Coal	Very weak to weak angular to subrounded fine to coarse gravel sized fragments	31.00 – 41.30	32.00 – 47.30
Bedrock	Very weak to weak very thinly to thickly bedded Mudstone Weak very thinly to thinly bedded Siltstone	31.50 – 41.00	32.50 – 48.50

Note: Strata descriptions taken from borehole logs.

5.4.3.3 Terra Firma – Margam Sand Quarry – 2014

An investigation by Terra Firma (South) in July 2014 determined that the site had been quarried periodically throughout the 20th and 21st century resulting in an undulating landform.

The GI comprised four cable percussion boreholes across the site to a maximum depth of 5.5 mbgl with groundwater monitoring installations.

As the investigation works were required to facilitate groundwater monitoring, the geotechnical information obtained as part of these works was limited to the information contained within the borehole logs with the materials encountered summarised in Table 5.14.

Table 5.14: Terra Firma – Margam Sand Quarry – GI Summary

Strata	Description	Depth from (mbgl)	Depth to (mbgl)
Made Ground	Firm clay	0.00 – 2.50	0.80 – 3.50

Strata	Description	Depth from (mbgl)	Depth to (mbgl)
	Fine to coarse sand Cobbles and boulders of slag		
Sand	Fine to medium	1.00 – 3.70	3.00 – 5.50
Clay	Soft to firm	3.50	3.70

Note: Strata descriptions taken from borehole logs.

5.4.3.4 Apex Drilling, Tata Steel Boreholes (2020);

An investigation was carried out by Apex Drilling on behalf of Tata Steel in July 2020 as part of the Tata Steel conveyor expansion works. The works comprised three cable percussion boreholes to a depth of 30 mbgl.

These works were limited in both number and extent being advanced in specific locations in order to provide information on the ground conditions where the proposed conveyor support structures were to be constructed. As such the usefulness of these boreholes is highly limited as they are located marginally outside of any proposed development area.

However, the logs can be used as an indicator of the likely ground conditions in this area. A summary of the materials encountered can be found in Table 5.15.

Table 5.15: Tata Steel – Coal Expansion Works – GI Summary

Strata	Description	Depth from (mbgl)	Depth to (mbgl)
Made Ground	Clay Coarse angular gravel of slag Slag and clay fill	0.00	2.00 – 3.50
Gravel	Subangular to subrounded of sandstone Some sub angular cobbles	2.00 – 23.80	3.00 – 30.00
Sand	Very dense to very loose	3.00 – 20.00	6.00 – 23.00
Clay	Soft to firm	7.00 – 14.00	10.00 – 20.80
Peat	Stiff	20.00 – 23.00	20.30 – 23.80

Note: Strata descriptions taken from borehole logs.

5.4.3.5 Tweedie Evans Consulting – Phoenix Wharf – 2022

Following completion of the Phase I Desk[23] study TEC carried out ground investigation works in May 2022, comprising of the following:

- 5 cable percussion boreholes to a maximum depth of 20.00 mbgl;
- 19 machine excavated trial pits to a maximum depth of 2.90 mbgl;
- 11 dynamic sampling boreholes to a maximum depth of 6.00 mbgl; and
- installation of groundwater and ground gas monitoring wells in selected boreholes.

A summary of the materials encountered is presented in Table 5.16.

Table 5.16: Tweedie Evans Consulting – Phoenix Wharf – GI Summary

Strata	Description	Depth from (mbgl)	Depth to (mbgl)
Made Ground	Gravelly sand Silty sand Silt Sand with gravel of brick, concrete and slag Gravel of slag	0.00 – 1.00	0.15 – 5.00

Strata	Description	Depth from (mbgl)	Depth to (mbgl)
	Slightly clayey sand		
Concrete	40% matrix, 45% clasts, 5% voids	0.00	0.12 – 0.13
Blown Sand	Fine to medium sand	0.00 – 2.00	1.20 – 6.50
Tidal Flat Deposits	Fine to coarse Sand Soft Silt Firm Peat Soft to firm Clay	0.20 – 13.50	1.30 – 14.20
Sand	Fine to medium	0.90	1.40
Alluvial Fan Deposits	Fine to coarse sand Fine to coarse gravel of mudstone and sandstone	9.50 – 15.20	19.60 – 24.50
South Wales Middle Coal Formation	Sandstone recovered as coarse subangular gravel	17.70	20.35

Note: Strata descriptions taken from borehole logs.

5.4.3.6 George Wimpey & Co, Lab ref no. S/2333 (May 1960)

A ground investigation undertaken by George Wimpey & Co in May 1960 comprised of the following:

- 7 cable percussion boreholes to maximum depth 130 ftbgl (39.6 mbgl); and
- 23 wash boring boreholes to maximum depth 21 ftbgl (6.4 mbgl).

The exploratory holes in this investigation are located across both Area A and Area C. The exploratory holes specific to Area C comprised of the following:

- 3 cable percussion boreholes to maximum depth 125.6 ftbgl (37.6 mbgl); and
- 15 wash boring boreholes to maximum depth 20 ftbgl (6.1 mbgl).

The ground conditions encountered during these works were described as comprising of the following:

Table 5.17: George Wimpey & Co (May 1960) – GI Summary

Strata	Description	Depth from (mbgl)	Depth to (mbgl)
Sand	Brown SAND	0	5.8 - 6.0
Clay	Firm silty CLAY	5.8 - 6.0	6.9 - 7.3
Sand	Medium dense to dense grey silty SAND	6.9 - 7.3	11 -13.6
Clay and Silt	Firm silty CLAY and clayey sandy SILT	11 -13.6	14. 9 - 19.5
Sand and Gravel	Very dense SAND and COBBLES	14. 9 - 19.5	24.7 -29.0
Clay	Hard grey CLAY with fragments of siltstone	24.7 -29.0	33.8
Bedrock	Grey SILTSTONE	33.8	>35.4

Note: Strata descriptions taken from borehole logs.

5.4.4 Area D: Talbot Wharf

Mott MacDonald is not aware of any historic GI undertaken in Area D with the exception of those for which logs are available through the BGS GeoIndex. Available logs are summarised in Table 5.18. A summary if the ground conditions from the BGS logs is presented in Table 5.19.

Table 5.18: BGS Borehole logs available within Area D

BGS ID	Date	Easting	Northing	Depth (mbgl)
SS78NE200	1992	275931	189000	5.10
SS78NE201	1992	275820	188979	5.40
SS78NE202	1992	275755	188976	7.20
SS78NE203	1992	275759	189055	8.00
SS78NE204	1992	275814	189072	7.00
SS78NE205	1992	275904	189036	6.00
SS78NE206	1992	275564	189089	19.00
SS78NE207	1992	275608	189103	18.80
SS78NE208	1992	275597	189161	25.00
SS78NE265	1994	275626	188907	27.25
SS78NE370	2007	275823	189123	428.91
SS78NE285	1994	275602	189195	3.10
SS78NE86	1958	276410	189100	19.81

Table 5.19: Area D BGS Boreholes Strata Summary

Strata	Description	Depth from (mbgl)	Depth to (mbgl)
Made Ground	Loose sand with angular rounded to subrounded fine to coarse gravel Very loose to loose silty sand Loose sand with coal gravel Clayey sand Very sandy clay with gravel of slag Ash and slag Sandy ash and clinker gravel	0.00 – 4.60	0.35 – 5.60
Sand	Fine to coarse sand	0.40 – 14.40	3.10 – 19.00
Clay	Soft to stiff clay	0.80 – 13.50	1.10 – 14.70
Peat	Soft to firm very sandy peat	2.90 – 7.80	3.60 – 8.10
Silt	Loose soft fine	10.30	13.30
Gravel	Medium dense to dense well graded to coarse angular to rounded sand and gravel	13.60 – 14.70	18.80 – 25.00
Bedrock	Siltstone recovered as sand, angular gravel and cobbles Sandstone recovered as sand, angular gravel and cobbles Mudstone: very weak rock, fault zone Coal Claystone Ironstone	19.18 – 45.50	>47.40

Note: Strata descriptions taken from borehole logs.

5.4.5 Area E: Lock and Approach Channel

5.4.5.1 BGS boreholes

Historical borehole logs available through the BGS GeoIndex[4] have been reviewed. A list of available BGS logs is included in Table 5.20, with a summary of the encountered ground conditions presented in Table 5.21.

Table 5.20: Area E BGS Boreholes

BGS ID	Date	Easting	Northing	Depth (mbgl)
SS78NE63	1958	275610	188780	18.29
SS78NE64	1958	275510	188750	22.86
SS78NE65	1958	275260	188730	7.01
SS78NW1	1958	274620	188670	7.62

Table 5.21: Area E BGS Boreholes Strata Summary

Strata	Description	Depth from (mbgl)	Depth to (mbgl)
Sand	Very dense, brown fine sand	0.00	5.79 – 6.17
Silt	Soft to firm clayey silt	0.00 – 7.62	2.13 - 9.45
Sand	Grey-brown clayey sand	5.79 – 6.17	6.40
Clay	Soft to firm	9.45	11.46
Silt		11.46	14.47
Peat	Soft to firm	14.47	17.07
Gravel	Coarse of sandstone Sandstone gravel with clay	17.07	17.52
Bedrock	Sandstone boulders	17.52	>18.30

Note: Strata descriptions taken from borehole logs.

5.4.5.2 George Wimpey & Co, Lab ref no. S/1617 (April 1958)

A ground investigation undertaken by George Wimpey & Co in October and November 1957 comprises the following:c8 window samples to maximum depth 18 ftbgl (5.5 mbgl); andcc10 boreholes to maximum depth 75 ftbgl (22.9 mbgl).

The exploratory holes in this investigation are located across both Area A and Area E. The exploratory holes specific to Area E comprise:

- 4 window samples to maximum depth 16 ftbgl (4.9 mbgl); and
- 10 boreholes to maximum depth 75 ftbgl (22.9 mbgl).

The ground conditions encountered during these works were described as comprising the following:

Table 5.22: George Wimpey & Co (April 1958) – GI Summary

Strata	Description	Depth from (mbgl)	Depth to (mbgl)
Sand	Brown fine SAND	0	5.8 -6.2
Clay and Silt	Layers of clayey SILT and silty CLAY	5.8 - 6.2	12.8 – 14.6
Clay	Silty CLAY with thin bands of peat	12.8 - 14.6	16.5 – 16.8
Gravel	Sandstone GRAVEL, COBBLES and BOULDERS	16.5 – 16.8	>22.6

Note: Strata descriptions taken from borehole logs.

5.4.6 Area F: Port Talbot Harbour Limit

At the time of writing no ground investigation records covering Area E have been made available. However, historical borehole logs available through the BGS GeoIndex[4] have been reviewed which can be used to indicate the likely ground conditions in this area. As such the

details of the borehole logs have been summarised in Table 5.23 and Table 5.24. Ground conditions are indicative only due to the time lapsed since the boreholes were carried out.

Table 5.23: Area F BGS Boreholes

BGS ID	Date	Easting	Northing	Depth (mbgl)
SS78NW2	1958	273800	188400	5.18
SS78NW3	1958	273100	188200	7.92

Table 5.24: Area F BGS Boreholes Strata Summary

Strata	Description	Depth from (mbgl)	Depth to (mbgl)
Clay	Soft silty clay	0.30 – 1.52	0.84 – 7.92
Sand	Silty sand Medium dense fine sand	0.38 – 0.84	1.52 – 7.92

Note: Strata descriptions taken from borehole logs.

5.4.7 Area G: Main Channel

A GI was carried out by Fugro in 1995 as presented in Section 5.4.1.2. No further GI data has been made available for Area G. Anticipated ground conditions in Area G from the 1995 Fugro GI are presented in Table 5.25 below.

Table 5.25: Fugro Limited – GI Summary – Area G

Strata	Description	Depth from (mbgl)	Depth to (mbgl)
Clay	Very soft to soft	0.00 – 1.80	0.10 – 1.90
Sand	Fine to coarse	0.00 – 1.90	0.30 – 1.90

Note: Strata descriptions taken from borehole logs.

5.4.8 Area H: Impounded Docks

There are no historic ground investigation records, including BGS borehole logs, available for Area H.

5.5 Anticipated Ground Conditions

5.5.1 Area A: Tidal Harbour

Based on the findings ground investigations reviewed in Section 4.4.1, the following ground conditions are expected:

- Tidal Flat Deposits comprising layers of very soft to soft clays and fine sands are expected to depths of up to 1.9mbgl;
- Storm Beach Deposits comprising medium dense brown sand are expected to follow the soft Tidal Flat Deposits up to depths of 14 mbgl;
- Alluvium comprising alternating layers of cohesive material (firm clays and silts) and granular material (loose sands) between 5.6 – 24.4 mbgl;
- Glacial Till comprising very dense layers of sand and gravel, followed with very stiff clay between 18.6 – 37.5 mbgl; and
- South Wales Middle Coal Measures Formation comprising sandstone and mudstone from 29.6 mbgl.

These are anticipated to be underlain by weathered bedrock of the South Wales Middle and Lower Coal Measures comprising medium to coarse gravel with some sand and clay.

5.5.2 Area B: Sounder Triangle Redevelopment

Based on the findings of the ground investigations reviewed in Section 5.4.2, the following ground conditions are expected:

- Made Ground comprising medium dense sand with gravel of slag and sometimes hard compacted slag from ground level up to 8.5 mbgl;
- Storm Beach Deposits comprising medium dense brown sand between 0.6 – 8.6 mbgl;
- Peat (brown, compact and fibrous) between 7.1 – 9.1 mbgl;
- Alluvium comprising alternating layers of cohesive material (Grey silty clay increasing in stiffness with depth) and granular material (medium dense sand) between 7.1 – 27 mbgl;
- Glacial Till comprising dense sandy gravel with cobbles and boulders, becoming stiff clay between 23.4 – 34 mbgl; and
- South Wales Middle Coal Measures Formation comprising sandstone and mudstone from 30 mbgl.

Made Ground comprising silty gravelly sand (slightly gravelly sandy silt in one borehole) is anticipated across the site, extending to a depth of at least 10.50mbgl. The following typical description for the Made Ground is included in the TEC 2022 GIR[19]: *'bands of sandy silt with variable fractions of sand and gravel to 4.90m, underlain by silty, gravelly sand with shell fragments and gravel sized fragments of slag'.*

The Made Ground is anticipated to be underlain by marine beach deposits to an unknown depth and bedrock of the South Wales Middle or Lower Coal Measures.

5.5.3 Area C: Harbourside

5.5.3.1 Former Margam Sand Quarry

Based on the information presented in Sections 5.2.4 and 5.3.4 the following ground conditions are expected in the north-west of Area C.

- Topsoil comprising grass covered sandy topsoil from the surface to between 0.40 - 0.50 mbgl;
- Made Ground with a variable composition (compact iron slag, sandy soil, gravel fill or tarmac) up to 5.60 mbgl;
- Blown Sand, loose to dense, brown, between 0.30 - 7.00 mbgl;
- Tidal Flat Deposits comprising gravelly or silty sand, very soft to firm silt or soft to stiff clay between 4.00 and 23.70 mbgl. This stratum also includes layers of localised peat; and
- Possible weathered bedrock comprising very dense grey/brown sand and gravel from circa 23.70 mbgl.

5.5.3.2 Phoenix Wharf 2022

The TEC Phoenix Wharf Ground Investigation Report[23] identified the following ground conditions in the centre of Area C.

- Made Ground comprising sand with gravels and cobbles of brick, concrete and slag from ground level to a maximum depth of 5.00 mbgl;
- Blown Sand deposits comprising yellowish-brown fine to medium sand from ground level to 6.50mbgl;

- Tidal Flat Deposits comprising layers of sand, silt, peat and clay between 0.20 - 14.20 mbgl;
- Alluvial Fan Deposits comprising fine to coarse gravelly sand with gravel of mudstone and sandstone between 9.50 - 24.50mbgl. It is noted that Alluvial Fan Deposits are not shown on available geological mapping for the site; and
- South Wales Middle Coal Measures Formation comprising sandstone and mudstone from 17.70 mbgl.

5.5.4 Area D: Talbot Wharf

Based on the historic and current land use and information from the historical BGS records, Made Ground is expected to be present across the area extending to a maximum depth of 5.60mbgl. Its composition is likely to be variable, likely comprising loose sands, gravels, clays and occasional instances of ash and boulders/cobbles of slag.

Alluvium is also anticipated at depths ranging approximately from 0.40 – 19.00mbgl, comprising fine to coarse sand, soft to stiff clay and some layers of soft to firm very sandy peat.

Weathered bedrock of the South Wales Middle and Lower Coal Measures is anticipated from approximately 13.50 – 25.00 mbgl, comprising siltstone and sandstone in the form of sand and angular to rounded gravels and cobbles.

5.5.5 Area E: Lock and Approach Channel

Based on the findings in Section 5.4.5, deposits of potential Alluvium and Tidal Flat Deposits are expected to be present with thicknesses of between 5.50– 17.20 mbgl. These were found to comprise layers of very dense fine sand, soft to firm clayey silt, soft to firm clay and soft to firm peat.

Bedrock has been encountered at depths of 5.50 – >22.9 mbgl comprising sandstone recovered as coarse gravel and boulders. This bedrock is expected to represent strata of the South Wales Middle and Lower Coal Measures.

5.5.6 Areas F and G

Based on the findings of the Fugro[10] ground investigation, Tidal Flat Deposits comprising layers of very soft to soft clays and fine sands are expected to depths of up to 1.9 mbgl.

These are expected to be underlain by weathered bedrock comprising medium to coarse gravel with some sand and clay. This bedrock is expected to represent strata of the South Wales Middle and Lower Coal Measures.

5.5.7 Area H: Impounded Docks

Based on the published geology it is expected that sandstones and mudstones of the South Wales Middle Coal Measures would be encountered beneath this area. Based on the site history and its environmental setting it is also expected that fine grained sediments would be encountered across the area as well having been deposited from sediment laden water entering the area from the sea via the dock gates to the south-west and watercourses to the north and east.

6 Geotechnical Risks

In consideration of all the information presented in the previous sections, the potential geotechnical hazards that have been identified are summarised in the sections below and in Table 6.1.

The Geotechnical Risk Register (GRR) is presented in Appendix A.

This is a live document and should be developed further as the project progresses, including prior to and following any ground investigation works. The register should be updated as definition of the project development areas becomes refined, along with the structures to be built and proposed methods of construction, alongside any mitigation measures presented.

6.1 Unforeseen ground conditions

In all development areas there is limited or absent ground investigation information. This results in uncertainty in the expected underlying strata and material parameters.

6.2 Lack of information on buried services and utilities

There is minimal information regarding buried services and utilities within Areas B, C, D and E. This creates risks of strikes or near misses during additional ground investigations and foundation construction.

Buried services are not anticipated in Areas A, F, G or H due to the marine setting in these areas.

6.3 Shallow groundwater

Shallow groundwater was encountered within boreholes in Areas B, C and D which may cause difficulties in excavation during ground investigation and construction.

6.4 Construction of new works adjacent to existing structures

Where new construction is undertaken adjacent to existing infrastructure or buildings, the interaction effects between the new construction and existing structures should be evaluated to assess whether the proposed development might adversely impact existing structures.

6.5 Buried obstructions

Buried obstructions associated with historical land uses are expected to be present in Areas B, C, D and E based on the anticipated presence of Made Ground. These may pose a risk of programme delay and associated costs as difficult excavation would be expected if encountered during construction.

Review of available information indicates the presence of shipwrecks in Area F. Their location and any protection status should be reviewed in relation to the development proposals.

6.6 Unexploded (UXO) Ordnance

UXO risk assessments[39] [40] have been undertaken covering the areas shown on Figure 4.1 and 4.2.

The assessments indicate that the offshore areas outside the main tidal harbour are at higher risk of encountering UXOs. Area A is considered to have a low UXO risk due to previous

dredging operations and the eastern half of Area C is considered to be at low-moderate UXO risk.

The areas of the site excluded from the assessment will need to be further evaluated to define the risks associated with UXOs.

6.7 Insufficient bearing capacity and/or excessive settlement

The loading requirements of the proposed new development may exceed the ground capacity. It is noted that Area B has seen little development to date and areas of anticipated soft ground have been encountered during historical GIs, particularly in Areas C and D. Ground compressibility may exceed the settlement performance requirements, and appropriate foundation solutions designed.

6.8 Running sands

Running sands have been indicated in some of the borehole logs reviewed. This may cause instability or collapse in excavations during ground investigations and construction resulting in harm to construction workers, additional cost and programme.

6.9 Ground aggressivity

The ground investigation information reviewed from Phoenix Wharf has produced a Design Sulphate (DS) Class of DS-1 to DS-2 and an Aggressive Chemical Environment for Concrete (ACEC) Class of AC-1 to AC-2. No other investigation works included testing for ground aggressivity and due to the presence of Made Ground of variable composition across the site this needs to be reviewed for future construction.

6.10 Material expansion

There is a potential for damage to foundations and other buried infrastructure due to the potential expansion risk of artificial ground materials (e.g. slag and refractory bricks) throughout Areas B, C, and D. Significant areas of slag materials were encountered during the site walkover and their presence is also recorded on published geology and exploratory hole logs reviewed as part of this study.

6.11 Earthworks along the abandoned rail corridor and highways

The existing earthworks along the abandoned railway corridor may not be in a suitable condition for enhanced traffic loading. Also, the existing trackbeds and trackbed drainage may also not be in a suitable condition should the use of the railway be reinstated. Investigations are recommended to confirm the stability of the existing earthworks and the thickness and condition of the trackbed materials.

The existing earthworks and pavements along the numerous roads on the site may not be in a suitable condition for enhanced loading.

6.12 Existing quay walls

The existing quay walls that form the access and egress point to Area H may also not be in a suitable condition to support enhanced loading.

6.13 Coal mining

Mining and quarrying are discussed in Section 5.2.

The presence of any deep unrecorded mine working may pose a risk to the prosed development associated with the potential for collapse of workings and subsequent propagation of voiding toward the ground surface.

The geometry of any workings, stratigraphy and competence and thickness of the cover to such works, are key factors influencing the risk posed by the potential presence of coal mining in the area. This risk should be reviewed upon receipt of a detailed Coal Authority risk assessment report, following completion of any additional ground investigations undertaken at the site and once the site proposals have been further developed (refer to recommendations in section 8.2).

6.14 Culvert loading

The existing culverts between Margam Wharf and Phoenix Wharf may not be in a suitable condition for enhanced loading.

Table 6.1: Geotechnical risk and opportunities for the various proposed development areas

		Site Areas							
		A	**B**	**C**	**D**	**E**	**F**	**G**	**H**
Geotechnical Risks	Unforeseen ground conditions	X	X	X	X	X	X	X	X
	Lack of information on buried services and utilities	X	X	X	X	X			
	Shallow groundwater	X	X	X	X	X			
	Construction of new works adjacent to existing infrastructure	X	X	X	X	X			
	Buried obstructions	X	X	X	X	X			X
	Unexploded (UXO) Ordnance	X	X	X	X	X	X	X	X
	Insufficient bearing capacity and/or excessive settlement	X	X	X	X	X			
	Running sands	X	X	X	X	X	X	X	
	Ground aggressivity		X	X	X	X			
	Material expansion		X	X	X	X			
	Earthworks along road/rail	X							
	Existing quay walls			X	X	X			X
	General earthworks	X	X	X	X				
	Coal mining	X	X	X	X	X	X	X	X
	Culvert loading			X					

6.15 Breakwater

The geotechnical risks associated with the breakwaters are as follows:

- stability of the breakwater in response to reclamation works and surface loading. Either sliding of the breakwater along its foundation and/or slope instability;
- settlement of the breakwater in response to reclamation and surface loading and consequently the reduction in height of the breakwater resulting in a reduction in the freeboard above sea level; and

the breakwater rock fill being an obstruction to piling works. If piling is required within the footprint of the breakwaters then the presence of cobble and boulder size rock fragments will inhibit the installation of pile, by either drilled or driven methods of pile installation.

6.16 Environmental risks

Interface with the protected species and zones discussed in Section 4.4 present risks of difficulty mobilising ground investigation works due to licencing. Additionally, there is a risk of programme delays. To mitigate this risk all appropriate parties (NRW, Ecologists) must be liaised with and appropriate time for site clearance and ecological surveys must be accounted for.

7 Geo-environmental Risks

7.1 Area A: Tidal Harbour

As the majority of the area is located within the marine environment the general geo-environmental risk is likely to be very low with the risk from ground gas or groundwater contamination likely to be negligible. Due to the nature of the area there is the potential for contaminants to be present in the sediments in the form of metals, heavy oils and fuels that may have leaked from ships using the harbour and any cargo including coal and iron ore that has dropped into the water throughout the harbour's operational life.

To date no samples of these sediments have been obtained so the chemical composition of these materials is currently unknown. Where dredged materials are removed from the harbour, these materials should be either tested prior to removal to determine their suitability for sea disposal or reuse on land or should be dredged and placed in a bunded area to prevent the migration of potential contaminants while samples are recovered for chemical analysis and a suitable risk assessment carried out.

7.2 Area B: Sounder Triangle Redevelopment

There is little information available regarding the potential geo-environmental risks within this area of the site with the only investigation works comprising those carried out by TEC in the area of the existing wind turbine and telecommunications mast[19]. Based on the conclusions within the TEC report the main geo-environmental risk is associated with the materials used to raise the site levels which are understood to comprise waste materials from local industry predominately comprising slag and steel works waste mixed with locally sourced sands. Ground investigation works in this area identified Made Ground to a maximum depth of 10.50m bgl comprising bands of sandy silt with variable fractions of sand and gravels of slag.

Soil samples recovered by TEC were tested for a range of commonly occurring contaminants with all samples being found to fall below the generic assessment criteria for an industrial/commercial land use scenario. However, it should be noted that the works did identify free fibres of chrysotile asbestos the risk from which should be assessed by a specialist consultant or contractor.

The intrusive works carried out in this area have been limited spatially and as such the ground conditions in this area should be considered to be essentially unknown. No groundwater or ground gas monitoring has been carried out in this area and as such there remain significant information gaps regarding the geo-environmental risks in this area.

TEC considered the risk to controlled water to be low due to the absence of visual or olfactory evidence of contamination, contaminants of potential concern not being identified in the soil samples recovered and the absence of any groundwater abstractions within 1km of the site. Mott MacDonald generally agree with this assessment however any future investigation works should include assessment of groundwater quality to confirm this.

TEC determined that the risk from ground gas for the site is generally low with no specific sources of ground gas identified during their works. However, it should be noted that there remains a potential risk due to the unknown nature of the materials used to raise the ground levels across the area and the potential for these materials to contain coal or other organic materials, as well as the presence of a sewage treatment works to the south-east. As such a potential ground gas risk cannot be discounted.

7.3 Area C: Harbourside

Mott MacDonald have reviewed the ground investigation reports produced by TEC[23],Soil Mechanics[27] SKM[26], Terra Firma[28] that have been carried out in Area C and have summarised the reports below.

7.3.1 Soil

7.3.1.1 TEC Assessment

Soil samples recovered from the Phoenix Wharf area were tested for a range of contaminants including metals, metalloids, phenols, total cyanide, general inorganics, speciated polyaromatic hydrocarbons (PAH), total petroleum hydrocarbons (TPH). The results of these tests were assessed by TEC and were found to contain elevated PAH and found to contain elevated PAH when compared against the Generic Assessment Criteria for an Industrial/Commercial land use scenario as well as recording free fibres of amosite, crocidolite and chrysotile asbestos.

7.3.1.2 Soil Mechanics and SKM Assessment

Intrusive works carried out Soil Mechanics and SKM included the recovery of 63 soil samples from within and around the former Margam Sand Quarry with the samples being analysed for metals, metalloids, phenols, total cyanide, general inorganics, speciated polyaromatic hydrocarbons (PAH), total petroleum hydrocarbons (TPH) benzene, toluene, ethylbenzene and xylene (BTEX) and methyl-tertiary-butyl-ether (MTBE).

The results of this testing were then compared by SKM against a range of human health assessment criteria including the now withdrawn ATRISK values as well as the CLEA Soil Guideline Values for a Commercial end use. This assessment identified exceedances of the following contaminants:

- Sulphate;
- Total Cyanide;
- pH; and
- TPH Aliphatic C12-16.

7.3.1.3 Terra Firma Assessment

Although no soil samples were recovered as part of the investigation works periodic groundwater monitoring has been carried out bi-annually between May 2014 until the present for a total of 19 monitoring rounds.

The water samples recovered were scheduled for a range of metals, chloride, ammoniacal nitrogen, total alkalinity, pH, total sulphates, nitrite, total oxidised nitrogen and total organic carbon.

The results of this sampling were compared against a combination of Drinking Water Standards and ‘Target Concentrations’ provided in a SLR Consulting Ltd Report a copy of which has not been provided at the time of writing. This assessment found consistently elevated concentrations of the following:

- Iron
- Manganese
- Potassium
- Ammoniacal nitrogen
- Nitrite and

- Sulphate.

Terra Firma considered it likely that the potassium and sulphate exceedances were associated with ingress of seawater into the boreholes where the monitoring coincided with high tides. Outside of this, the exceedances were generally located in the boreholes located down hydraulic gradient of the quarry indicating that the soils used to infill the quarry are likely to be impacting the groundwater.

Mott MacDonald considers that this is likely due to the presence of slag waste in the area which will inherently have a high metal content due to the nature of its formation and in conjunction with a relatively high surface area associated with its physical composition the potential for leachate is likely to be high.

7.3.2 Groundwater

7.3.2.1 TEC Assessment

TEC recovered 10 groundwater samples from boreholes located across the Phoenix Wharf area and analysed them for a range of contaminants including metals, metalloids, phenols, total cyanide, general inorganics, speciated polyaromatic hydrocarbons (PAH), total petroleum hydrocarbons (TPH).

The results of the testing were compared against the Environmental Quality Standards (EQS) or, in the absence of an EQS, the Drinking Water Standards.

This assessment identified the following elevated contaminants in the shallow groundwater:

- Antimony;
- Arsenic;
- Cobalt;
- Lead;
- Nickel;
- Zinc;
- PAH (naphthalene, anthracene and benzo(a)pyrene);
- TPH; and
- Sulphate.

Additionally, samples recovered from the deeper groundwater were found to contain the following elevated contaminants:

- Cadmium;
- Cobalt; and
- Sulphate.

7.3.2.2 SKM Assessment

As part of a controlled waters risk assessment SKM scheduled seven soil samples for leachate analysis (testing for metals, phenols and PAH) alongside eight groundwater samples recovered from the monitoring boreholes installed across the site and tested for metals, inorganics, PAH and TPH). The results of these tests were compared against the Environment Agency's Environmental Quality Standards for saltwater (coastal and estuarine screening values) and where these were not available, the UK Drinking Water Standards. This assessment identified elevated concentrations of the following determinants in the leachate results:

- Arsenic;

- Chromium;
- Copper;
- Selenium;
- Total Phenol; and
- Polyaromatic Hydrocarbons.

Additionally, the following determinants were found to be elevated in the groundwater results:

- Arsenic;
- Chromium;
- Zinc; and
- pH.

Based on this assessment SKM concluded that a potential risk to controlled waters was present.

Additionally, the hydrocarbon impacted soils identified in TP35 were considered to pose a localised potential risk to the Port Talbot Docks and River Afan located to the north should it be determined that groundwater is able to migrate in that direction.

7.3.3 Ground Gas

7.3.3.1 TEC Assessment

An assessment of ground gas monitoring results carried out TEC has assessed the site as potentially Characteristic Situation 3 based on high methane concentrations (<0.1% to 81%) and moderate flow rates (<0.1l/hr to 13l/hr) however, as the ground gas monitoring carried out to date has been limited in its temporal and spatial distribution, the assessment is consequentially also limited. TEC noted this and recommended that further ground gas monitoring is carried out in addition to the supplementary ground investigation works in the areas that could not be accessed during their works.

The concentrations of hydrogen sulphide monitored in BH02 exceed the Workplace Exposure Limits (WEL) by up to two orders of magnitude with a peak concentration of 1050ppm when compared against a WEL of 5ppm for long term exposure and 10ppm for short term exposure.

It should be noted that the majority of response zones within the monitoring wells, especially those within the deeper boreholes were flooded meaning that it is likely that the gas monitoring results are not fully representative of the local ground gas regime.

7.3.3.2 SKM Assessment

As part of their investigation works SKM carried out six ground gas monitoring rounds between the 15 March and the 2 May 2007. These monitoring works identified the following gas concentration ranges:

- Carbon Dioxide - < 0.1% - 6.2%;
- Methane – <0.1% in all monitoring rounds;
- Oxygen – 7.1% - 20.3%;
- Hydrogen Sulphide – 0ppm – 55ppm; and
- Flow - <0.1l/hr in all monitoring rounds.

SKM determined that the ground gas regime for the site generally fell within Characteristic Situation 1 however due to the recording of carbon dioxide in excess of 5% it would be prudent to increase this to Characteristic Situation 2 requiring gas protection measures potentially including a reinforced cast in-situ concrete slab with a 1200g damp proof membrane, or beam

and block, or precast concrete and 2000g damp proof membrane and underfloor venting with all joints and penetrations sealed.

SKM also noted that the concentrations of hydrogen sulphide recorded in BH16 were in excess of occupational health guidance concentrations for short term exposure and as such suitable health and safety precautions should be implemented during the works.

7.3.4 Summary

Based on the findings of the previous ground investigation works the following geo-environmental risks have been identified:

- the presence of free asbestos fibres (chrysotile, amosite and crocidolite) at Phenix Wharf;
- metal and hydrocarbon contamination associated with the industrial wastes used to infill and raise areas of the site;
- a potential risk to controlled waters including the Port Talbot Dock (Area H) through the migration of impacted groundwater and leachate production within the Made Ground; and
- a likely ground gas risk is present on site due to the recording of high concentrations of both methane and hydrogen sulphide likely associated with the presence and degradation of materials within the made ground present across the site.

As the existing investigation works have been limited both temporally and spatially a site wide investigation is needed to fully characterise and delineate the extent and level of risk present.

7.4 Area D: Talbot Wharf

To date, no ground investigation works have been carried out in this area however given the area has a prolonged history of commercial and industrial usage it is likely that ground contamination is present across the area. This is most likely to be in the form of soil contamination associated with the industrial land uses as well as the deposition of soils used to raise the land around the harbour when this facility was created. Contaminants that have the potential to be present on site include polyaromatic hydrocarbons, petroleum hydrocarbons, metals and asbestos. Any ground investigations carried out in this area should include the recovery of soil samples which should, as a minimum, test soil samples for these contaminants.

According to the Wardell Armstrong (2016) desk study[30], a (disused) chemical works located south of Talbot Wharf was leased by Mechema Chemical Limited between 1972 and 1993. There was a groundwater pollution incident that occurred in December 1990 where arsenic and other metals were discovered in groundwater. Records of a Site Encapsulation Proposal from July 1992 describes the site to be sealed in a plastic membrane both horizontally and vertically extending to the impermeable clay sub-strata in an attempt to contain any contamination. The proposal identifies that mercury had been found in samples between the boundary of Mechema Chemicals and the dock wall thus encapsulation would prevent further leaching into the dock waters.

There may also be a risk to controlled waters arising through the production of leachate from the Made Ground as rainfall percolates through the materials or from fluid leaks from process plant which could in turn flow into either the River Afan to the west or Area H (Impounded Dock) to the east.

There is a potential ground gas risk on site due to the presence of Made Ground and the potential for organic materials such as peat to be present within the natural deposits.

These risks should be further assessed and any future ground investigation works designed to include characterisation of the level of risk present.

7.5 Area E: Lock and Approach Channel

To date no investigation works have been carried out within Area E. However, the area has been used as a lock and approach channel to the original Port Talbot Docks for over 130 years as well as comprising the estuary of the River Afan. As such, there is the potential for the sediments in this area to have been impacted by effluent washing downstream from both the River Afan and the Port Talbot Docks as well as surface run-off from the industrial areas located to the north and south. The geo-environmental risks from these materials are likely to be very low with few if any active contaminant linkages.

Should sediments be dredged from this area as part of any future maintenance works, the sediments should either be tested prior to recovery or stored in a bunded quarantine area and tested in order to determine waste classification and/or suitability for reuse.

7.6 Area F: Port Talbot Harbour Limit

As this area is located offshore the available information regarding its geo-environmental risk is also limited. The only potential risk present in this area would be the impact of contaminants being washed into the sea from the industrial activities operating on the adjacent coastline or those upstream on the River Afan which discharges into the Swansea Bay. Based on the land uses in the vicinity the potential contaminants present in this area could comprise petroleum hydrocarbons and metals.

Should sediments be dredged from this area as part of any future maintenance works the sediments should either be tested prior to recovery or placed in a bunded quarantine area to prevent the migration of potential contaminants while samples are recovered for chemical analysis and a suitable risk assessment carried out.

7.7 Area G: Main Channel

As this area is also located offshore the available information regarding its geo-environmental risk is also limited. The only potential risk present in this area would be the impact of oils or fuels that may have leaked from ships accessing and egressing the ports or from sediments or contaminants that have been washed into the sea from onshore sources. However, these are likely to have been degraded, diluted or dispersed by the tides over time and as such the risk from these materials likely to be very low. Based on the land uses in the vicinity the potential contaminants present in this area could comprise petroleum hydrocarbons and metals.

Where dredged materials are removed from the area and brought onto land, these materials should be either tested prior to removal to determine the risk or should be placed in a bunded quarantine area to prevent the migration of potential contaminants while samples are recovered for chemical analysis and a suitable risk assessment carried out.

7.8 Area H: Impounded Docks

The available information regarding geo-environmental risk within the Impounded Dock is limited. The potential risk present in this area would be the impact of oils or fuels that may have leaked from ships accessing and egressing the dock, or from sediments or contaminants that have been washed into the area from onshore sources.

Contaminants are likely to accumulate within the shallow sediment within the harbour. Based on the land uses in the vicinity, the potential contaminants present in this area could comprise petroleum hydrocarbons and metals. Likewise, the presence of tributyl tin associated with the use of marine paints.

Where dredged materials are removed from the area and brought onto land, these materials should be either tested prior to removal to determine the risk or should be placed in a bunded

quarantine area to prevent the migration of potential contaminants while samples are recovered for chemical analysis and a suitable risk assessment carried out.

8 Conclusions and Recommendations

8.1 Conclusions

This report has provided a review of available information to assess geotechnical and geo-environmental constraints on the proposed development at the site arising from the anticipated ground conditions. This has informed the preliminary geotechnical risk register presented in Appendix A.

Key geotechnical and geo-environmental risks have been identified across the site areas, as summarised in the sub-sections below.

8.1.1 Area A: Tidal Harbour

- The bedrock underlying this area of the site comprise mudstones and sandstones of the South Wales Middle and Lower Coal Measures;
- The superficial deposits comprise Marine Beach Deposits and Storm Beach Deposits, underlain by Alluvial Deposits and Glacial Till;
- Previous GI information has been obtained from Fugro in 1995 and a series of George Wimpey & Co investigations from 1958 -1970;
- UXO risk is considered to be low;
- Multiple Section 7 protected habitats; namely peat and clay exposures are present within the intertidal harbour in this area;
- Contaminants have the potential to be present associated with the land's use as a harbour for the transport of raw materials required for steel production; and
- The area appears to have been a natural tidal area, with the north breakwater built during the 1800s and the south breakwater built in the 1960s.

8.1.2 Area B: Sounder Triangle Redevelopment

- The bedrock underlying this area of the site comprises mudstones and sandstones of the South Wales Middle and Lower Coal Measures;
- Extensive Made Ground is anticipated in this area, comprising reclaimed material from other locations on site (Sounder Triangle Redevelopment is an area of reclaimed land) and slag;
- The superficial deposits comprise Storm Beach Deposits and Blown Sand, underlain by Alluvial Deposits and Glacial Till;
- Previous GI information has been obtained from:
  - Tweedie Evans Consulting (2022);
  - Costain BGS boreholes (1997);
  - Earlswood Materials Laboratory (1994); and
  - George Wimpey & Co (June 1970).
- UXO risk is considered to be low;
- The protected species Orabranche Picridis is located in a small area within this site;
- Contaminants are likely to be present associated with extensive infilling and land reclamation works which likely used waste materials from nearby industrial sites;
- The area was located in the intertidal area until the 1960s when the land was reclaimed;
- Potential geotechnical risks include the potential for insufficient bearing capacity and excessive settlement and insufficient information regarding buried services and obstructions;

8.1.3 Area C: Harbourside

- The bedrock underlying this area of the site comprises mudstones and sandstones of the South Wales Middle Coal Measures;
- Extensive Made Ground is anticipated in this area in the form of slag cobbles and cemented slag;
- The superficial deposits comprise Blown Sand and Tidal Flat Deposits, underlain by Alluvial Deposits and Glacial Till;
- Previous GI information has been obtained from:
  - Sinclair Knight Merz (2007);
  - Soil Mechanics (2009);
  - Terra Firma (2014);
  - Tweedie Evans Consulting (2022);
  - Apex Drilling, Tata Steel Boreholes (2020); and
  - George Wimpey & Co, Port Talbot Development (May 1960).

  These ground investigations predominantly cover the western extents of the area;
- UXO risk is considered to be low to moderate;
- The site is known to contain multiple protected species, Japanese Knotweed (invasive species) and Orabranche Picridis (protected habitat);
- Contaminants are likely to be present on site due to historical industrial uses including a copper works, coal works, metal refining works, sand pits, wharfs and railway lines; and
- Potential geotechnical risks include the potential for insufficient bearing capacity and excessive settlement, insufficient information regarding buried services and obstructions and groundwater contamination.

8.1.4 Area D: Talbot Wharf

- The bedrock underlying this area of the site comprises mudstones and sandstones of the South Wales Middle Coal Measures;
- The superficial deposits comprise Blown Sand and Tidal Flat Deposits, underlain by Alluvial Deposits and Glacial Till;
- No ground investigations have been carried out on this area however there are historical borehole logs in the area dated between 1958 and 2007 available through the BGS GeoIndex;
- UXO risk is considered to be low to moderate;
- Dense Japanese Knotweed has been identified in multiple locations across the site;
- Contaminants are likely to be present on site due to historical industrial uses across the area including a chemical works, copper works, coal works, metal refining works, sand pits, wharfs and railway lines; and
- Potential geotechnical risks include the potential for insufficient bearing capacity and excessive settlement, insufficient information regarding buried services and obstructions and groundwater contamination.

8.1.5 Area E: Lock and approach channel

- The bedrock is likely to comprise mudstones and sandstones of the South Wales Middle Coal Measures Formation;

- Superficial deposits are likely to comprise Marine Beach Deposits and Storm Beach Deposits, underlain by Alluvial Deposits and Glacial Till.
- Previous GI information has been obtained from:
  - BGS boreholes dated from 1958; and
  - George Wimpey & Co (April 1958).
- UXO risk is considered to be high;
- The site is not located in any environmentally protected areas;
- Contaminants may be present on site associated with nearby industrial land uses including an impounded dock, tidal harbour and steel works;
- The area is located mostly offshore within the marine environment and has been used as the entrance channel for the Port Talbot impounded dock since its construction. The lock gates are located in the eastern end of the area.

8.1.6 Area F: Port Talbot Harbour Limit

- Although the geological mapping does not extend into this area it is considered likely that the bedrock underlying the site comprises the South Wales Lower Coal Measures;
- No superficial deposits are recorded in the area however it is likely that fine grained Marine Deposits and Storm Beach Deposits are present due to the presence of similar deposits being recorded along the coastline in the area;
- No ground investigation works have been carried out in the area to date and there are no borehole records available through the BGS GeoIndex;
- UXO risk is considered to be moderate;
- The site is not located in any environmentally protected areas;
- Potential geoenvironmental risks for this area comprise the potential for contaminated sediments containing hydrocarbons and metals which could become mobile during dredging activities;
- Shipwrecks have been identified in this area. Their location and any protection status should be reviewed to assess any risks to the proposed development; and
- The area is located offshore within the marine environment and comprises the outer limit of Port Talbot.

8.1.7 Area G: Main Channel

- Although the geological mapping does not extend into this area it is considered likely that the bedrock underlying the site comprises the South Wales Lower Coal Measures;
- No superficial deposits are recorded in the area however it is likely that fine grained Marine Beach Deposits and Storm Beach Deposits are present due to the presence of similar deposits being recorded along the coastline in the area;
- The only ground investigation works in this area were undertaken by Fugro in 1995 and identify soft Tidal Flat Deposits up to 1.9 mbgl.
- UXO risk is considered to be low to moderate;
- The site is not located in any environmentally protected areas;
- Potential geoenvironmental risks for this area comprise the potential for contaminated sediments containing hydrocarbons and metals which could become mobile during dredging activities;
- Potential geotechnical risks for this area include potential interaction with UXO; and
- The area is located offshore within the marine environment and has been used as the approach channel for the Port Talbot harbour and impounded dock since their construction.

8.1.8 Area H: Impounded Docks

- The bedrock underlying the site comprises mudstone and sandstone of the South Wales Middle Coal Measures;
- No superficial deposits are recorded in the area however it is likely that Alluvial Deposits are present due to the presence of watercourses flowing into the area and the potential for sediment laden seawater to enter when the lock gates are opened at high tide;
- No ground investigation works have been carried out in the area to date;
- UXO risk is considered to be moderate;
- The site is not located in any environmentally protected areas;
- Potential geoenvironmental risks for this area comprise the potential for contaminated sediments containing hydrocarbons and metals which could become mobile during dredging activities;
- Potential geotechnical risks for this area include potential interaction with UXO; and
- The area is known to have comprised an impounded dock since the first available mapping dated 1885.

8.2 Recommendations

Key recommendations based on the findings of this report are summarised in the sub-sections below.

8.2.1 Area All

- Develop a 3D geological model for the site to visualise the variability in ground conditions.
- Develop an initial ground model based upon currently available data and then update following ground investigations.
- 3D ground model of cut areas identifying the differing classes of material, their suitability for re-use and material volumes.
- Material management plan to inform construction planning for cut and fill works.

8.2.2 Area A: Tidal Harbour

- Supplementary ground investigation works to characterise the site along with soil and water samples to derive characteristic soil and rock parameters and determine the absence or presence of contamination.
- Completion of a utilities survey (PAS128 or equivalent) to determine the presence and routing of all services and utilities within the area.
- Road earthworks asset inspections carried out for signs of instability.
- Pavement investigations for the design of new pavement.
- Stability analysis of existing revetment slopes.

8.2.3 Area B: Sounder Triangle Redevelopment

- Supplementary ground investigation works to characterise the site along with soil and water samples to derive characteristic soil and rock parameters and determine the absence or presence of contamination.
- Completion of a utilities survey (PAS128 or equivalent) to determine the presence and routing of all services and utilities within the area.
- Road earthworks asset inspections carried out for signs of instability.
- Pavement investigations for the design of new pavement.

8.2.4 Area C: Harbourside

- Supplementary ground investigation works to characterise the site along with soil and water samples to derive characteristic soil and rock parameters and determine the absence or presence of contamination.
- Completion of a utilities survey (PAS128 or equivalent) to determine the presence and routing of all services and utilities within the area.
- Rail corridor and road earthworks asset inspections carried out for signs of instability.
- Pavement investigations for the design of new pavement.
- Ground investigations to assess the excavatability of waste material from the steel works.
- Geotechnical assessment of existing quay walls.

8.2.5 Area D: Talbot Wharf

- Ground investigation works to characterise the site along with soil and water samples to derive characteristic soil and rock parameters and determine the absence or presence of contamination.
- Commissioning of a detailed UXO risk assessment.
- Completion of a utilities survey (PAS128 or equivalent) to determine the presence and routing of all services and utilities within the area.
- Road earthworks asset inspections carried out for signs of instability.
- Trackbed investigations for the design of new trackbed layers.
- Pavement investigations for the design of new pavement.
- Geotechnical assessment of existing quay walls.

8.2.6 Area E: Lock and approach channel

- Ground investigation works to characterise the site along with soil and water samples to derive characteristic soil and rock parameters and determine the absence or presence of contamination.
- Pavement investigations for the design of new pavement.
- Geotechnical assessment of existing quay walls.

8.2.7 Area F: Port Talbot Harbour Limit

- Ground investigation works to characterise the site along with soil and water samples to derive characteristic soil and rock parameters and determine the absence or presence of contamination.

8.2.8 Area G: Main Channel

- Ground investigation works to characterise the site along with soil and water samples to derive characteristic soil and rock parameters and determine the absence or presence of contamination.

8.2.9 Area H: Impounded Docks

- Ground investigation works to characterise the site along with soil and water samples to derive characteristic soil and rock parameters and determine the absence or presence of contamination.
- Geotechnical assessment of existing quay walls.

Appendices

A. Geotechnical risks per Development Area

Area	Uncertainty in ground conditions	Lack of information on buried/overhead services	Shallow groundwater	Construction of new works adjacent to existing structures	Buried obstructions	Unexploded (UXO) Ordnance	Insufficient bearing capacity and/or excessive settlement	Running sands	Ground aggressivity	Materials	Existing quay walls	General earthworks	Coal mining	Contamination Risk
Area A: Tidal Harbour	**Hazard description**													
	Uncertainty in underlying strata and material parameters due to absence of recent ground investigation information	Currently available information on buried services and utilities is outdated.	Shallow groundwater expected to be present within landside section due to proximity to the sea.	Construction may impact the existing breakwater and iron ore jetty	Presence of buried obstructions beneath the site	Potential for encountering UXOs. The risk in this area is considered low.	Potential presence of compressible ground. Area within marine environment therefore likely no historical loading.	Sands identified during previous GIs below groundwater table.	Aggressive ground conditions.	Presence of waste products from the existing steelworks (i.e.slag) which may undergo expansion. Low risk due to area's marine setting	N/A	Earthworks present in landside section of area.	Potential presence of unrecorded mine workings beneath the site.	Potential soil contamination in the form of oils, fuels and metals originating from ships accessing and egressing the area. Groundwater and ground gas risks are likely to be low or negligible.
	Consequence													
	Inappropriate and/or conservative engineering design	Damage to existing utilities in response to additional loading. Risk of injury or death of personnel on site	Groundwater ingress in excavations leading to destabilisation of excavations	Damage to existing structures	Difficult excavation leading to programme delay and additional costs. Unidentified obstructions may pose a risk to structure foundations.	Delays during construction and fatalities if UXOs not identified prior to excavation	Excessive settlement and/or bearing capacity failure	Risk of running sands leading to ground instability. Difficulty in excavation and/or boring. Delays to GI/ construction works	Degradation of buried concrete and metallic elements, particularly in sulphate or pyritic bearing strata. Potential for sulphate-induced heave. Adverse impact on any proposed structure foundations.	Material may be unsuitable for re-use.	-	Proposed development may lead to additional loading onto existing earthworks.	Adverse impact on proposed development, including potential migration of voids from collapse of any coal workings	Delays to construction and associated costs of treatment and/or removal and/or disposal off-site. Potential delays and costs associated with redesign of scheme elements. Risk to construction workers and operational staff. Risk to controlled waters.
	Mitigation													
	Ground investigation required to provide adequate understanding of the ground and groundwater conditions. 3D geological model to be developed to visualise variability in ground conditions, to be updated upon completion of ground investigations	Utility providers to be consulted to obtain up to date information during initial design phase. Designer to ensure all known utility information is communication during the design stage to the Contractor. Potential need to undertake non-intrusive surveys (PAS 128 compliant)	Requirement for pumping from excavations. Presence of contamination may require treatment on site before disposal. Ground investigation to include installation of groundwater standpipes to determine groundwater regime.	Designer to consider presence of existing structures with suitable mitigation measures considered.	Ground investigations to confirm the presence and lateral extent of buried obstructions. Appropriate excavation techniques to be implemented by Contractor. Variable ground conditions and obstructions to be considered in foundation design.	UXO desk study and site surveys	Ground investigation to characterise geology and determine strength and consolidation properties. Ground treatment may be required. Designer to consider additional mitigation measures within the design to accommodate large differential settlements if expected.	Ground investigation method to consider the potential for collapsible ground. Temporary works design to consider the potential for collapsible materials on site and possible mitigation measures depending on the end design solution.	Ground investigation required to verify geochemistry of the site strata. Classification of ground aggressivity and design of concrete to be taken in accordance with BRE SD1 2005	Ground investigation required to provide adequate understanding of the ground and groundwater conditions and assess materials suitability for reuse	-	Undertake stability analysis of existing revetment slopes. Ground investigation required to assess suitability of materials for re-use. If materials excavated Export material offsite, if possible.	Obtain detailed Coal mining risk assessment report. Ground investigation proposed to aid assessment of mining risk.	Ground investigation to include geo-environmental testing. Contamination testing to be undertaken where potential evidence of contamination is observed. Mitigation measures implemented should a risk be identified

Area	Uncertainty in ground conditions	Lack of information on buried services	Shallow groundwater	Construction of new works adjacent to existing structures	Buried obstructions	Unexploded (UXO) Ordnance	Insufficient bearing capacity and/or excessive settlement	Running sands	Ground aggressivity	Materials	Existing quay walls	General earthworks	Coal mining	Contamination Risk
Area B: Sounder Triangle Redevelopment	**Hazard description**													
	Uncertainty in underlying strata and material parameters due to absence of recent ground investigation information	Currently available information is outdated. Risk include damage to existing utilities in response to additional loading	Shallow groundwater expected to be present within this area due to proximity to the sea despite groundwater not being encountered in previous ground investigation.	Considering that an iron ore conveyor runs across the north of the area, impact on existing infrastructure is to be considered.	Considering the reclaimed nature of the area, buried obstructions could be present.	Based upon previous UXO risk assessment, this area has a low UXO risk.	Potential presence of compressible ground due to uncertainty in ground conditions despite historical evidence of past loading.	Sands identified during previous GIs below groundwater table.	Aggressive ground is expected in this area due to the presence of made ground in previous ground investigation information.	Presence of waste products from the existing steelworks (i.e.slag) which may undergo expansion.	N/A	Earthworks present in area.	Potential presence of unrecorded mine workings beneath the site.	Potential soil and groundwater contamination in the form of oils, fuels and metals originating from materials used during the reclamation of the area. Potential for a ground gas risk to be present due to the likely significant thickness of Made Ground and potential for peat to be present at depth. Note: Asbestos has been identified on site previously
	Consequence													
	Inappropriate and/or conservative engineering design	Damage to existing utilities in response to additional loading. Risk of injury or death of personnel on site	Groundwater ingress in excavations leading to destabilisation of excavations	Damage to existing structures	Difficult excavation leading to programme delay and additional costs. Unidentified obstructions may pose a risk to structure foundations.	Delays during construction and fatalities if UXOs not identified prior to excavation	Excessive settlement and/or bearing capacity failure	Risk of running sands leading to ground instability	Chemical reactions may occur between any buried concrete and existing ground. Adverse impact on any proposed structure foundations.	Material may be unsuitable for re-use.	-	Proposed development may lead to additional loading onto existing earthworks.	Adverse impact on proposed development, including potential collapse of any coal workings	Delays to construction and associated costs of treatment and/or removal and/or disposal off-site. Potential delays and costs associated with redesign of scheme elements. Risk to construction workers and site operatives. Risk to the sites end users. Risk to controlled waters.
	Mitigation													
	Ground investigation required to provide adequate understanding of the ground and groundwater conditions. 3D geological model to be developed to visualise variability in ground conditions, to be updated upon completion of ground investigations	Utility providers to be consulted to obtain up to date information during initial design phase. Designer to ensure all known utility information is communication during the design stage to the Contractor. Potential need to undertake non-intrusive surveys (PAS 128 compliant)	Requirement for pumping from excavations. Presence of contamination may require treatment on site before disposal. Ground investigation to include installation of groundwater standpipes to determine groundwater regime.	Designer to consider presence of existing structures with suitable mitigation measures considered.	Ground investigations to confirm the presence and lateral extent of buried obstructions. Appropriate excavation techniques to be implemented by Contractor. Variable ground conditions and obstructions to be considered in foundation design.	UXO desk study and site surveys	Ground investigation to characterise geology and determine strength and consolidation properties. Ground treatment may be required. Designer to consider additional mitigation measures within the design to accommodate large differential settlements if expected.	Ground investigation method to consider the potential for collapsible ground. Temporary works design to consider the potential for collapsible materials on site and possible mitigation measures depending on the end design solution.	Ground investigation required to verify geochemistry of the site strata. Classification of ground aggressivity and design of concrete to be taken in accordance with BRE SD1 2005	Ground investigation required to provide adequate understanding of the ground and groundwater conditions and assess materials suitability for reuse	-	Undertake stability analysis of existing revetment slopes. Ground investigation required to assess suitability of materials for re-use. If materials excavated Export material offsite, if possible.	Obtain detailed Coal Authority mining risk assessment. Ground investigation proposed to aid assessment	Ground investigation to include geo-environmental testing including groundwater and ground gas monitoring. Contamination testing to be undertaken where potential evidence of contamination is observed. Mitigation measures implemented should a risk be identified

Area	Uncertainty in ground conditions	Lack of information on buried services	Shallow groundwater	Construction of new works adjacent to existing structures	Buried obstructions	Unexploded (UXO) Ordnance	Insufficient bearing capacity and/or excessive settlement	Running sands	Ground aggressivity	Materials	Existing quay walls	General earthworks	Coal mining	Contamination Risk
Area C: Harbourside	**Hazard description**													
	Uncertainty in underlying strata and material parameters due to absence of recent ground investigation information	Currently available information on buried services and utilities is outdated.	Shallow groundwater expected to be present within area based on information from previous ground investigation.	Construction may impact the existing wharf and other existing buildings.	Presence of buried obstructions beneath the site	Potential for encountering UXOs. The risk in this area is considered low to moderate.	Potential presence of compressible ground due to uncertainty in ground conditions despite historical evidence of past loading.	Running sands identified during previous GIs.	Aggressive ground conditions.	Presence of waste products from the existing steelworks (i.e.slag) which may undergo expansion.	This area has quay walls in the northern end.	Earthworks present in area.	Potential presence of unrecorded mine workings beneath the site.	Potential soil and groundwater contamination in the form of oils, fuels, metals and asbestos originating from made ground placed on the site and from spills from historic and current commercial activity. Ground gas risks are likely to be low.
	Consequence													
	Inappropriate and/or conservative engineering design	Damage to existing utilities in response to additional loading. Risk of injury or death of personnel on site	Groundwater ingress in excavations leading to destabilisation of excavations	Damage to existing structures	Difficult excavation leading to programme delay and additional costs. Unidentified obstructions may pose a risk to structure foundations.	Delays during construction and fatalities if UXOs not identified prior to excavation	Excessive settlement and/or bearing capacity failure	Risk of running sands leading to ground instability	Chemical reactions may occur between any buried concrete and existing ground. Adverse impact on any proposed structure foundations.	Material may be unsuitable for re-use.	Proposed development may lead to additional loading onto existing quay walls.	Proposed development may lead to additional loading onto existing earthworks.	Adverse impact on proposed development, including migration of collapse of coal workings to the surface.	Potential soil and groundwater contamination in the form of oils, fuels and metals originating from materials used during the reclamation of the area and infilling. Potential for a ground gas risk to be present due to the likely significant thickness of Made Ground and potential for peat to be present at depth. Delays to construction and associated costs of treatment and/or removal and/or disposal off-site. Potential delays and costs associated with redesign of scheme elements. Risk to construction workers and site operatives. Risk to controlled waters.
	Mitigation													
	Ground investigation required to provide adequate understanding of the ground and groundwater conditions. 3D geological model to be developed to visualise variability in ground conditions, to be updated upon completion of ground investigations	Utility providers to be consulted to obtain up to date information during initial design phase. Designer to ensure all known utility information is communication during the design stage to the Contractor. Potential need to undertake non-intrusive surveys (PAS 128 compliant)	Requirement for pumping from excavations. Presence of contamination may require treatment on site before disposal. Ground investigation to include installation of groundwater standpipes to determine groundwater regime.	Designer to consider presence of existing structures with suitable mitigation measures considered.	Ground investigations to confirm the presence and lateral extent of buried obstructions. Appropriate excavation techniques to be implemented by Contractor. Variable ground conditions and obstructions to be considered in foundation design.	UXO desk study and site surveys	Ground investigation to characterise geology and determine strength and consolidation properties. Ground treatment may be required. Designer to consider additional mitigation measures within the design to accommodate large differential settlements if expected.	Ground investigation method to consider the potential for collapsible ground. Temporary works design to consider the potential for collapsible materials on site and possible mitigation measures depending on the end design solution.	Ground investigation required to verify geochemistry of the site strata. Classification of ground aggressivity and design of concrete to be taken in accordance with BRE SD1 2005	Ground investigation required to provide adequate understanding of the ground and groundwater conditions and assess materials suitability for reuse	Undertake geotechnical assessment of existing quay walls.	Undertake stability analysis of existing revetment slopes. Ground investigation required to assess suitability of materials for re-use. If materials excavated Export material offsite, if possible.	Obtain detailed Coal Mining Risk Assessment. Ground investigation proposed to aid assessment	Ground investigation to include geo-environmental testing including groundwater and ground gas monitoring. Contamination testing to be undertaken where potential evidence of contamination is observed. Mitigation measures implemented should a risk be identified

Area	Uncertainty in ground conditions	Lack of information on buried services	Shallow groundwater	Construction of new works adjacent to existing structures	Buried obstructions	Unexploded (UXO) Ordnance	Insufficient bearing capacity and/or excessive settlement	Running sands	Ground aggressivity	Materials	Existing quay walls	General earthworks	Coal mining	Contamination Risk
Area D : Talbot Wharf	**Hazard description**													
	Uncertainty in underlying strata and material parameters due to absence of recent ground investigation information, resulting.	Currently available information is outdated.	Shallow groundwater expected to be present within area based on information from previous ground investigation.	Construction may impact the existing wharves and other existing buildings.	Presence of buried obstructions beneath the site	Potential for encountering UXOs. The risk in this area has not been defined.	Potential presence of compressible ground due to uncertainty in ground conditions despite historical evidence of past loading.	Running sands identified during previous GIs.	Aggressive ground is expected in this area due to the presence of made ground in previous ground investigation information.	Presence of waste products from the existing steelworks (i.e.slag) associated with significant thickness of made ground. Slag which may undergo expansion.	This area has quay walls in the southern end.	Earthworks present in area.	Potential presence of unrecorded mine workings beneath the site.	Potential soil and groundwater contamination in the form of oils, fuels and metals originating from former industrial land uses. Potential for a ground gas risk to be present due to the likely significant thickness of Made Ground and potential for peat to be present at depth.
	Consequence													
	Inappropriate and/or conservative engineering design	Damage to existing utilities in response to additional loading. Risk of injury or death of personnel on site	Groundwater ingress in excavations leading to destabilisation of excavations	Damage to existing structures	Difficult excavation leading to programme delay and additional costs. Unidentified obstructions may pose a risk to structure foundations.	Delays during construction and fatalities if UXOs not identified prior to excavation	Excessive settlement and/or bearing capacity failure	Risk of running sands leading to ground instability	Chemical reactions may occur between any buried concrete and existing ground. Adverse impact on any proposed structure foundations.	Material may be unsuitable for re-use.	Proposed development may lead to additional loading onto existing quay walls.	Proposed development may lead to additional loading onto existing earthworks.	Adverse impact on proposed development, including potential collapse of any coal workings	Delays to construction and associated costs of treatment and/or removal and/or disposal off-site. Potential delays and costs associated with redesign of scheme elements. Risk to construction workers and site operatives. Risk to controlled waters
	Mitigation													
	Ground investigation required to provide adequate understanding of the ground and groundwater conditions. 3D geological model to be developed to visualise variability in ground conditions, to be updated upon completion of ground investigations	Utility providers to be consulted to obtain up to date information during initial design phase. Designer to ensure all known utility information is communication during the design stage to the Contractor. Potential need to undertake non-intrusive surveys (PAS 128 compliant)	Requirement for pumping from excavations. Presence of contamination may require treatment on site before disposal. Ground investigation to include installation of groundwater standpipes to determine groundwater regime.	Designer to consider presence of existing structures with suitable mitigation measures considered.	Ground investigations to confirm the presence and lateral extent of buried obstructions. Appropriate excavation techniques to be implemented by Contractor. Variable ground conditions and obstructions to be considered in foundation design.	UXO desk study and site surveys	Ground investigation to characterise geology and determine strength and consolidation properties. Ground treatment may be required. Designer to consider additional mitigation measures within the design to accommodate large differential settlements if expected.	Ground investigation method to consider the potential for collapsible ground. Temporary works design to consider the potential for collapsible materials on site and possible mitigation measures depending on the end design solution.	Ground investigation required to verify geochemistry of the site strata. Classification of ground aggressivity and design of concrete to be taken in accordance with BRE SD1 2005	Ground investigation required to provide adequate understanding of the ground and groundwater conditions and assess materials suitability for reuse	Undertake geotechnical assessment of existing quay walls.	Undertake stability analysis of existing revetment slopes. Ground investigation required to assess suitability of materials for re-use. If materials excavated Export material offsite, if possible.	Obtain detailed Coal Authority mining risk assessment. Ground investigation proposed to aid assessment	Ground investigation to include geo-environmental testing including groundwater and ground gas monitoring. Contamination testing to be undertaken where potential evidence of contamination is observed. Mitigation measures implemented should a risk be identified

Area	Uncertainty in ground conditions	Lack of information on buried services	Shallow groundwater	Construction of new works adjacent to existing structures	Buried obstructions	Unexploded (UXO) Ordnance	Insufficient bearing capacity and/or excessive settlement	Running sands	Ground aggressivity	Materials	Existing quay walls	General earthworks	Coal mining	Contamination Risk
Area E: Lock and approach channel	**Hazard description**													
	Uncertainty in underlying strata and material parameters due to absence of recent ground investigation information	Records of any services or utilities in this area are not available. Are is in marine setting so risk is deemed low.	N/A	Construction may impact the existing lock structures.	N/A	Potential for encountering UXOs. The risk in this area is considered high.	Potential presence of compressible ground. Majority of the area within marine environment therefore likely no historical loading.	Sands identified during previous GIs below groundwater table.	Aggressive ground conditions.	Due to this area being entirely in the marine environment, the potential for artificial material to expand is not expected	This area has quay walls in the eastern end.	N/A	Potential presence of unrecorded mine workings benath the site.	Potential soil contamination in the form of oils, fuels and metals originating from ships accessing and egressing the area. Groundwater and ground gas risks are likely to be low or negligible.
	Consequence													
	Inappropriate and/or conservative engineering design	Damage to existing utilities in response to additional loading. Risk of injury or death of personnel on site	-	Damage to existing structures	-	Delays during construction and fatalities if UXOs not identified prior to exacavation	Excessive settlement and/or bearing capacity failure	Risk of running sands leading to ground instability	Chemical reactions may occur between any buried concrete and existing ground. Adverse impact on any proposed structure foundations.	-	Proposed development may lead to additional loading onto existing quay walls.	-	Adverse impact on proposed development, including potential collapse of any coal workings	Delays to construction and associated costs of treatment and/or removal and/or disposal off-site. Potential delays and costs associated with redesign of scheme elements. Risk of transporting contaminated soils onto previously uncontaminated land during dredging Risk to construction workers and operational staff. Risk to controlled waters.
	Mitigation													
	Ground investigation required to provide adequate understanding of the ground and groundwater conditions. 3D geological model to be developed to visualise variability in ground conditions, to be updated upon completion of ground investigations	Utility providers to be consulted to obtain upto date information during initial design phase. Designer to ensure all known utility information is communication during the design stage to the Contractor. Potential need to undertake non-intrusive surveys (PAS 128 compliant)	-	Designer to consider presence of exisitng structures with syuitable mitigation measures considered.	-	UXO desk study and site surveys	Ground investigation to characterise geology and determine strength and consolidation properties. Ground treatment may be required. Designer to consider additional mitigation measures within the design to accommodate large differential settlements if expected.	Ground investigation method to consider the potential for collapsible ground. Temporary works design to consider the potential for collapsible materials on site and possible mitigation measures depending on the end design solution.	Ground investigation required to verify geochemistry of the site strata. Classification of ground aggressivity and design of concrete to be taken in accordance with BRE SD1 2005	Ground investigation required to provide adequate understanding of the ground and groundwater conditions and assess materials suitability for reuse	Undertake geotechnical assessment of existing quay walls.	Undertake stability analysis of existing revetment slopes. Ground investigation required to assess suitability of materials for re-use. If materials excavated Export material offsite, if possible.	Obtain detailed Coal Authority mining risk assessment. Ground investigation proposed to aid assessment	Ground investigation to include geo-environmental testing. Contamination testing to be undertaken where potential evidence of contamination is observed. Mitigation measures implemented should a risk be identified

Area	Uncertainty in ground conditions	Lack of information on buried services	Shallow groundwater	Construction of new works adjacent to existing structures	Buried obstructions	Unexploded (UXO) Ordnance	Insufficient bearing capacity and/or excessive settlement	Running sands	Ground aggressivity	Materials	Existing quay walls	General earthworks	Coal mining	Contamination Risk
	Hazard description													
Area F: Port Talbot Harbour Limit	Uncertainty in underlying strata and material parameters due to absence of recent ground investigation information	N/A	N/A	N/A	Potential for encountering shipwrecks.	Potential for encountering UXOs. The risk in this area is considered moderate.	Potential presence of compressible ground. Area within marine environment therefore likely no historical loading.	Sands identified during previous GIs below groundwater table.	N/A	N/A	N/A	N/A	Potential presence of unrecorded mine workings benath the site.	Potential soil contamination in the form of oils, fuels and metals originating from ships accessing and egressing the area. Groundwater and ground gas risks are likely to be low or negligible.
	Consequence													
	Inappropriate and/or conservative engineering design	-	-	-	Delays during construction if presence of shipwrecks no idenfied prior to excavation.	Delays during construction and fatalities if UXOs not identified prior to exacavation	Excessive settlement and/or bearing capacity failure	Risk of running sands leading to ground instability	-	-	-	-	Adverse impact on proposed development, including potential collapse of any coal workings	Delays to construction and associated costs of treatment and/or removal and/or disposal off-site. Potential delays and costs associated with redesign of scheme elements. Risk of transporting contaminated soils onto previously uncontaminated land during dredging Risk to construction workers and operational staff. Risk to controlled waters.
	Mitigation													
	Ground investigation required to provide adequate understanding of the ground and groundwater conditions. 3D geological model to be developed to visualise variability in ground conditions, to be updated upon completion of ground investigations					UXO desk study and site surveys	Ground investigation to characterise geology and determine strength and consolidation properties. Ground treatment may be required. Designer to consider additional mitigation measures within the design to accommodate large differential settlements if expected.	Ground investigation method to consider the potential for collapsible ground. Temporary works design to consider the potential for collapsible materials on site and possible mitigation measures depending on the end design solution.					Obtain detailed Coal Authority mining risk assessment. Ground investigation proposed to aid assessment	Ground investigation to include geo-environmental testing. Contamination testing to be undertaken where potential evidence of contamination is observed. Mitigation measures implemented should a risk be identified.

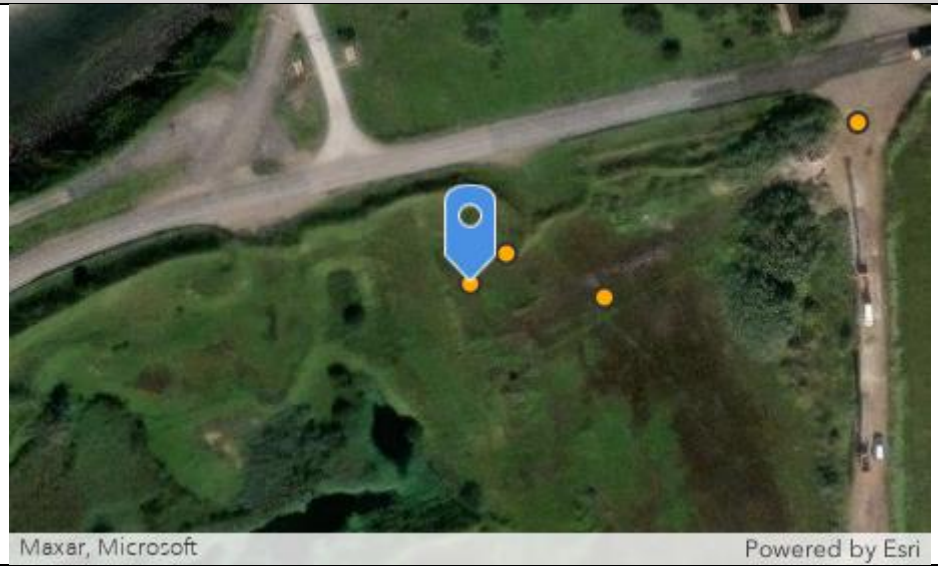
Area	Uncertainty in ground conditions	Lack of information on buried services	Shallow groundwater	Construction of new works adjacent to existing structures	Buried obstructions	Unexploded (UXO) Ordnance	Insufficient bearing capacity and/or excessive settlement	Running sands	Ground aggressivity	Materials	Existing quay walls	General earthworks	Coal mining	Contamination Risk
Area G: Main Channel	**Hazard description**													
	Uncertainty in underlying strata and material parameters due to absence of recent ground investigation information	N/A	N/A	N/A	Potential for encountering shipwrecks.	Potential for encountering UXOs. The risk in this area is considered moderate.	Potential presence of compressible ground. Area within marine environment therefore likely no historical loading.	Sands identified during previous GIs below groundwater table.	N/A	N/A	N/A	N/A	Potential presence of unrecorded mine workings benath the site.	Potential soil contamination in the form of oils, fuels and metals originating from ships accessing and egressing the area. Groundwater and ground gas risks are likely to be low or negligible.
	Consequence													
	Inappropriate and/or conservative engineering design	-	-	-	Delays during construction if presence of shipwrecks no idenfied prior to excavation.	Delays during construction and fatalities if UXOs not identified prior to exacavation	Excessive settlement and/or bearing capacity failure	Risk of running sands leading to ground instability	-	-	-	-	Adverse impact on proposed development, including potential collapse of any coal workings	Delays to construction and associated costs of treatment and/or removal and/or disposal off-site. Potential delays and costs associated with redesign of scheme elements. Risk of transporting contaminated soils onto previously uncontaminated land during dredging Risk to construction workers and operational staff. Risk to controlled waters.
	Mitigation													
	Ground investigation required to provide adequate understanding of the ground and groundwater conditions. 3D geological model to be developed to visualise variability in ground conditions, to be updated upon completion of ground investigations	-	-	-	-	UXO desk study and site surveys	Ground investigation to characterise geology and determine strength and consolidation properties. Ground treatment may be required. Designer to consider additional mitigation measures within the design to accommodate large differential settlements if expected.	Ground investigation method to consider the potential for collapsible ground. Temporary works design to consider the potential for collapsible materials on site and possible mitigation measures depending on the end design solution.	-	-	-	-	Obtain detailed Coal Authority mining risk assessment. Ground investigation proposed to aid assessment	Ground investigation to include geo-environmental testing. Contamination testing to be undertaken where potential evidence of contamination is observed. Mitigation measures implemented should a risk be identified

Area	Uncertainty in ground conditions	Lack of information on buried services	Shallow groundwater	Construction of new works adjacent to existing structures	Buried obstructions	Unexploded (UXO) Ordnance	Insufficient bearing capacity and/or excessive settlement	Running sands	Ground aggressivity	Materials	Existing quay walls	General earthworks	Coal mining	Contamination Risk
Area H: Impounded Harbour	**Hazard description**													
	Uncertainty in underlying strata and material parameters due to absence of recent ground investigation information	N/A	N/A	N/A	N/A	Potential for encountering UXOs. The risk in this area is considered moderate.	Potential presence of compressible ground. Area within marine environment therefore likely no historical loading.	N/A	Aggressive ground conditions.	N/A	This area has quay walls along the boundary.	N/A	Potential presence of unrecorded mine workings benath the site.	Potential soil contamination in the form of oils, fuels and metals originating from ships accessing and egressing the area. Groundwater and ground gas risks are likely to be low or negligible.
	Consequence													
	Inappropriate and/or conservative engineering design	-	-	-	-	Delays during construction and fatalities if UXOs not identified prior to exacavation	Excessive settlement and/or bearing capacity failure. Only a risk for development proposed within the channel.	-	Chemical reactions may occur between any buried concrete and existing ground. Adverse impact on any proposed structure foundations.	-	Proposed development may lead to additional loading onto existing quay walls.	-	Adverse impact on proposed development, including potential collapse of any coal workings	Delays to construction and associated costs of treatment and/or removal and/or disposal off-site. Potential delays and costs associated with redesign of scheme elements. Risk of transporting contaminated soils onto previously uncontaminated land during dredging Risk to construction workers and operational staff. Risk to controlled waters.
	Mitigation													
	Ground investigation required to provide adequate understanding of the ground and groundwater conditions. 3D geological model to be developed to visualise variability in ground conditions, to be updated upon completion of ground investigations	-	-	-	-	UXO desk study and site surveys	Ground investigation to characterise geology and determine strength and consolidation properties. Ground treatment may be required. Designer to consider additional mitigation measures within the design to accommodate large differential settlements if expected.	-	Ground investigation required to verify geochemistry of the site strata. Classification of ground aggressivity and design of concrete to be taken in accordance with BRE SD1 2005	-	Undertake geotechnical assessment of existing quay walls.	-	Obtain detailed Coal Authority mining risk assessment. Ground investigation proposed to aid assessment	Ground investigation to include geo-environmental testing. Contamination testing to be undertaken where potential evidence of contamination is observed. Mitigation measures implemented should a risk be identified

B. Site Walkover Notes

Geometry Information	
Survey Date	June 28, 2023 2:28 PM
Surveyor	Nia.Jones@mottmac.com_mottmac_EMA

Map



Attribute Information		
X coordinate	**Y coordinate**	**Chainage**
275,540.014733327	188,634.528023475	ABP land

Notes

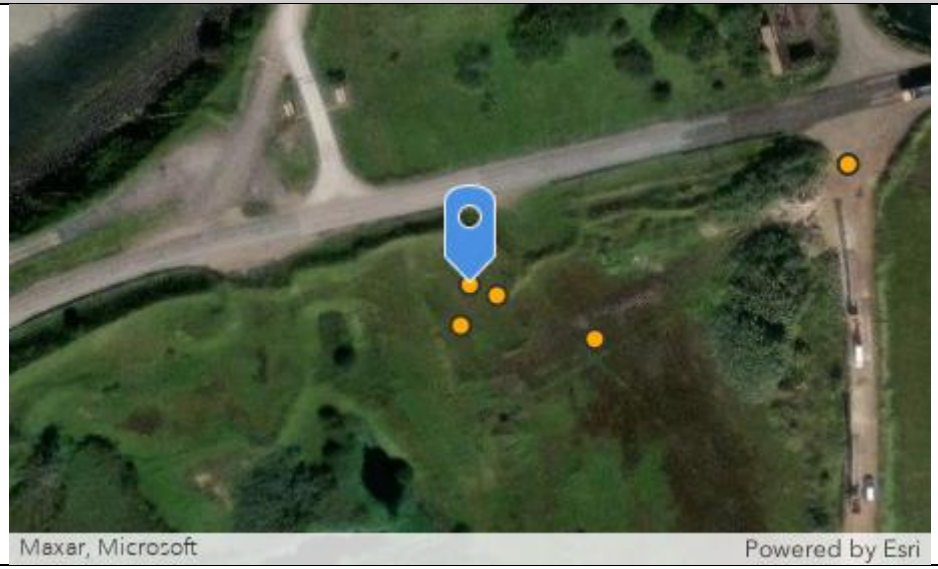
Material appears to have been poured on top of surface. Slight hydrocarbon smell. Black on inside, beige/grey cooled surfaces and margins on top and bottom. Chilled by rock from below and by air from above.

Attachments		
Photo	Direction	Description
		

	North	

Geometry Information	
Survey Date	June 28, 2023 2:19 PM
Surveyor	Nia.Jones@mottmac.com_mottmac_EMA

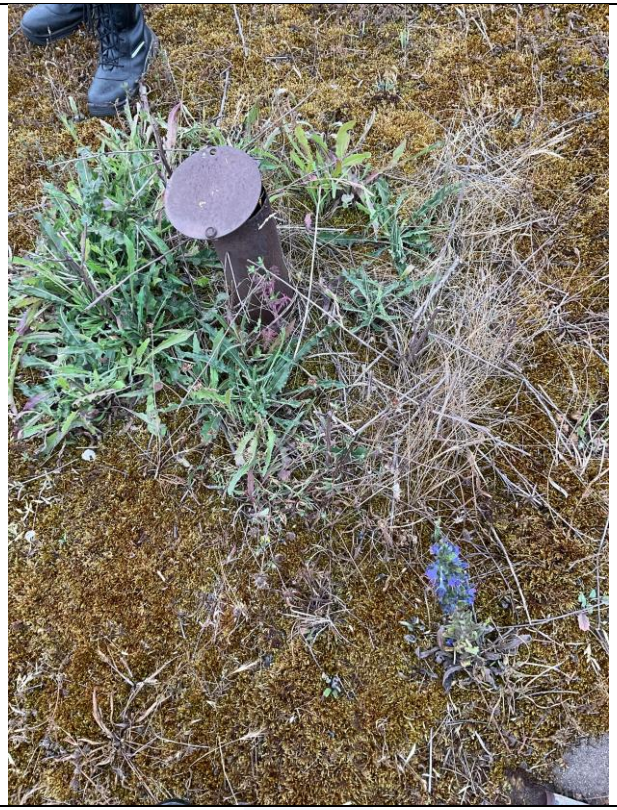
Map



Attribute Information		
X coordinate	**Y coordinate**	**Chainage**
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Notes

Boreholes approx 7.5m apart.

Attachments		
Photo	**Direction**	**Description**
		Borehole top unable to open.

Geometry Information	
Survey Date	June 28, 2023 2:19 PM
Surveyor	Nia.Jones@mottmac.com_mottmac_EMA

Map

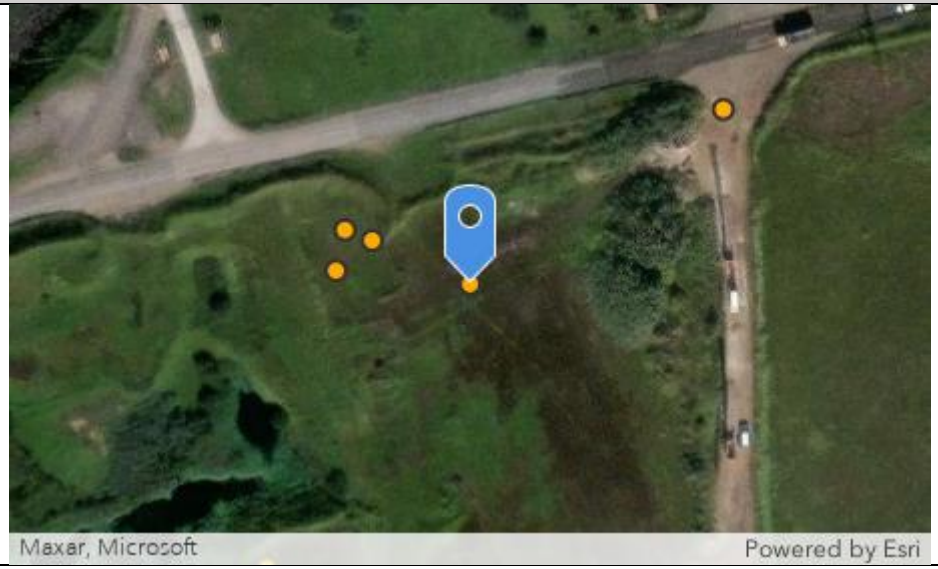


Attribute Information		
X coordinate	**Y coordinate**	**Chainage**
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Notes		
Boreholes approx 7.5m apart		

Attachments		
Photo	**Direction**	**Description**
	South	Borehole top unable to open.

Geometry Information	
Survey Date	June 28, 2023 2:15 PM
Surveyor	Nia.Jones@mottmac.com_mottmac_EMA

Map



Attribute Information		
X coordinate	**Y coordinate**	**Chainage**
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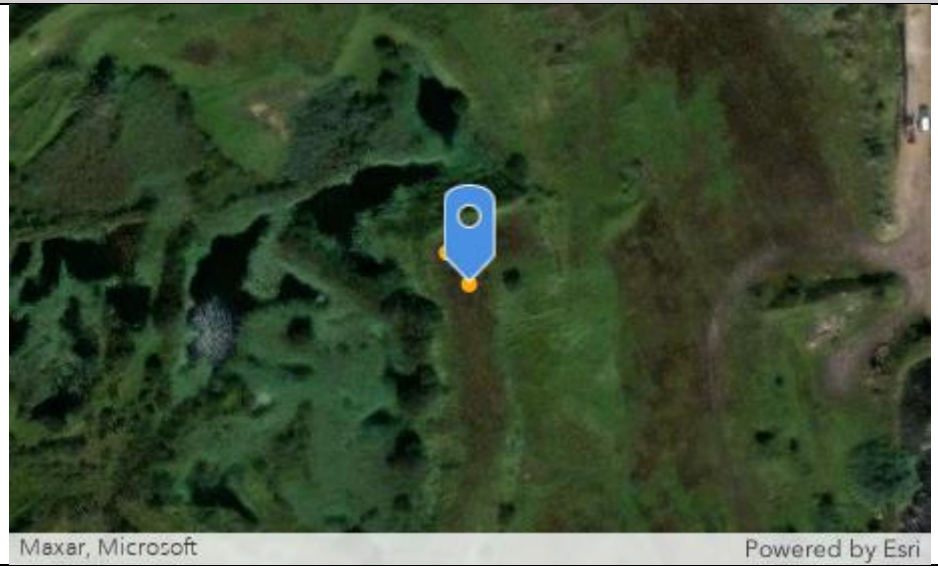
Notes

Concern for rippability of this material during construction.

Attachments		
Photo	**Direction**	**Description**
		Flat area of ground. Potentially a ‘skull’ area with fast dump of molten material

Geometry Information	
Survey Date	June 28, 2023 2:11 PM
Surveyor	Nia.Jones@mottmac.com_mottmac_EMA

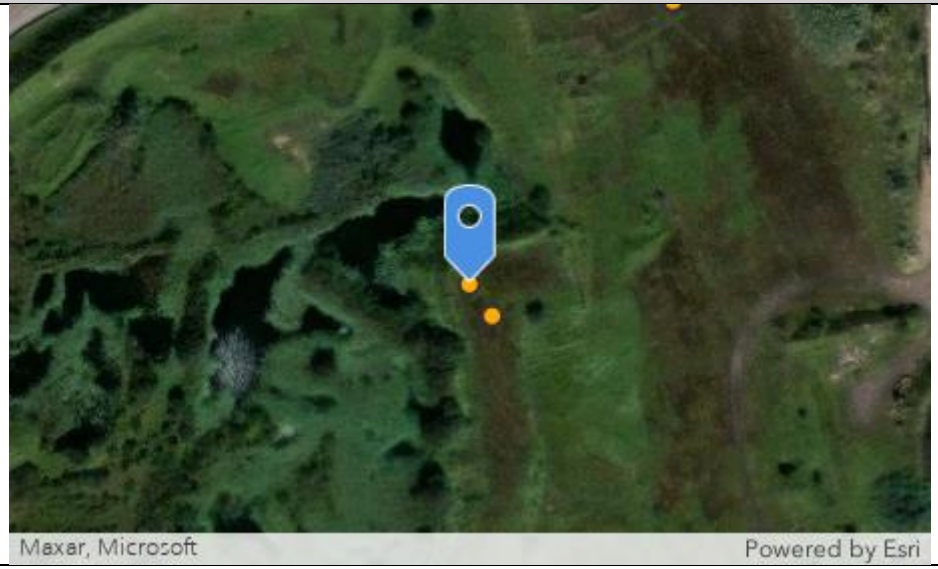
Map



Attribute Information		
X coordinate	**Y coordinate**	**Chainage**
275,526.756844705	188,554.115157599	ABP land
Notes		
Large old pipe		

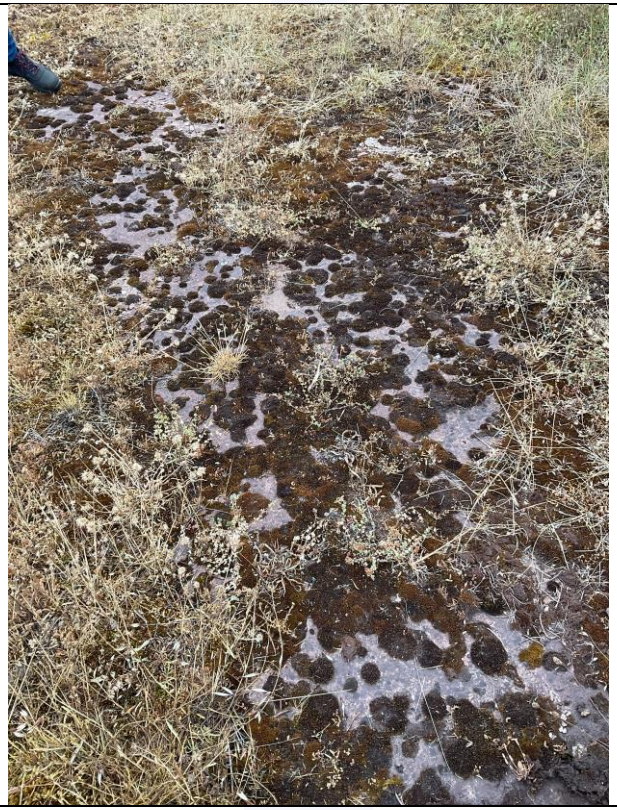
Geometry Information	
Survey Date	June 28, 2023 2:07 PM
Surveyor	Nia.Jones@mottmac.com_mottmac_EMA

Map



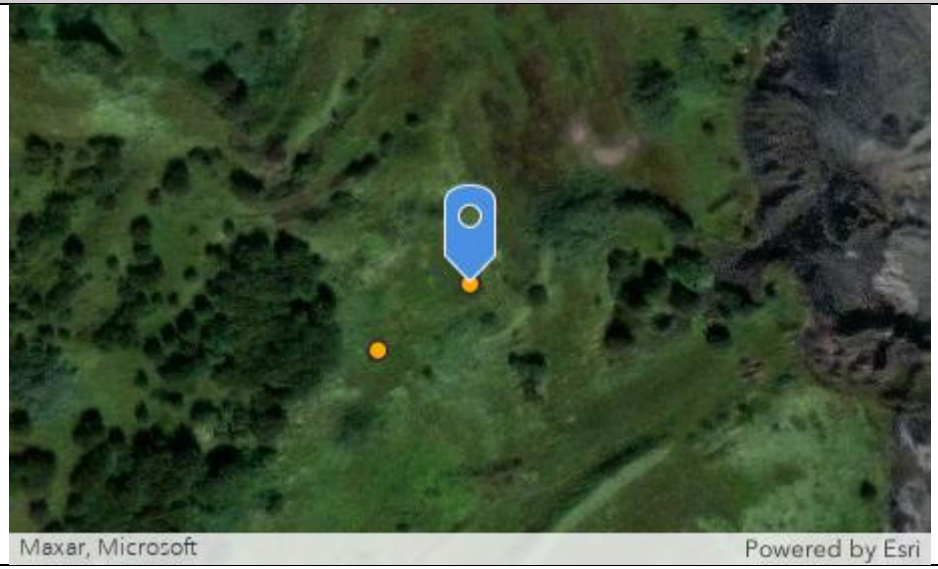
Attribute Information		
X coordinate	**Y coordinate**	**Chainage**
275,521.305886104	188,562.051244929	ABP land

Notes

Attachments		
Photo	**Direction**	**Description**
		Large, smooth area of potentially slag. 4m by 2.5m approx.

Geometry Information	
Survey Date	June 28, 2023 2:01 PM
Surveyor	Nia.Jones@mottmac.com_mottmac_EMA

Map



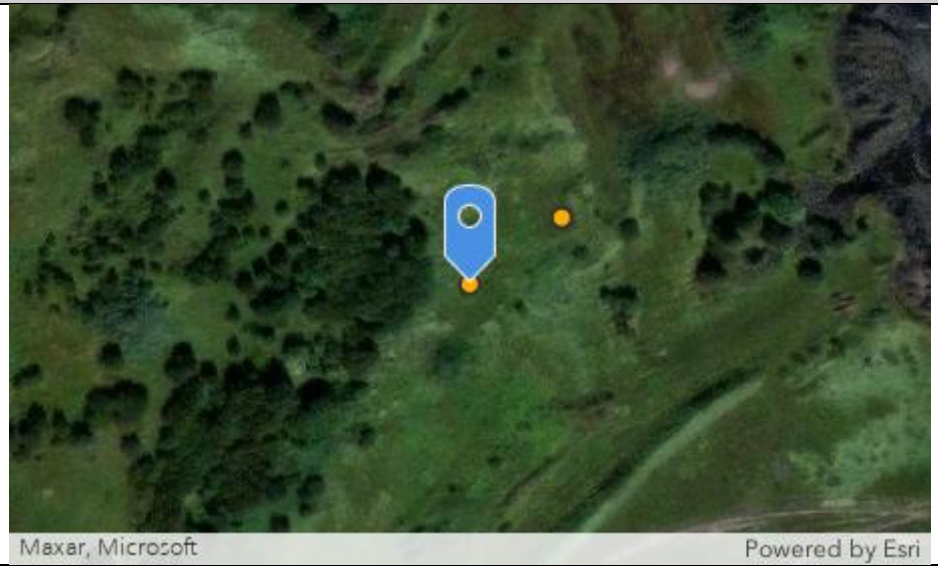
Attribute Information		
X coordinate	**Y coordinate**	**Chainage**
275,557.21463072	188,438.707922111	ABP land

Notes

Attachments		
Photo	**Direction**	**Description**
	South	Large lumps of fused slag

Geometry Information	
Survey Date	June 28, 2023 2:00 PM
Surveyor	Nia.Jones@mottmac.com_mottmac_EMA

Map



Attribute Information		
X coordinate	**Y coordinate**	**Chainage**
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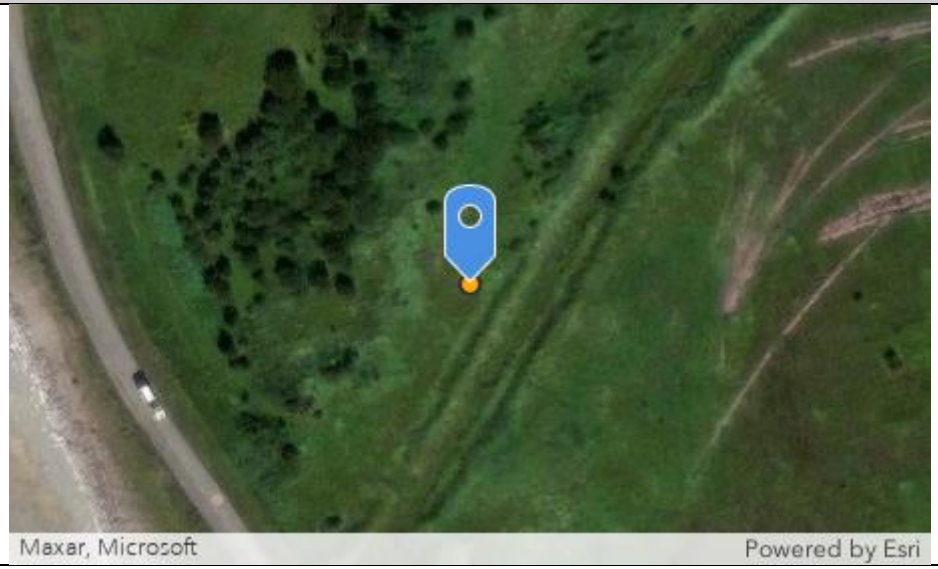
Notes

Attachments		
Photo	**Direction**	**Description**
		

Geometry Information	
Survey Date	June 28, 2023 1:53 PM
Surveyor	Nia.Jones@mottmac.com_mottmac_EMA

Map



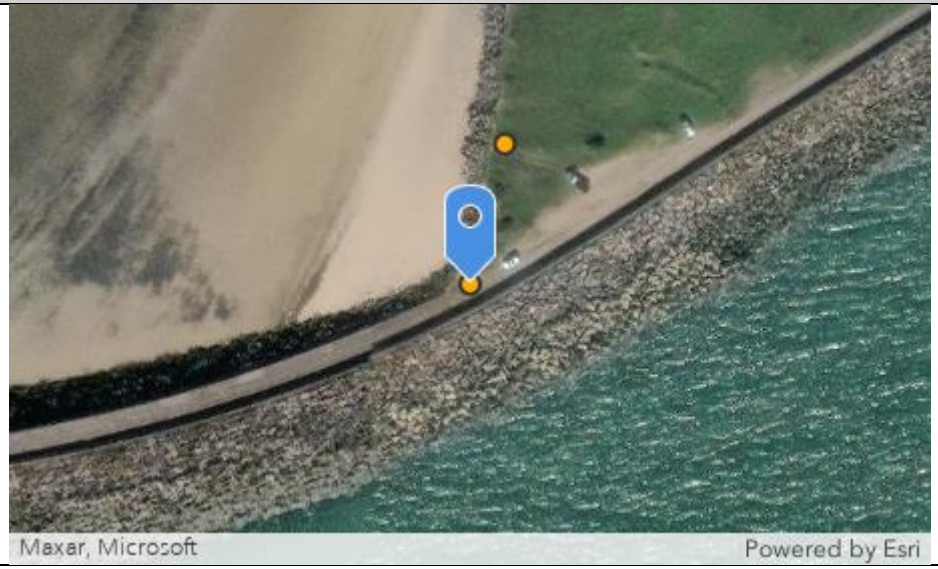
Attribute Information		
X coordinate	**Y coordinate**	**Chainage**
275,485.772067392	188,302.144537417	ABP land
Notes		
Old borehole with standpipe		

Attachments		
Photo	**Direction**	**Description**
		

Geometry Information	
Survey Date	June 28, 2023 1:34 PM
Surveyor	Nia.Jones@mottmac.com_mottmac_EMA

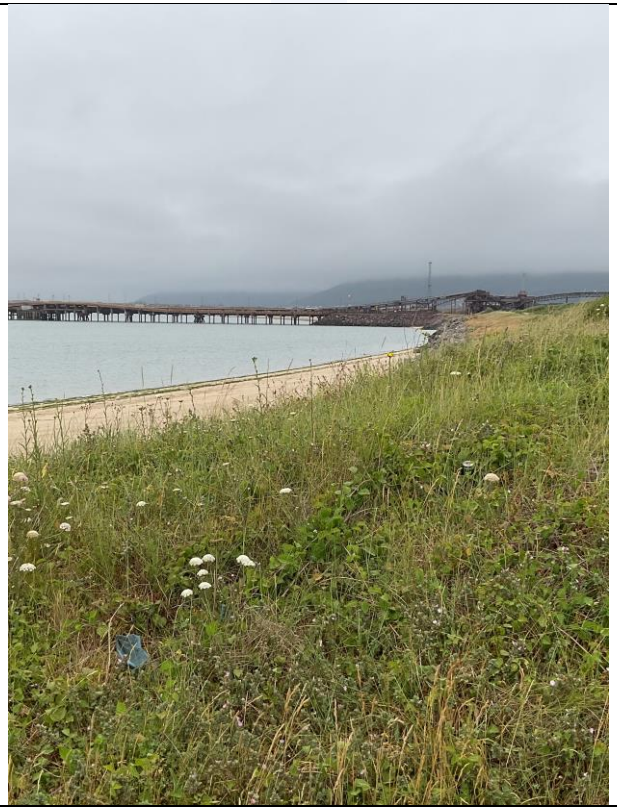
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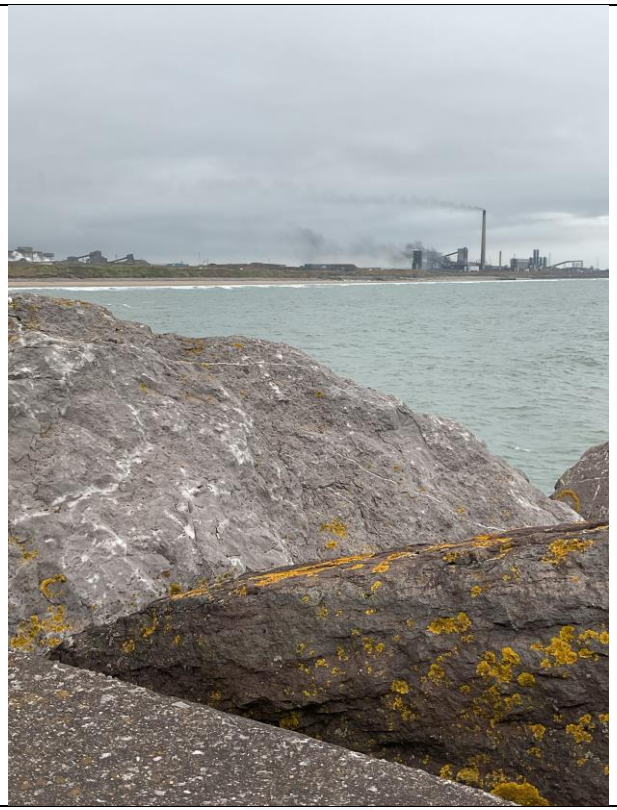


Attribute Information		
X coordinate	**Y coordinate**	**Chainage**
275,547.816853972	187,119.068867098	South breakwater

Notes

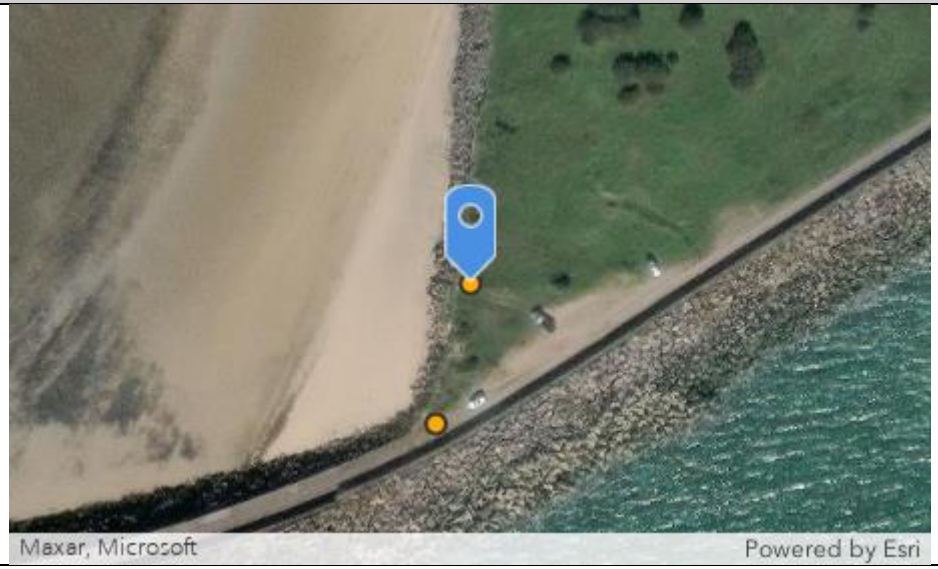
Land reclaimed in 1960s/1970s after 1964 harbour act. Breakwaters built as well.

Attachments		
Photo	**Direction**	**Description**
	North	

	East	

Geometry Information	
Survey Date	June 28, 2023 1:26 PM
Surveyor	Nia.Jones@mottmac.com_mottmac_EMA

Map

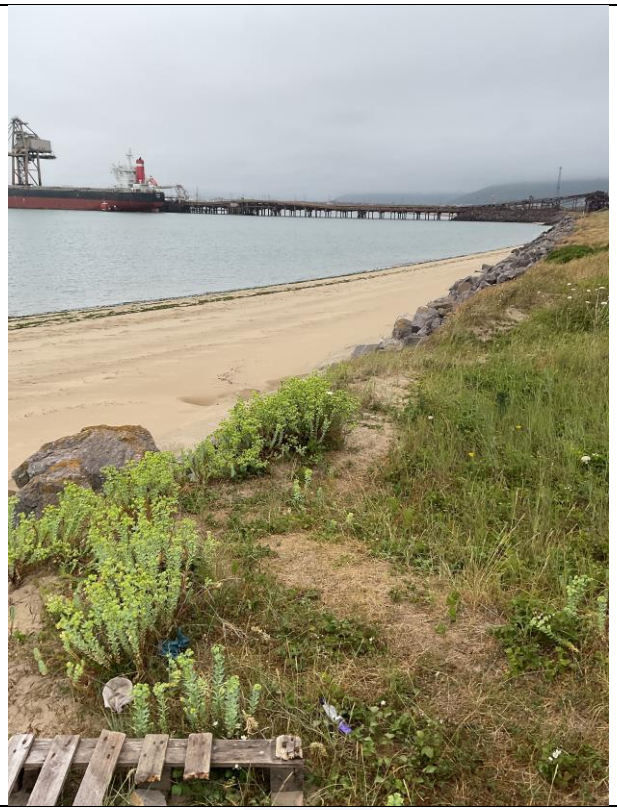


Attribute Information		
X coordinate	**Y coordinate**	**Chainage**
275,557.079809412	187,153.240187813	Southern breakwater

Notes

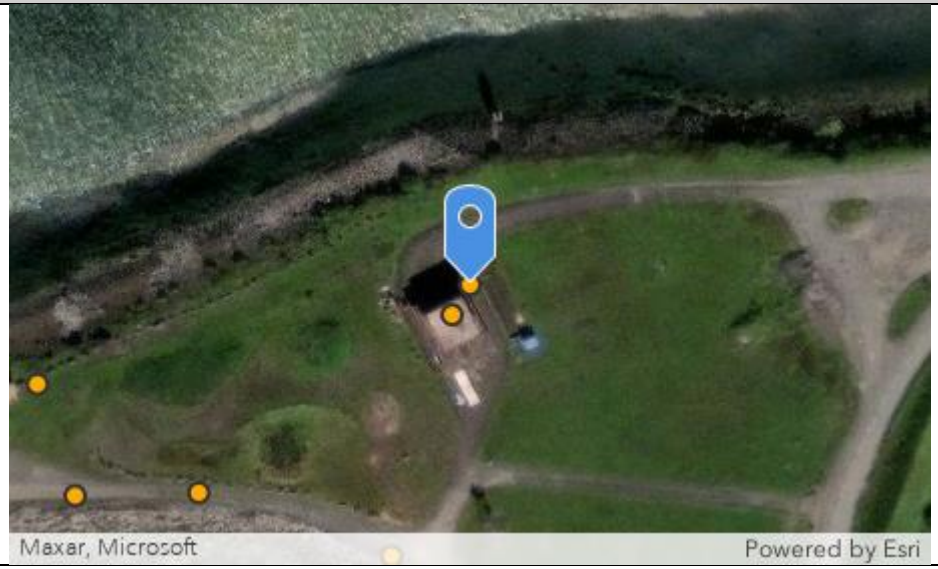
Attachments		
Photo	**Direction**	**Description**
	South West	

		West	

	North	Rip rap above beach, sandy ground behind rocks

Geometry Information	
Survey Date	June 28, 2023 1:14 PM
Surveyor	Nia.Jones@mottmac.com_mottmac_EMA

Map



Attribute Information		
X coordinate	**Y coordinate**	**Chainage**
275,263.224870694	188,613.745434893	APB building

Notes

Attachments		
Photo	**Direction**	**Description**
	East	Potential wharf/jetty to be built

Geometry Information	
Survey Date	June 28, 2023 1:10 PM
Surveyor	Nia.Jones@mottmac.com_mottmac_EMA

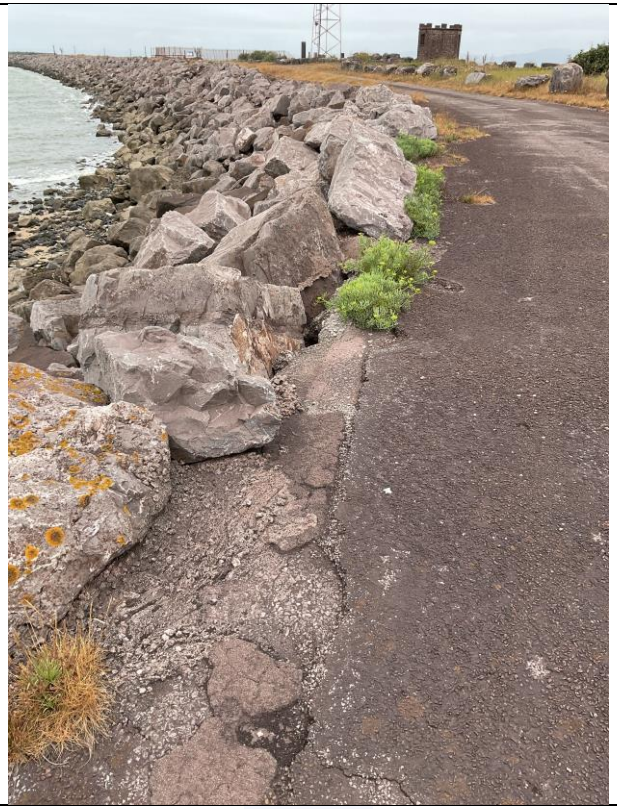
Map



Attribute Information		
X coordinate	**Y coordinate**	**Chainage**
275,242.431095851	188,547.329346983	East side of dock bay

Notes

Attachments		
Photo	**Direction**	**Description**
	South East	Erosion along top of beach area causing subsidence and collapse of roadway.

	North West	

Geometry Information	
Survey Date	June 28, 2023 1:09 PM
Surveyor	Nia.Jones@mottmac.com_mottmac_EMA

Map



Attribute Information		
X coordinate	**Y coordinate**	**Chainage**
275,195.214913965	188,564.116531651	North breakwater

Notes

Attachments		
Photo	**Direction**	**Description**
		Ground formed of vesicular slag

Geometry Information	
Survey Date	June 28, 2023 1:07 PM
Surveyor	Nia.Jones@mottmac.com_mottmac_EMA

Map



Attribute Information		
X coordinate	**Y coordinate**	**Chainage**
275,145.326545322	188,591.201107354	Old fort tower
Notes		
Listed building?		

Attachments		
Photo	**Direction**	**Description**
		

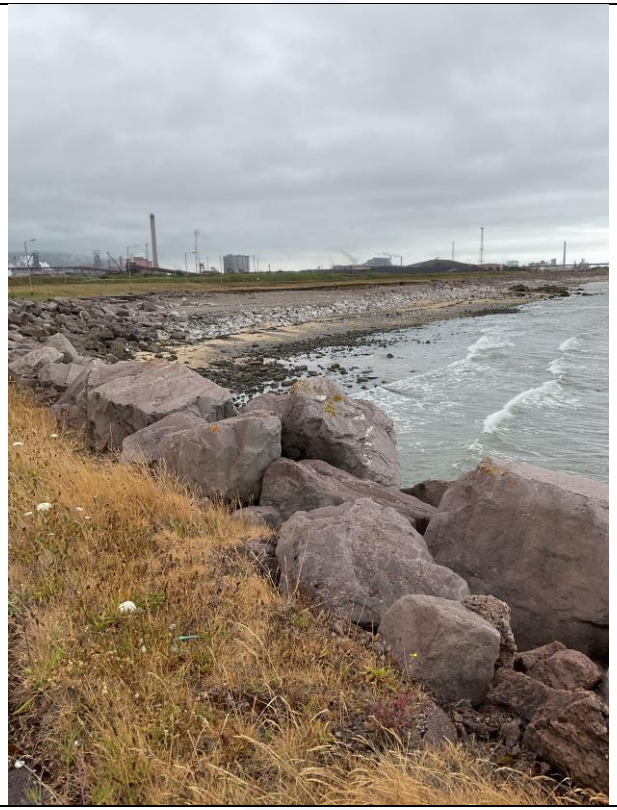
Geometry Information	
Survey Date	June 28, 2023 1:02 PM
Surveyor	Nia.Jones@mottmac.com_mottmac_EMA

Map



Attribute Information		
X coordinate	**Y coordinate**	**Chainage**
275,164.616667137	188,564.143421726	North breakwater

Notes

Attachments		
Photo	**Direction**	**Description**
	South East	Beach area along eastern side of bay

Geometry Information	
Survey Date	June 28, 2023 1:00 PM
Surveyor	Nia.Jones@mottmac.com_mottmac_EMA

Map



Attribute Information		
X coordinate	**Y coordinate**	**Chainage**
275,155.860246172	188,591.822722193	Start of north breakwater

Notes

Attachments		
Photo	**Direction**	**Description**
	West	

		South	View across to dock and southern breakwater

	East	

Geometry Information	
Survey Date	June 28, 2023 12:08 PM
Surveyor	Nia.Jones@mottmac.com_mottmac_EMA

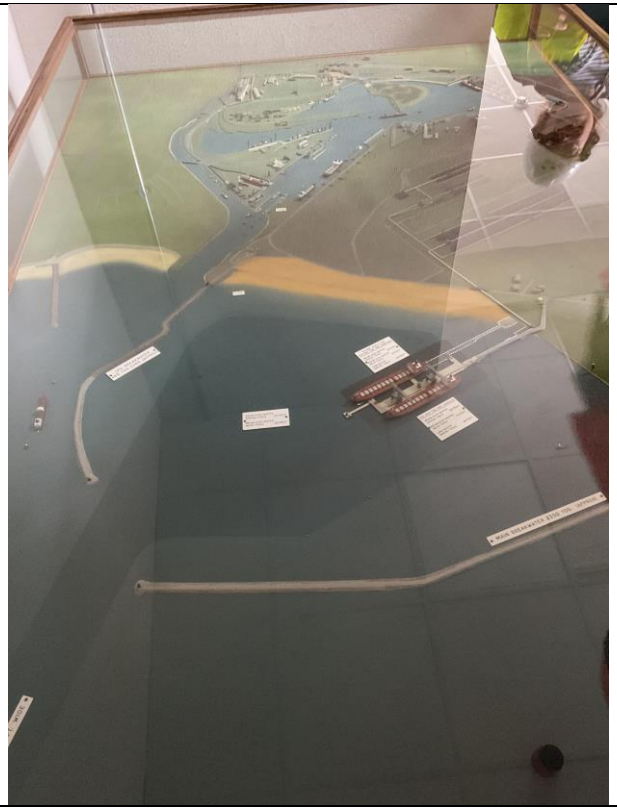
Map

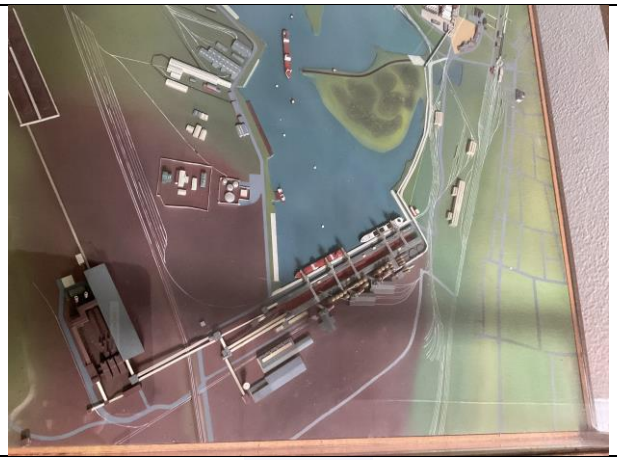


Attribute Information		
X coordinate	**Y coordinate**	**Chainage**
275,258.61963115	188,606.50900059	ABP office

Notes

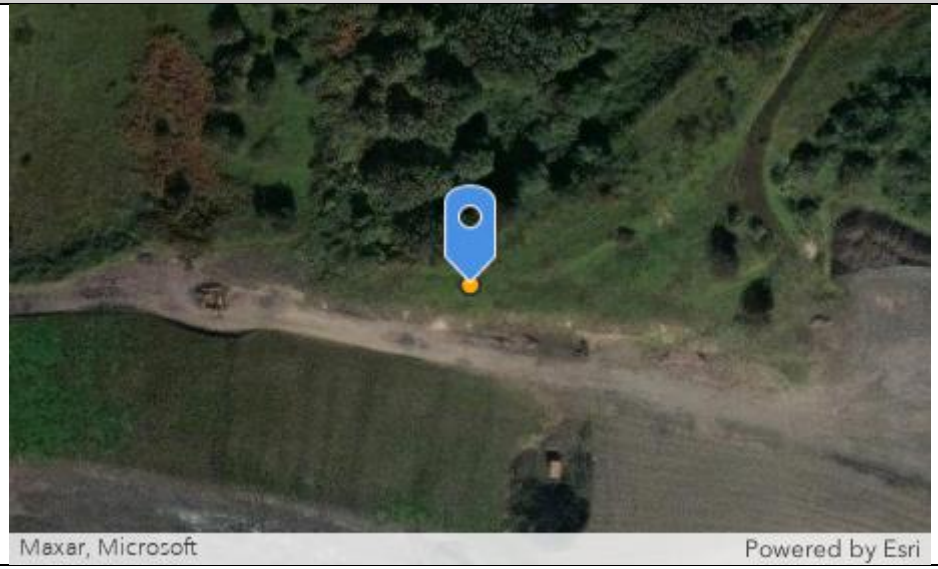
Port Talbot model, port opened by QE2 in 1970.

Attachments		
Photo	**Direction**	**Description**
		

		Dock from earlier,

Geometry Information	
Survey Date	June 28, 2023 11:50 AM
Surveyor	Nia.Jones@mottmac.com_mottmac_EMA

Map



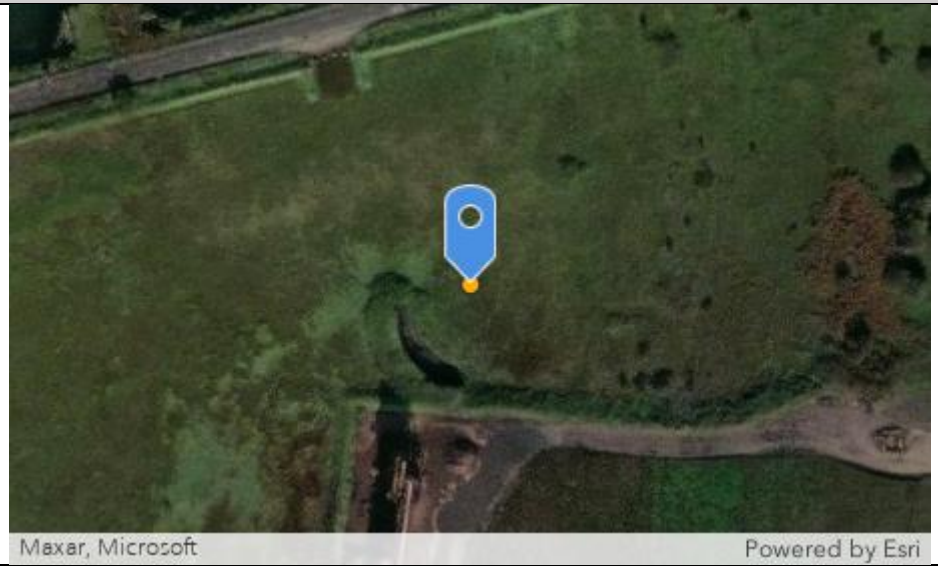
Attribute Information		
X coordinate	**Y coordinate**	**Chainage**
275,975.378004328	188,614.501620596	Next to ore pile
Notes		
Sandy underfoot in areas. Apparently very sandy underneath top layer		

Attachments		
Photo	**Direction**	**Description**
		Coal found in ground.

Geometry Information	
Survey Date	June 28, 2023 11:45 AM
Surveyor	Nia.Jones@mottmac.com_mottmac_EMA

Map



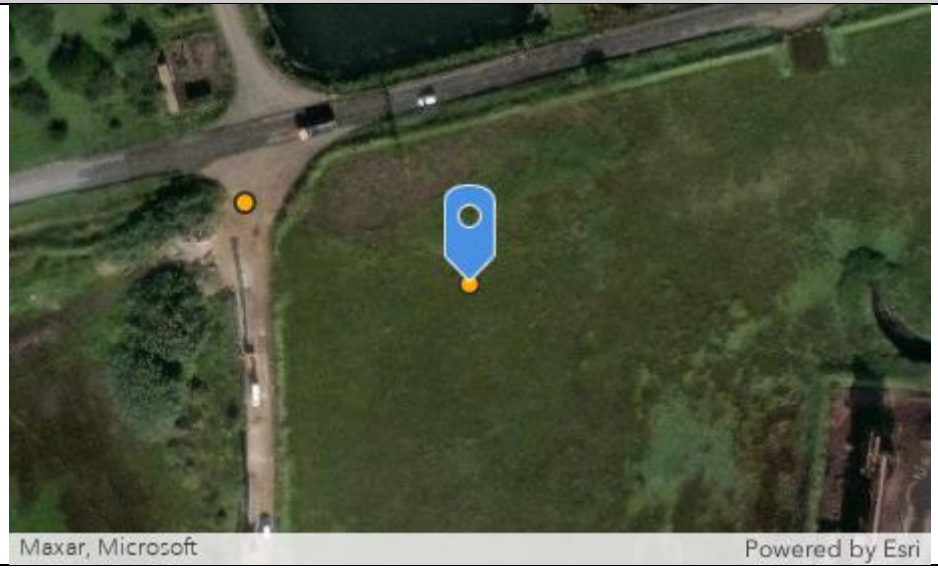
Attribute Information		
X coordinate	**Y coordinate**	**Chainage**
275,808.535577223	188,653.789875191	Near end of conveyor belt

Notes

Attachments		
Photo	**Direction**	**Description**
		Slag. Approx 50% air, very light.

Geometry Information	
Survey Date	June 28, 2023 11:40 AM
Surveyor	Nia.Jones@mottmac.com_mottmac_EMA

Map



Attribute Information		
X coordinate	**Y coordinate**	**Chainage**
275,691.571870247	188,650.554799273	Near ore pile
Notes		
Porous slag found on ground		

Geometry Information	
Survey Date	June 28, 2023 11:27 AM
Surveyor	Nia.Jones@mottmac.com_mottmac_EMA

Map



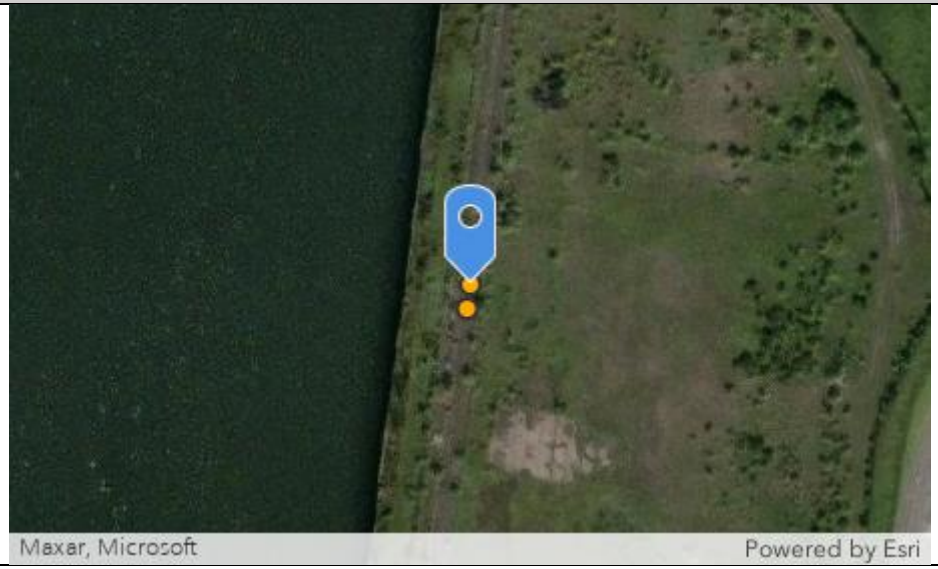
Attribute Information		
X coordinate	**Y coordinate**	**Chainage**
275,636.476994683	188,672.061069195	West end of impounded doc

Notes

Attachments		
Photo	**Direction**	**Description**
	East	Ore stockpile with conveyor belt. Fence in front of conveyor belt marks start of ABP land.

Geometry Information	
Survey Date	June 28, 2023 11:14 AM
Surveyor	Nia.Jones@mottmac.com_mottmac_EMA

Map

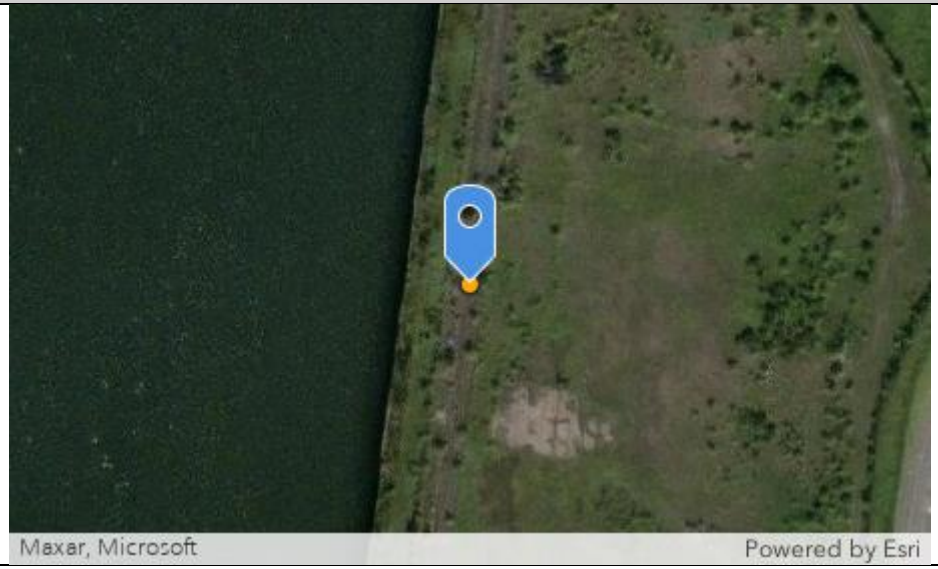


Attribute Information		
X coordinate	**Y coordinate**	**Chainage**
276,977.713516816	188,774.333429667	Potential lay down area
Notes		
Built up edge of dock. Covered in vegetation.		

Attachments		
Photo	**Direction**	**Description**
	South West	

Geometry Information	
Survey Date	June 28, 2023 11:13 AM
Surveyor	Nia.Jones@mottmac.com_mottmac_EMA

Map



Attribute Information		
X coordinate	**Y coordinate**	**Chainage**
276,976.939389999	188,768.362669036	Impounded dock east side

Notes

Attachments		
Photo	**Direction**	**Description**
	South West	

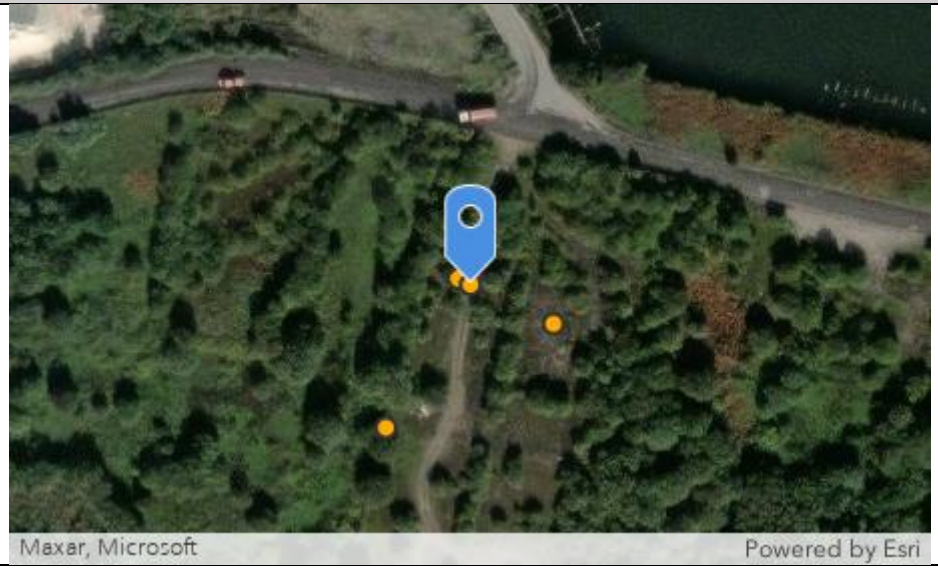
		South West	Potential operational wharfs opposite ABP site with fencing

			Refractory brick found in spoil heap. Iron ore found also.

			Vesicular slag found in spoil heap.

Geometry Information	
Survey Date	June 28, 2023 11:06 AM
Surveyor	Nia.Jones@mottmac.com_mottmac_EMA

Map

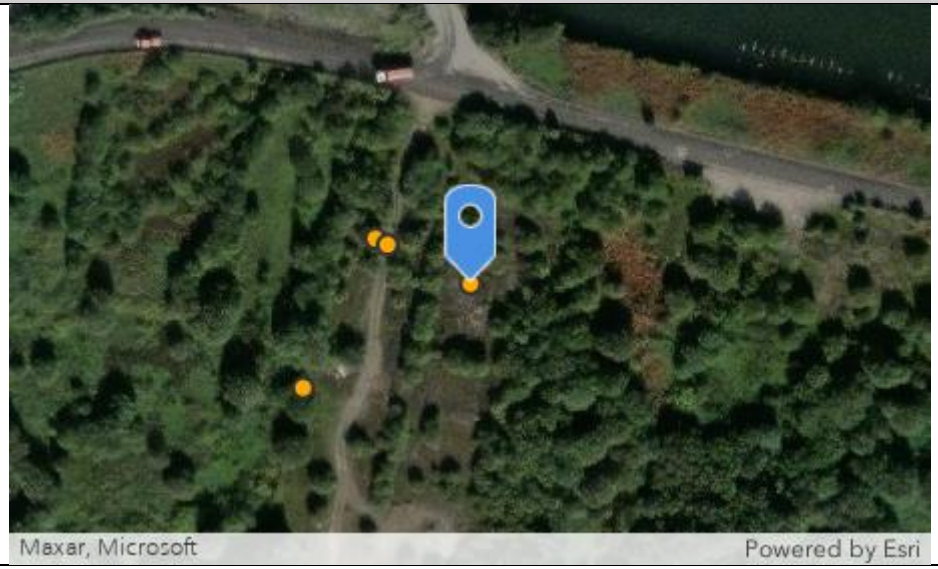


Attribute Information		
X coordinate	**Y coordinate**	**Chainage**
276,460.578783959	188,735.355935902	ABP land
Notes		
WS07 in mid ground. Unknown borehole in background. Site potentially to be used as a biofuel site.		

Attachments		
Photo	**Direction**	**Description**
	East	WS07 in mid ground. Unknown borehole in background.

Geometry Information	
Survey Date	June 28, 2023 11:06 AM
Surveyor	Nia.Jones@mottmac.com_mottmac_EMA

Map



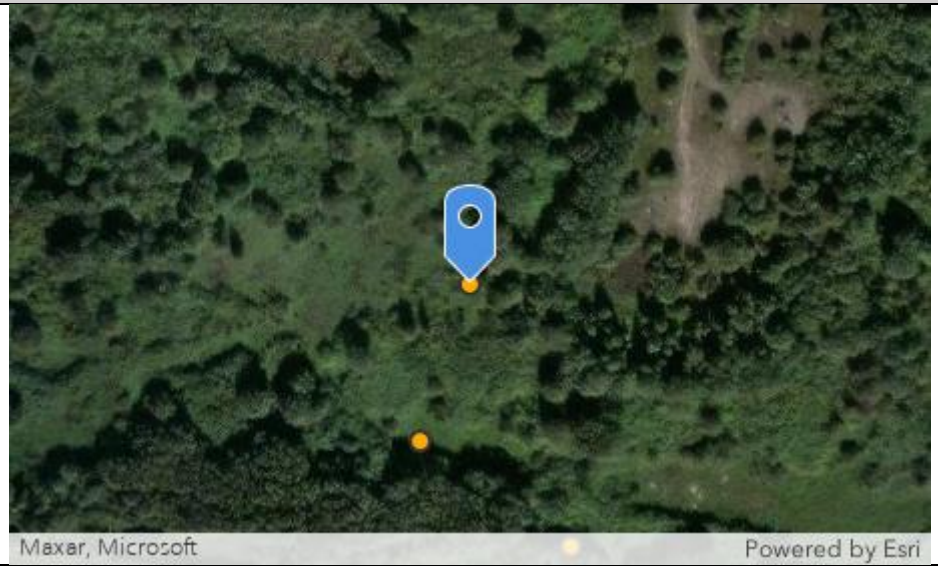
Attribute Information		
X coordinate	**Y coordinate**	**Chainage**
276,480.757141915	188,725.040355153	WS07

Notes

Attachments		
Photo	**Direction**	**Description**
		

Geometry Information	
Survey Date	June 28, 2023 11:02 AM
Surveyor	Nia.Jones@mottmac.com_mottmac_EMA

Map



Attribute Information		
X coordinate	**Y coordinate**	**Chainage**
276,391.797685085	188,623.119556127	ABP land

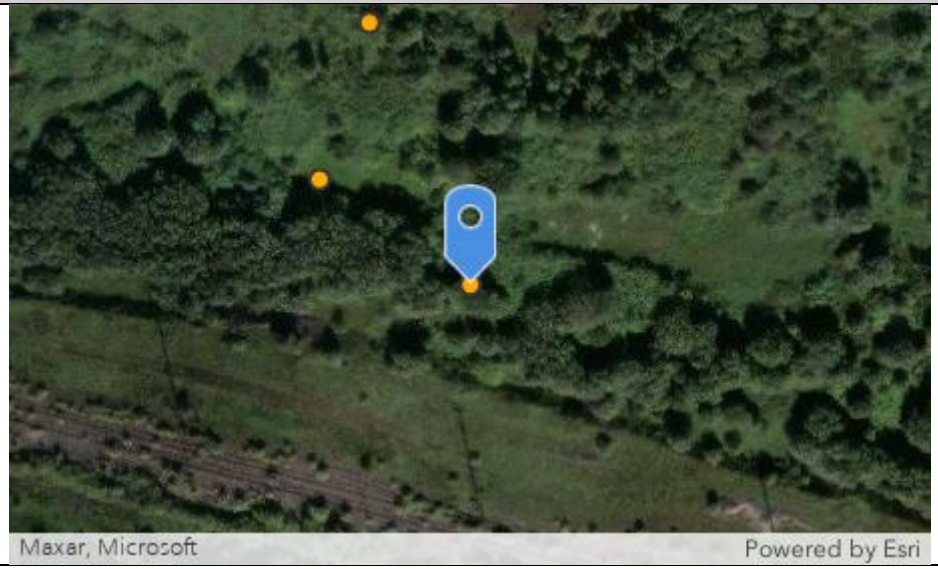
Notes

Attachments		
Photo	**Direction**	**Description**
	South	Unknown borehole

	North West	

Geometry Information	
Survey Date	June 28, 2023 10:57 AM
Surveyor	Nia.Jones@mottmac.com_mottmac_EMA

Map

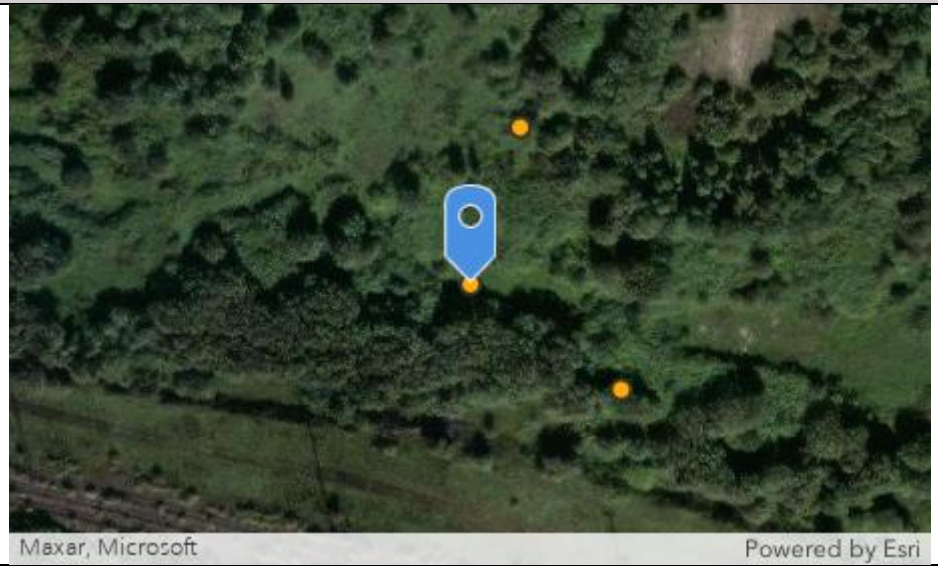


Attribute Information		
X coordinate	**Y coordinate**	**Chainage**
276,414.969679382	188,558.171549184	ABP land
Notes		
Three 8-inch holes with pipes within. Not packed in.		

Attachments		
Photo	**Direction**	**Description**
	North	

Geometry Information	
Survey Date	June 28, 2023 10:55 AM
Surveyor	Nia.Jones@mottmac.com_mottmac_EMA

Map



Attribute Information		
X coordinate	**Y coordinate**	**Chainage**
276,378.44406679	188,584.813935427	WS11
Notes		
Water monitoring pipe. Previous phase of GI.		

Geometry Information	
Survey Date	June 28, 2023 10:53 AM
Surveyor	Nia.Jones@mottmac.com_mottmac_EMA

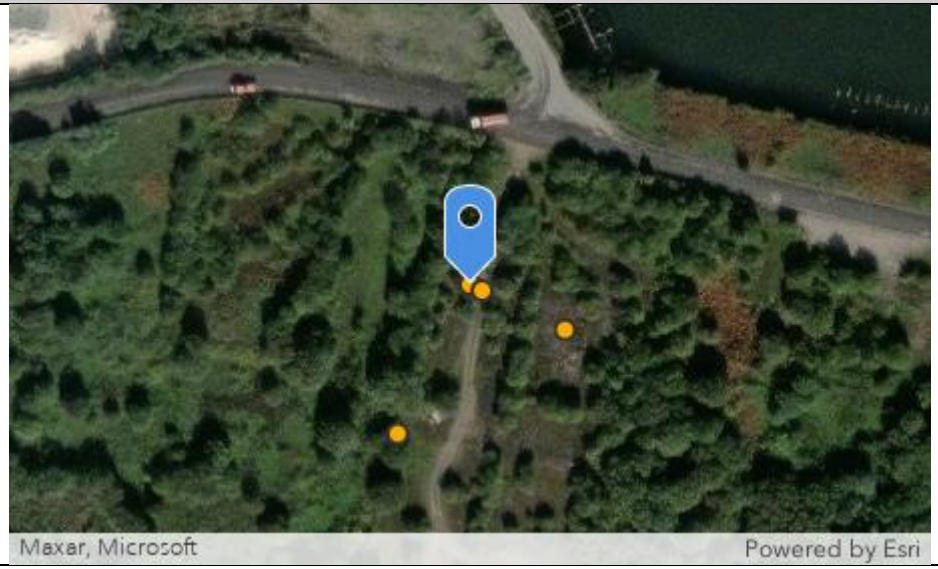
Map



Attribute Information		
X coordinate	**Y coordinate**	**Chainage**
276,438.894947012	188,700.617320175	BH108
Notes		
Gas bund not in borehole. Blue in colour.		

Geometry Information	
Survey Date	June 28, 2023 10:40 AM
Surveyor	Nia.Jones@mottmac.com_mottmac_EMA

Map



Attribute Information		
X coordinate	**Y coordinate**	**Chainage**
276,457.745935361	188,736.899105294	ABP land

Notes

RPS on site at moment trapping and moving reptiles. Started this week. Dock was previously extended.

Attachments		
Photo	**Direction**	**Description**
	South	New ABP fence with railway line behind. Large bund with trees behind.

	East	View of Tata plant



Appendix H
Ecology Surveys Technical Note – Survey Methodology and Scope

MOTT MACDONALD

Ecology Surveys 2024

Technical Note - Survey Methodology and Scope

Project:	Future Port Talbot		
Our reference:	ABP_WSSP_23_0559_MDEC-MMD-ZZ-XX-TEN-EN-000005 RevB	**Your reference:**	<Insert Text>
Prepared by:	L. Woolley, A. Owen	**Date:**	03/04/2024
Approved by:	R. Richardson	**Checked by:**	R. Monckton
Subject:	Proposed Scope of Ecological Surveys 2024 - for NPTCBC Review		

1 Introduction

A full suite of ecological survey work has been proposed across the Associated British Ports (ABP) estate at Port Talbot, to inform a full terrestrial ecological baseline and future Environmental Statement for Future Port Talbot (FPT). This technical note sets out the scope of the ecological survey work, including proposed methodology, scale, timings and rationale.

The high-level scope of the ecological surveys has already been agreed in principle in a meeting with Neath Port Talbot County Borough Council (NPTCBC) ecology team. This note provides further clarification on the survey methodology and timings proposed, for review and agreement with NPTCBC and other stakeholders, where required.

2 Ecology Survey Scope and Assumptions

2.1 Overall Survey Boundary

The survey scope currently covers the red line boundary indicated in Figure 2.1 and as shown in Appendix A – Further Survey Work Plan.

Given the high levels of existing baseline disturbance at the site and the nature of the site boundary, which is mostly bordered by industrial development or natural waterbodies, **no survey work outside of the red line** boundary is currently proposed with one notable exception – the area currently supporting an artificial sand martin (Riparia riparia) bank and associated pond, just beyond the red line on Figure 2.1 (inside TATA land but within ABP ownership) has been included in the scope of surveys. Should the scope of works change such that specific activities that could disturb ecology receptors outside of the boundary be proposed, the survey scope would be reviewed.

2.2 Rapid Walkover and Desk Study

A rapid ecological walkover was undertaken in September 2023 alongside a desk study review of previous survey work and biological records from within 5.0km of the scheme boundary, which has informed the scope of surveys in this document.

As part of the rapid ecological walkover, building / building groups were assessed for bat potential at a high level by experienced bat workers to inform scope. However, it is part of this scope to refine this assessment with a more detailed Potential Roost Assessment.

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Figure 2.1: Survey Area Boundary



Source: Mott MacDonald 2024
Note: There is a zone within ABP land ownership boundaries excluded from Port Talbot site boundaries (indicative area shown in yellow)

More recent survey work, including surveys informing the LanzaTech proposal, have recently been made available. Some of these results have been briefly reviewed but not in detail. These will be reviewed and where they affect or inform the survey scope, this will be refined as appropriate.

2.3 Proposed Scope of Ecological Surveys

The proposed scope of ecological surveys, timings of works, methodology and rationale is included in Table 2.1. Where survey specific assumptions and clarifications are in place, these are also included.

Where access is restricted for health and safety reasons, this will be clearly stated and a precautionary approach to the assessment applied to ensure that potential receptors are adequately assessed and, where necessary, mitigated / compensated for as part of the scheme.

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Table 2.1: Proposed Survey Scope

Survey	Location	Methodology, Guidance and Rationale	Proposed Survey Timings	Reporting
Extended Phase 1 Habitat Survey	Entire ABP estate	An extended Phase 1 Habitat Survey will be undertaken by a botanical specialist, in line with JNCC (2010) guidance. This has been selected over UK Habitat Classification to maintain consistency with how the LanzaTech proposal was mapped and to follow the recent steer from NRW that Phase 1 Habitat Survey is preferred in Wales. However, it is proposed that these surveys will be led by Peter Sturgess (Sturgess Ecology), a highly experienced and well respected local botanist, accompanied by Mott MacDonald Ltd surveyors, who will not only map habitats but will record botanical target notes to capture more detail. It is therefore anticipated that using a broader habitat classification will not affect the quality or detail of the habitat assessment completed. This survey will classify habitats but also aim to identify any areas of interest for notable plants including *Orobanche* sp. and basil thyme (*Clinopodium acinos*). Habitats will be mapped using ArcGIS Fieldmaps software. Presence of invasive species will also be indicatively mapped.	May / June	Preliminary Ecological Appraisal Report
Orobanche Survey	Entire ABP estate	A specialist survey led by Oxford University specialists is proposed across the entire ABP estate to identify and verify all records of Oxtongue broomrape (*Orobanche picridis*). The location and extent of this species will be mapped using ArcGIS Fieldmaps software. The methodology will include a strategic walkover of suitable habitat identified by the specialists and priority areas identified during the Phase 1 survey. The intention is to map the presence and distribution of all *Orobanche picridis* across the survey area.	June / early July	Orobanche Survey Report
Bryophyte Survey	Entire ABP estate	A specialist bryophyte survey identifying and mapping presence of any bryophyte species across the entire estate. Surveys will be undertaken by an experienced Bryologist (subconsultant) and accompanied by a Mott MacDonald Ltd surveyor. The methodology will include a strategic walkover of suitable habitat identified by the specialist. The specialist will also undertake any post survey laboratory identification of samples. Surveys will be undertaken by Bryophyte Surveys Ltd, accompanied by Mott MacDonald Ltd. Surveyors. This subconsultant has also undertaken surveys on behalf of RPS / LanzaTech on Margam Wharf. As these surveys were in 2022, it is proposed to update these along with completing surveys of the rest of the estate.	May	Bryophyte Survey Report
Breeding Bird Surveys	Entire ABP estate (terrestrial habitats only)	Breeding bird surveys comprise a total of six visits spread across the breeding bird period (April – July). This will include five early morning surveys and one nocturnal survey (last few hours of the day and extending beyond sunset), in line with standard industry practice (Bird Survey & Assessment Steering Group, 2023)[1].	April to July Anticipated survey timing: • 1 visit April	Breeding Bird Survey Report

[1] Bird Survey & Assessment Steering Group. (2023). Bird Survey Guidelines for assessing ecological impacts, v.1.1.0. https://birdsurveyguidelines.org

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Survey	Location	Methodology, Guidance and Rationale	Proposed Survey Timings	Reporting
		Surveys will be undertaken by experienced ornithologists, along planned survey transects and listening points. The route will be reversed on alternate visits to avoid potential temporal bias. Presence of breeding birds over the entire site, plus adjacent habitats (where accessible) will be recorded on a map using ArcGIS FieldMaps. Tidal species will be picked up by survey work currently being undertaken by BSG-ecology. Vantage point surveys will be continued by BSG-ecology into the breeding season.	• 2 visits May • 2 visits June • 1 visit July Each survey will be completed at least 10 days apart.	
Wintering Bird Surveys	Freshwater and intertidal habitats	Mott MacDonald Ltd scope includes review of WEBS records as well as ArcGIS mapping of results. Work done by others: Wintering bird surveys comprise a total of six visits spread across the non-breeding period (September – March), in line with standard industry practice (Bird Survey & Assessment Steering Group, 2023)[1]. Vantage point surveys, intertidal waterbird surveys and waterbird surveys of the freshwater pools will be completed [*Note: these surveys are currently being completed by BSG-ecology*]. Mott MacDonald Ltd ornithologists have reviewed and agreed the scope of surveys and will also review the report prior to finalisation.	September/ October to February/March	Wintering Bird Survey Report
Roosting Bats: Preliminary Roost Assessment and Inspection of Buildings and Trees	All buildings and trees within the red line.	Preliminary Roost Assessment (PRA) of buildings and Ground Level Tree Assessment (GLTA) of any suitable trees identified within previously inaccessible areas. The assessment will identify any Potential Roost Features (PRFs), which will inform categorisation of the tree/building and subsequent survey effort. Assessments will follow methodology outlined in Bat Surveys for Professional Ecologists: Good Practice Guidelines, Fourth Edition (Collins, 2023)[2]. The assessment details will be captured on Survey 123 App linked to ArcGIS Fieldmaps software. Given the high levels of baseline disturbance on the site, no surveys outside of the red line are currently proposed as there are not anticipated to be any significant changes to disturbance outside of the site boundary.	March/April (prior to May emergence surveys).	Bat Survey Report
Roosting Bats: Emergence Surveys of Buildings and Trees	Subject to PRA (see proposed survey work plan for anticipated buildings)	Emergence surveys to establish presence/likely absence of bat roosts within buildings categorised between low and high suitability, and trees categorised as PRF-M. Surveys will be carried out in line with Bat Survey Guidelines (Collins, 2023)[2] guidance. This will include the use of Night Vision Aids (NVAs) in the form of infra-red cameras. Camera footage will be reviewed using VLC Media Player. All activity will be recorded using full spectrum, hand-held batloggers with any observations and bat calls noted manually. Recordings will be analysed using Kaleidoscope Lite software and calls identified to species or species group level. All analysis results will undergo an internal Quality Assurance (QA) process.	May to August / September Anticipated: • 7 high potential buildings each requiring 3 visits (2-6 people per building) • 9 moderate potential buildings requiring 2 visits (2-4 people per building)	Bat Survey Report

[2] Collins, J. (2023). Bat Surveys for Professional Ecologists: Good Practice Guidelines, 4th Edition. The Bat Conservation Trust, London. ISBN-978-1-7395-126-0-6.

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Survey	Location	Methodology, Guidance and Rationale	Proposed Survey Timings	Reporting
			• 17 low potential buildings requiring 1 visit (2-8 people per building). Surveys must be 3 weeks apart on each building, so will be spread throughout May to August with some night surveys anticipated every week. Follow up IR footage review and detector analysis will be undertaken between surveys on a rolling basis where time allows and finished in Autumn.	
Roosting Bats – Visual (endoscope) Inspection	Buildings (where required)	A single visual inspection using an endoscope and hand-held torch, undertaken by a bat licenced ecologist or accredited agent, is proposed on certain low suitability buildings where features are suitable and accessible, to replace an emergence survey on a like-for like basis. One high suitability building is proposed to undergo two emergence surveys (detailed above) and a visual inspection to replace the third emergence survey (in respect of certain features). This approach is considered suitable based upon the PRFs present and nature of the building. Surveys will be carried out in line with Bat Survey Guidelines (Collins, 2023) guidance[2]. The assessment details will be captured on Survey 123 App linked to ArcGIS Fieldmaps software.	May to August	Bat Survey Report
Foraging and Commuting Bats: Manual Activity Surveys	Entire ABP estate	Night-time bat walkover surveys will be undertaken in line with the Bat Survey Guidelines (Collins, 2023)[2] and NatureScot (2021)[3] onshore wind turbines survey guidance. This involves surveyors positioned in predetermined locations near roosts or potential roosts for the first 30-60 minutes after sunset, followed by walkover route of the site. It is anticipated that four walkover routes will be required, of up to 2/3 hours each. One survey of 4 walkover routes should be undertaken in each of Spring, Summer and Autumn. All activity will be recorded using full spectrum, hand-held batloggers with any observations and bat calls noted manually. Recordings will be analysed using Kaleidoscope Lite software and calls identified to species or species group level. All analysis results will undergo an internal QA process.	One survey visit per season, in April/May, July/August and September/ October	Bat Survey Report
Foraging and Commuting Bats: Static Activity Surveys	Entire ABP estate	Surveys will involve deployment of 8 full spectrum static detectors across the site, each to be in place for a minimum of 10 consecutive nights per month from April to October. Surveys comply with Bat Survey Guidelines (Collins, 2023)[2] and also Bats and Onshore Turbine Guidelines (NatureScot, 2021)[3].	April to October (10 consecutive nights a month)	Bat Survey Report

[3] NatureScot. (Scottish Natural Heritage). (2021). Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation. ISBN: 978-1-3999-4679-7.

Survey	Location	Methodology, Guidance and Rationale	Proposed Survey Timings	Reporting
		Data will be analysed using AnalookW.exe or Kaleidoscope Lite software to identify patterns in activity as well as species/species groups utilising the site. All analysis results will undergo an internal QA process.		
Other Mammal Walkover	Entire ABP estate	The presence of burrowing "other" mammals will be noted incidentally as a result of other surveys. The locations will be mapped on ArcGIS Fieldmaps software. Meetings with NPTCBC confirmed that likely presence of badger (*Meles meles*) can be scoped out.	Any time of year (ideally when vegetation is sparse)	Preliminary Ecological Appraisal Report
Otter Survey	River Afan, Impounded Dock, waterbodies	Presence/likely absence surveys of the accessible areas of the River Afan, Impounded Docks, reedbeds and waterbodies. Surveys will involve walking alongside suitable waterbodies and reedbed edges (where safe to do so), observing any evidence of signs of otter use including spraints, anal jelly, paths and slides. Survey work will also identify potential holts or couches. Where these are identified, further camera trapping surveys (deployment of remote triggered camera traps) will be used to ascertain use by otter. These will be deployed for as long as required (minimum 1 month). Checks can be undertaken at any time of year. Two survey visits are proposed, one in Spring and one in Summer/Autumn, with additional time for camera trap survey work and review of footage using VLC media player. Survey work will be undertaken in line with Chanin (2003)[4]. It has been assumed surveys would be completed from safe vantage points and routes on land, and that boat access will not be required. During meetings with NPTCBC, it was concluded that likely presence of water vole was low and so survey work could be scoped out. However, this species would be recorded incidentally on otter surveys.	April and July (subject to results the later survey could change)	Otter Survey Report
Amphibian Surveys	Waterbodies on site (where accessible)	Presence / likely absence surveys, comprising 4 visits, will be undertaken of the waterbodies on site (where accessible) within the harbourside area. Surveys will be undertaken in line with the Natural England Great Crested Newt Mitigation Guidelines (2001)[5], including a minimum of 3 survey methods. Surveys will include use of high-powered torches to look for newts in the ponds, as well as leaving bottle traps in the ponds overnight. In the unlikely event that Great Crested Newt (GCN) are recorded, an additional 2 population estimate survey visits would be required. Refugia deployed as part of the reptile survey will also act as an additional method with which to record presence of GCN in their terrestrial phase, if present.	Mid-March to June (at least half of visits between mid-April and mid-May).	Great Crested Newt and Other Amphibian Survey Report

[4] Chanin, P. (2003). Monitoring the Otter Lutra lutra. Conserving Natura 2000 Rivers Monitoring Series No. 10, English Nature, Peterborough. ISBN-1-85716-724-4.

[5] English Nature (2001). Great Crested Newt Mitigation Guidelines. Version: August, 2001. English Nature, Peterborough. ISBN 1 85716 568 3.

Survey	Location	Methodology, Guidance and Rationale	Proposed Survey Timings	Reporting
Reptile Surveys	Entire estate – yellow areas on Further Survey Work Plan in Appendix A	A presence/likely absence survey and population estimate within areas supporting suitable habitat identified during the site walkover in September 2023. The survey will include a total of eight visits over Spring and early Summer to cover the optimal survey window for snake species (May and June). A Habitat Suitability Assessment will be carried out alongside peak counts to calculate population estimates. Methodology will follow the principles set out within the Natural England Technical Information Note (TIN102) (2011) withdrawn guidance. When interpreting the survey results and population estimate, the LanzaTech results will be reviewed (the ratio of peak counts in surveys to actual numbers translocated) and used to inform a more robust assessment of predicted population numbers. A total of 1000 refugia have been calculated at a density of approximately 20 per hectare. This has been agreed with NPTCBC as being proportionate for this scheme, as it represents double the recommended density in Froglife Advice Note 10[6] but is not as high as the NE guidance of 100 per hectare, which could risk smothering the important habitats present. Correspondence with NPTCBC is included in Appendix B. A combination of refugia has been proposed: • 300 reptile profile tins 50cm x 50cm; • 100 corrugated reptile survey sheets 50cm x 50cm; • 100 corrugated reptile corrugated reptile survey sheet 100cm x 50cm; • 150 reptile survey felts, standard large 100cm x 50cm; and • 350 reptile survey felts, standard small 50cm x 50cm. A mixture of two different types of refugia material (tin and bitumen) and sizes are proposed, to optimise suitability for all reptile species. Use of smaller 50cm x 50cm mats will reduce surface area so as not to impact upon any rare plant species, if/where known to be present.	April to June as follows: • 2 x visits in April • 3 x visits in May • 3 x visits in June Deployment of mats and tins in early April (or before), leaving 2 week bed in time. Collection of mats and tins in July.	Reptile Survey Report
Invertebrate Surveys	Entire ABP estate	Invertebrate surveys will be undertaken over 6 visits monthly between April and September, by two experienced entomologists employing a range of survey techniques. This will include surveys covering the margins of the freshwater habitats. The entomologists will also curate specimens in the lab following the survey. Surveys are proposed by Colliery Spoil Biodiversity Initiative. Two entomologists will undertake the surveys. The invertebrate report will be produced by Colliery Spoil Initiative. It will be checked by Mott MacDonald Ltd ecologists prior to finalisation.	April to September	Invertebrate Survey Report
Invasive Species Mapping	Entire ABP estate	The presence of invasive non-native plant species will be noted incidentally as a result of other surveys and where identified during the Phase 1 Habitat Survey. The locations will be mapped on ArcGIS Fieldmaps software and GIS hours have been allowed to produce standalone maps.	All survey season	Preliminary Ecological Appraisal Report

Source: Mott MacDonald Ltd, 2024

[6] Froglife (1999) Advice Sheet 10: REPTILE SURVEYS: An introduction to planning, conducting and interpreting surveys for snake and lizard conservation.

2.4 Surveys Scoped out of the Assessment

A number of ecological surveys have not been included in the proposed scope on the basis that these are considered unlikely to be present due to there being a suboptimal habitat on site, lack of connectivity to suitable areas and a paucity in desktop records. In addition, in respect of badger, no incidental sightings of this species have been reported by any on site workers who are frequently present at night. This has been provisionally agreed with NPTCBC. These include:

- Hazel dormouse (*Muscardinus avellanarius*);
- Badger; and
- Water vole (*Arvicola amphibius*).

In addition, fish and marine species surveys/ investigations are understood to be covered separately by ABPmer, who are also completing relevant intertidal surveys and an assessment of the Impounded Dock.

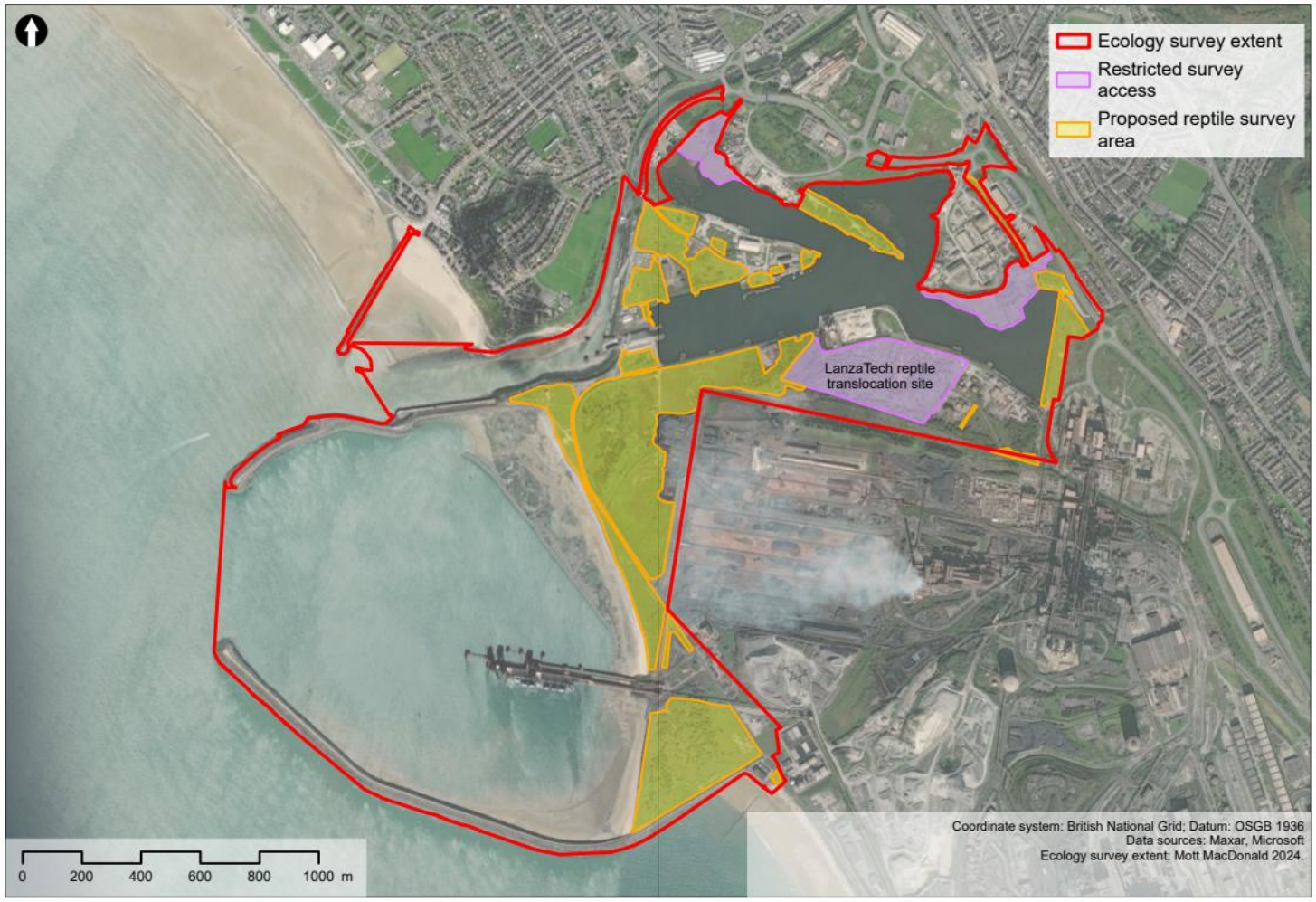
2.5 Analysis and Reporting

The results of all survey work will be collated and mapped on ArcGIS software.

Survey data will be analysed and subject to internal checks and approvals, before being compiled into comprehensive reports in the form of a PEAR (botanical Phase 1 results) and relevant protected species survey reports. These will form the baseline for the ecology chapter of the Environmental Impact Assessment (EIA). One round of comments will be included within the reporting costs.

ABP CONFIDENTIAL

A. Further Survey Work



Source: Mott MacDonald Ltd, 2024

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B. Correspondence on Reptile Surveys with NPTCBC

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Lorraine Woolley

From: Laura Palmer <l.palmer@npt.gov.uk>
Sent: 14 March 2024 15:26
To: Lorraine Woolley
Cc: Fiona Brown; Anna Owen; Alice Rudd
Subject: RE: Future Port Talbot - Reptile Survey Approach

Hi Lorraine

That approach is reasonable, happy to support it.

Kind regards
Laura

From: Lorraine Woolley <Lorraine.Woolley@mottmac.com>
Sent: Thursday, March 14, 2024 2:12 PM
To: Laura Palmer <l.palmer@npt.gov.uk>
Cc: Fiona Brown <fiona.brown@abports.co.uk>; Anna Owen <Anna.Owen@mottmac.com>; Alice Rudd <Alice.Rudd@mottmac.com>
Subject: Future Port Talbot - Reptile Survey Approach

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Hi Laura,

Really good to speak to you today.

As discussed, we are designing the reptile surveys at Future Port Talbot. The purpose of the survey work is to identify how reptiles are distributed across the site and understand numbers so as to inform the translocation strategy.

As requested, we have reviewed the Natural England Technical Information Note (TIN102) Reptile Mitigation Guidelines, which I know ARC suggested following. We have designed the surveys in line with the principles of this document, notably:

- We are proposing a mixture of corrugated tins, corrugated felt and felt tiles (some 0.5x1m and some 0.5x0.5m);
- We are covering the key months for all species, including the optimal survey window for snakes;
- We are doing 8 visits to get the required number of points and are spacing the surveys out (aiming for a spread through Spring into early Summer); and
- We will be including habitat suitability assessment alongside peak counts to calculate population estimates.

In terms of the number of refugia proposed, the NE guidance recommends 100 refugia per hectare in suitable habitat, which for Future Port Talbot would be approximately 2700 tins. Our view is this is disproportionate for this site and actually could cause more harm than good, as the habitats are of potential ecological value for rare plants, bryophytes and other species which could be smothered by the sheer sea of felt! Instead we propose approximately **20 refugia per hectare**, which at this site would be about 1,000 refugia total. This is double the proposed density in the Froglife Advice Sheet 10 and so would be justifiably greater than that guidance but recognises the constraints of this scheme.

In addition, we would propose that when interpreting the survey results and population estimate, we are also able to use the LanzaTech results (the ratio of peak count in surveys to actual numbers translocated) to inform a more robust assessment of predicted population numbers.

Please could you confirm that this reflects our conversation, and you are happy with this approach?

Thanks,

Lorraine Woolley
Pronouns: she, her, hers
CEcol CEnv BA(Hons) MA (Oxon)
Senior Associate - Ecology
Wales Ecology Team Lead

D (0)29 2046 7894
lorraine.woolley@mottmac.com

Please note my working hours are Monday - Thursday and I am currently using a flexible working pattern which may mean I email outside of normal office hours. Please do not feel it necessary to reply outside of office hours.

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Appendix I
Underwater Noise and Vibration

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I - Underwater Noise and Vibration

1.1 Introduction

1.1.1 This technical appendix presents proposed scope and approach to be used to assess the potential underwater noise and vibration effects on marine receptors in relation to the construction, operation and maintenance of the Project (see **Chapter 5 – Approach to Assessment**).

1.1.2 It provides details of the datasets to be used to inform the assessment, presents an overview of baseline conditions, sets out the likely significant effects to be considered within the assessment, discusses how these likely significant effects would be assessed and managed for the purpose of the Environmental Impact Assessment (EIA), and identifies any matters proposed to be scoped out of the assessment.

1.1.3 The effects of the Project on the following are considered:

- fish;
- marine mammals;
- benthic species (animals that live on the sea floor such as invertebrates); and
- diving birds.

1.1.4 This environmental topic relates to marine aspects of the Project.

1.1.5 The approach to the scoping exercise is set out in **Section 5.3 of Chapter 5 – Approach to Assessment**.

1.1.6 The assessment presented in this Chapter has linkages with the following environmental topics which should be considered when reading this **Chapter 17 – Marine Ecology and Chapter 7 – Airborne Noise and Groundborne Vibration.**

1.2 Relevant Legislation, Policy and Technical Guidance

1.2.1 At the time of writing, there are no specific standards either British or International (ISO), specific to the assessment of underwater noise and vibration impact on fish or marine mammals therefore peer reviewed research papers will be used as supporting literature and guidance.

1.2.2 The legislation, policy, and technical guidance considered to be relevant to the EIA of underwater noise and vibration are detailed in Table 1.1. These relate entirely to the marine elements of the Project.

Table 1.1: Legislation, policy and technical guidance relevant to Underwater Noise and Vibration

Relevant legislation / policy / guidance	Relevance to assessment
Legislation	
The Environment (Wales) Act 2016	The Environment (Wales) Act 2016 sets out the requirement for the 'sustainable management of natural resources' together with new ways of working to achieve this.

Relevant legislation / policy / guidance	Relevance to assessment
	Potential underwater noise and vibration on relevant marine species and habitats of principle importance listed under Section 7 of the Environment (Wales) Act 2016 will be considered in this technical appendix.
The Wildlife and Countryside Act 1981	The Wildlife and Countryside Act, WCA is the principal mechanism for the legislative protection of wildlife in Great Britain. The WCA applies to the terrestrial environment and inshore waters (0 to 12 nautical miles) and concerns the protection of wild animals and the designation of protected areas, including Site of Special Scientific Interest (SSSIs). Potential underwater noise and vibration effects on relevant protected species under the WCA will be considered in this technical appendix.
National Policy	
Welsh National Marine Plan (Welsh Government, 2019)	The Welsh National Marine Plan provides the planning framework to support proposals and license applications, as well as public authorities for decision making. Relevant policies include: ENV_05 Underwater Noise: Proposals should demonstrate that they have considered man-made noise impacts on the marine environment and, in order of preference to first avoid, minimise and lastly mitigate. If significant adverse impacts cannot be avoided, minimised or mitigated, proposals must present a clear and convincing case for proceeding.
National Policy Statement for Ports (NPS) (Department for Transport, UK, 2012)	The NPS provides framework for decisions on proposals for new port development. The NPS stipulates that noise during construction and operation of port infrastructure can have an adverse impact on biodiversity and/or geodiversity by impacting fish and marine mammalian behaviour patterns. As a general principle, development should aim to avoid significant harm to biodiversity and geological conservation interest, including through mitigation and consideration of reasonable alternatives.
UK Marine Policy Statement (MPS) (HM Government, 2011)	The MPS is the framework for preparing Marine Plans and taking decisions affecting the marine environment. Relevant considerations include: Noise resulting from a proposed activity or development in the marine area or in coastal and estuarine waters can have adverse effects on biodiversity. For certain animals, deliberate disturbance is prohibited and can only be carried out in accordance with the terms of a license.
Local Policy	
Neath Port Talbot County Borough Council – Local Development Plan (2011 – 2026) (Neath Port Talbot County Borough Council, 2016)	The Local Development Plan (LDP) provides the planning framework for future developments at Neath Port Talbot. Relevant policies within the LDP include: Policy SP 15 Biodiversity and Geodiversity: Important habitats, species and sites of geological interest will be protected, conserved, enhanced, and managed. Policy SP 16 Environmental Protection: Air, water (underwater noise and vibration) and ground quality and the environment generally will be protected and where feasible improved.
Guidance and Standards	
ISO 18405:2017 “Underwater acoustics –	Provides basic terminology and quantities for underwater acoustics.

Relevant legislation / policy / guidance	Relevance to assessment
Terminology" (International Organization for Standardization, 2017)	
Statutory nature conservation agency protocol for minimising the risk of injury to marine mammals from piling noise (Joint Nature Conservation Committee, 2010)	Outlines protocol for mitigation of potential underwater noise impacts arising from pile driving during offshore wind farm construction which may useful and applicable for pile driving in other industries in the marine environment.
Guidance for assessing the significance of noise disturbance against Conservation Objectives of harbour porpoise SACs (England, Wales & Northern Ireland) (Joint Nature Conservation Committee , 2020)	Sets out guidance in assessing the risk of significant disturbance as a result of noise and consequently managing noise disturbance within harbour porpoise UK Special Areas of Conservation (SAC) to avoid potential adverse effects on site integrity.
Sound exposure guidelines for fishes and sea turtles, (Popper, et al., 2014)	Provides permanent threshold shift, temporary threshold shift, and disturbance criteria in assessing the potential adverse impact of underwater anthropogenic noise for fish, sea turtles and larvae.
2024 Revision to: Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (National Oceanic and Atmospheric Administration, 2024)	Provides auditory injury (including permanent threshold shift) and temporary threshold shift in assessing the potential adverse impact of underwater anthropogenic noise for marine mammals of various generalised hearing groups.
National Marine Fisheries Service: Summary of Marine Mammal Protection Act Acoustic Thresholds (National Marine Fisheries Service (NMFS), Office of Protected Resources, 2024)	Provides a summary of the acoustic thresholds presented in the National Oceanic and Atmospheric Administration, Technical Memorandum, 2024. Also provides the disturbance criteria in assessing the potential adverse impact of underwater anthropogenic noise for marine mammals.

1.3 Engagement and Consultation

1.3.1 The general Project engagement and consultation undertaken to date and proposed future engagement and consultation is presented in **Chapter 4 – Consultation and Engagement.**

1.3.2 Further consultation with Natural Resources Wales (NRW) will be undertaken to discuss proposed mitigation requirements of the Project.

1.4 Study Area

1.4.1 The construction activity likely to have the greatest impact on underwater noise and vibration is anticipated to be impact piling during construction phase. The study area will comprise of a 15 km buffer distance from the EIA

Scoping Boundary based on the effective deterrent ranges for pin piling laid out in Guidance for assessing the significance of noise disturbance against Conservation Objectives of harbour porpoise SACs (Joint Nature Conservation Committee , 2020). It is anticipated that no underwater noise and vibration adverse effects will arise at distances greater than 15 km from the EIA Scoping Boundary.

1.4.2 The study area for Underwater Noise and Vibration is provided in Figure I.1 in Appendix I.1. The study area is wholly within the marine area.

1.5 Description of the Existing Environment

Data Sources

1.5.1 Baseline information and data has been gathered from the following sources:

- United Kingdom's Special Areas of Conservation 2024 list from JNCC.
- Multi-Agency Geographic Information for the Countryside (MAGIC) Map by Department for Environment, Food and Rural Affairs.

Baseline Conditions

1.5.2 It is anticipated that the baseline underwater noise at the port of Port Talbot consist of mainly noise from maritime traffic moving in and out of the port. Fish and marine mammals within the area will likely have become habituated to these noise sources.

1.5.3 Other noise sources include recreational noise generated by the activities from YMCA Port Talbot and the Port Talbot Sea Cadets. It is anticipated that the recreational activities will not generate significant underwater noise.

1.5.4 It is anticipated that the following animal groups within the study area may be impacted by underwater noise and vibration:

- fish;
- marine mammals;
- diving birds; and
- benthic species

1.5.5 Popper, et al. 2014 categorise fish into three main hearing mechanisms:

- fish without swim bladder that utilise particle motion detection for hearing;
- fish with swim bladder (not involved in hearing) that utilise particle motion detection for hearing; and
- fish with swim bladder (involved in hearing) that utilise pressure detection for hearing.

1.5.6 National Oceanic and Atmospheric Administration, 2024 categorise marine mammals into six hearing groups according to their auditory weighting function and frequency ranges. These are:

- low-frequency cetaceans (LF);
- high-frequency cetaceans (HF);

- very high-frequency cetaceans (VHF);
- sirenians (SI);
- phocid carnivores in water (PCW); and
- other marine carnivores in water (OCW).

1.5.7 The marine receptors anticipated to be within the identified study area are identified in **Chapter 17 – Marine Ecology**, and categorised into their respective hearing groups in Table 1.2 along with their associated hearing groups based on supporting literature from (Popper, et al., 2014) and (National Oceanic and Atmospheric Administration, 2024).

Table 1.2: Identified fish and mammal marine receptors and their associated hearing groups within study area (15km from the EIA Scoping Boundary)

Hearing group	Species
Fish	
No swim bladder (particle motion detection)	Dover sole *(Solea solea)* European plaice *(Pleuronectes platessa)* Flounder *(Platichthys flesus)* Gobies *(Pomatoschistus spp.)* River lamprey *(Lampetra fluviatilis)* Sand eel *(Ammodytes spp.)* Sea lamprey *(Petronmyzon marinus)* Small-spotted catshark *(Scyliorhinus canicular)* Thornback ray (*Raja clavata*) Spotted ray (*Raja montagui*) Tope (*Galeorhinus galeus*)
Swim bladder is not involved in hearing (particle motion detection)	European eel (*Anguilla anguilla*) Atlantic salmon (*Salmo salar*) European seabass (*Dicentrarchus labrax*) Sea trout (*Salmo trutta*) Whiting (*Merlangius merlangus*) Pouting (*Trisopterus luscus*) Poor cod (*Trisopterus minutus*)
Swim bladder is involved in hearing (primarily pressure detection)	Herring (*Clupea harengus*) Sprat (*Spratus spratus*) Twaite shad (*Alosa fallax*) Allis shad (*Alosa alosa*)
Eggs and larvae	None identified
Marine mammals	
Low-frequency cetaceans (LF)	None identified
High-frequency cetaceans (HF)	None identified
Very high-frequency cetaceans (VHF)	Harbour porpoise (*Phocoena phocoena*)
Sirenians (SI)	None identified
Phocid carnivores in water (PCW)	Grey seal (*Halichoerus grypus*)
Other marine carnivores in water (OCW)	None identified

1.5.8 Diving birds which rely on underwater prey as food source may experience increased underwater noise levels during diving periods. However, exposure to the increased noise levels would be limited to short durations and there is a lack of criteria for disturbance and harm for avian underwater noise impact. It is anticipated that due to limited exposure duration any underwater noise

would have minimal adverse effect on diving birds and is therefore scoped out for further underwater noise assessments.

1.5.9 There is limited research on the effects of anthropogenic noise on benthic species. From limited existing literature, benthic invertebrates respond to manmade noise with behavioral responses observed in a range of species in close proximity to ship playback noise (El-Dairi, Outinen, & Kankaanpää, 2024). Responses recorded include a change in activity, reduction in antipredator behaviour, and biomarker changes. Mortality and barotrauma, however, are considered unlikely. This impact pathway has, therefore, been scoped out of the assessment.

1.6 Future Baseline

1.6.1 As set out in **Chapter 5 – Approach to Assessment**, future baseline scenarios will be established to understand the potential situation without the Project. The Marine Ecology chapter of the ES would seek to explain what the environmental change, in terms of underwater noise and vibration, would likely be in the future if the Project were not to go ahead.

1.6.2 The future baseline will include natural changes to the environment, and existing development that is complete and operational at the time when construction of the Project is due to commence.

1.6.3 In the absence of the Project, the current underwater noise and vibration levels will remain the same subject to any variation due to changes in shipping noise from vessels entering and exiting the Port, and recreational marine activities.

1.7 Mitigation Measures

1.7.1 The Project design is an iterative process adhering to the principles of the mitigation hierarchy. Control measures for underwater noise and vibration will be identified as the Project progresses and those taken forward recorded in a mitigation register. **Chapter 5 – Approach to Assessment** provides further information on the mitigation hierarchy principles and types of mitigation, and how mitigation will be taken forward and secured.

1.7.2 This section sets out the potential controls relevant to underwater noise and vibration, which have been informed by the assessment undertaken as part of this EIA Scoping Report, the mitigation hierarchy principles and best practice from other projects. This list will be kept under review through the EIA process and is non-exhaustive at this stage.

1.7.3 Best Practicable Means (BPM) of noise control that will be adopted to ensure terrestrial noise and vibration is kept to a minimum (**Chapter 7 – Airborne Noise and Groundborne Vibration**), should also be effective for the control of underwater noise and vibration.

1.7.4 The development of the Project design shall be an iterative process undertaken as part of an integrated design team to adhere to the principles of the design and mitigation hierarchy. The first principle being to avoid potential effects, if at all possible, before seeking to minimise or mitigate for any unavoidable impacts through a well-developed mitigation strategy.

Design Measures

1.7.5 Embedded mitigation (primary mitigation) which may be incorporated into the Project design development is likely to include:

- reduce the number of piles required during design phase; and
- efficient routing of maritime transportation of materials to prevent congestion and reduce unnecessary noise emissions.

Construction Controls

1.7.6 Possible mitigation opportunities (including primary, secondary and tertiary mitigation) with reference to JNCC 2010 (Joint Nature Conservation Committee, 2010) which may be incorporated into the Project at the construction phase include:

- prior to starting any noise-generating activities a 500m mitigation zone around non-impulsive sources and 1km zone around impulsive sources should be monitored for marine mammals for 30 minutes minimum;
- passive acoustic monitoring (PAM) should be used to aid monitoring of the mitigation zones for vocalising species;
- if marine mammals are observed or acoustically detected, the start of operations should be delayed until 20 minutes after the last sighting of a marine mammal within the mitigation zone;
- where possible equipment should be soft started with either a ramp up in energy or gradual decreasing intervals between strikes over a period of 20-40 minutes duration;
- piling should not be commenced during periods of darkness or poor visibility (such as fog), or during periods when the sea state is not conducive to visual mitigation (above Sea State 4); and
- piling methodology (e.g. impact v vibratory piling) to consider potential underwater noise impact where alternatives are practicable.

Operational Controls

1.7.7 Possible mitigation opportunities (including primary, secondary and tertiary mitigation) which may be incorporated at the operation and maintenance phase include:

- transportation vessels should be well maintained to reduce noise generated from vibration of equipment.

1.8 Potential Likely Significant Effects

1.8.1 This section presents the key impact pathways that will be considered further in the underwater noise and vibration assessment.

1.8.2 The potential likely significant effects for underwater noise and vibration are described in Table 1.3. These take into account the expected control measures set out within Section 1.7.

Table 1.3: Likely significant Underwater Noise and Vibration effects

Activity	Effect	Receptor
Underwater noise levels from dredging.	Behavioural changes and risk of auditory injury on marine receptors.	Fish, Marine Mammals
Underwater noise levels from shipping vessels	Behavioural changes and risk of auditory injury on marine receptors.	Fish, Marine Mammals
Underwater noise levels from impact and vibratory piling	Behavioural changes and risk of auditory injury on marine receptors.	Fish, Marine Mammals
Underwater noise levels from integration and commissioning of wind turbines	Behavioural changes and risk of auditory injury on marine receptors.	Fish, Marine Mammals

1.9 Resources to be Scoped Out of Assessment

1.9.1 It is anticipated that the underwater vibration levels produced by the Project will be low and limited to the direct vicinity of the works. Transmission of underwater vibration from the Project activities are heavily attenuated at the boundary layer between soil and water. The underwater vibrations generated will be transmitted in the form of structure radiated noise and captured in the underwater noise assessment of various activities. Hence, underwater vibration is not considered further within the scoping report for the ES.

1.9.2 Activities to be scoped out of the assessment are set out within Table 1.4.

Table 1.4: Resources to be scoped out of assessment

Activity	Effect	Receptor	Justification for scoping out
Vibration arising from dredging, piling and shipping vessels.	Behavioural changes	Fish, Marine Mammals	Underwater vibration generated from the Project are anticipated to be low for all activities.

1.10 Proposed Assessment Methodology

Supporting Literature Overview

1.10.1 Popper et al., 2014 establish broadly applicable sound exposure guidelines for fish and sea turtles subject to anthropogenic noise. The guidelines consider noise impacts on behavioral changes, injuries, and mortality of various species of fish and turtles.

1.10.2 National Oceanic and Atmospheric Administration, 2024 provide noise exposure criteria for marine mammals. This technical memorandum assigns marine mammals to different hearing groups based upon their hearing range and provides acoustic thresholds to assess auditory impacts.

1.10.3 Both references lay out the acoustic thresholds for marine species subjected to anthropogenic noise. The acoustic thresholds introduced are Temporary Threshold Shift (TTS), Permanent Threshold Shift (PTS) and Auditory Injury (AUD INJ).

1.10.4 TTS is a temporary, reversible increase in the threshold of audibility at a specified frequency or portion of an individual's hearing range above an established reference level while PTS results in a permanent, irreversible increase in the threshold of audibility.

1.10.5 AUD INJ is the damage to the inner ear of a marine animal which can result in destruction of tissue, such as the loss of cochlear neuron synapses or auditory neuropathy. Hence, AUD INJ includes but is not limited to PTS as AUD INJ may or may not result PTS.

Acoustic Weighting Function of Hearing Groups

1.10.6 Different marine mammal species have different frequency-specific hearing sensitivity, and this influences how each species perceive underwater noise. However, broad marine mammal hearing groups, each containing many species that still have some expected differences among them have been established to predict the effects of noise exposure. Within these groupings, group-specific weighting functions were developed, with the shape of the weighting function acting as a band pass filter that attenuates low and high frequency components depending on the hearing range of the marine mammal species.

1.10.7 The acoustic criteria specified may be weighted or unweighted. A weighted acoustic threshold level has been adjusted against the weighting function of each hearing group where appropriate.

Acoustic Weighting Function of Hearing Groups

1.10.8 Underwater noise sources are typically categorised into two types: non-impulsive and impulsive noise sources. Non-impulsive noise sources are characterised by prolonged, continuous or intermittent noise sources that do not have rapid rise and decay of sound pressure levels (i.e., dredging, shipping noise) while impulsive noise sources are characterised by transient, brief and rapid rise and decay of sound pressure levels (i.e., impact piling, explosives).

1.10.9 For non-impulsive noise sources, the acoustic pressure of underwater noise over a specified duration can be expressed as the square root of the average of the square of it. This is known as the root-mean-square (rms) pressure which when converted to sound pressure level is the L_{rms} with a reference pressure of 1µPa.

1.10.10 Criteria also involve the sound exposure level, SEL, that is used to characterise the PTS and TTS thresholds for marine mammals and fish. The SEL is the mean square value of the acoustic pressure normalised to a period of 1 second, converted to dB re 1µPa^{2}s.

1.10.11 For impulsive noise sources, the sound exposure level from a single impulse is defined as the single strike sound exposure level SEL_{SS}. The combined energy of multiple impulses over a specified duration is known as the cumulative sound exposure level, SEL_{cum}. (National Oceanic and Atmospheric Administration, 2024) recommends assessing SEL_{cum} over 24-

hour duration. Hence, the SEL_{cum} of an impact piling activity will be the combined energy of the total number of pile strikes over a 24-hour period.

1.10.12 The peak sound pressure level, L_{Peak} is defined as the instantaneous peak sound pressure level of an impulse and is associated with the risk of harm due a high instantaneous sound pressure level even if the duration is short. Hence, the dual metrics, SEL_{cum} and L_{Peak} are used when assessing noise exposure in comparison with the PTS and TTS criteria for impulsive noise.

1.10.13 Noise sources from concurrent works should be assessed depending on the type of source (impulsive or non-impulsive) as criteria and units for impulsive and non-impulsive noise sources are not interchangeable. This means impulsive noise sources can only be cumulatively assessed with other impulsive noise and vice versa.

Acoustic Weighting Function of Hearing Groups

1.10.14 Table 1.5 summarises the AUD INJ/PTS and TTS acoustic thresholds to be used for the underwater noise assessment. The SEL levels expressed in Table 1.5 are unweighted levels for fish and weighted for marine mammals to account for the marine mammal auditory function. High peak sound pressure levels do not strictly reflect the hearing sensitivity and frequency range of each hearing groups. Hence, the L_{Peak} criteria is considered unweighted within the generalised hearing range of the marine mammals and fish are unweighted levels for fish and weighted for marine mammals to account for the marine mammal auditory function. High peak sound pressure levels do not strictly reflect the hearing sensitivity and frequency range of each hearing groups. Hence, the L_{Peak} criteria is considered unweighted within the generalised hearing range of the marine mammals and fish.

1.10.15 The disturbance criteria applicable for marine mammals is Lrms, flat 120 dB re 1µPa for non-impulsive noise sources with subscript flat denoting unweighted received noise levels (National Marine Fisheries Service (NMFS), Office of Protected Resources, 2024).

1.10.16 As existing research on fish are limited, literature recommends a subjective approach for non-impulsive sound in which relative risk of effect is placed in order of rank at three distances from source – near (N, for tens of metres), intermediate (I, for hundreds of metres) and far (F, for thousands of metres). The relative risk of effect is then rated as ‘high’, ‘moderate’, and ‘low’ with respect to source distance and fish hearing type (Popper, et al., 2014).

Table 1.5: PTS and TTS acoustic criteria for all generalised hearing groups

Hearing group/animal types	Weighting	Non-impulsive sound		Impulsive sound			
		SEL in dB re 1µPa^{2}s		SEL_{cum} in dB re 1µPa^{2}s		$L_{Peak, unweighted}$ in dB re 1µPa	
		AUD INJ/PTS	TTS	AUD INJ/PTS	TTS	AUD INJ/PTS	TTS
Fish							
No swim bladder (particle motion detection)	Unweighted	(N) Low (I) Low (F) Low	(N) Moderate (I) Low (F) Low	>219	>>186	>213	---
Swim bladder is not involved in hearing (particle motion detection)	Unweighted	(N) Low (I) Low (F) Low	(N) Moderate (I) Low (F) Low	210	>186	>207	---
Swim bladder is involved in hearing (primarily pressure detection)	Unweighted	(N) Low (I) Low (F) Low	L_{rms} 158 dB re 1µPa for 12h	207	186	>207	---
Marine mammals							
Low-frequency cetaceans (LF)	LF	197	177	183	168	222	216
High-frequency cetaceans (HF)	HF	201	181	193	178	230	224
Very high-frequency cetaceans (VHF)	VHF	181	161	159	144	202	196
Sirenians (SI)	SI	200	180	186	171	225	219
Phocid carnivores in water (PCW)	PCW	195	175	183	168	223	217
Other marine carnivores in water (OCW)	OCW	199	179	185	170	230	224

1.10.17 The AUD INJ/PTS, TTS and disturbance acoustic thresholds are evaluated against the predicted source level of the identified construction, operational and maintenance phase works. Distances at which the acoustic thresholds arise may be estimated using simplified underwater propagation loss models or underwater noise prediction software depending on detail of available data and maturity of design.

1.10.18 It should be noted that the methods adopted for the underwater noise assessment would be slightly different compared to other environmental topics. Whilst the underwater noise assessment would be able to predict distances at which AUD INJ/PTS, TTS and disturbance on marine receptors may arise, the impact distances do not directly equate to ‘effects’. The effects would instead be the consequence of these impact distances on marine ecology. Underwater noise contributes to the complex marine

environment that affects the overall marine ecology and should not be considered in a vacuum.

1.10.19 Therefore, it is intended that the underwater noise assessment would present only the impact distances of AUD INJ/PTS, TTS and disturbance of marine receptors in this technical appendix. The consequential significance of effects, resulting from the impact distances of these acoustic thresholds, will be further assessed in **Chapter 17 – Marine Ecology**.

Cumulative Effects

1.10.20 The approach to the assessment of cumulative effects is presented in **Chapter 27 – Cumulative and In-combination effects**. This Chapter includes details of the proposed developments identified to date that may give rise to potential cumulative effects.

1.11 Assumptions and Limitations

1.11.1 The accuracy of predicted distances at which effects arises will be proportionate to the level of detail of the input data. Required inputs include source spectrum and levels, exposure duration of the marine receptor and local underwater conditions.

1.11.2 Duration of works may not be known at the time of assessment pending on the development of construction programme. Works may happen concurrently depending on spatial, equipment and programme limitations. Thus, reasonable worst-case assumptions of work hours per day, concurrent works as well as their indicative locations will be required to ensure the assessment is conservative.

1.11.3 Source levels and spectra are typically obtained from literature and may differ from the actual source levels in the project. To reduce inaccuracy arising from source levels, a literature review will be conducted to ensure the source spectrum and levels resemble the worst-case working conditions of the Project as far as reasonably possible. Higher source levels may be used as a worst-case approach in the absence of site-specific equipment noise data.

1.11.4 Thus, the reasonable worst-case assumptions above ensure assessment results are conservative and representative of the underwater noise levels produced from the Project.

1.12 Summary

1.12.1 The proposed scope of the assessment for Underwater Noise and Vibration is contained within Table 1.6.

Table 1.6: Proposed scope of the Underwater Noise and Vibration of the ES

Matter	Construction scoped in or out	Operation and maintenance scoped in or out	Justification for scoping in or out
Dredging	In	In	Dredging may produce underwater noise levels that negatively impact marine receptors.
Vibratory Piling, Impact Piling	In	Out	Piling may produce underwater noise levels that negatively impact marine receptors. Piling works are not present during operation and maintenance phase hence has been scoped out of assessment.
Shipping noise from transport vessels	In	In	Shipping noise produced from transport vessels may produce underwater noise levels that negatively impact marine receptors.
Integration and commissioning of wind turbines	Out	In	Integration and commissioning work done on sea may produce underwater noise levels that negatively impact marine receptors. The works are not yet present during construction phase hence has been scoped out of assessment.
Underwater vibration arising from all marine side work	Out	Out	Underwater vibration levels generated from the Project are anticipated to be low for all activities. Hence, it has been scoped out of construction, operation and maintenance phase.

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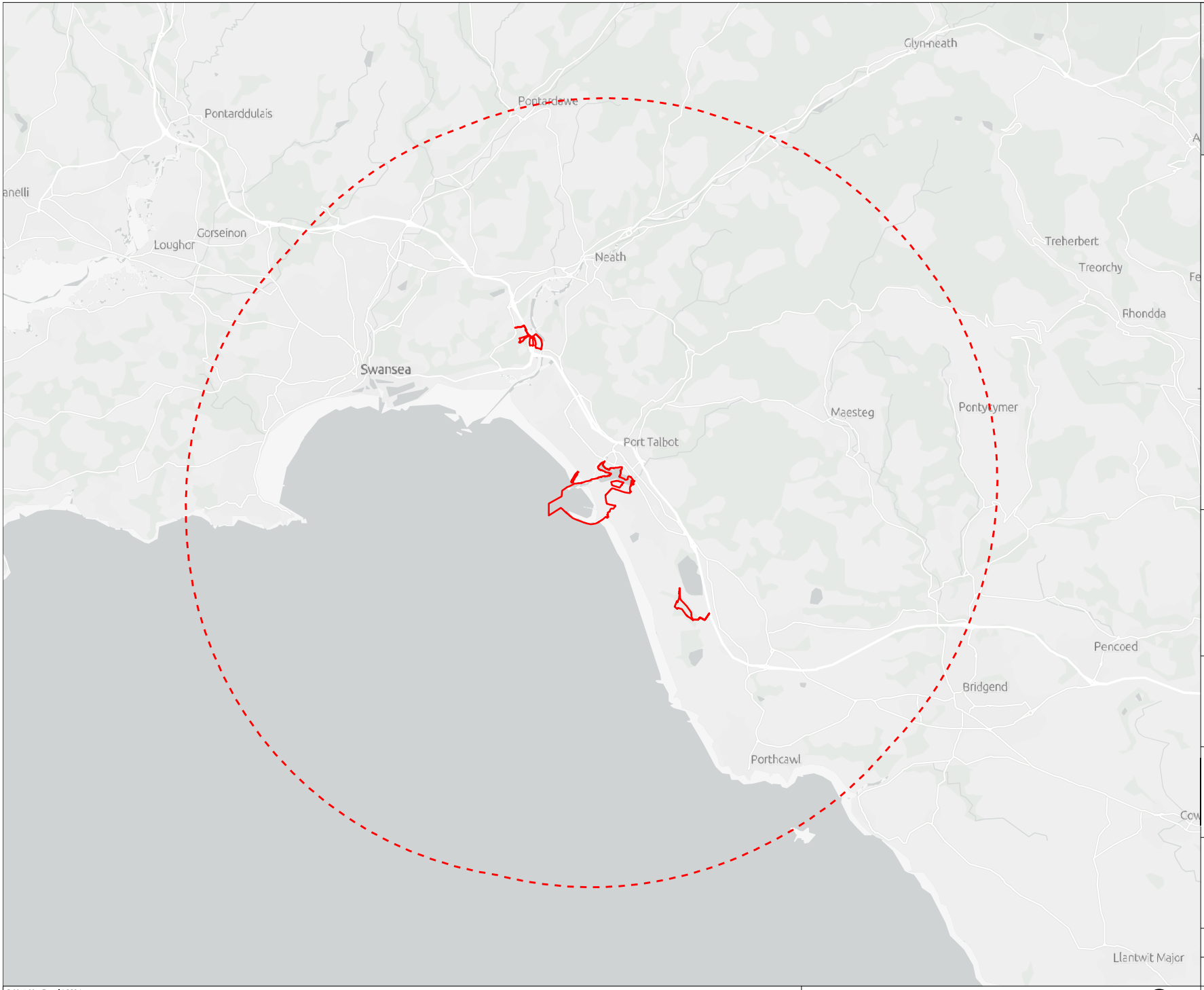
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Appendix I.1

Figure I.1 Underwater Noise and Vibration Study Area



FLOW EIA Scoping Boundary

Underwater noise and vibration study area

Coordinate system: British National Grid; Datum: OSGB 1936

Data Sources:
FLOW EIA Scoping Boundary: ABP/Mott MacDonald 2024.

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Contains data from OS Zoomstack

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Future Port Talbot
FLOW EIA Scoping
Figure I.1
Underwater Noise and Vibration Study Area

Drawn	GIS Checked	Checked	Approved
MH	SLG	SD	RR
Scale at A3	Status	Revision	Security
1:150,000	S3	P01	STD

ABP_WSSP_23_0559_MDEC-MMD-ZZ-XX-DRG-EN-000072

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Appendix J
Marine Historic Environment Gazetteer

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J - Marine Historic Environment Gazetteer

Screening Process

J.1 Port of Port Talbot

J.1.1 Non-designated Marine Historic Assets

Appendix Table Error! No text of specified style in document.**-1 List of Non-designated Marine Historic Assets within the port of Port Talbot Study Area**

PRN	Name	Dataset	Type	Period	Summary
GGAT03123w	Breakwater, Port Talbot Docks	Heneb (GGA) HER	Breakwater	Post Medieval	A Breakwater depicted on the 1st edition 1:2500 OS map of 1877 to the 4th ed. OS Map of 1940. A lighthouse was originally shown located at its eastern-most point on the 1st ed. OS map, this is noted as being ˜disused' by the 2nd ed. OS map of 1899. By the 3rd ed. OS map of 1919 a new lighthouse has been constructed at its most westerly point, labelled as ' Lighthouse, Occulting Red & White'.
GGAT03127w	*'The Amazon'*, Wreck	Heneb (GGA) HER	Wreck	Modern	The *Amazon* was wrecked west of Port Talbot on the 1st of September, 1908. It was a four master of Greenock traveling from Port Talbot to Iquique, Chile with a cargo of coal and had reached eight miles across Swansea Bay when anchors dragged and cables parted in severe weather. The Amazon public house, Port Talbot, is named after the ship (Nash 2014). 'The crew lashed themselves to the bulwarks and to the masts, but three of the masts were lost, and then the Main mast broke free too with 20 men lashed to it. Only six of these 20 men survived, and that by the bravery of some local men who waded into the water and pulled them ashore. Eventually, after many, many attempts, a line was got aboard by means of the Coastguard Rocket Apparatus, and two men who remained on board were saved. In all 20 crew members were drowned including Captain Garrick of Penarth. The wreck subsequently broke up.
GGAT03124w	Lock, Entrance to New Dock, Port Talbot Docks	Heneb (GGA) HER	Lock	Post Medieval	Lock forming the entrance to Port Talbot Docks, with a rectangular inset quay on its N side. The Lock is depicted on the 2nd edition OS map of 1899 and largely unchanged on later edition maps.

GGAT03128w	Wreck, Margam Moors	Heneb (GGA) HER	Wreck	Post Medieval	?wreck/undated (steel wreckage of unknown purpose)
GGAT08800w	Jetty, Entrance to New Dock, Port Talbot	Heneb (GGA) HER	Jetty	Post Medieval	Jetty depicted on the 2nd edition OS map (1899),located at the north side of the entrance gates of the Lock to New Dock, Port Talbot. Three mooring posts shown. The Jetty remains in place on the 3rd edition OS map of 1919 and the 4th edition map of 1940.
GGAT08801w	Jetty, Entrance to New Dock, Port Talbot	Heneb (GGA) HER	Jetty	Post Medieval	Jetty depicted on the 2nd edition OS map (1899),located at the north side of the entrance gates of the Lock to New Dock, Port Talbot. Three mooring posts shown. The Jetty remains in place on the 3rd edition OS map of 1919 and the 4th edition map of 1940 with a crane noted.
GGAT08802w	Jetty, New Dock, Port Talbot	Heneb (GGA) HER	Jetty	Post Medieval	Jetty depicted on the 2nd edition OS map (1899), wedge-shaped, located within New Dock, Port Talbot. The feature had been removed by the expansion of the Dock indicated by the 3rd edition OS map of 1919 and the 4th edition map of 1940.
GGAT08803w	Jetty, New Dock, Port Talbot	Heneb (GGA) HER	Jetty	Post Medieval	Jetty depicted on the 2nd edition OS map (1899), linear with double mooring post at terminus, located within New Dock, Port Talbot. The feature had been removed by the expansion of the Dock indicated by the 3rd edition OS map of 1919.
GGAT08804w	Jetty, New Dock, Port Talbot	Heneb (GGA) HER	Jetty	Post Medieval	Jetty depicted on the 2nd edition OS map (1899), linear with double mooring post at terminus, located within New Dock, Port Talbot. The feature had been removed by the expansion of the Dock indicated by the 3rd edition OS map of 1919 .
GGAT08805w	Jetty, New Dock, Port Talbot	Heneb (GGA) HER	Jetty	Post Medieval	Jetty depicted on the 2nd edition OS map (1899), linear with single mooring post at terminus, located at the junction of New Dock and Old Dock, Port Talbot. The feature had been removed by the expansion of the Dock indicated by the 3rd edition OS map of 1919.
GGAT08806w	Jetty, Old Dock, Port Talbot	Heneb (GGA) HER	Jetty	Post Medieval	Jetty depicted on the 2nd edition OS map (1899), rectangular, located within Old Dock, Port Talbot. The feature had been removed by the expansion of the Dock indicated by the 3rd edition OS map of 1919.
GGAT08807w	Jetty, Old Dock, Port Talbot	Heneb (GGA) HER	Jetty	Post Medieval	Jetty depicted on the 2nd edition OS map (1899), rectangular, located within Old Dock, Port Talbot. The jetty, still shown on the 3rd edition OS map of 1919 (though with a Boat House attached to its SE side), had been removed by further alterations to the Dock carried out by the 4th ediiton of 1940.
GGAT08808w	Jetty, Old Dock, Port Talbot	Heneb (GGA) HER	Jetty	Post Medieval	Jetty depicted on the 2nd edition OS map (1899), wedge-shaped, located within Old Dock, Port Talbot. The feature is shown as a SW-NE aligned jetty, cross-shaped, approached by a disused tramway. With the

					remodeling of the Dock indicated on the 3rd edition of 1919.
GGAT08809w	Jetty, Old Dock, Port Talbot	Heneb (GGA) HER	Jetty	Post Medieval	Jetty depicted on the 2nd edition OS map (1899), located at the junction of Old and New Docks, Port Talbot. The feature had been removed by the remodeling of the Docks, that had occurred by the 3rd edition OS map of 1919.
GGAT08812w	Talbot Wharf, Old Dock, Port Talbot	Heneb (GGA) HER	Wharf	Post Medieval	Wharf at Port Talbot, depicted on the 1st edition OS map (1880). The wharf is shown with sidings approaching the dock at right angles, all served by the Cam Afon Tramway. The wharf is identified as Talbot Wharf on the 2nd edition OS map (1899) then served by the Port Talbot Railway, the lines now running parallel to the wharf front. A single Mooring post is indicated. Unchanged by the 3rd edition OS map of 1917, apart from 3 mooring posts and a Dolphin with a further mooring post (the Railway now given as the Port Talbot Dock railway). The 4th ed. OS map of 1939 indicates the presence of Travelling Cranes, Mooring posts, 6 cranes, and at its east end another crane and a Dolphin and further MPs (1st ed 1:2500 OS map 1876; 2nd ed.1:2500 OS map 1899; 3rd ed. 1:2500 OS map 1917; 4th ed. 1:2500 OS map 1939).
GGAT08813w	Landing Stage, Llewelyn's Quay, Port Talbot	Heneb (GGA) HER	Landing Stage	Post Medieval	Landing Stage depicted on the 2nd edition OS map (1899), located at the south end of Llewelyn's Quay at the end of a narrow spit of land projecting across a body of water known as 'The Float'and the eastern end of the 'Old Dock', Port Talbot.
GGAT08814w	Goods Wharf, North Bank, Port Talbot	Heneb (GGA) HER	Wharf	Post Medieval	Wharf depicted on the 2nd edition OS map (1899) and identified as 'Goods Wharf', located on North Bank, on the north side of 'Old Dock', Port Talbot.
GGAT08818w	New Wharf, Old Dock, Port Talbot	Heneb (GGA) HER	Wharf	Post Medieval	Wharf depicted on the 1st edition OS map (1876) and identified as 'New Wharf', located on North Bank at Port Talbot on the north side of what is given as 'Old Dock' on the 2nd ed OS map (1899). The 1st ed. OS map shows two projecting staithes/landing stages, the wharf served by three sidings from the Cwm-Afon Tramway, linked to the Mansel Tin Plate Works and beyond. The 2nd edition OS map (1899) shows that the wharf had been redeveloped (with one stage removed and the other reduced in size, given as landing stage on 3rd ed OS map); Two larger stages noted as Coal Tips have been erected further apart both linked to the Port Talbot Railway and both with small rectangular track-side structures (indicated as weigh machines on the 3rd ed OS map). The 3rd edition OS map of 1917 shows little change, apart from the addition of mooring posts, some dockside structures including 2 circular tanks. By the 4th edition OS map

					(1939), the western Coal Tip has been removed (stub survives), the eastern Coal Tip has been moved slightly west to approximately the location of the eastern stage shown of 1876 and is connected to the more extensive sidings of the then G.W.R. Old Docks Branch, a new weigh machine and nearby crane are indicated, along with numerous mooring posts and a new landing stage near the tip of the North Bank spit.
GGAT08819w	Llewelyn's Quay, Port Talbot	Heneb (GGA) HER	Quay	Post Medieval	Llywelyn's Quay depicted on the 1st ed OS map (1876) as a curving quay located along the west side of a narrow spit of land projecting across a body of water known as 'The Float' to the eastern end of the 'Old Dock', Port Talbot. A small island lies to the west, possibly ships' ballast.
GGAT08820w	Wharf, Old Dock, Port Talbot	Heneb (GGA) HER	Wharf	Post Medieval	Wharf depicted on the 1st edition OS map (1876) and identified as 'side of harbour', located on south side of 'Old Dock', Port Talbot and served by multiple sidings from the Cwm-Afon Tramway.
GGAT08832w	Slipway, Harbour House, New Dock, Port Talbot Docks	Heneb (GGA) HER	Slipway	Post Medieval	A slipway, located immediately SE of Harbour House, New Dock, Port Talbot Docks, shown and given as 'Slip' on the 1st edition OS map. The feature remains to be shown and identified on the 2nd, 3rd and 4th edition OS maps.
GGAT08833w	Graving Dock, North West of New Dock, Port Talbot Docks	Heneb (GGA) HER	Dry Dock	Post Medieval	Graving Dock identified on 2nd edition OS map, located NW of New Dock, Port Talbot Docks. Associated Mooring Posts and dock related structures/buildings are added by the survey of the 3rd edition OS map with minor changes visible on the 4th edition.
GGAT08841w	Locks, between New Dock and Old Dock, Port Talbot Docks	Heneb (GGA) HER	Lock	Post Medieval	Two locks located originally at the entrance to Old Dock, Port Talbot Docks depicted and identified on the 1st edition 1:2500 OS map with three pairs of lock gates and mooring posts shown, unchanged on the 2nd ed. 1:2500 OS map, but already by-passed with the creation of New Dock to the west and south. By the 3rd and 4th ed. OS maps and the further expansion of New Dock, the locks are shown in an abandoned state, the lock gates removed.
GGAT09975m	Weir, Riverside	Heneb (GGA) HER	Weir	Post Medieval	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10017m	Weir, Conduit	Heneb (GGA) HER	Weir	Unknown	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10028m	Mooring	Heneb	Mooring	Unknown	Potential river feature identified as part of GGAT and Cadw?s GGAT 160

	Posts, New Dock South	(GGA) HER	Bollard		Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10029m	West Gate, New Dock	Heneb (GGA) HER	Flood Lock	Post Medieval	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10030m	Mooring Posts, New Dock North	Heneb (GGA) HER	Mooring Bollard	Post Medieval	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10032m	Sluice, Margam and Mansel	Heneb (GGA) HER	Sluice	Post Medieval	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10035m	Dolphin River Feature One, Aberavon	Heneb (GGA) HER	Dolphin	-	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10036m	Dolphin River Feature Two, Aberavon	Heneb (GGA) HER	Dolphin	-	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10037m	Dolphin River Feature Three, Aberavon	Heneb (GGA) HER	Dolphin	-	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10038m	Dolphin River Feature Four, Aberavon	Heneb (GGA) HER	Dolphin	-	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10039m	West Gate, New Dock Lock, Neath	Heneb (GGA) HER	Flood Lock	Post Medieval	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10190m	Dolphin One, New Dock Neath	Heneb (GGA) HER	Dolphin	-	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10191m	Dolphin Two, New Dock Neath	Heneb (GGA) HER	Dolphin	-	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10192m	Dolphin Three, New Dock Neath	Heneb (GGA) HER	Dolphin	-	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10193m	Dolphin Four, New Dock	Heneb (GGA)	Dolphin	-	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project,

	Neath	HER			visible on OS historic mapping.
GGAT10194m	Dolphin Five, New Dock Neath	Heneb (GGA) HER	Dolphin	-	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10195m	Dolphin Six, New Dock Neath	Heneb (GGA) HER	Dolphin	-	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10196m	Dolphin Seven, New Dock Neath	Heneb (GGA) HER	Dolphin	-	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10197m	Dolphin Eight, New Dock Neath	Heneb (GGA) HER	Dolphin	-	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10198m	Dolphin Nine, New Dock Neath	Heneb (GGA) HER	Dolphin	-	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10801m	Jetty South, Aberavon	Heneb (GGA) HER	Jetty	Post Medieval	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10802m	Jetty North, Aberavon	Heneb (GGA) HER	Jetty	Post Medieval	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10803m	Dolphin, Aberavon Dock	Heneb (GGA) HER	Dolphin	Unknown	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10807m	Weir, Afon Vale, Aberavon	Heneb (GGA) HER	Weir	Unknown	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10808m	Sluice, Aberavon	Heneb (GGA) HER	Sluice	Post Medieval	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10809m	Sluice, Caermarthen Mill	Heneb (GGA) HER	Sluice	Unknown	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10856m	Flood Locks, Aberavon	Heneb (GGA) HER	Flood Lock	Unknown	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.

GGAT10857m	Jetties, Aberavon Harbour	Heneb (GGA) HER	Jetty's	Unknown	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10858m	Slipway, Aberavon Harbour	Heneb (GGA) HER	Slipway	Unknown	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10859m	Landing Stage, Aberavon Harbour	Heneb (GGA) HER	Landing Stage	Post Medieval	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10860m	Landing Stage, Llewelyn's Quay	Heneb (GGA) HER	Landing Stage	Post Medieval	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10861m	Jetty One, Llewelyn's Quay	Heneb (GGA) HER	Jetty	Post Medieval	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10862m	Jetty Two, Llewelyn's Quay	Heneb (GGA) HER	Jetty	Post Medieval	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10863m	Jetty Three, Llewelyn's Quay	Heneb (GGA) HER	Jetty	Post Medieval	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10864m	Boat House, Rio Tinto	Heneb (GGA) HER	Boat House	Post Medieval	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10865m	Dolphin, North Bank, Aberavon	Heneb (GGA) HER	Dolphin	Unknown	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10866m	Landing Stage, North Bank, Aberavon	Heneb (GGA) HER	Landing Stage	Unknown	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10867m	Dolphin, Talbot Wharf	Heneb (GGA) HER	Dolphin	Unknown	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10915m	Dolphin, Goods Wharf,	Heneb (GGA)	Dolphin	Unknown	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project,

	Port Talbot	HER			visible on OS historic mapping.
GGAT10916m	Landing Stage, Llewelyn's Quay	Heneb (GGA) HER	Landing Stage	Post Medieval	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10917m	Landing Stage, Rio, Port Talbot	Heneb (GGA) HER	Landing Stage	Post Medieval	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10918m	Landing Stage, North Bank	Heneb (GGA) HER	Landing Stage	Post Medieval	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10930m	Mooring Rings, New Dock	Heneb (GGA) HER	Mooring Ring	Post Medieval	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10932m	Mooring Posts 1, New Dock	Heneb (GGA) HER	Mooring Bollard	Post Medieval	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10933m	Mooring Posts 2, New Dock	Heneb (GGA) HER	Mooring Bollard	Post Medieval	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10934m	Mooring Posts 3, New Dock	Heneb (GGA) HER	Mooring Bollard	Post Medieval	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10935m	Mooring Posts 4, New Dock	Heneb (GGA) HER	Mooring Bollard	Post Medieval	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10936m	Mooring Posts 5, New Dock	Heneb (GGA) HER	Mooring Bollard	Post Medieval	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10937m	Mooring Posts 6, New Dock	Heneb (GGA) HER	Mooring Bollard	Post Medieval	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10938m	Mooring Posts 7, New Dock	Heneb (GGA) HER	Mooring Bollard	Post Medieval	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10939m	Mooring Posts 8, New Dock	Heneb (GGA) HER	Mooring Bollard	Post Medieval	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.

GGAT10940m	Mooring Posts 9, New Dock	Heneb (GGA) HER	Mooring Bollard	Post Medieval	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10941m	Mooring Posts 10, New Dock	Heneb (GGA) HER	Mooring Bollard	Post Medieval	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10942m	Mooring Posts 11, New Dock	Heneb (GGA) HER	Mooring Bollard	Post Medieval	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10944m	Mooring Posts 12, New Dock	Heneb (GGA) HER	Mooring Bollard	Post Medieval	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10945m	Mooring Posts 13, New Dock	Heneb (GGA) HER	Mooring Bollard	Post Medieval	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10946m	Mooring Posts 14, New Dock	Heneb (GGA) HER	Mooring Bollard	Post Medieval	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10947m	Mooring Posts 15, New Dock	Heneb (GGA) HER	Mooring Bollard	Post Medieval	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10948m	Mooring Posts 16, New Dock	Heneb (GGA) HER	Mooring Bollard	Post Medieval	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10949m	Mooring Posts 17, New Dock	Heneb (GGA) HER	Mooring Bollard	Post Medieval	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10950m	Mooring Posts 18, New Dock	Heneb (GGA) HER	Mooring Bollard	Post Medieval	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10951m	Mooring Posts 19, New Dock	Heneb (GGA) HER	Mooring Bollard	Post Medieval	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10952m	Mooring Posts 20, New Dock	Heneb (GGA) HER	Mooring Bollard	Post Medieval	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10953m	Mooring Posts 21, New Dock	Heneb (GGA)	Mooring Bollard	Post Medieval	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project,

		HER			visible on OS historic mapping.
GGAT10955m	Jetty One, New Dock	Heneb (GGA) HER	Jetty	Post Medieval	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10956m	Jetty Two, New Dock	Heneb (GGA) HER	Jetty	Post Medieval	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10957m	Jetty Three, New Dock	Heneb (GGA) HER	Jetty	Post Medieval	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10958m	Jetty Four, New Dock	Heneb (GGA) HER	Jetty	Post Medieval	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10959m	Jetty Five, New Dock	Heneb (GGA) HER	Jetty	Post Medieval	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10960m	Landing Stage One, New Dock	Heneb (GGA) HER	Landing Stage	Post Medieval	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
GGAT10961m	Landing Stage Two, New Dock	Heneb (GGA) HER	Landing Stage	Post Medieval	Potential river feature identified as part of GGAT and Cadw?s GGAT 160 Climate Change Adaptation Rivers and Riparian Environments project, visible on OS historic mapping.
273568	*Aberthaw*	NMRW	Wreck	Post Medieval	N/A
506806	*Eva*	NMRW	Wreck	Modern	N/A
515495	*Jumbo*	NMRW	Wreck	Modern	N/A
34237	Briton Ferry Dock, Briton Ferry	NMRW	Dock	Post Medieval	N/A
34238	Briton Ferry Dock Entrance	NMRW	Dock	Post Medieval	N/A
91603	A48 Road Bridge over River Neath;Clevela nd Bridge, Neath By-	NMRW	Road Bridge	Modern	N/A

	Pass, Briton Ferry				
240960	*Isabel*	NMRW	Wreck	Post Medieval	N/A
525585	*Porth*	NMRW	Wreck	Post Medieval	N/A
90543	Wreck, Sandfields	NMRW	Wreck	Post Medieval	N/A
240187	*Mary*	NMRW	Wreck	Post Medieval	N/A
240211	*Sunbeam*	NMRW	Wreck	Modern	N/A
240656	Unnamed Wreck	NMRW	Wreck	Post Medieval	N/A
240828	UKHO 12523 (Obstruction)	NMRW	Wreck	Post Medieval	N/A
240948	*John Stroud*	NMRW	Wreck	Post Medieval	N/A
240956	*Pioneer*	NMRW	Wreck	Post Medieval	N/A
273466	*Bristol Packet*	NMRW	Wreck	Post Medieval	N/A
273746	*Venus*	NMRW	Wreck	Post Medieval	N/A
273850	*Pet*	NMRW	Wreck	Post Medieval	N/A
273934	*Windermere*	NMRW	Wreck	Post Medieval	N/A
273973	*Salado*	NMRW	Wreck	Post Medieval	N/A
273982	*Carola*	NMRW	Wreck	Post Medieval	N/A
274013	*Water Sprite*	NMRW	Wreck	Post Medieval	N/A
274059	*Thomas Peile*	NMRW	Wreck	Post Medieval	N/A
274095	*James Stevens No 12*	NMRW	Wreck	Modern	N/A

274133	*Semiramis*	NMRW	Wreck	Modern	N/A
274142	*Amazon* (UKHO 12522)	NMRW and UKHO	Wreck	Modern	N/A
274184	*Don Federico*	NMRW	Wreck	Modern	N/A
274309	*Mary*	NMRW	Wreck	Post Medieval	N/A
274310	*Grace*	NMRW	Wreck	Modern	N/A
274357	*Stalheim* (UKHO 12508)	NMRW and UKHO	Wreck	Modern	N/A
409374	Unidentified Wreck (UKHO 12523)	NMRW and UKHO	Wreck	Post Medieval	N/A
418100	Outfalls, Margam Sands	NMRW	Outfall Sewer	Modern	N/A
418106	Unidentified Wreck, Margam Sands	NMRW	Wreck	Post Medieval	N/A
506807	*Wendreen*	NMRW	Wreck	Modern	N/A
506808	*Doria*	NMRW	Wreck	Modern	N/A
507084	Port Talbot Maritime Named Location	NMRW	Seascape	Multiperiod	N/A
544524	*Ethelwalda*	NMRW	Wreck	Modern	Wreck *Ethelwalda*
12508	*Stalheim*	UKHO	Wreck	Unknown	Dangerous wreck *Stalheim*
88835	Unknown Wreck	UKHO	Wreck	Unknown	Wreck showing any portion of hull or superstructure
12516	Unknown Wreck	UKHO	Wreck	Unknown	Wreck showing any portion of hull or superstructure
99670	Unknown	UKHO	Wreck	Unknown	LEAST M/B DEPTH 0.48MTRS LENGTH 7MTRS, WIDTH 4.6MTRS,

	Wreck				HEIGHT 0.78MTRS, ORIENTATION 090/270 DEGS. (H525.2, ABP S

Source: Heneb GGA HER; NMRW; UKHO 2024

J.2 Jersey Marine site

J.2.1 Non-designated Marine Historic Assets

Appendix Table Error! No text of specified style in document.**-2 List of Non-designated Marine Historic Assets within the Jersey Marine Study Area**

Record Number	Name	Dataset	Type	Period	Summary
GGAT03144w	4 Giant's Grave Wharfs	Heneb (GGA) HER	Dock	Post Medieval	Four post-medieval docks depicted on the 1st edition OS map.
GGAT03147w	7 Briton Ferry Dock	Heneb (GGA) HER	Dock	Post Medieval	A post-medieval dock depicted on the 1st edition OS map.
GGAT03586w	NE 6 - New Quay, Briton Ferry Iron Works	Heneb (GGA) HER	Quay	Post Medieval	Neath Estuary Improvement Scheme A412 New Quay, Briton Ferry Iron Works First indicated on a map of 1888; masonry quay wall not shown on 1st edition 25" map of 1875.
GGAT03589w	NE9 - Wharf, Neath Jersey Canal Basin	Heneb (GGA) HER	Wharf	Post Medieval	Neath Estuary Improvement Scheme A412 Neath (Jersey) Canal Basin Remains of abutment or wharf, concrete and wooden beam construction, in poor condition, purpose and exact date unknown. Roberts 1997.
GGAT03605w	NE 25 - Giants grave coal Wharves	Heneb (GGA) HER	Wharf	Post Medieval	Neath Estuary Improvement Scheme A412 Giant's Grave Coal Wharfs Site of coal wharfs on the north and south banks of former Giant's Grave Pill, including the Tonmawr coal wharf; apparently in use as such from at least the early 18th century, on estate maps of 1798 and 1808-1813 and on all editions of the OS 25" map; infilled and levelled over.
GGAT03609w	NE29-Limekiln Wharf	Heneb (GGA) HER	Wharf	Post Medieval	Neath Estuary Improvement Scheme A412 Limekiln Wharf Site of old limekiln wharf on the Neath (Jersey) Canal with associated turning place and sluice into former Giant's Grave Pill; canal towpath bridge over sluice.
GGAT08810w	Jetty, Outer Basin, Briton Ferry Dock	Heneb (GGA) HER	Jetty	Post Medieval	Jetty depicted on the 1st edition OS map (1880), linear with single mooring post at terminus, located at the southern side of the entrance channel to the Outer Basin of Briton Ferry Dock. The feature survives to be shown on the 2nd edition OS map (1899), the 3rd edition OS map of

					1919 and the 4th ed. OS map of 1940.
GGAT08821w	Wharf, Giant's Grave, Briton Ferry	Heneb (GGA) HER	Wharf	Post Medieval	Wharf on the River Neath and the Neath Canal depicted on the 1st edition OS map (1882), located at Giant's Grave; the western-most of four adjacent wharves. The canal and its tow-path defines the NE edge of the area, whilst the High Water mark of Ordinary Tides on the River Neath marks the SW boundary.
GGAT08822w	Wharf, Giant's Grave, Briton Ferry	Heneb (GGA) HER	Wharf	Post Medieval	Wharf on the River Neath and the Neath Canal depicted on the 1st edition OS map (1882), located at Giant's Grave; the 2nd of four adjacent wharves from the west. The canal and its tow-path defines the NE edge of the area, whilst the High Water mark of Ordinary Tides on the River Neath marks the SW boundary.
GGAT08823w	Wharf, Giant's Grave, Briton Ferry	Heneb (GGA) HER	Wharf	Post Medieval	Wharf on the River Neath and the Neath Canal depicted on the 1st edition OS map (1882), located at Giant's Grave; the 3rd of four adjacent wharves from the west. The canal and its tow-path defines the N edge of the area, whilst the High Water mark of Ordinary Tides on the River Neath marks the SW boundary.
GGAT08824w	Wharf, Giant's Grave, Briton Ferry	Heneb (GGA) HER	Wharf	Post Medieval	Wharf (Coal) on the River Neath and the Neath Canal depicted on the 1st edition OS map (1882), located at Giant's Grave; the easternmost of four adjacent wharves. The canal and its tow-path defines the N edge of the area, whilst a curving boundary with the adjacent wharf marks the SW and SE boundary, whilst to the NE is an area of waste ground.
GGAT08827w	Wharf, near the Site of Vernon House, Briton Ferry	Heneb (GGA) HER	Wharf	Post Medieval	Wharf, Briton Ferry, depicted on the 1st edition OS map (1881) located NW of the site of Vernon House, bounding the River Neath on its west and the Jersey Canal and towpath to the east.
GGAT08830w	Jetty, Outer Basin, Briton Ferry Dock	Heneb (GGA) HER	Jetty	Post Medieval	Jetty depicted on the 1st edition OS map (1880), linear , located on the River Neath just north of the entrance channel to the Outer Basin of Briton Ferry Dock. The feature survives to be shown on the 2nd edition OS map (1899), though appears to have been shortened, unchanged by the 3rd edition OS map of 1919, it is no longer named as a jetty on the 4th ed. OS map of 1940.
GGAT08842w	Briton Ferry, River Neath, West of Warren Hill, Briton Ferry	Heneb (GGA) HER	Ferry Crossing	Post Medieval, Multi-period, Medieval	Briton Ferry (Site of), historic ferry crossing route across the River Neath from West of Warren Hill, at Briton Ferry to the area below Earlswood Colliery as noted on 1st edition 1:2500 OS map, and later editions.
240960	*Isabel*	NMRW	Wreck	Post Medieval	Archaeological remains associated with the loss of this vessel are not

					confirmed as present at this location, but may be in the vicinity. Event and Historical Information: The *Isabel* was a wooden brigantine built by Nathaniel McLaren of Prince Edwqard Island in 1871. Technical and configuration specifications are given as 227gt; 107.9ft length x 24.9ft breadth x 12.5ft depth; 1 deck with after deck house and roudn house forward, 2 masts, elliptical stern, carvel built, figurehead consisting of a billet, wooden framework. The ISABEL was sold to Thomas Ace of Port Talbot, ship chandler, on 17 January 1874 and placed on the Swansea Shipping Register (7 in 1874). By the time of loss, Thomas Ace had sold various small numbers of shares to local Port Talbot investors who included retired master mariners, drapers, grocers, a tin man and a pilot. The owners also included master mariners from Newquay and Aberavon. The ISABEL's registry was closed on 3 February 1882 after notification was received that the vessel had been wrecked at Briton Ferry on 27 December 1881.
525585	*Porth*	NMRW	Wreck	Post Medieval	Archaeological remains associated with the loss of this vessel are not confirmed as present at this location, but may be in the vicinity. Event and Historical Information: The *Porth* was a wooden sloop built at Padstow in 1818. Technical and configuration specifications are given as 27.38gt; 43ft length x 14.4ft breadth x 6.9ft depth of hold; 1 deck, 1 mast, rigging sloop, stern square, carvel, framework wood; official number 10876. The sloop was transferred from Bristol to the port of Bideford in July 1861, at which time the owner was Daniel Walters of Bideford, master mariner. The sloop's Bideford Shipping Register entry (18 in 1861) is closed with the annotation ' Lost in Neath River 4 February 1867'.

Source: Heneb GGA HER; NMRW; UKHO 2024

Appendix K
Viewpoint Photography

Future Port Talbot

FLOW EIA Scoping

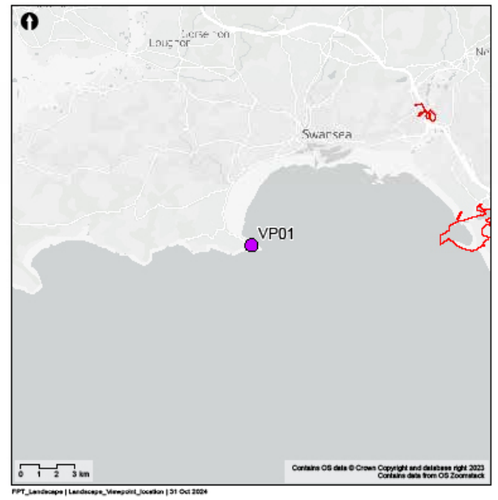
Landscape and Visual Impact Assesment

Appendix K - Viewpoint Photography

December 2024



Viewpoint 01: Visitors to Mumbles Lighthouse and Mumbles Hill LNR and users of Wales Coast Path (Gower) 50mm image



Location Plan

Viewpoint Photography Details

Viewpoint 01 (VP01): Visitors to Mumbles Lighthouse and Mumbles Hill LNR and users of Wales Coast Path (Gower)

Location: Latitude: 51; 34; 4.67, Longitude: 3; 58; 38.54, Altitude: 46m AOD

Camera: Canon EOS 6D

Lens: 50mm on a full frame camera

Height of lens above ground: 1.6m

Enlargement factor: 100% @ A3 (50mm Image)

Approx. Viewing distance: 430mm @ A3 (50mm Image)

Approx. Distance to site: 11km

Direction of view: East

Date and Time: 08/03/2024

Weather: Fair

Visibility: 6 - Haze

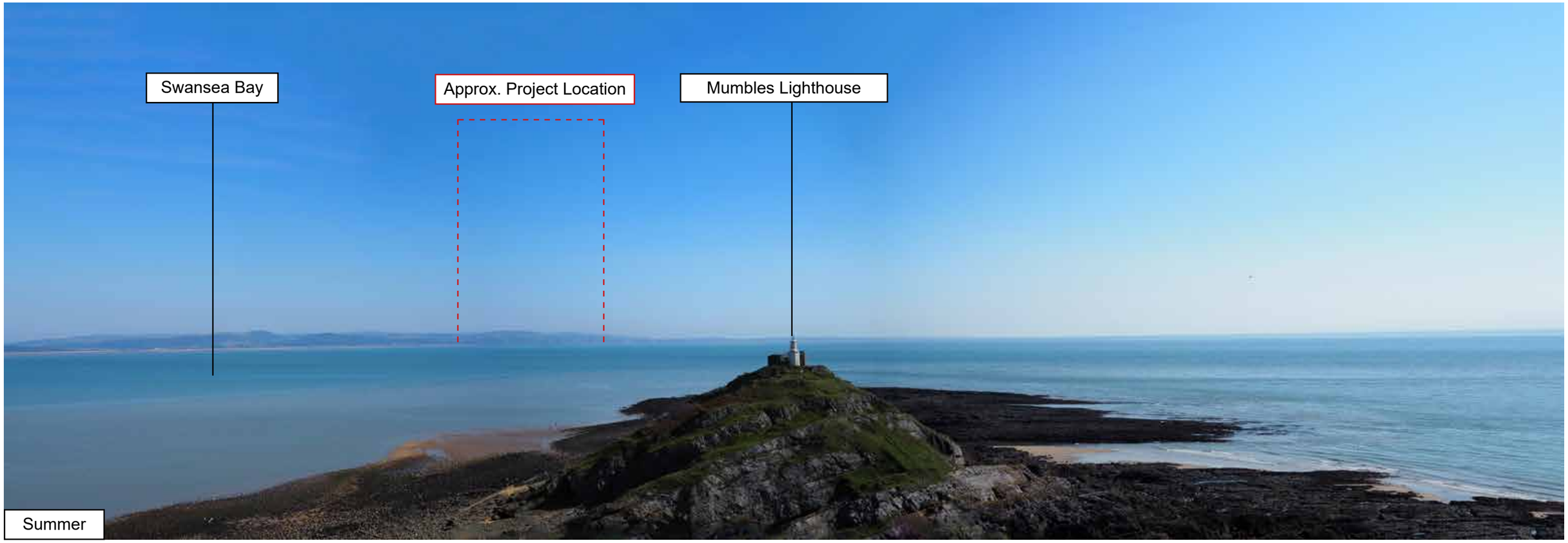
Futute Port Talbot
FLOW EIA Scoping
Appendix K: Viewpoint Photography

ABP | FUTURE PORT TALBOT

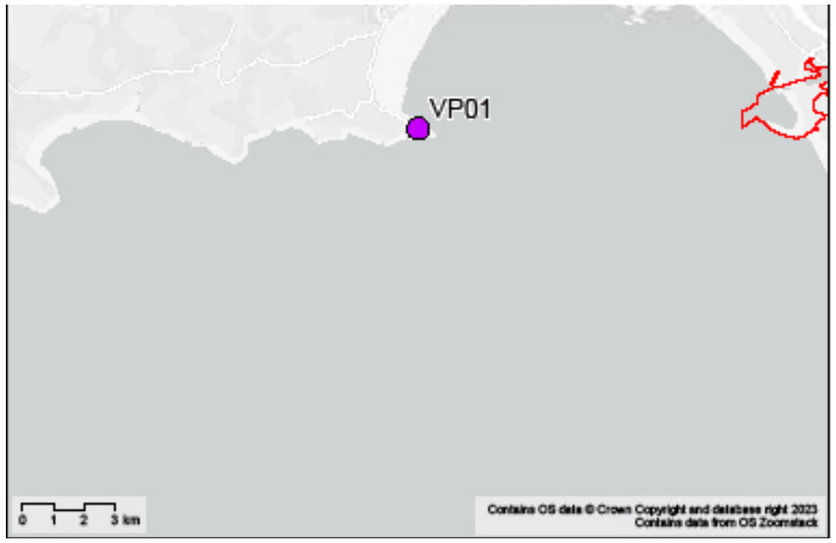
NOTES:
1. This figure to be read in conjunction with EIA Scoping Report: Chapter 21 - Landscape Seascape and Visual Amenity
2. This document is issued for the party which commissioned it and for specific purposes connected with the above-captioned project only. It should not be relied upon by any other party or used for any other purpose.
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VISIBILITY SCALE:
1 - Dense fog
2 - Thick fog
3 - Moderate fog
4 - Light fog
5 - Thin fog
6 - Haze
7 - Light haze
8 - Clear
9 - Very clear
10 - Exceptionally clear
11 - Pure air

Rev	Date	Drawn	Description	Checked	Approved
001	01.11.2024	KHR	First issue	AH	PW
002	10.12.2024	KHR	EIA Scoping Report Issue	AH	PW



Viewpoint 01: Visitors to Mumbles Lighthouse and Mumbles Hill LNR and users of Wales Coast Path (Gower) Panorama



Location Plan

Viewpoint Photography Details

Viewpoint 01 (VP01): Visitors to Mumbles Lighthouse and Mumbles Hill LNR and users of Wales Coast Path (Gower)

Location: Latitude: 51; 34; 4.67, Longitude: 3; 58; 38.54, Altitude: 46m AOD
Camera: Olympus E-M10
Lens: 35mm on a cropped frame camera
Height of lens above ground: 1.6m
Enlargement factor: 100% @ A2 (50mm Image)
Approx. Viewing distance: 430mm @ A2 (50mm Image)
Approx. Distance to Project Location: 11km
Direction of view: East
Date and Time: 18/09/2024
Weather: Good
Visibility: 9 - Very clear

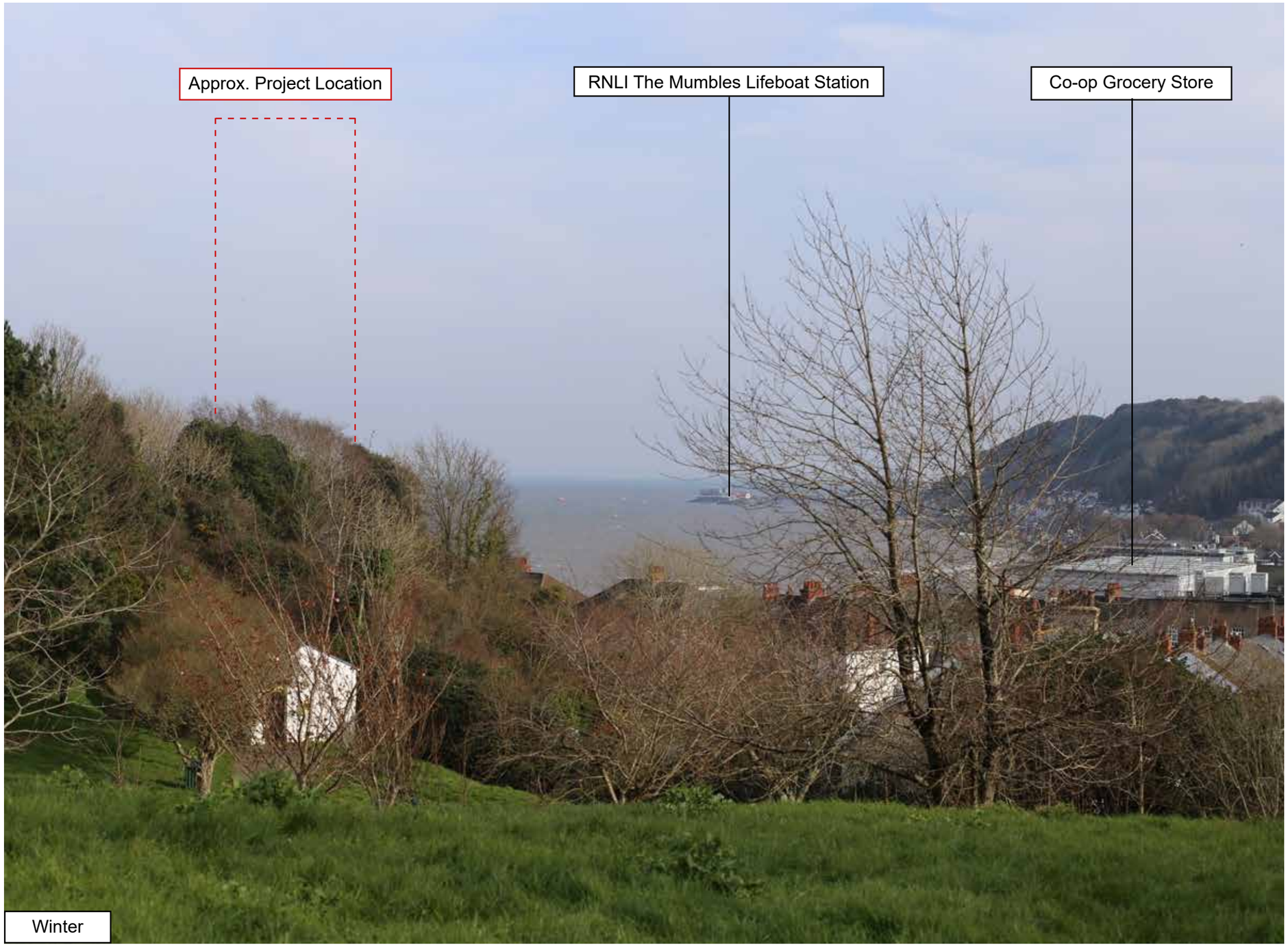
Futute Port Talbot
FLOW EIA Scoping
Appendix K: Viewpoint Photography

ABP | FUTURE PORT TALBOT

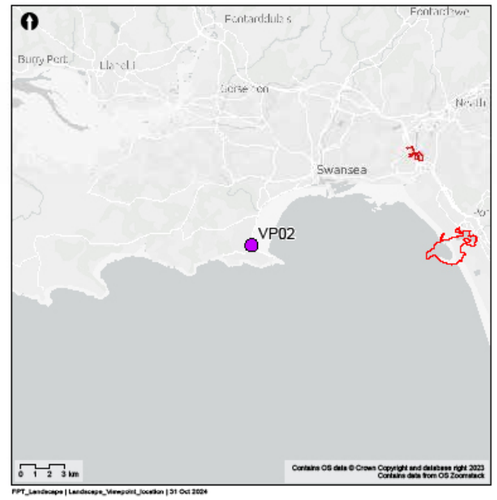
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7 - Light haze
8 - Clear
9 - Very clear
10 - Exceptionally clear
11 - Pure air

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001	01.11.2024	KHR	First issue	AH	PW
002	10.12.2024	KHR	EIA Scoping Report Issue	AH	PW



Viewpoint 02: Visitors to Oystermouth Castle and residents of Oystermouth and Norton 50mm image



Location Plan

Viewpoint Photography Details

Viewpoint 02 (VP02): Visitors to Oystermouth Castle and residents of Oystermouth and Norton

Location: Latitude: 51; 34; 36.02 , Longitude: 4; 0; 7.94, Altitude: 43.4m AOD

Camera: Canon EOS 6D

Lens: 50mm on a full frame camera

Height of lens above ground: 1.6m

Enlargement factor: 100% @ A3 (50mm Image)

Approx. Viewing distance: 430mm @ A3 (50mm Image)

Approx. Distance to Project Location: 13km

Direction of view: East

Date and Time: 08/03/2024

Weather: Fair

Visibility: 6 - Haze

Futute Port Talbot
FLOW EIA Scoping
Appendix K: Viewpoint Photography

ABP | FUTURE PORT TALBOT

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Viewpoint 02: Visitors to Oystermouth Castle and residents of Oystermouth and Norton



Location Plan

Viewpoint Photography Details

Viewpoint 02 (VP02): Visitors to Oystermouth Castle and residents of Oystermouth and Norton

Location: Latitude: 51; 34; 36.02 , Longitude: 4; 0; 7.94, Altitude: 43.4m AOD

Camera: Canon EOS 6D

Lens: 50mm on a full frame camera

Height of lens above ground: 1.6m

Enlargement factor: 100% @ A2 (50mm Image)

Approx. Viewing distance: 430mm @ A2 (50mm Image)

Approx. Distance to Project Location: 13km

Direction of view: East

Date and Time: 22/07/2024

Weather: Cloudy

Visibility: 6 - Haze

Futute Port Talbot
FLOW EIA Scoping
Appendix K: Viewpoint Photography

ABP | FUTURE PORT TALBOT

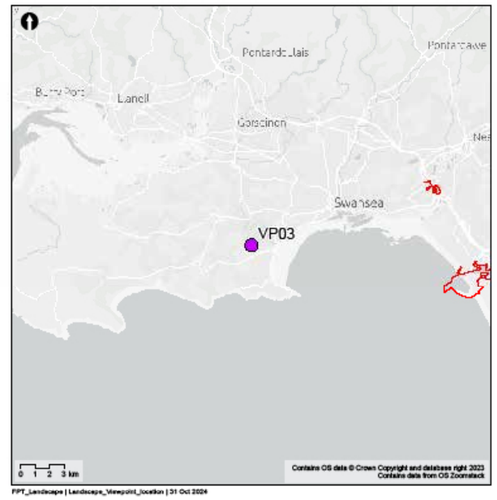
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Viewpoint 03: Visitors to Gower National Landscape and users of Bridleway MU57 50mm image



Location Plan

Viewpoint Photography Details

Viewpoint 03 (VP03): Visitors to Gower National Landscape and users of Bridleway MU57

Location: Latitude: 51; 35;50., Longitude: 4; 1; 9.04,
Altitude: 111.2m AOD
Camera: Canon EOS 6D
Lens: 50mm on a full frame camera
Height of lens above ground: 1.6m
Enlargement factor: 100% @ A3 (50mm Image)
Approx. Distance to Project Location: 430mm @ A3 (50mm Image)
Approx. Distance to site: 14.5km
Direction of view: East
Date and Time: 08/03/2024
Weather: Fair
Visibility: 6 - Haze

Futute Port Talbot
FLOW EIA Scoping
Appendix K: Viewpoint Photography

ABP | FUTURE PORT TALBOT

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Viewpoint 03: Visitors to Gower National Landscape and users of Bridleway MU57 Panorama



Location Plan

Viewpoint Photography Details

Viewpoint 03 (VP03): Visitors to Gower National Landscape and users of Bridleway MU57

Location: Latitude: 51; 35;50., Longitude: 4; 1; 9.04, Altitude: 111.2m AOD

Camera: Olympus E-M10

Lens: 35mm on a cropped frame camera

Height of lens above ground: 1.6m

Enlargement factor: 100% @ A2 (50mm Image)

Approx. Viewing distance: 430mm @ A2 (50mm Image)

Approx. Distance to Project Location: 14.5km

Direction of view: East

Date and Time: 18/09/2024

Weather: Fair

Visibility: 9 - Very clear

Futute Port Talbot
FLOW EIA Scoping
Appendix K: Viewpoint Photography

ABP | FUTURE PORT TALBOT

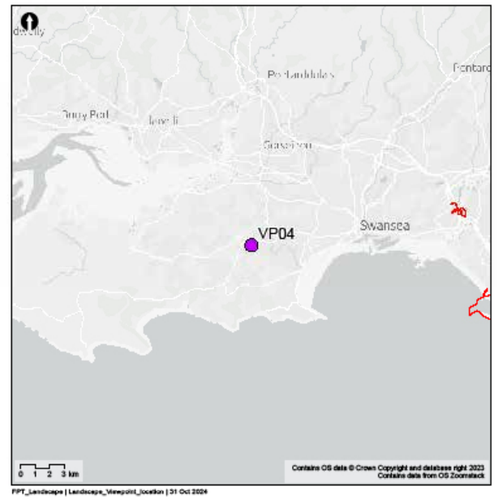
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Viewpoint 04: Users of Footpath BI44 50mm image



Location Plan

Viewpoint Photography Details

Viewpoint 04 (VP04): Users of Footpath BI44

Location: Latitude: 51; 36; 41.18 , Longitude: 4; 2; 48.17, Altitude: 100.2m AOD
Camera: Canon EOS 6D
Lens: 50mm on a full frame camera
Height of lens above ground: 1.6m
Enlargement factor: 100% @ A3 (50mm Image)
Approx. Viewing distance: 430mm @ A3 (50mm Image)
Approx. Distance to Project Location: 16.6km
Direction of view: East
Date and Time: 08/03/2024
Weather: Fair
Visibility: 6 - Haze

Futute Port Talbot
FLOW EIA Scoping
Appendix K: Viewpoint Photography

ABP | FUTURE PORT TALBOT

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Viewpoint 04: Users of Footpath BI44 Panorama



Location Plan

Viewpoint Photography Details

Viewpoint 04 (VP04): Users of Footpath BI44

Location: Latitude: 51; 36; 41.18 , Longitude: 4; 2; 48.17, Altitude: 100.2m AOD

Camera: Canon EOS 6D

Lens: 50mm on a full frame camera

Height of lens above ground: 1.6m

Enlargement factor: 100% @ A2 (50mm Image)

Approx. Viewing distance: 430mm @ A2 (50mm Image)

Approx. Distance to Project Location: 16.6km

Direction of view: East

Date and Time: 24/07/2024

Weather: Cloudy

Visibility: 6 - Haze

Futute Port Talbot
FLOW EIA Scoping
Appendix K: Viewpoint Photography

ABP | FUTURE PORT TALBOT

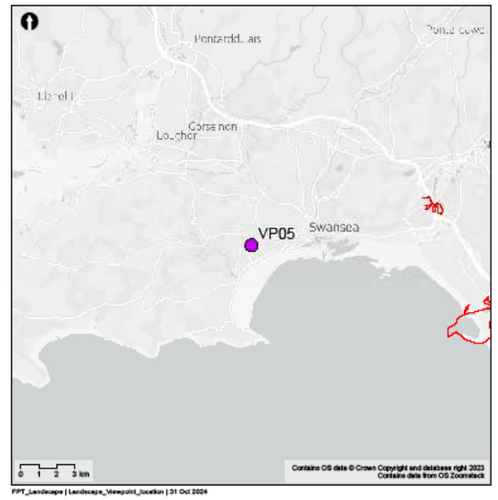
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Viewpoint 05: Users of Singleton Park 50mm image



Location Plan

Viewpoint Photography Details

Viewpoint 05 (VP05): Users of Singleton Park

Location: Latitude: 51; 36; 53.83, Longitude: 3; 58; 59,39, Altitude: 57.5m AOD

Camera: Canon EOS 6D

Lens: 50mm on a full frame camera

Height of lens above ground: 1.6m

Enlargement factor: 100% @ A3 (50mm Image)

Approx. Viewing distance: 430mm @ A3 (50mm Image)

Approx. Distance to Project Location: 12.5km

Direction of view: Southeast

Date and Time: 09/03/2024

Weather: Mostly Cloudy

Visibility: 6 - Haze

Futute Port Talbot
FLOW EIA Scoping
Appendix K: Viewpoint Photography

ABP | FUTURE PORT TALBOT

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Viewpoint 05: Users of Singleton Park Panorama



Location Plan

Viewpoint Photography Details

Viewpoint 05 (VP05): Users of Singleton Park

Location: Latitude: 51; 36; 53.83, Longitude: 3; 58; 59,39, Altitude: 57.5m AOD
Camera: Canon EOS 6D
Lens: 50mm on a full frame camera
Height of lens above ground: 1.6m
Enlargement factor: 100% @ A2 (50mm Image)
Approx. Viewing distance: 430mm @ A2 (50mm Image)
Approx. Distance to Project Location: 12.5km
Direction of view: Southeast
Date and Time: 24/07/2024
Weather: Cloudy
Visibility: 6 - Haze

Futute Port Talbot
FLOW EIA Scoping
Appendix K: Viewpoint Photography

ABP | FUTURE PORT TALBOT

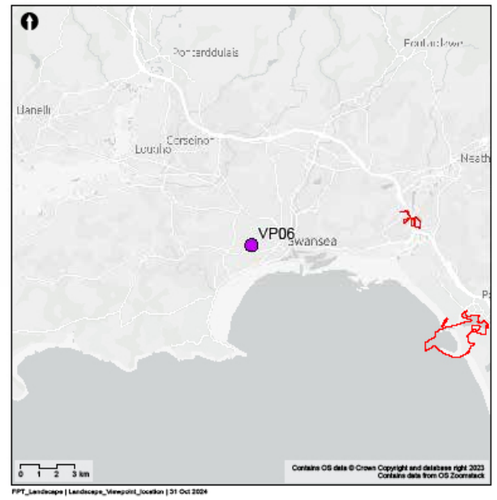
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Viewpoint 06: Users of Cwmdonkin Park 50mm image



Location Plan

Viewpoint Photography Details

Viewpoint 06 (VP06): Users of Cwmdonkin Park

Location: Latitude: 51; 37; 14.43, Longitude: 3; 58; 8.68, Altitude: 69.6m AOD

Camera: Canon EOS 6D

Lens: 50mm on a full frame camera

Height of lens above ground: 1.6m

Enlargement factor: 100% @ A3 (50mm Image)

Approx. Viewing distance: 430mm @ A3 (50mm Image)

Approx. Distance to Project Location: 11.7km

Direction of view: Southeast

Date and Time: 09/03/2024

Weather: Mostly Cloudy

Visibility: 6 - Haze

Futute Port Talbot
FLOW EIA Scoping
Appendix K: Viewpoint Photography

ABP | FUTURE PORT TALBOT

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Viewpoint 06: Users of Cwmdonkin Park Panorama



Location Plan

Viewpoint Photography Details

Viewpoint 06 (VP06): Users of Cwmdonkin Park

Location: Latitude: 51; 37; 14.43, Longitude: 3; 58; 8.68, Altitude: 69.6m AOD

Camera: Canon EOS 6D

Lens: 50mm on a full frame camera

Height of lens above ground: 1.6m

Enlargement factor: 100% @ A2 (50mm Image)

Approx. Viewing distance: 430mm @ A2 (50mm Image)

Approx. Distance to Project Location: 11.7km

Direction of view: Southeast

Date and Time: 24/07/2024

Weather: Cloudy

Visibility: 6 - Haze

Futute Port Talbot
FLOW EIA Scoping
Appendix K: Viewpoint Photography

ABP | FUTURE PORT TALBOT

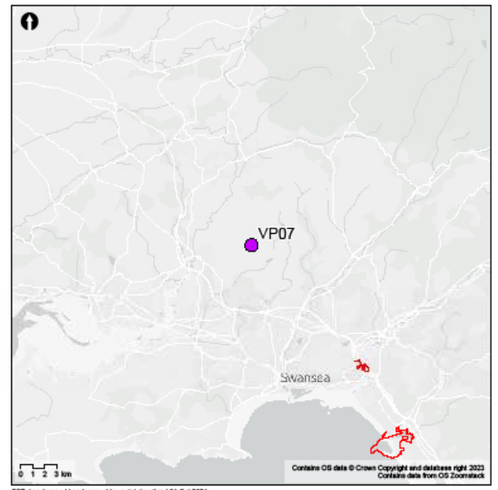
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Viewpoint 07: Visitors to Mynydd Pysgodlyn 50mm image



Location Plan

Viewpoint Photography Details

Viewpoint 07 (VP07): Visitors to Mynydd Pysgodlyn

Location: Latitude: 51; 43; 31.53, Longitude: 3; 58; 38.13, Altitude: 261.9m AOD
Camera: Canon EOS 6D
Lens: 50mm on a full frame camera
Height of lens above ground: 1.6m
Enlargement factor: 100% @ A3 (50mm Image)
Approx. Viewing distance: 430mm @ A3 (50mm Image)
Approx. Distance to Project Location: 20km
Direction of view: Southeast
Date and Time: 08/03/2024
Weather: Fair
Visibility: 6 - Haze

Futute Port Talbot
FLOW EIA Scoping
Appendix K: Viewpoint Photography

ABP | FUTURE PORT TALBOT

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Viewpoint 07: Visitors to Mynydd Pysgodlyn Panorama



Location Plan

Viewpoint Photography Details

Viewpoint 07 (VP07): Visitors to Mynydd Pysgodlyn

Location: Latitude: 51; 43; 31.53, Longitude: 3; 58; 38.13, Altitude: 261.9m AOD

Camera: Canon EOS 6D

Lens: 50mm on a full frame camera

Height of lens above ground: 1.6m

Enlargement factor: 100% @ A2 (50mm Image)

Approx. Viewing distance: 430mm @ A2 (50mm Image)

Approx. Distance to Project Location: 20km

Direction of view: Southeast

Date and Time: 22/07/2024

Weather: Cloudy

Visibility: 6 - Haze

Futute Port Talbot
FLOW EIA Scoping
Appendix K: Viewpoint Photography

ABP | FUTURE PORT TALBOT

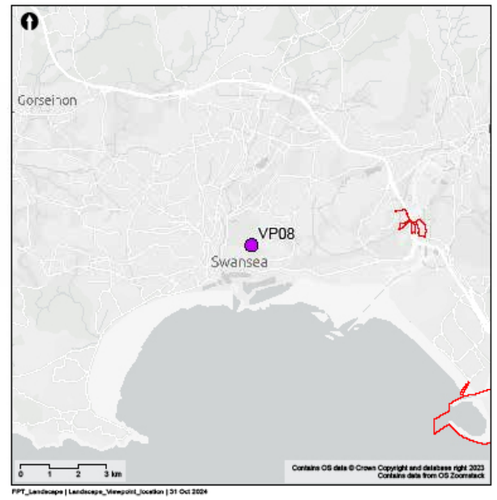
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Viewpoint 08: Visitors to Kilvey Hill, Kilvey Community Woodland and users of new skilift 50mm image



Location Plan

Viewpoint Photography Details

Viewpoint 08 (VP08): Visitors to Kilvey Hill, Kilvey Community Woodland and users of new skilift

Location: Latitude: 51; 37; 43.32, Longitude: 3; 55; 14.24, Altitude: 192.4m AOD

Camera: Canon EOS 6D

Lens: 50mm on a full frame camera

Height of lens above ground: 1.6m

Enlargement factor: 100% @ A3 (50mm Image)

Approx. Viewing distance: 430mm @ A3 (50mm Image)

Approx. Distance to Project Location: 9km

Direction of view: Southeast

Date and Time: 08/03/2024

Weather: Fair

Visibility: 6 - Haze

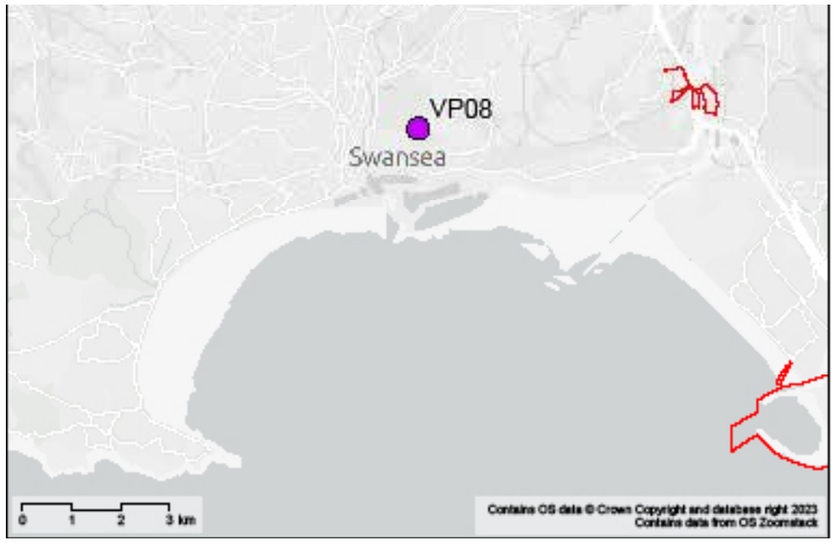
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11 - Pure air

Rev	Date	Drawn	Description	Checked	Approved
001	01.11.2024	KHR	First issue	AH	PW
002	10.12.2024	KHR	EIA Scoping Report Issue	AH	PW



Viewpoint 08: Visitors to Kilvey Hill, Kilvey Community Woodland and users of new skilift Panorama



Location Plan

Viewpoint Photography Details

Viewpoint 08 (VP08): Visitors to Kilvey Hill, Kilvey Community Woodland and users of new skilift

Location: Latitude: 51; 37; 43.32, Longitude: 3; 55; 14.24, Altitude: 192.4m AOD

Camera: Canon EOS 6D

Lens: 50mm on a full frame camera

Height of lens above ground: 1.6m

Enlargement factor: 100% @ A2 (50mm Image)

Approx. Viewing distance: 430mm @ A2 (50mm Image)

Approx. Distance to Project Location: 9km

Direction of view: Southeast

Date and Time: 24/07/2024

Weather: Cloudy

Visibility: 6 - Haze

Futute Port Talbot
FLOW EIA Scoping
Appendix K: Viewpoint Photography

ABP | FUTURE PORT TALBOT

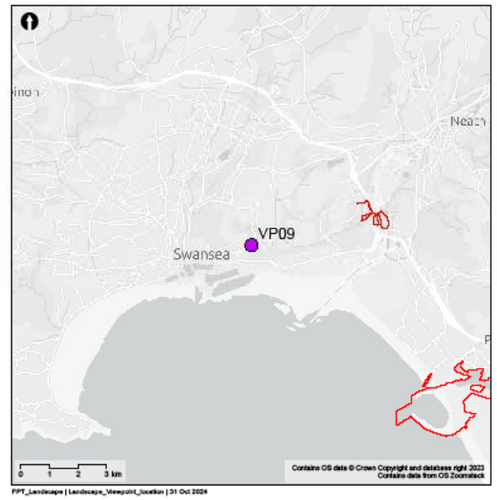
NOTES:
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4. This document contains confidential information and proprietary intellectual property. It should not be shown to other parties without consent from us and from the party which commissioned it.

VISIBILITY SCALE:
1 - Dense fog
2 - Thick fog
3 - Moderate fog
4 - Light fog
5 - Thin fog
6 - Haze
7 - Light haze
8 - Clear
9 - Very clear
10 - Exceptionally clear
11 - Pure air

Rev	Date	Drawn	Description	Checked	Approved
001	01.11.2024	KHR	First issue	AH	PW
002	10.12.2024	KHR	EIA Scoping Report Issue	AH	PW



Viewpoint 09: Users of Footpath ST484 50mm image



Location Plan

Viewpoint Photography Details

Viewpoint 09 (VP09): Users of Footpath ST484

Location: Latitude: 51; 37; 35.10, Longitude: 3; 54; 2.04, Altitude: 20.8m AOD

Camera: Canon EOS 6D

Lens: 50mm on a full frame camera

Height of lens above ground: 1.6m

Enlargement factor: 100% @ A3 (50mm Image)

Approx. Viewing distance: 430mm @ A3 (50mm Image)

Approx. Distance to Project Location: 7.7km

Direction of view: Southeast

Date and Time: 08/03/2024

Weather: Fair

Visibility: 6 - Haze

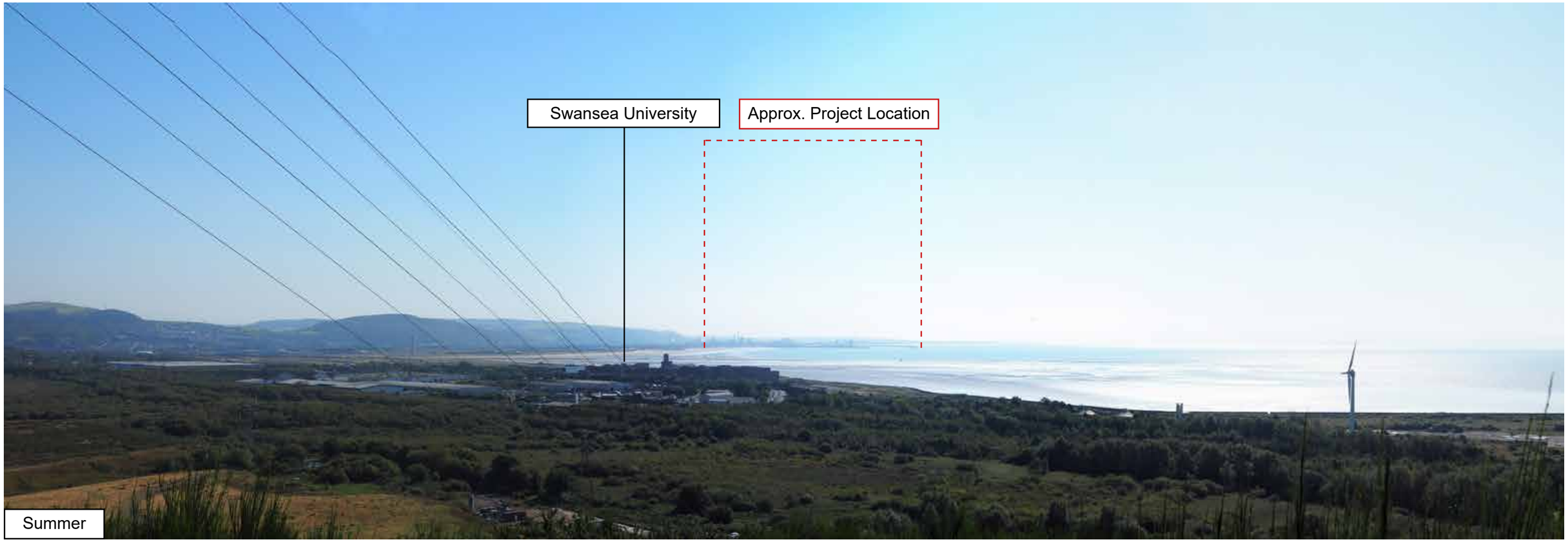
Futute Port Talbot
FLOW EIA Scoping
Appendix K: Viewpoint Photography

ABP | FUTURE PORT TALBOT

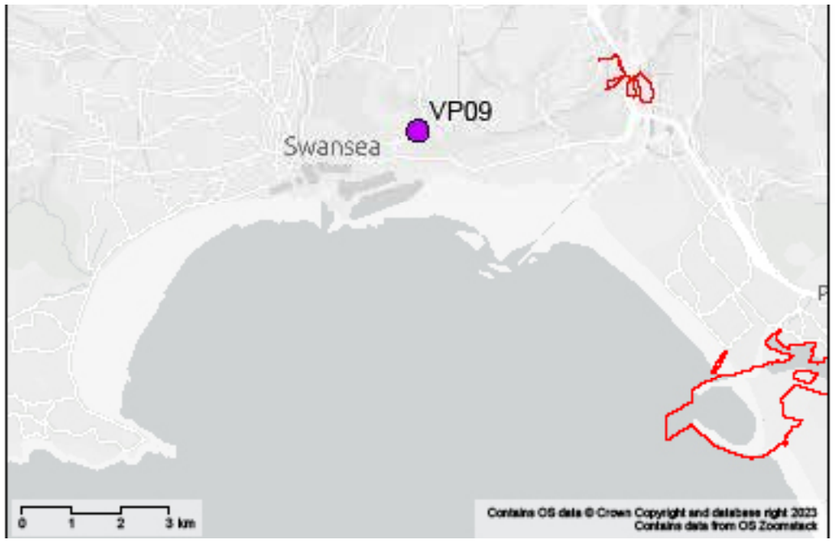
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VISIBILITY SCALE:
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3 - Moderate fog
4 - Light fog
5 - Thin fog
6 - Haze
7 - Light haze
8 - Clear
9 - Very clear
10 - Exceptionally clear
11 - Pure air

Rev	Date	Drawn	Description	Checked	Approved
001	01.11.2024	KHR	First issue	AH	PW
002	10.12.2024	KHR	EIA Scoping Report Issue	AH	PW



Viewpoint 09: Users of Footpath ST484 Panorama



Location Plan

Viewpoint Photography Details

Viewpoint 09 (VP09): Users of Footpath ST484

Location: Latitude: 51; 37; 35.10, Longitude: 3; 54; 2.04, Altitude: 20.8m AOD
Camera: Olympus E-M10
Lens: 35mm on a cropped frame camera
Height of lens above ground: 1.6m
Enlargement factor: 100% @ A2 (50mm Image)
Approx. Viewing distance: 430mm @ A2 (50mm Image)
Approx. Distance to Project Location: 7.7km
Direction of view: Southeast
Date and Time: 18/09/2024
Weather: Fair
Visibility: 9 - Very Clear

Futute Port Talbot
FLOW EIA Scoping
Appendix K: Viewpoint Photography

ABP | FUTURE PORT TALBOT

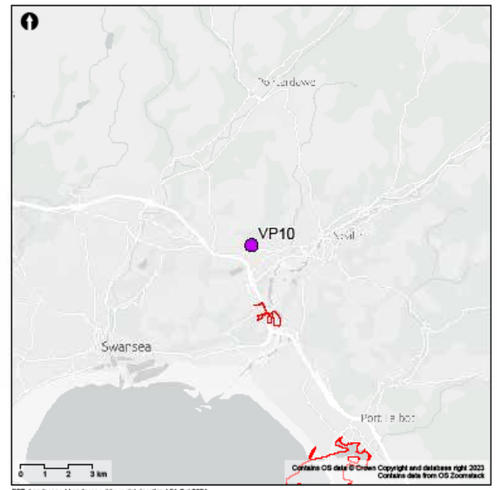
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VISIBILITY SCALE:
1 - Dense fog
2 - Thick fog
3 - Moderate fog
4 - Light fog
5 - Thin fog
6 - Haze
7 - Light haze
8 - Clear
9 - Very clear
10 - Exceptionally clear
11 - Pure air

Rev	Date	Drawn	Description	Checked	Approved
001	01.11.2024	KHR	First issue	AH	PW
002	10.12.2024	KHR	EIA Scoping Report Issue	AH	PW



Viewpoint 10: Users of Footpaths 12/10/1 and 12/34/1 50mm image



Location Plan

Viewpoint Photography Details

Viewpoint 10 (VP10): Users of Footpaths 12/10/1 and 12/34/1

Location: Latitude: 51; 39; 17.05, Longitude: 3; 50; 56.42, Altitude: 36.3m AOD
Camera: Canon EOS 6D
Lens: 50mm on a full frame camera
Height of lens above ground: 1.6m
Enlargement factor: 100% @ A3 (50mm Image)
Approx. Viewing distance: 430mm @ A3 (50mm Image)
Approx. Distance to Project Location: 9.5km
Direction of view: South
Date and Time: 07/03/2024
Weather: Fair
Visibility: 6 - Haze

Futute Port Talbot
FLOW EIA Scoping
Appendix K: Viewpoint Photography

ABP | FUTURE PORT TALBOT

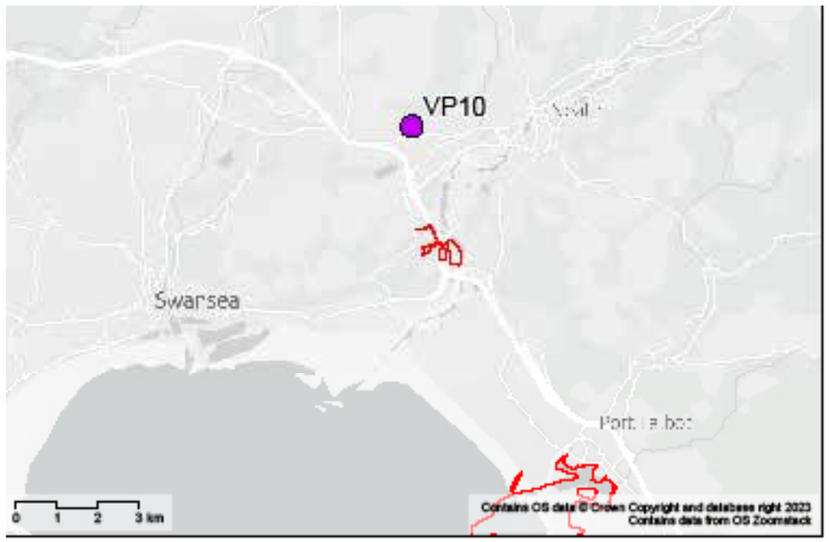
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VISIBILITY SCALE:
1 - Dense fog
2 - Thick fog
3 - Moderate fog
4 - Light fog
5 - Thin fog
6 - Haze
7 - Light haze
8 - Clear
9 - Very clear
10 - Exceptionally clear
11 - Pure air

Rev	Date	Drawn	Description	Checked	Approved
001	01.11.2024	KHR	First issue	AH	PW
002	10.12.2024	KHR	EIA Scoping Report Issue	AH	PW



Viewpoint 10: Users of Footpaths 12/10/1 and 12/34/1 Panorama



Location Plan

Viewpoint Photography Details

Viewpoint 10 (VP10): Users of Footpaths 12/10/1 and 12/34/1

Location: Latitude: 51; 39; 17.05, Longitude: 3; 50; 56.42, Altitude: 36.3m AOD
Camera: Olympus E-M10
Lens: 50mm on a full frame camera
Height of lens above ground: 1.6m
Enlargement factor: 100% @ A2 (50mm Image)
Approx. Viewing distance: 430mm @ A2 (50mm Image)
Approx. Distance to Project Location: 9.5km
Direction of view: South
Date and Time: 18/09/2024
Weather: Fair
Visibility: 9 - Very Clear

Futute Port Talbot
FLOW EIA Scoping
Appendix K: Viewpoint Photography

ABP | FUTURE PORT TALBOT

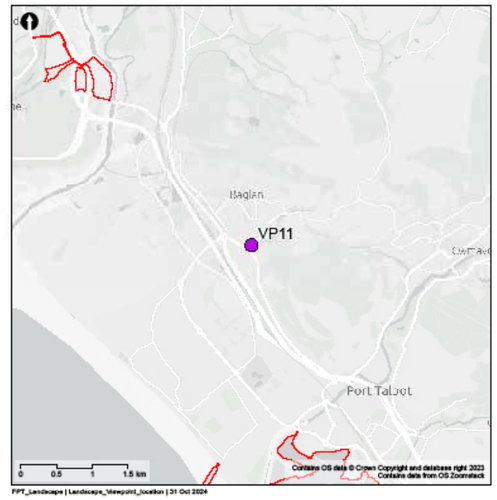
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VISIBILITY SCALE:
1 - Dense fog
2 - Thick fog
3 - Moderate fog
4 - Light fog
5 - Thin fog
6 - Haze
7 - Light haze
8 - Clear
9 - Very clear
10 - Exceptionally clear
11 - Pure air

Rev	Date	Drawn	Description	Checked	Approved
001	01.11.2024	KHR	First issue	AH	PW
002	10.12.2024	KHR	EIA Scoping Report Issue	AH	PW



Viewpoint 11: Visitors to St Catharine's Church and residents of Baglan 50mm image



Location Plan

Viewpoint Photography Details

Viewpoint 11 (VP11): Visitors to St Catharine's Church and residents of Baglan

Location: Latitude: 51; 36; 55.20, Longitude: 3; 48; 10.02, Altitude: 26.4m AOD

Camera: Canon EOS 6D

Lens: 50mm on a full frame camera

Enlargement factor: 100% @ A3 (50mm Image)

Approx. Viewing distance: 430mm @ A3 (50mm Image)

Approx. Distance to Project Location: 2.7km

Direction of view: South

Date and Time: 07/03/2024

Height of lens above ground: 1.6m

Weather: Fair

Visibility: 6 - Haze

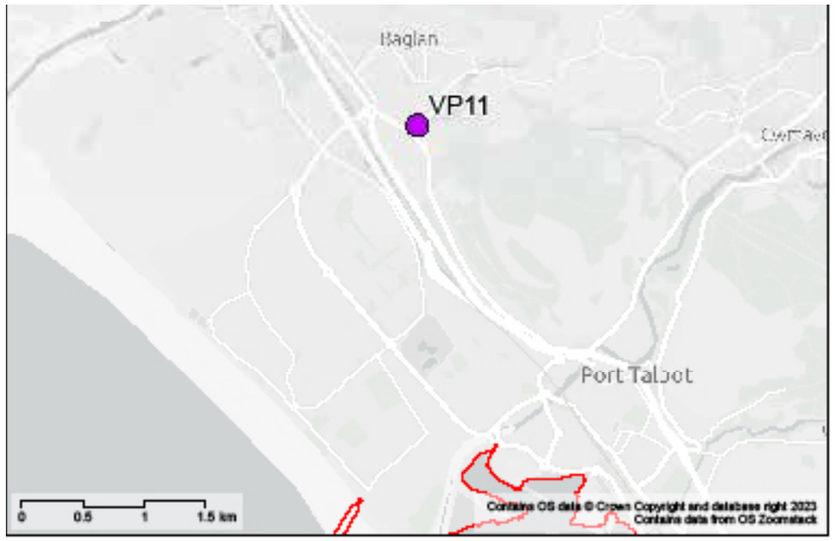
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VISIBILITY SCALE:
1 - Dense fog
2 - Thick fog
3 - Moderate fog
4 - Light fog
5 - Thin fog
6 - Haze
7 - Light haze
8 - Clear
9 - Very clear
10 - Exceptionally clear
11 - Pure air

Rev	Date	Drawn	Description	Checked	Approved
001	01.11.2024	KHR	First issue	AH	PW
002	10.12.2024	KHR	EIA Scoping Report Issue	AH	PW



Viewpoint 11: Visitors to St Catharine's Church and residents of Baglan Panorama



Location Plan

Viewpoint Photography Details

Viewpoint 11 (VP11): Visitors to St Catharine's Church and residents of Baglan

Location: Latitude: 51; 36; 55.20, Longitude: 3; 48; 10.02, Altitude: 26.4m AOD

Camera: Canon EOS 6D

Lens: 50mm on a full frame camera

Height of lens above ground: 1.6m

Enlargement factor: 100% @ A2 (50mm Image)

Approx. Viewing distance: 430mm @ A2 (50mm Image)

Approx. Distance to Project Location: 2.7km

Direction of view: South

Date and Time: 23/07/2024

Weather: Light Cloud

Visibility: 8 - Clear

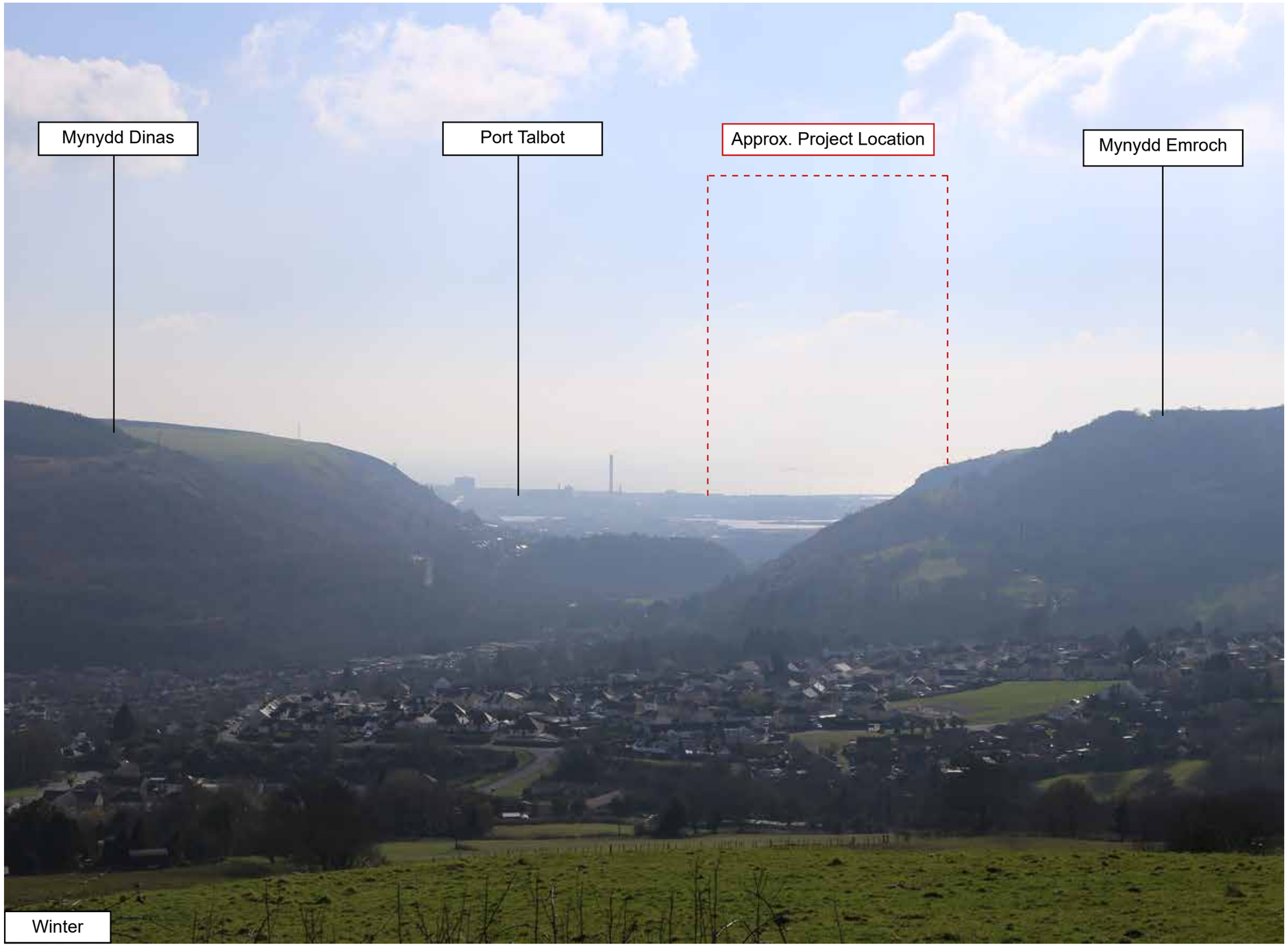
Futute Port Talbot
FLOW EIA Scoping
Appendix K: Viewpoint Photography

ABP | FUTURE PORT TALBOT

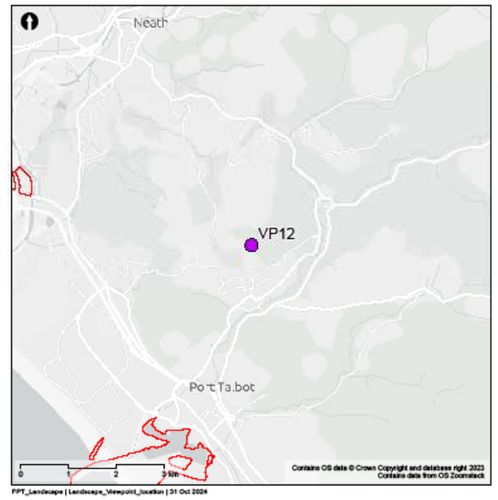
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VISIBILITY SCALE:
1 - Dense fog
2 - Thick fog
3 - Moderate fog
4 - Light fog
5 - Thin fog
6 - Haze
7 - Light haze
8 - Clear
9 - Very clear
10 - Exceptionally clear
11 - Pure air

Rev	Date	Drawn	Description	Checked	Approved
001	01.11.2024	KHR	First issue	AH	PW
002	10.12.2024	KHR	EIA Scoping Report Issue	AH	PW



Viewpoint 12: Visitors to Foel Fynyddau, Trig Point and users of Byway 41/111.PT/1 50mm image



Location Plan

Viewpoint Photography Details

Viewpoint 12 (VP12): Visitors to Foel Fynyddau, Trig Point and users of Byway 41/111.PT/1

Location: Latitude: 51; 37; 25.01, Longitude: 3; 45; 39.99, Altitude: 167.8m AOD

Camera: Canon EOS 6D

Lens: 50mm on a full frame camera

Height of lens above ground: 1.6m

Enlargement factor: 100% @ A3 (50mm Image)

Approx. Viewing distance: 430mm @ A3 (50mm Image)

Approx. Distance to Project Location: 4km

Direction of view: South

Date and Time: 07/03/2024

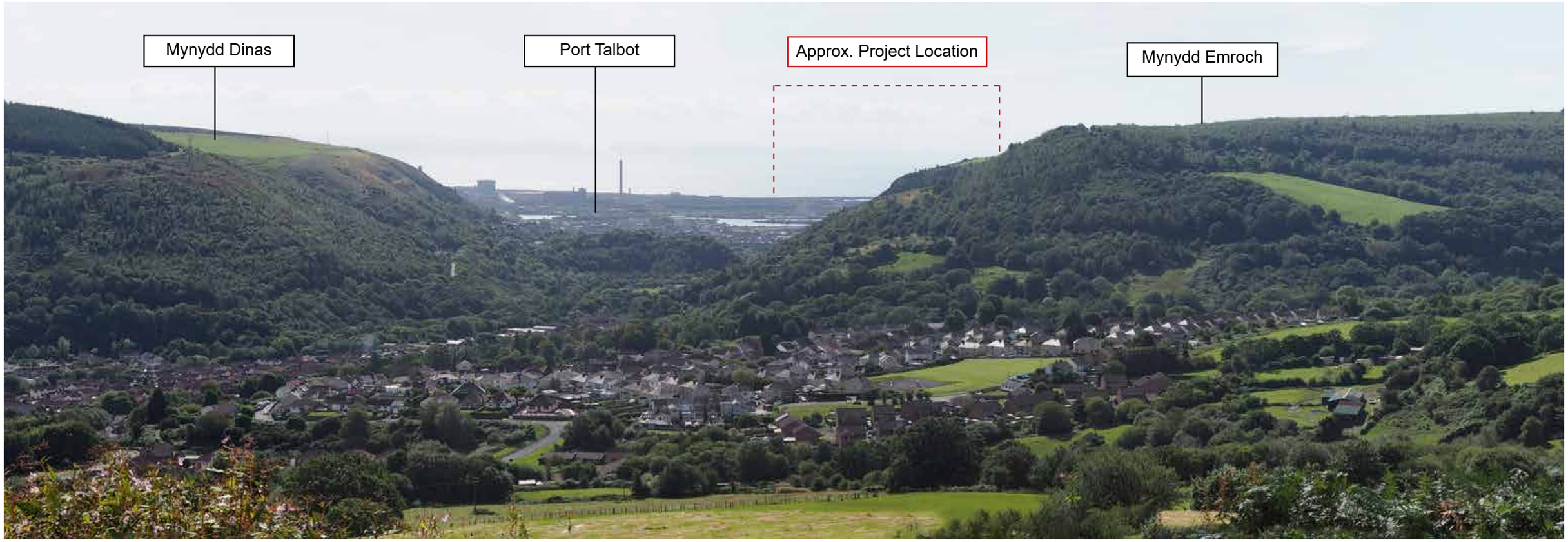
Weather: Fair

Visibility: 6 - Haze

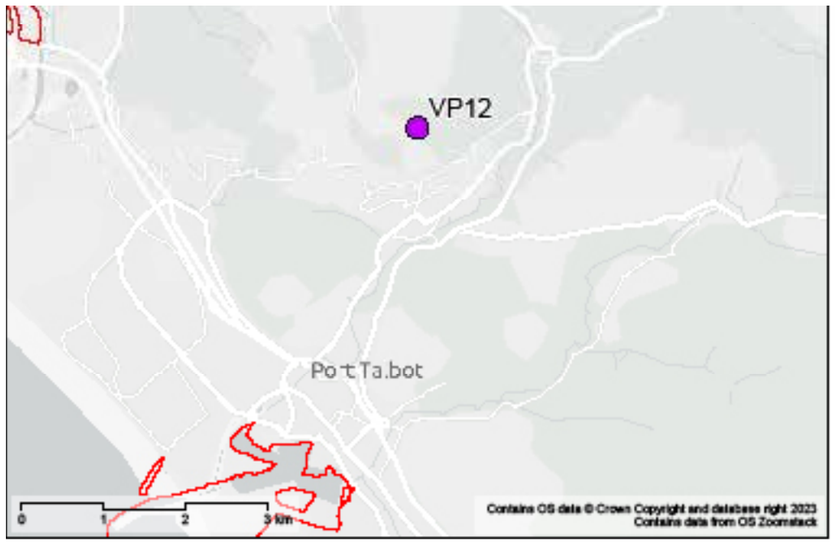
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VISIBILITY SCALE:
1 - Dense fog
2 - Thick fog
3 - Moderate fog
4 - Light fog
5 - Thin fog
6 - Haze
7 - Light haze
8 - Clear
9 - Very clear
10 - Exceptionally clear
11 - Pure air

Rev	Date	Drawn	Description	Checked	Approved
001	01.11.2024	KHR	First issue	AH	PW
002	10.12.2024	KHR	EIA Scoping Report Issue	AH	PW



Viewpoint 12: Visitors to Foel Fynyddau, Trig Point and users of Byway 41/111.PT/1 Panorama



Location Plan

Viewpoint Photography Details

Viewpoint 12 (VP12): Visitors to Foel Fynyddau, Trig Point and users of Byway 41/111.PT/1

Location: Latitude: 51; 37; 25.01, Longitude: 3; 45; 39.99, Altitude: 167.8m AOD

Camera: Olympus E-M10

Lens: 35mm on a cropped frame camera

Height of lens above ground: 1.6m

Enlargement factor: 100% @ A2 (50mm Image)

Approx. Viewing distance: 430mm @ A2 (50mm Image)

Approx. Distance to Project Location: 4km

Direction of view: South

Date and Time: 13/09/2024

Weather: Mostly Cloudy

Visibility: 7 - Light Haze

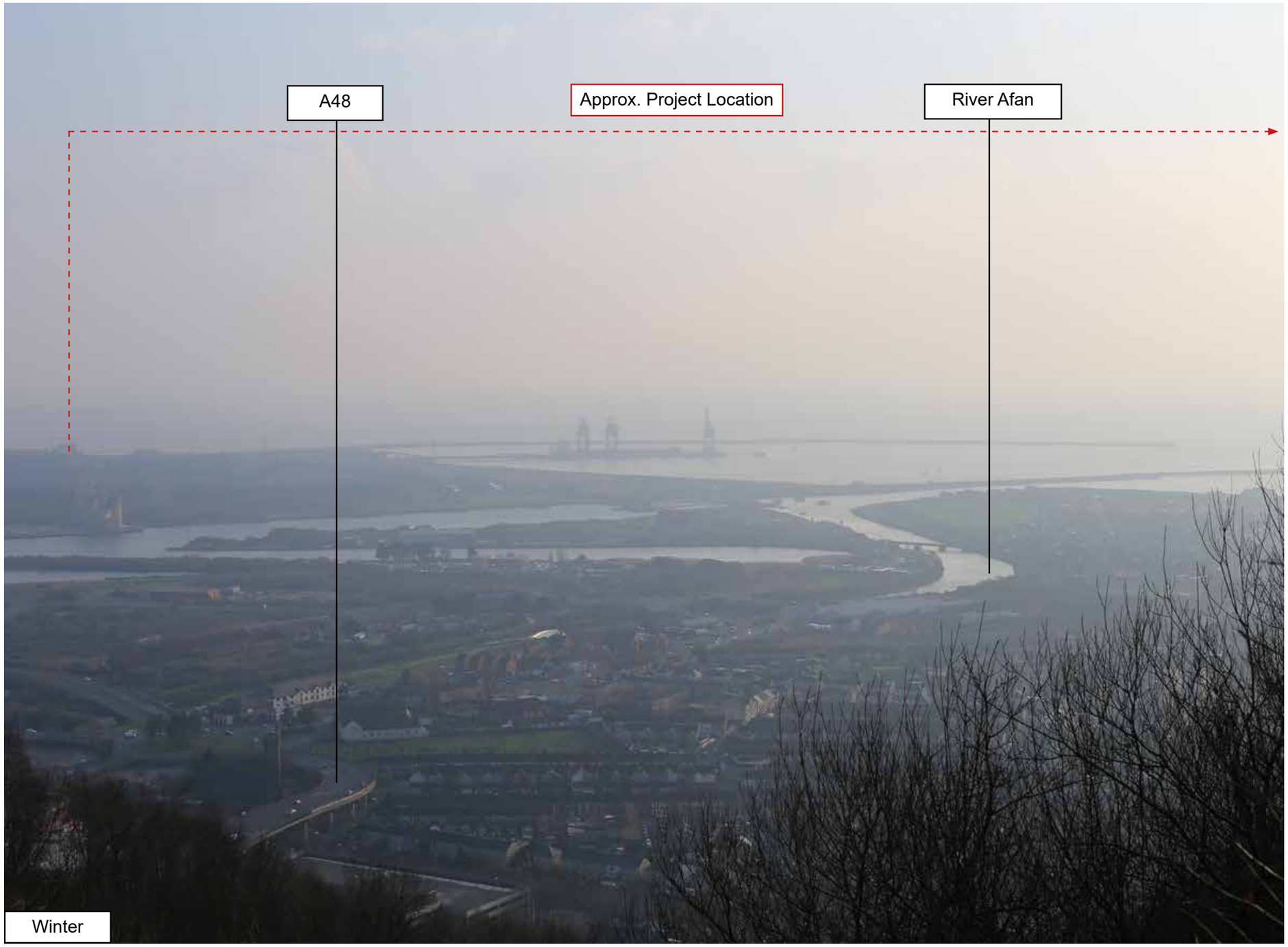
Futute Port Talbot
FLOW EIA Scoping
Appendix K: Viewpoint Photography

ABP | FUTURE PORT TALBOT

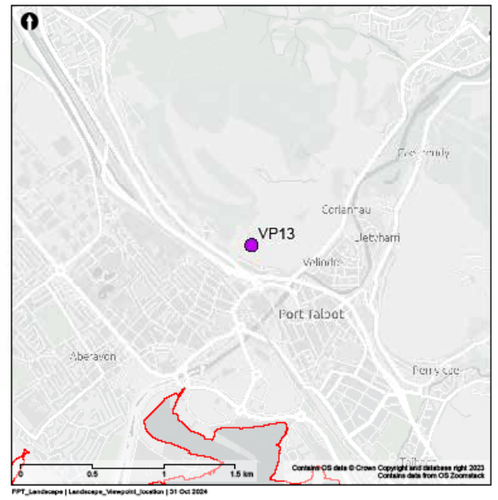
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VISIBILITY SCALE:
1 - Dense fog
2 - Thick fog
3 - Moderate fog
4 - Light fog
5 - Thin fog
6 - Haze
7 - Light haze
8 - Clear
9 - Very clear
10 - Exceptionally clear
11 - Pure air

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002	10.12.2024	KHR	EIA Scoping Report Issue	AH	PW



Viewpoint 13: Users of Footpaths 59/120.PT/1, 59/119.PT/3, 59/WCP.Alt/5, 59/120.PT/2 and 59/119.PT/4 and residents on nearby roads 50mm image



Location Plan

Viewpoint Photography Details

Viewpoint 13 (VP13): Users of Footpaths 59/120. PT/1, 59/119.PT/3, 59/WCP.Alt/5, 59/120.PT/2 and 59/119.PT/4 and residents on nearby roads

Location: Latitude: 51; 36; 11.87, Longitude: 3; 47; 8.90, Altitude: 191.6m AOD

Camera: Canon EOS 6D

Lens: 50mm on a full frame camera

Height of lens above ground: 1.6m

Enlargement factor: 100% @ A3 (50mm Image)

Approx. Viewing distance: 430mm @ A3 (50mm Image)

Approx. Distance to Project Location: 850m

Direction of view: South

Date and Time: 07/03/2024

Weather: Fair

Visibility: 6 - Haze

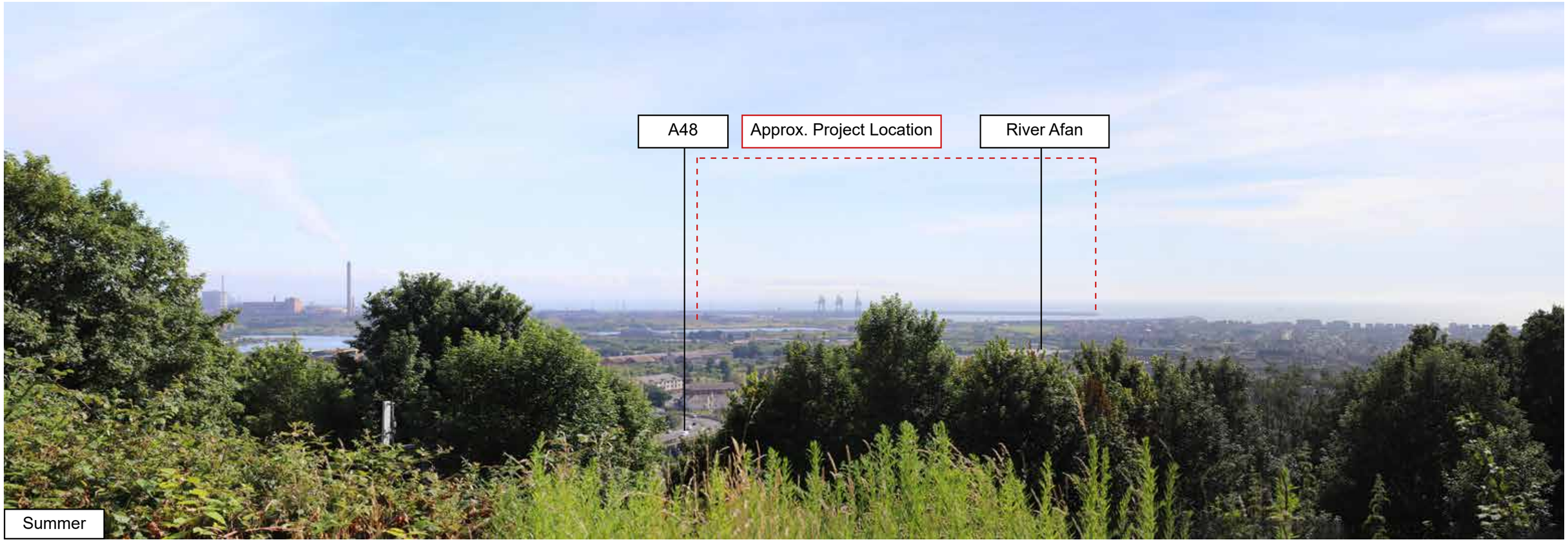
Futute Port Talbot
FLOW EIA Scoping
Appendix K: Viewpoint Photography

ABP | FUTURE PORT TALBOT

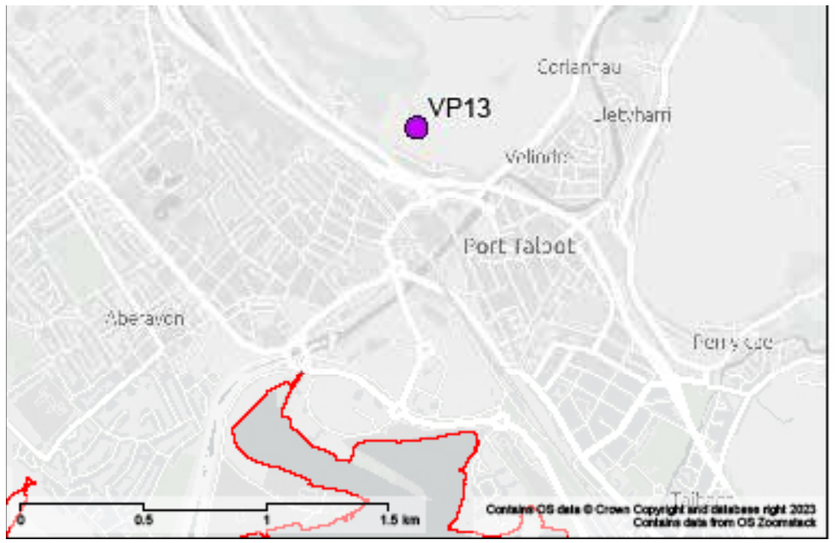
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VISIBILITY SCALE:
1 - Dense fog
2 - Thick fog
3 - Moderate fog
4 - Light fog
5 - Thin fog
6 - Haze
7 - Light haze
8 - Clear
9 - Very clear
10 - Exceptionally clear
11 - Pure air

Rev	Date	Drawn	Description	Checked	Approved
001	01.11.2024	KHR	First issue	AH	PW
002	10.12.2024	KHR	EIA Scoping Report Issue	AH	PW



Viewpoint 13: Users of Footpaths 59/120.PT/1, 59/119.PT/3, 59/WCP.Alt/5, 59/120.PT/2 and 59/119.PT/4 and residents on nearby roads Panorama



Location Plan

Viewpoint Photography Details

Viewpoint 13 (VP13): Users of Footpaths 59/120.PT/1, 59/119.PT/3, 59/WCP.Alt/5, 59/120.PT/2 and 59/119.PT/4 and residents on nearby roads

Location: Latitude: 51; 36; 11.87, Longitude: 3; 47; 8.90, Altitude: 191.6m AOD
Camera: Canon EOS 6D
Lens: 50mm on a full frame camera
Height of lens above ground: 1.6m
Enlargement factor: 100% @ A2 (50mm Image)
Approx. Viewing distance: 430mm @ A2 (50mm Image)
Approx. Distance to Project Location: 850m
Direction of view: South
Date and Time: 23/07/2024
Weather: Light Cloud
Visibility: 7 - Light Haze

Futute Port Talbot
FLOW EIA Scoping
Appendix K: Viewpoint Photography

FUTURE PORT TALBOT

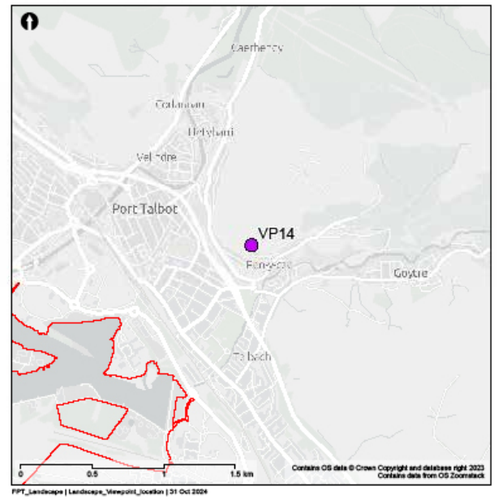
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VISIBILITY SCALE:
1 - Dense fog
2 - Thick fog
3 - Moderate fog
4 - Light fog
5 - Thin fog
6 - Haze
7 - Light haze
8 - Clear
9 - Very clear
10 - Exceptionally clear
11 - Pure air

Rev	Date	Drawn	Description	Checked	Approved
001	01.11.2024	KHR	First issue	AH	PW
002	10.12.2024	KHR	EIA Scoping Report Issue	AH	PW



Viewpoint 14: Users of Footpaths 41/WCP.Alt/4, 40/3/1 and 40/5/2 and residents of Penycae 50mm image



Location Plan

Viewpoint Photography Details

Viewpoint 14 (VP14): Users of Footpaths 41/WCP. Alt/4, 40/3/1 and 40/5/2 (Neath Port Talbot) and residents of Penycae

Location: Latitude: 51; 35; 38.97, Longitude: 3; 46; 12.31, Altitude: 92.5m AOD

Camera: Canon EOS 6D

Lens: 50mm on a full frame camera

Height of lens above ground: 1.6m

Enlargement factor: 100% @ A3 (50mm Image)

Approx. Viewing distance: 430mm @ A3 (50mm Image)

Approx. Distance to Project Location: 850m

Direction of view: West

Date and Time: 06/03/2024

Weather: Fair

Visibility: 7 - Light Haze

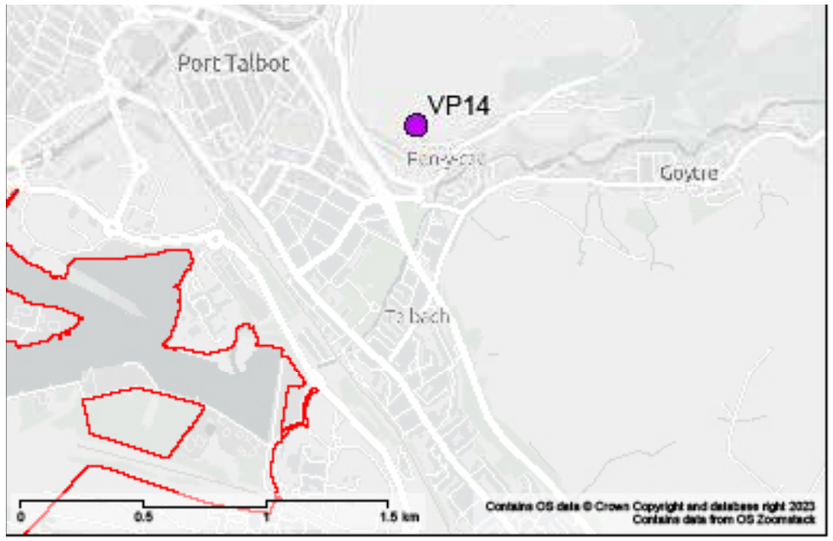
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002	10.12.2024	KHR	EIA Scoping Report Issue	AH	PW



Viewpoint 14: Users of Footpaths 41/WCP.Alt/4, 40/3/1 and 40/5/2 and residents of Penycae Panorama



Location Plan

Viewpoint Photography Details

Viewpoint 14 (VP14): Users of Footpaths 41/WCP.Alt/4, 40/3/1 and 40/5/2 and residents of Penycae

Location: Latitude: 51; 35; 38.97, Longitude: 3; 46; 12.31, Altitude: 92.5m AOD

Camera: Canon EOS 6D

Lens: 50mm on a full frame camera

Height of lens above ground: 1.6m

Enlargement factor: 100% @ A2 (50mm Image)

Approx. Viewing distance: 430mm @ A2 (50mm Image)

Approx. Distance to Project Location: 850m

Direction of view: West

Date and Time: 23/07/2024

Weather: Light Cloud

Visibility: 7 - Light haze

Futute Port Talbot
FLOW EIA Scoping
Appendix K: Viewpoint Photography

ABP | FUTURE PORT TALBOT

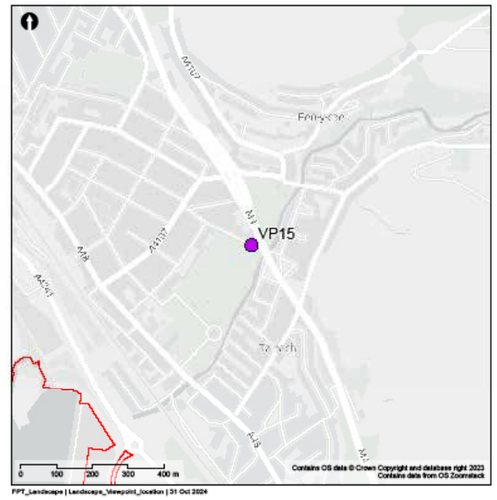
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Viewpoint 15: Visitors to St Theodore's Church, Talbot Memorial Park and residents of Taibach 50mm image



Location Plan

Viewpoint Photography Details

Viewpoint 15 (VP15): Visitors to St Theodore's Church, Talbot Memorial Park and residents of Taibach

Location: Latitude: 51; 35; 23.60, Longitude: 3; 46; 13.28, Altitude: 36.6m AOD

Camera: Canon EOS 6D

Lens: 50mm on a full frame camera

Height of lens above ground: 1.6m

Enlargement factor: 100% @ A3 (50mm Image)

Approx. Viewing distance: 430mm @ A3 (50mm Image)

Approx. Distance to Project Location: 590m

Direction of view: West

Date and Time: 09/03/2024

Weather: Mostly Cloudy

Visibility: 6 - Haze

Futute Port Talbot
FLOW EIA Scoping
Appendix K: Viewpoint Photography

ABP | FUTURE PORT TALBOT

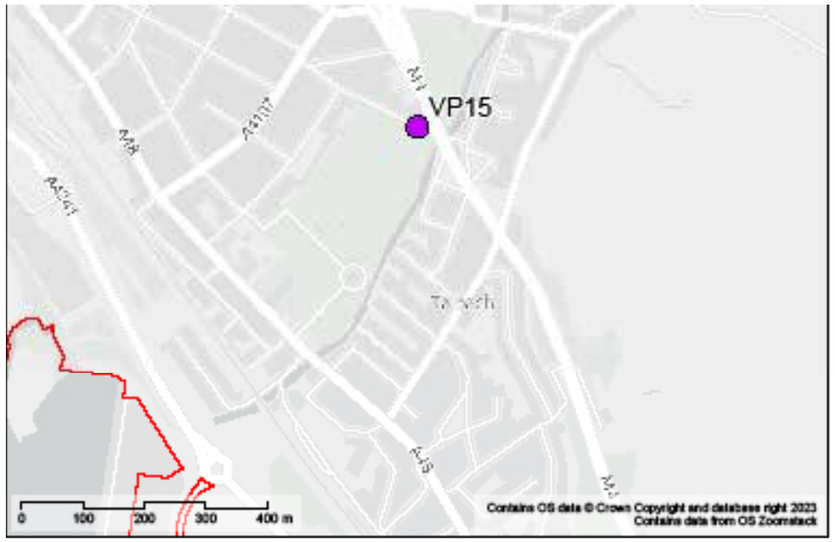
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11 - Pure air

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002	10.12.2024	KHR	EIA Scoping Report Issue	AH	PW



Viewpoint 15: Visitors to St Theodore’s Church, Talbot Memorial Park and residents of Taibach Panorama



Location Plan

Viewpoint Photography Details

Viewpoint 15 (VP15): Visitors to St Theodore’s Church, Talbot Memorial Park and residents of Taibach

Location: Latitude: 51; 35; 23.60, Longitude: 3; 46; 13.28, Altitude: 36.6m AOD

Camera: Canon EOS 6D

Lens: 50mm on a full frame camera

Height of lens above ground: 1.6m

Enlargement factor: 100% @ A2 (50mm Image)

Approx. Viewing distance: 430mm @ A2 (50mm Image)

Approx. Distance to Project Location: 590m

Direction of view: West

Date and Time: 23/07/2024

Weather: Mostly Cloudy

Visibility: 8 - Clear

Futute Port Talbot
FLOW EIA Scoping
Appendix K: Viewpoint Photography

ABP | FUTURE PORT TALBOT

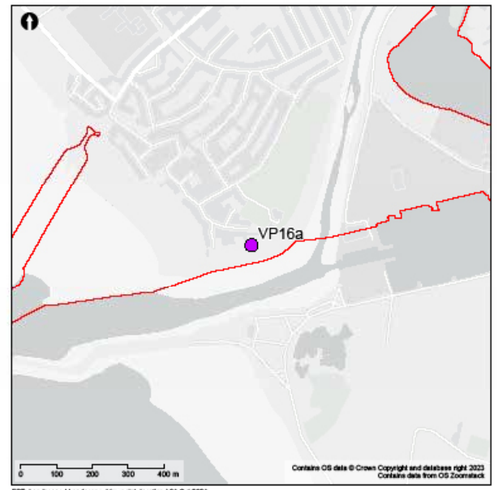
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7 - Light haze
8 - Clear
9 - Very clear
10 - Exceptionally clear
11 - Pure air

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Viewpoint 16a: Users of Little Warren Playing Fields, The Small Beach, Wales Coast Path PRoW 58/WCP/5 and residents of Mariners Point (looking southeast) 50mm image



Location Plan

Viewpoint Photography Details

Viewpoint 16 (VP16): Users of Little Warren Playing Fields, The Small Beach, Wales Coast Path 58/WCP/5 and residents of Mariners Point (looking southeast)

Location: Latitude: 51; 35; 5.60, Longitude: 3; 48; 4.26, Altitude: 6.4m AOD
Camera: Canon EOS 6D
Lens: 50mm on a full frame camera
Height of lens above ground: 1.6m
Enlargement factor: 100% @ A3 (50mm Image)
Approx. Viewing distance: 430mm @ A3 (50mm Image)
Approx. Distance to Project Location: 20m
Direction of view: South
Date and Time: 05/03/2024
Weather: Mostly Cloudy
Visibility: 7 - Light Haze

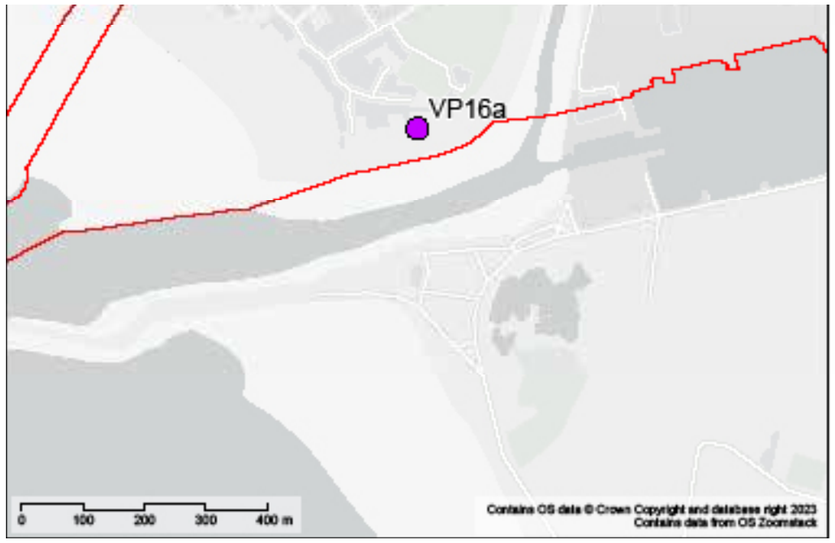
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11 - Pure air

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Viewpoint 16a: Users of Little Warren Playing Fields, The Small Beach, Wales Coast Path 58/WCP/5 and residents of Mariners Point (looking southeast) Panorama



Location Plan

Viewpoint Photography Details

Viewpoint 16a (VP16a): Users of Little Warren Playing Fields, The Small Beach, Wales Coast Path 58/WCP/5 and residents of Mariners Point (looking southeast)

Location: Latitude: 51; 35; 5.60, Longitude: 3; 48; 4.26, Altitude: 6.4m AOD
Camera: Canon EOS 6D
Lens: 50mm on a full frame camera
Height of lens above ground: 1.6m
Enlargement factor: 100% @ A2 (50mm Image)
Approx. Viewing distance: 430mm @ A2 (50mm Image)
Approx. Distance to site: 20m
Direction of view: South
Date and Time: 23/07/2024
Weather: Light Cloud
Visibility: 8 - Clear

Futute Port Talbot
FLOW EIA Scoping
Appendix K: Viewpoint Photography

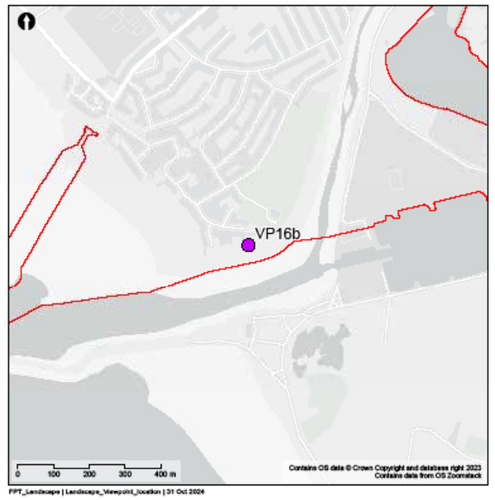
ABP | FUTURE PORT TALBOT

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No winter photo was taken from this location
Extra viewpoint requested by Neath Port Talbot Borough Council after winter photography had been taken



Location Plan

Viewpoint Photography Details
Viewpoint 16 (VP16): Users of Little Warren Playing Fields, The Small Beach, Wales Coast Path 58/WCP/5 and residents of Mariners Point (looking southwest)
Location: Latitude: 51; 35; 5.60, Longitude: 3; 48; 4.26, Altitude: 6.4m AOD
Camera: Canon EOS 6D
Lens: 50mm on a full frame camera
Height of lens above ground: 1.6m
Enlargement factor: 100% @ A3 (50mm Image)
Approx. Viewing distance: 430mm @ A3 (50mm Image)
Approx. Distance to site: 20m
Direction of view: South
Date and Time: N/A
Weather: N/A
Visibility: N/A

Winter

Viewpoint 16b: Users of Little Warren Playing Fields, The Small Beach, Wales Coast Path 58/WCP/5 and residents of Mariners Point (looking southwest) 50mm image

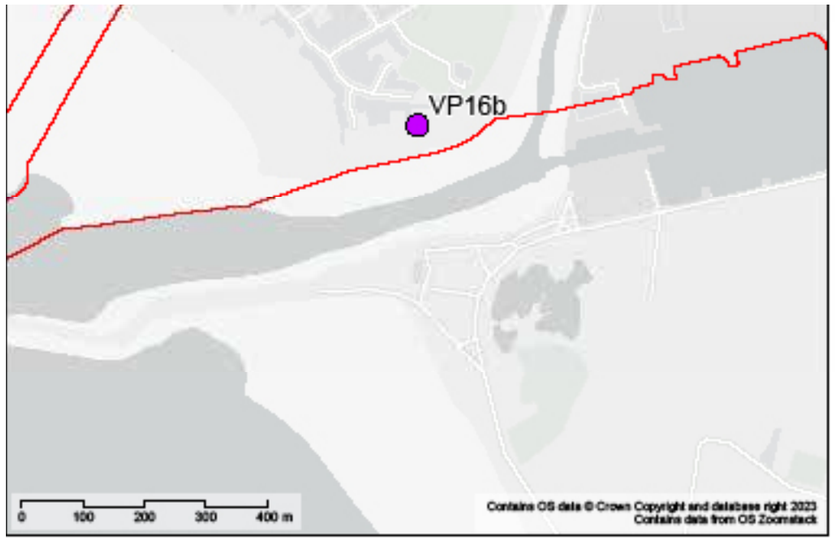
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6 - Haze
7 - Light haze
8 - Clear
9 - Very clear
10 - Exceptionally clear
11 - Pure air

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Viewpoint 16b: Users of Little Warren Playing Fields, The Small Beach, Wales Coast Path 58/WCP/5 and residents of Mariners Point (looking southwest) Panorama



Location Plan

Viewpoint Photography Details

Viewpoint 16b (VP16b): Users of Little Warren Playing Fields, The Small Beach, Wales Coast Path 58/WCP/5 and residents of Mariners Point (looking southwest)

Location: Latitude: 51; 35; 5.60, Longitude: 3; 48; 4.26, Altitude: 6.4m AOD
Camera: Canon EOS 6D
Lens: 50mm on a full frame camera
Height of lens above ground: 1.6m
Enlargement factor: 100% @ A2 (50mm Image)
Approx. Viewing distance: 430mm @ A2 (50mm Image)
Approx. Distance to site: 20m
Direction of view: South
Date and Time: 23/07/2024
Weather: Light Cloud
Visibility: 8 - Clear

Futute Port Talbot
FLOW EIA Scoping
Appendix K: Viewpoint Photography

ABP | FUTURE PORT TALBOT

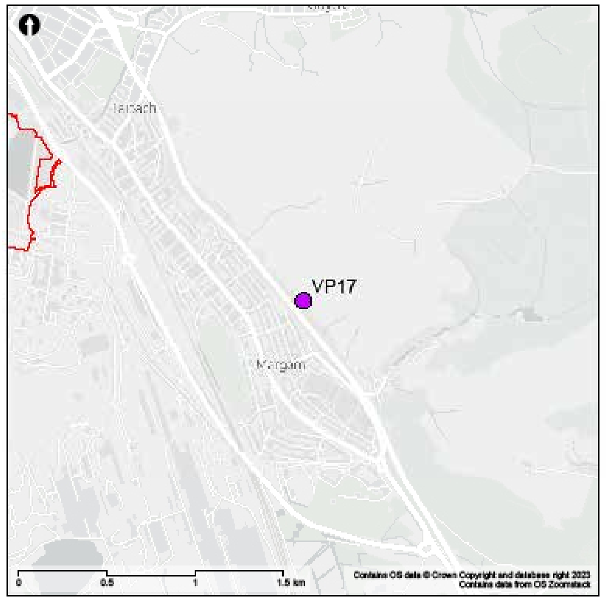
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Viewpoint 17: Users of Footpath 39/42.PT/1 and 39/41.PT/2 and residents of Margam 50mm image



Location Plan

Viewpoint Photography Details

Viewpoint 17 (VP17): Users of Footpaths 39/42.PT/1 and 39/41.PT/2 and residents of Margam

Location: Latitude: 51; 34; 39.53 Longitude: 3; 45; 16.70, Altitude: 63.5m AOD

Camera: Canon EOS 6D

Lens: 50mm on a full frame camera

Height of lens above ground: 1.6m

Enlargement factor: 100% @ A3 (50mm Image)

Approx. Viewing distance: 430mm @ A3 (50mm Image)

Approx. Distance to site: 1.6km

Direction of view: West

Date and Time: 06/03/2024

Weather: Fair

Visibility: 7 - Light Haze

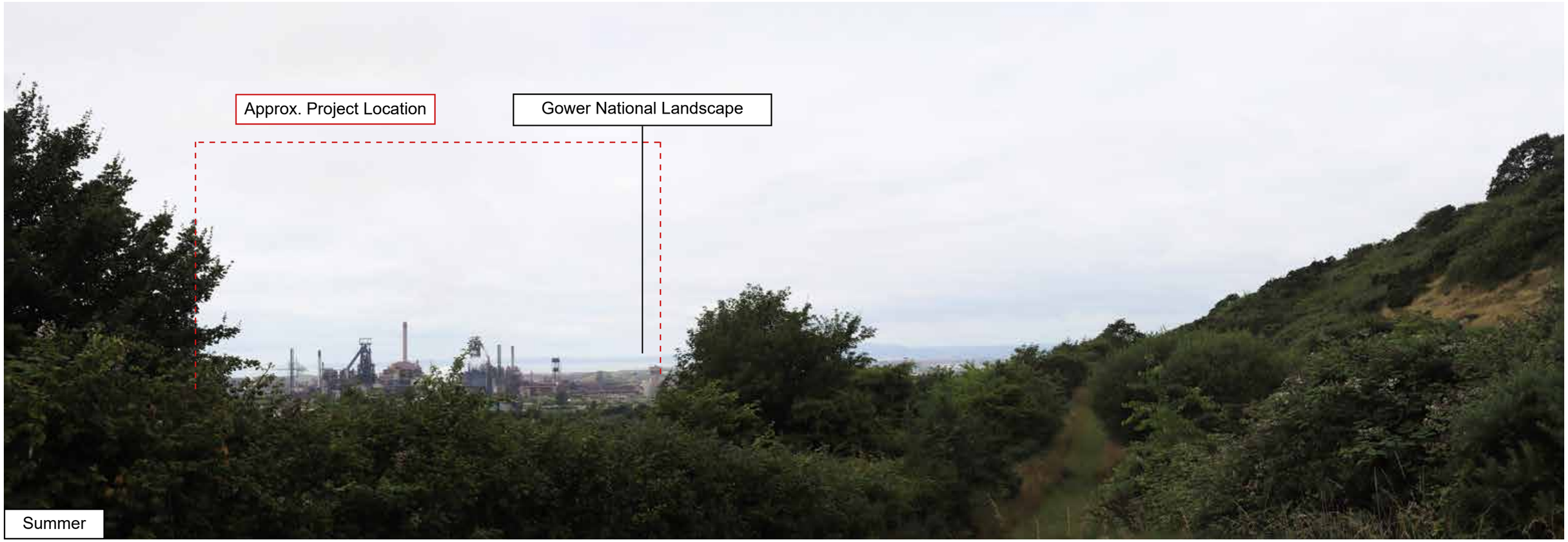
Futute Port Talbot
FLOW EIA Scoping
Appendix K: Viewpoint Photography

FUTURE
PORT TALBOT

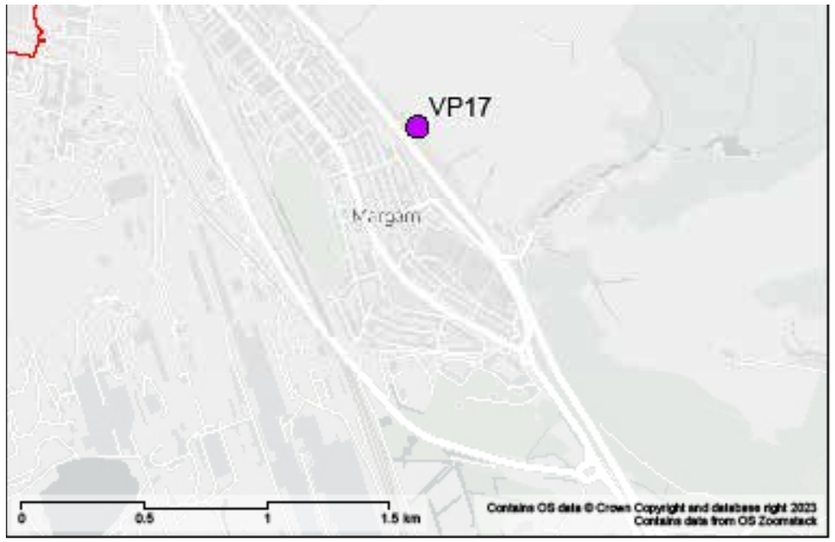
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- 11 - Pure air

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Viewpoint 17: Users of Footpaths 39/42.PT/1 and 39/41.PT/2 and residents of Margam Panorama



Location Plan

Viewpoint Photography Details

Viewpoint 17 (VP17): Users of Footpaths 39/42.PT/1 and 39/41.PT/2 and residents of Margam

Location: Latitude: 51; 34; 39.53 Longitude: 3; 45; 16.70, Altitude: 63.5m AOD

Camera: Canon EOS 6D

Lens: 50mm on a full frame camera

Height of lens above ground: 1.6m

Enlargement factor: 100% @ A2 (50mm Image)

Approx. Viewing distance: 430mm @ A2 (50mm Image)

Approx. Distance to site: 1.6km

Direction of view: West

Date and Time: 23/07/2024

Weather: Mostly Cloudy

Visibility: 6 - Haze

Futute Port Talbot
FLOW EIA Scoping
Appendix K: Viewpoint Photography

ABP | FUTURE PORT TALBOT

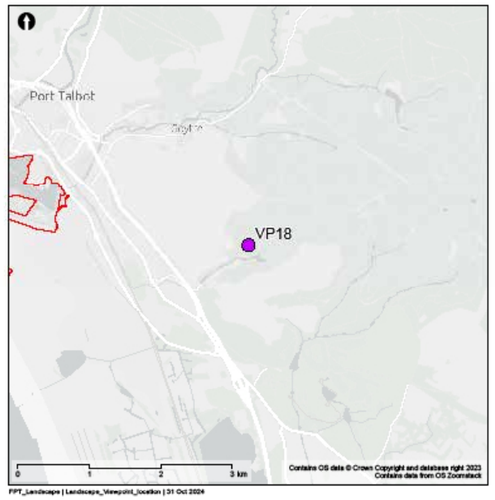
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Viewpoint 18: Users of Footpath 9/41.PT/6 and visitors to Ergyd Isaf Round Barrows (Scheduled Monument) 50mm image



Location Plan

Viewpoint Photography Details

Viewpoint 18 (VP18): Users of Footpath 9/41. PT/6 and visitors to Ergyd Isaf Round Barrows (Scheduled Monument)

Location: Latitude: 51; 34; 43.86, Longitude: 3; 44; 17.21, Altitude: 214.9m AOD

Camera: Canon EOS 6D

Lens: 50mm on a full frame camera

Height of lens above ground: 1.6m

Enlargement factor: 100% @ A3 (50mm Image)

Approx. Viewing distance: 430mm @ A3 (50mm Image)

Approx. Distance to site: 2.7km

Direction of view: West

Date and Time: 06/03/2024

Weather: Fair

Visibility: 7 - Light Haze

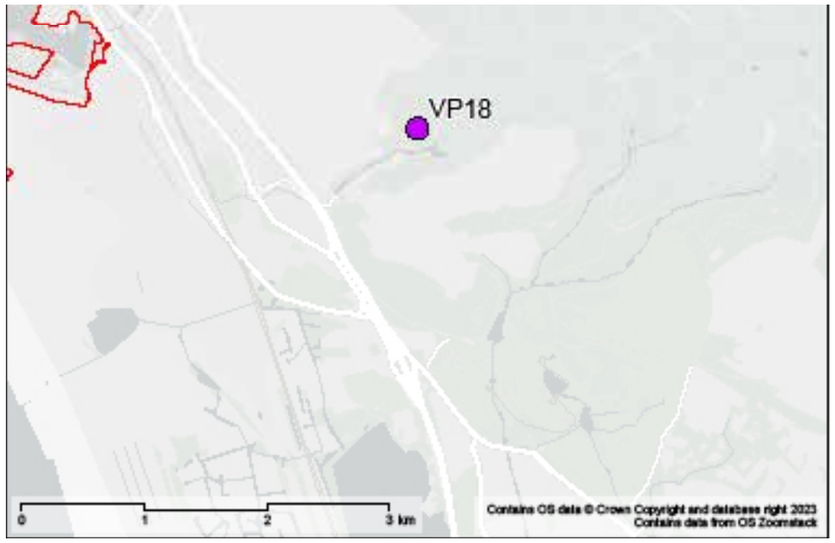
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Viewpoint 18: Users of Footpath 9/41.PT/6 and visitors to Ergyd Isaf Round Barrows (Scheduled Monument) Panorama



Location Plan

Viewpoint Photography Details

Viewpoint 18 (VP18): Users of Footpath 9/41.PT/6 and visitors to Ergyd Isaf Round Barrows (Scheduled Monument)

Location: Latitude: 51; 34; 43.86, Longitude: 3; 44; 17.21, Altitude: 214.9m AOD

Camera: Canon EOS 6D

Lens: 50mm on a full frame camera

Height of lens above ground: 1.6m

Enlargement factor: 100% @ A2 (50mm Image)

Approx. Viewing distance: 430mm @ A2 (50mm Image)

Approx. Distance to site: 2.7km

Direction of view: West

Date and Time: 23/07/2024

Weather: Mostly Cloudy

Visibility: 6 - Haze

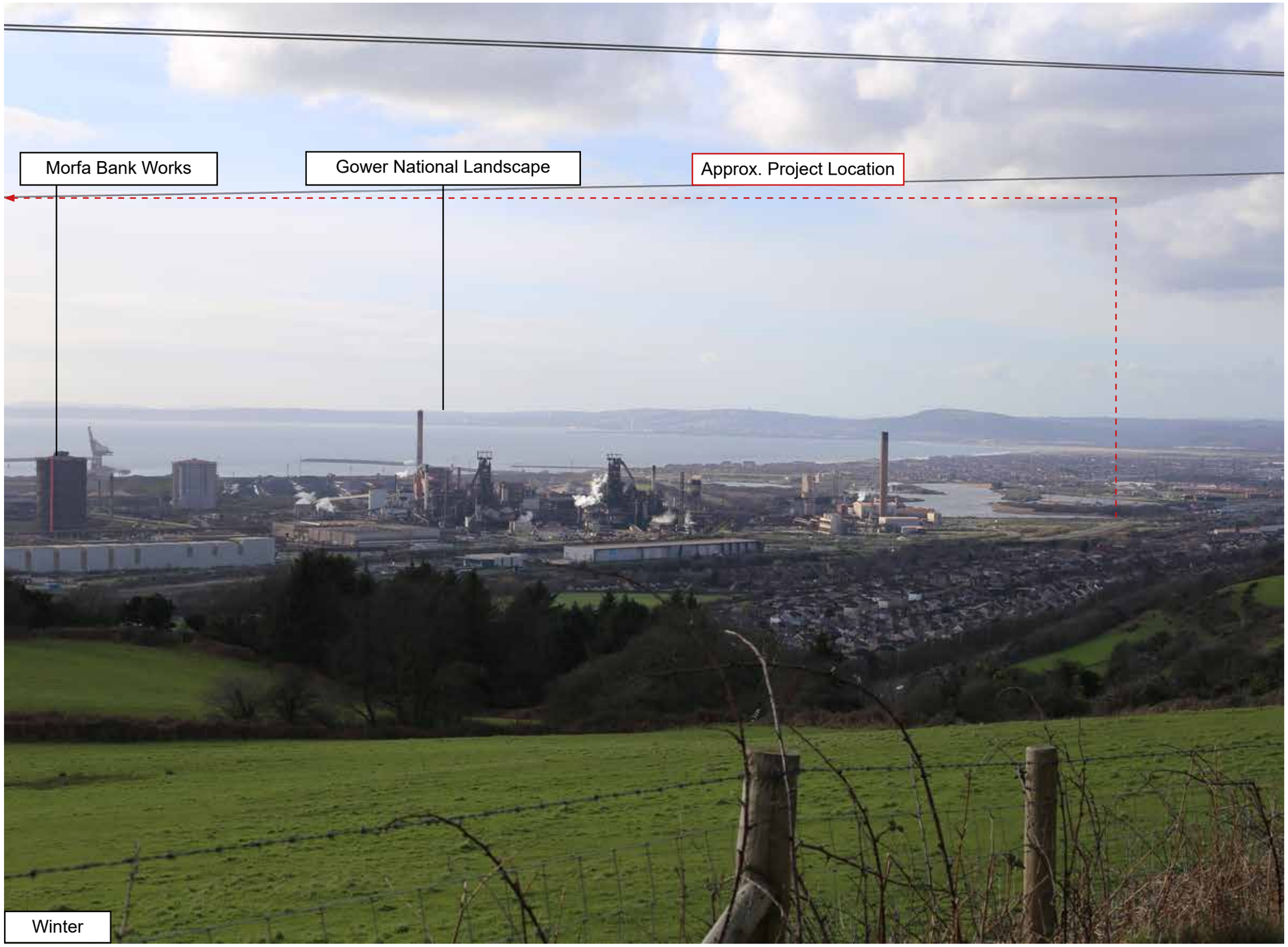
Futute Port Talbot
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Appendix K: Viewpoint Photography

ABP | FUTURE PORT TALBOT

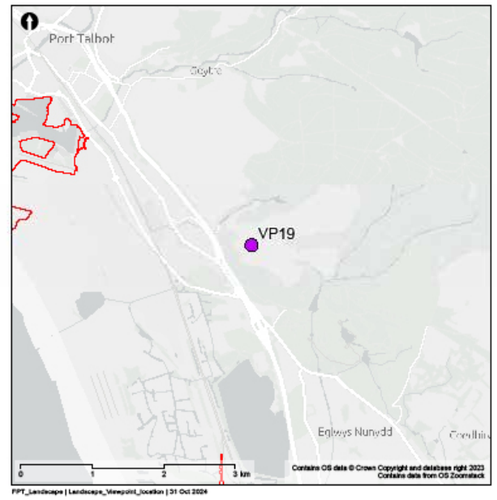
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VISIBILITY SCALE:
1 - Dense fog
2 - Thick fog
3 - Moderate fog
4 - Light fog
5 - Thin fog
6 - Haze
7 - Light haze
8 - Clear
9 - Very clear
10 - Exceptionally clear
11 - Pure air

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001	01.11.2024	KHR	First issue	AH	PW
002	10.12.2024	KHR	EIA Scoping Report Issue	AH	PW



Viewpoint 19: Users of Footpath 9/44.PT/2 50mm image



Location Plan

Viewpoint Photography Details

Viewpoint 19 (VP19): Users of Footpath 9/44.PT/2

Location: Latitude: 51; 34; 12.16, Longitude: 3; 44; 40.29, Altitude: 37.8m AOD

Camera: Canon EOS 6D

Lens: 50mm on a full frame camera

Height of lens above ground: 1.6m

Enlargement factor: 100% @ A3 (50mm Image)

Approx. Viewing distance: 430mm @ A3 (50mm Image)

Approx. Distance to site: 2.7km

Direction of view: Northwest

Date and Time: 06/03/2024

Weather: Mostly Cloudy

Visibility: 7 - Light Haze

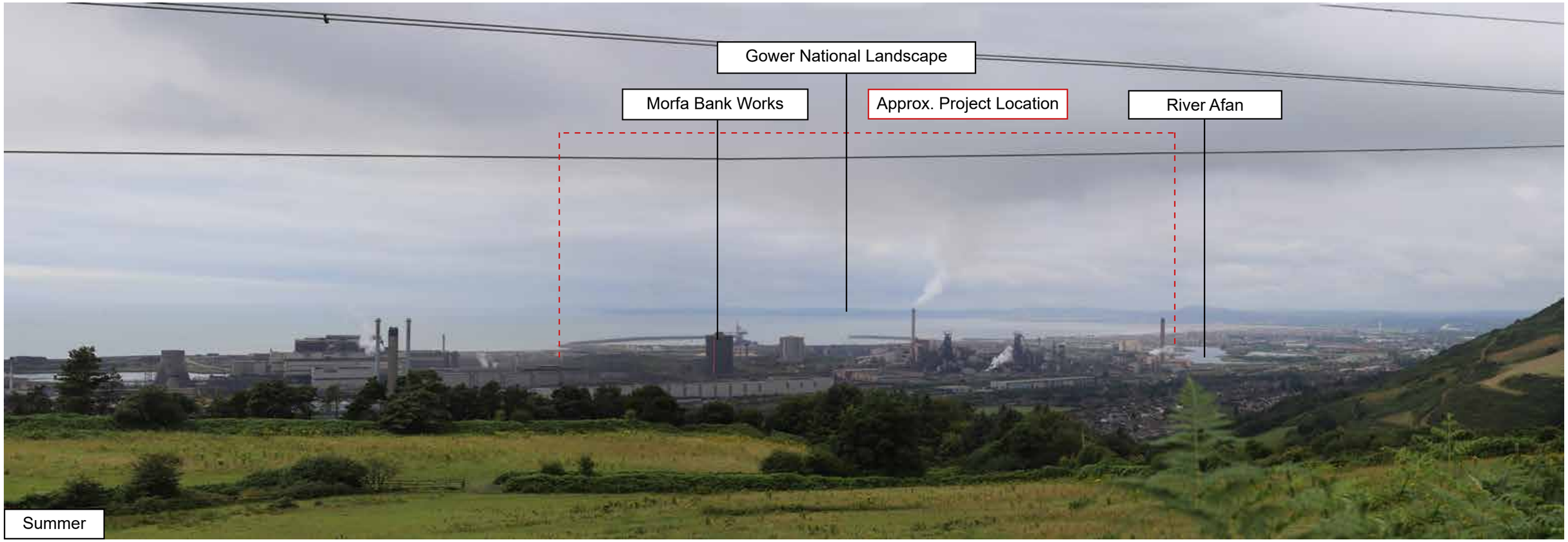
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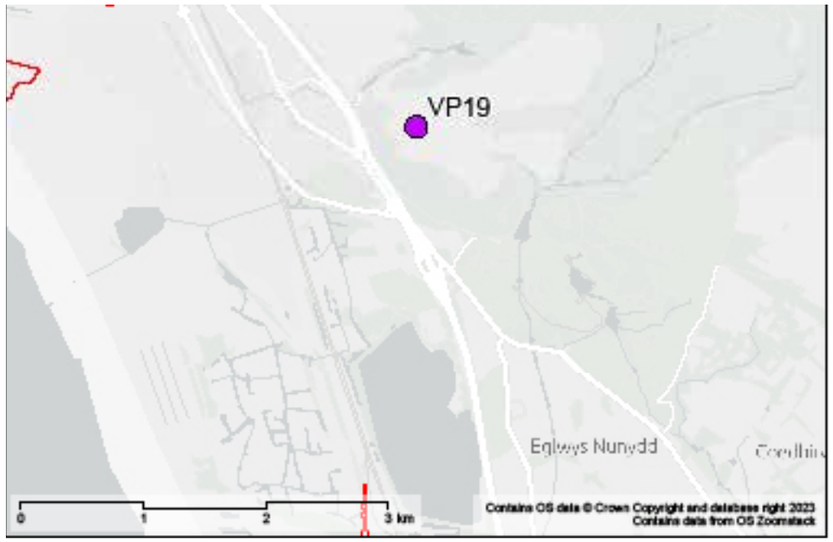
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10 - Exceptionally clear
11 - Pure air

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Viewpoint 19: Users of Footpath 9/44.PT/2 Panorama



Location Plan

Viewpoint Photography Details

Viewpoint 19 (VP19): Users of Footpath 9/44.PT/2

Location: Latitude: 51; 34; 16.81, Longitude: 3; 44; 27.60, Altitude: 37.8m AOD
Camera: Canon EOS 6D
Lens: 50mm on a full frame camera
Height of lens above ground: 1.6m
Enlargement factor: 100% @ A2 (50mm Image)
Approx. Viewing distance: 430mm @ A2 (50mm Image)
Approx. Distance to site: 2.7km
Direction of view: Northwest
Date and Time: 23/07/2024
Weather: Mostly Cloudy
Visibility: 6 - Haze

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Appendix K: Viewpoint Photography

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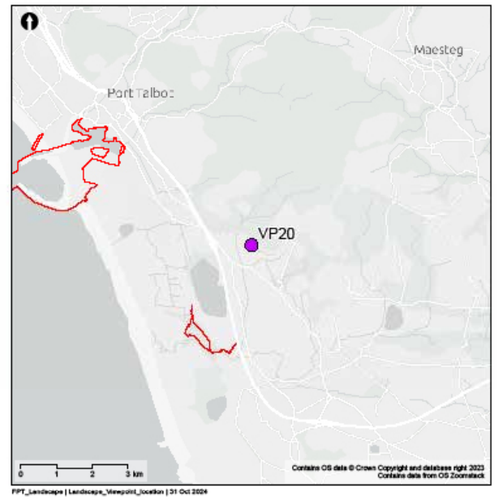
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8 - Clear
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10 - Exceptionally clear
11 - Pure air

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Viewpoint 20: Visitors to Margam Castle and Margam Country Park 50mm image



Location Plan

Viewpoint Photography Details

Viewpoint 20 (VP20): Visitors to Margam Castle and Margam Country Park

Location: Latitude: 51; 33; 37.90, Longitude: 3; 43; 22.51, Altitude: 69.9m AOD
Camera: Canon EOS 6D
Lens: 50mm on a full frame camera
Height of lens above ground: 1.6m
Enlargement factor: 100% @ A3 (50mm Image)
Approx. Viewing distance: 430mm @ A3 (50mm Image)
Approx. Distance to site: 4.3km
Direction of view: Northwest
Date and Time: 07/03/2024
Weather: Fair
Visibility: 7 - Light Haze

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Appendix K: Viewpoint Photography

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11 - Pure air

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Viewpoint 20: Visitors to Margam Castle and Margam Country Park Panorama



Location Plan

Viewpoint Photography Details

Viewpoint 20 (VP20): Visitors to Margam Castle and Margam Country Park

Location: Latitude: 51; 33; 37.90, Longitude: 3; 43; 22.51, Altitude: 69.9m AOD

Camera: Olympus E-M10

Lens: 35mm on a cropped frame camera

Height of lens above ground: 1.6m

Enlargement factor: 100% @ A2 (50mm Image)

Approx. Viewing distance: 430mm @ A2 (50mm Image)

Approx. Distance to site: 4.3km

Direction of view: Northwest

Date and Time: 13/09/2024

Weather: Good

Visibility: 8 - Clear

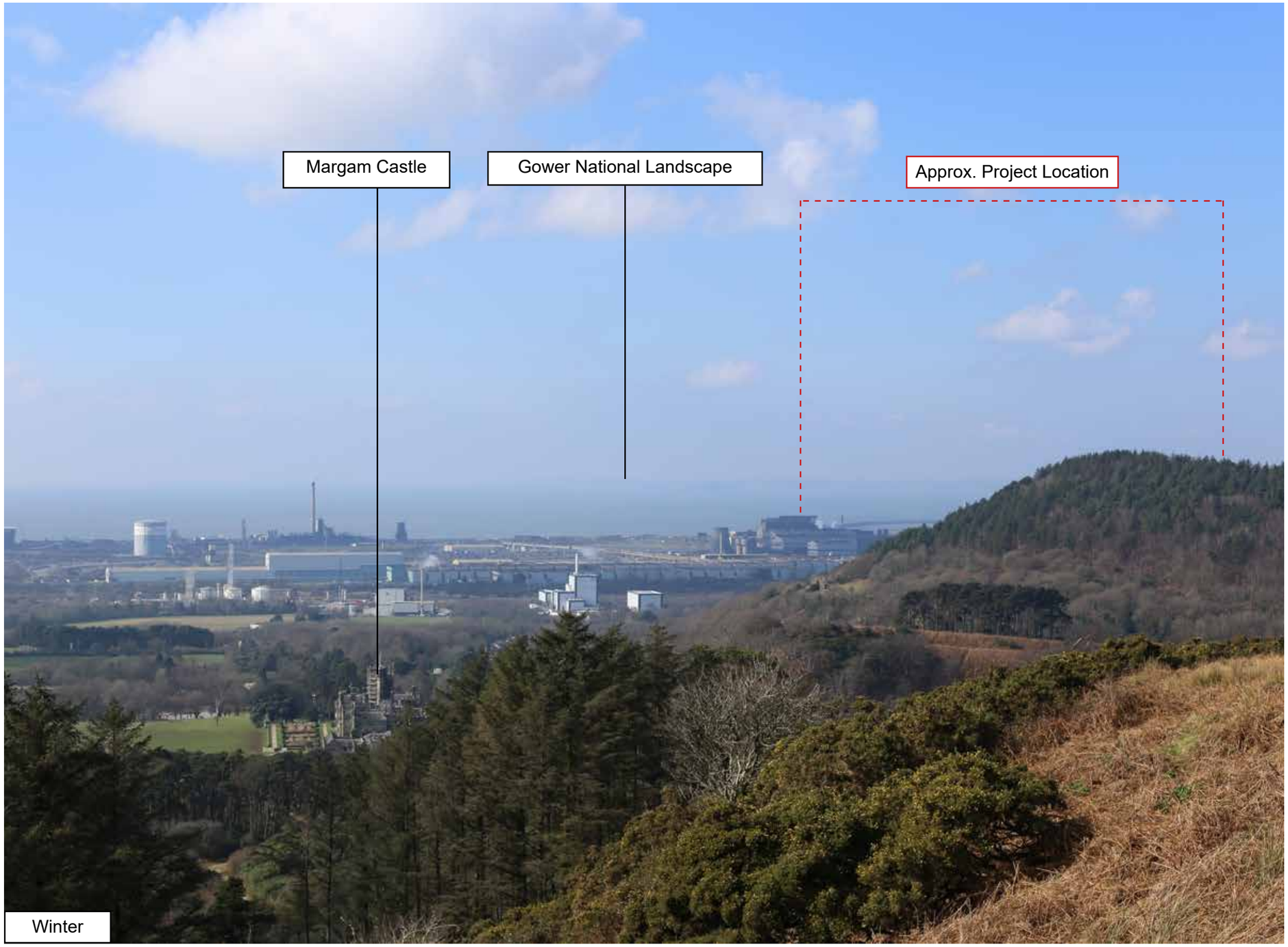
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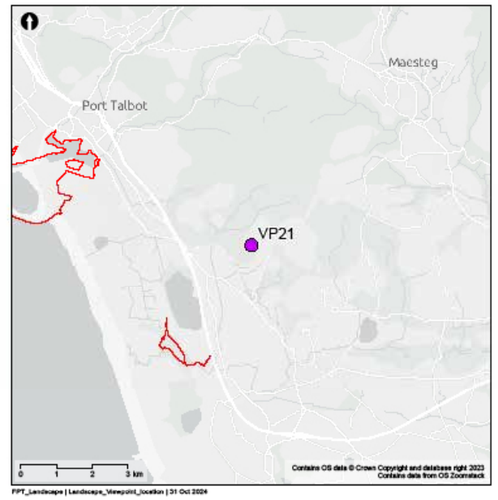
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Viewpoint 21: Visitors to The Pulpit View Point and users of Footpath 9/76.PT/1 50mm image



Location Plan

Viewpoint Photography Details

Viewpoint 21 (VP21): Visitors to The Pulpit View Point and users of Footpath 9/76.PT/1

Location: Latitude: 51; 33; 49. 03, Longitude: 3; 42; 44.32, Altitude: 170.9m AOD
Camera: Canon EOS 6D
Lens: 50mm on a full frame camera
Enlargement factor: 100% @ A3 (50mm Image)
Approx. Viewing distance: 430mm @ A3 (50mm Image)
Approx. Distance to site: 5.24km
Direction of view: Northwest
Date and Time: 07/03/2024
Height of lens above ground: 1.6m
Weather: Fair
Visibility: 7 - Light Haze

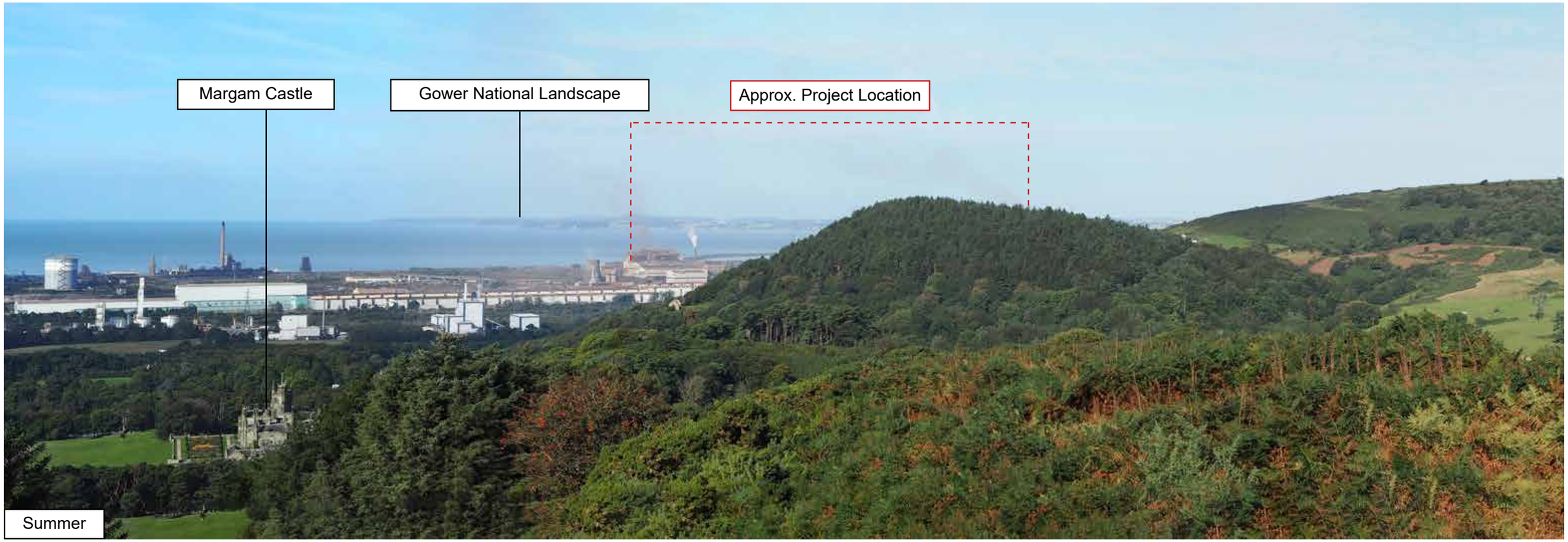
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11 - Pure air

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Viewpoint 21: Visitors to The Pulpit View Point and users of Footpath 9/76.PT/1 Panorama



Location Plan

Viewpoint Photography Details

Viewpoint 21 (VP21): Visitors to The Pulpit View Point and users of Footpath 9/76.PT/1

Location: Latitude: 51; 33; 49. 03, Longitude: 3; 42; 44.32, Altitude: 170.9m AOD

Camera: Olympus E-M10

Lens: 35mm on a cropped frame camera

Height of lens above ground: 1.6m

Enlargement factor: 100% @ A2 (50mm Image)

Approx. Viewing distance: 430mm @ A2 (50mm Image)

Approx. Distance to site: 5.24km

Direction of view: Northwest

Date and Time: 13/09/2024

Weather: Good

Visibility: 8 - Clear

Futute Port Talbot
FLOW EIA Scoping
Appendix K: Viewpoint Photography

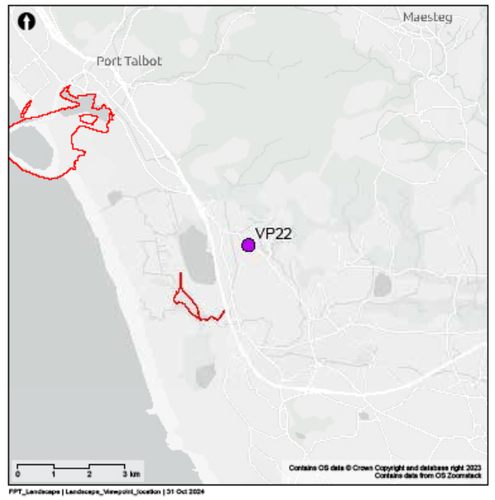
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Location Plan

Viewpoint Photography Details

Viewpoint 22 (VP22): Residents on properties on Old Park Road and users of Footpath 9/91.PT/1 and 9/WCP.Temp/1

Location: Latitude: 51; 33; 3.60, Longitude: 3; 43; 11.93, Altitude: 64m AOD
Camera: Canon EOS 6D
Lens: 50mm on a full frame camera
Height of lens above ground: 1.6m
Enlargement factor: 100% @ A3 (50mm Image)
Approx. Viewing distance: 430mm @ A3 (50mm Image)
Approx. Distance to site: 14.4km
Direction of view: Northwest
Date and Time: 06/03/2024
Weather: Partly Cloudy
Visibility: 7 - Light Haze

Viewpoint 22: Residents on properties on Old Park Road and users of Footpath 9/91.PT/1 and 9/WCP.Temp/1 50mm image

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Viewpoint 22: Residents on properties on Old Park Road and users of Footpath 9/91.PT/1 and 9/WCP.Temp/1 (Neath Port Talbot) Panorama



Location Plan

Viewpoint Photography Details

Viewpoint 22 (VP22): Residents on properties on Old Park Road and users of Footpath 9/91.PT/1 and 9/WCP.Temp/1 (Neath Port Talbot)

Location: Latitude: 51; 33; 3.60, Longitude: 3; 43; 11.93, Altitude: 64m AOD

Camera: Olympus E-M10

Lens: 35mm on a cropped frame camera

Height of lens above ground: 1.6m

Enlargement factor: 100% @ A2 (50mm Image)

Approx. Viewing distance: 430mm @ A2 (50mm Image)

Approx. Distance to site: 14.4km

Direction of view: Northwest

Date and Time: 13/09/2024

Weather: Good

Visibility: 8 - Clear

Futute Port Talbot
FLOW EIA Scoping
Appendix K: Viewpoint Photography

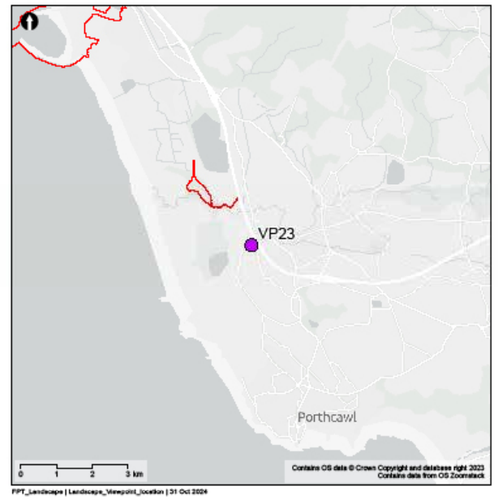
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Location Plan

Viewpoint Photography Details

Viewpoint 23 (VP23): Visitors to St Mary Magdalene Church, residents of Maudlam and North Cornell, users of Bridleway COR/9/4 and users of Footpaths COR/15/1 and COR/82/7

Location: Latitude: 51; 31; 27.44, Longitude: 3; 43; 19.15, Altitude: 35.9m AOD
Camera: Canon EOS 6D
Lens: 50mm on a full frame camera
Height of lens above ground: 1.6m
Enlargement factor: 100% @ A3 (50mm Image)
Approx. Viewing distance: 430mm @ A3 (50mm Image)
Approx. Distance to site: 14.7km
Direction of view: North
Date and Time: 05/03/2024
Weather: Partly Cloudy
Visibility: 7 - Light Haze

Viewpoint 23: Visitors to St Mary Magdalene Church, residents of Maudlam and North Cornell, users of Bridleway COR/9/4 and users of Footpaths COR/15/1 and COR/82/7 50mm image

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Appendix K: Viewpoint Photography

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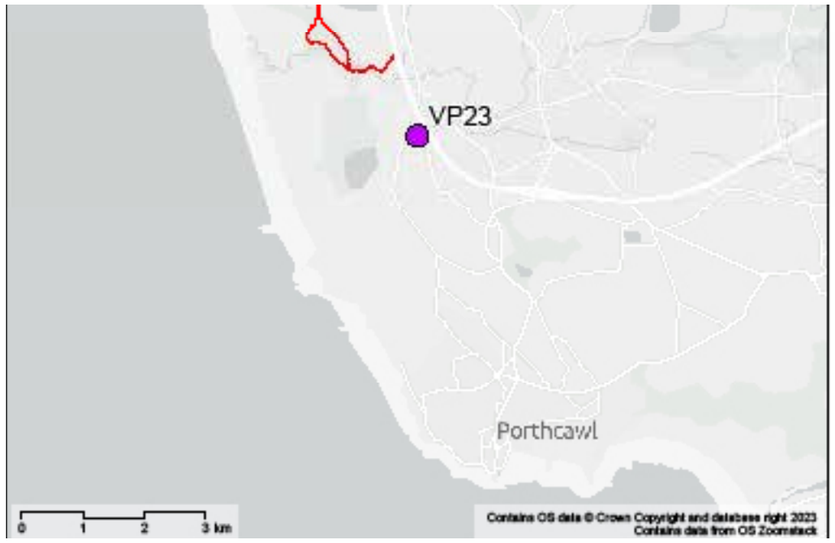
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Viewpoint 23: Visitors to St Mary Magdalene Church, residents of Maudlam and North Cornell, users of Bridleway COR/9/4 and users of Footpaths COR/15/1 and COR/82/7 Panorama



Location Plan

Viewpoint Photography Details

Viewpoint 23 (VP23): Visitors to St Mary Magdalene Church, residents of Maudlam and North Cornell, users of Bridleway COR/9/4 and users of Footpaths COR/15/1 and COR/82/7

Location: Latitude: 51; 31; 27.44, Longitude: 3; 43; 19.15, Altitude: 35.9m AOD

Camera: Olympus E-M10

Lens: 35mm on a cropped frame camera

Height of lens above ground: 1.6m

Enlargement factor: 100% @ A2 (50mm Image)

Approx. Viewing distance: 430mm @ A2 (50mm Image)

Approx. Distance to site: 14.7km

Direction of view: North

Date and Time: 13/09/2024

Weather: Good

Visibility: 8 - Clear

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Appendix K: Viewpoint Photography

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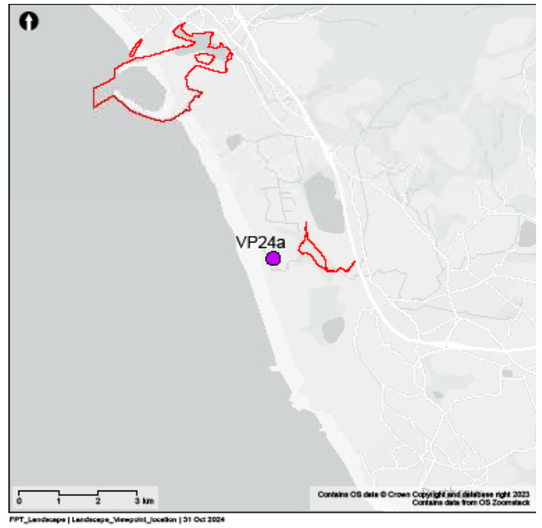
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Viewpoint 24a: Visitors to Kenfig NNR and users of Footpath 5/WCP/1 (looking north) 50mm image



Location Plan

Viewpoint Photography Details

Viewpoint 24a (VP24a): Visitors to Kenfig NNR and users of Footpath 5/WCP/1 (looking north)

Location: No coordinates taken
Camera: Olympus E-M10
Lens: 35mm on a cropped frame camera
Height of lens above ground: 1.6m
Enlargement factor: 100% @ A3 (50mm Image)
Approx. Viewing distance: 430mm @ A3 (50mm Image)
Approx. Distance to site: 4.5km
Direction of view: North
Date and Time: 07/03/2024
Weather: Fair
Visibility: 7 - Light Haze

Futute Port Talbot
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VISIBILITY SCALE:
1 - Dense fog
2 - Thick fog
3 - Moderate fog
4 - Light fog
5 - Thin fog
6 - Haze
7 - Light haze
8 - Clear
9 - Very clear
10 - Exceptionally clear
11 - Pure air

Rev	Date	Drawn	Description	Checked	Approved
001	01.11.2024	KHR	First issue	AH	PW
002	10.12.2024	KHR	EIA Scoping Report Issue	AH	PW



Viewpoint 24a: Visitors to Kenfig NNR and users of Footpath 5/WCP/1 (looking north) Panorama (Location adjusted at Summer site visit)



Location Plan

Viewpoint Photography Details

Viewpoint 24 (VP24): Visitors to Kenfig NNR and users of Footpath 5/WCP/1 (looking north)

Location: Latitude: 51; 32; 9.7 Longitude: 3; 45; 29.08 Altitude: 9m AOD

Camera: Olympus E-M10

Lens: 35mm on a cropped frame camera

Height of lens above ground: 1.6m

Enlargement factor: 100% @ A2 (50mm Image)

Approx. Viewing distance: 430mm @ A2 (50mm Image)

Approx. Distance to site: 4.5km

Direction of view: North

Date and Time: 13/09/2024

Weather: Good

Visibility: 8 - Clear

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FLOW EIA Scoping
Appendix K: Viewpoint Photography

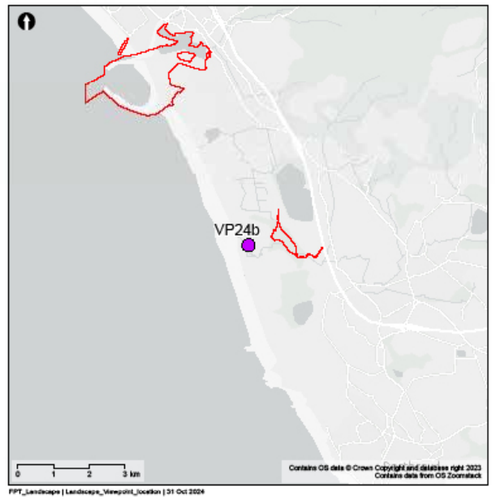
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11 - Pure air

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002	10.12.2024	KHR	EIA Scoping Report Issue	AH	PW

No winter photo was taken from this location
Extra viewpoint requested by Neath Port Talbot Borough Council after winter photography had been taken



Location Plan

Viewpoint Photography Details

Viewpoint 24 (VP24): Visitors to Kenfig NNR and users of Footpath 5/WCP/1 (looking east)

Location: Latitude: 51; 32; 9.7 Longitude: 3; 45; 29.08
Altitude: 9m AOD
Camera: Olympus E-M10
Lens: 35mm on a cropped frame camera
Height of lens above ground: 1.6m
Enlargement factor: 100% @ A3 (50mm Image)
Approx. Viewing distance: 430mm @ A3 (50mm Image)
Approx. Distance to site: 680m
Direction of view: East
Date and Time: N/A
Weather: N/A
Visibility: N/A

Winter

Viewpoint 24b: Visitors to Kenfig NNR and users of Footpath 5/WCP/1 (looking east) 50mm image

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FLOW EIA Scoping
Appendix K: Viewpoint Photography

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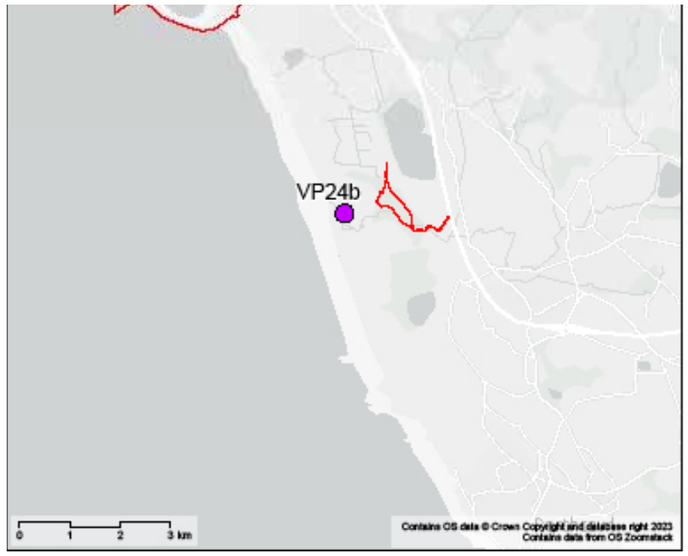
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Viewpoint 24b: Visitors to Kenfig NNR and users of Footpath 5/WCP/1 Panorama (looking east)



Location Plan

Viewpoint Photography Details

Viewpoint 24 (VP24): Visitors to Kenfig NNR and users of Footpath 5/WCP/1 (looking east)

Location: Latitude: 51; 32; 9.7 Longitude: 3; 45; 29.08 Altitude: 9m AOD

Camera: Olympus E-M10

Lens: 35mm on a cropped frame camera

Height of lens above ground: 1.6m

Enlargement factor: 100% @ A2 (50mm Image)

Approx. Viewing distance: 430mm @ A2 (50mm Image)

Approx. Distance to site: 680m

Direction of view: East

Date and Time: 13/09/2024

Weather: Good

Visibility: 8 - Clear

Futute Port Talbot
FLOW EIA Scoping
Appendix K: Viewpoint Photography

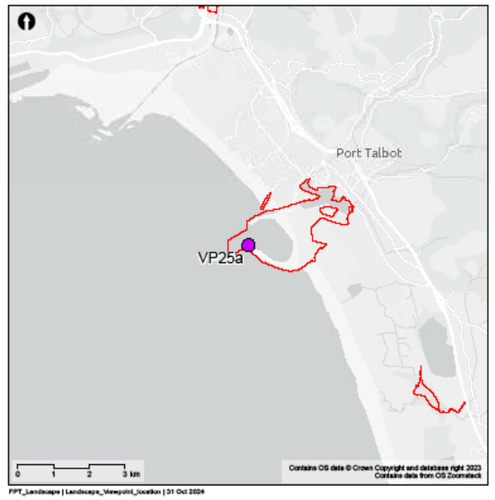
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11 - Pure air

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No winter photo was taken from this location
Extra viewpoint requested by CADW after winter photography had been taken



Location Plan

Viewpoint Photography Details

Viewpoint 25a (VP25a): Recreational users of Swansea Bay (looking northeast)

Location: Latitude: 51; 34; 27.91 Longitude: 3; 49; 1.61 Altitude: 2m AOD
Camera: Canon EOS 6D
Lens: 50mm on a full frame camera
Height of lens above ground: 1.6m
Enlargement factor: 100% @ A3 (50mm Image)
Approx. Viewing distance: 430mm @ A3 (50mm Image)
Approx. Distance to site: Location is within site
Direction of view: Northeast
Date and Time: N/A
Weather: N/A
Visibility: N/A

Winter

Viewpoint 25a: Recreational users of Swansea Bay 50mm image (looking northeast) 50mm image

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FLOW EIA Scoping
Appendix K: Viewpoint Photography

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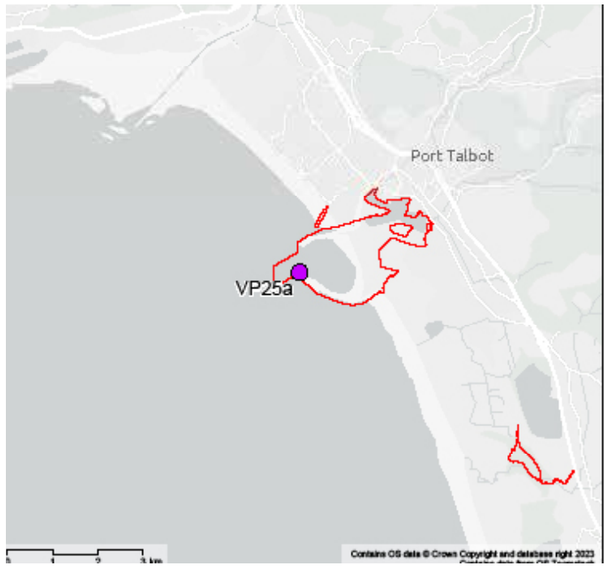
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11 - Pure air

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Viewpoint 25a: Recreational users of Swansea Bay Panorama (looking northeast)



Location Plan

Viewpoint Photography Details

Viewpoint 25a (VP25a): Recreational users of Swansea Bay (looking northeast)

Location: Latitude: 51; 34; 27.91 Longitude: 3; 49; 1.61 Altitude: 2m AOD

Camera: Canon EOS 6D

Lens: 50mm on a full frame camera

Height of lens above ground: 1.6m

Enlargement factor: 100% @ A2 (50mm Image)

Approx. Viewing distance: 430mm @ A2 (50mm Image)

Approx. Distance to site: Location is within site

Direction of view: Northeast

Date and Time: 23/07/2024

Weather: Cloudy

Visibility: 8 - Clear

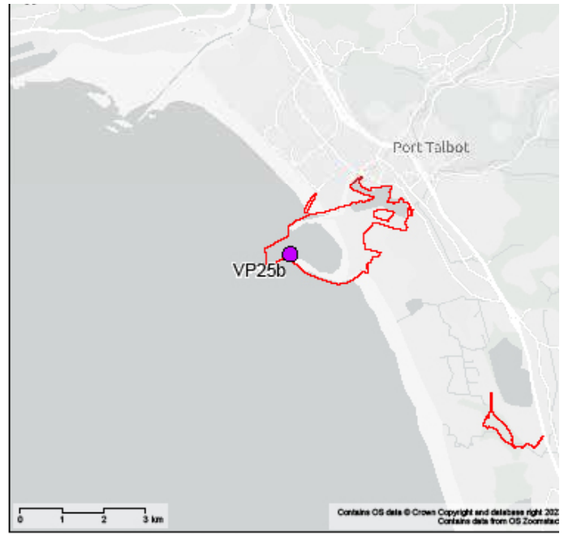
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11 - Pure air

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002	10.12.2024	KHR	EIA Scoping Report Issue	AH	PW



Location Plan

No winter photo was taken from this location
Extra viewpoint requested by CADW after winter photography had been taken

Viewpoint Photography Details

Viewpoint 25b (VP25b): Recreational users of Swansea Bay (looking east)

Location: Latitude: 51; 34; 27.91 Longitude: 3; 49; 1.61 Altitude: 2m AOD
Camera: Canon EOS 6D
Lens: 50mm on a full frame camera
Height of lens above ground: 1.6m
Enlargement factor: 100% @ A3 (50mm Image)
Approx. Viewing distance: 430mm @ A3 (50mm Image)
Approx. Distance to site: Location is within site
Direction of view: East
Date and Time: N/A
Weather: N/A
Visibility: N/A

Winter

Viewpoint 25b: Recreational users of Swansea Bay 50mm image (looking east)

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Appendix K: Viewpoint Photography

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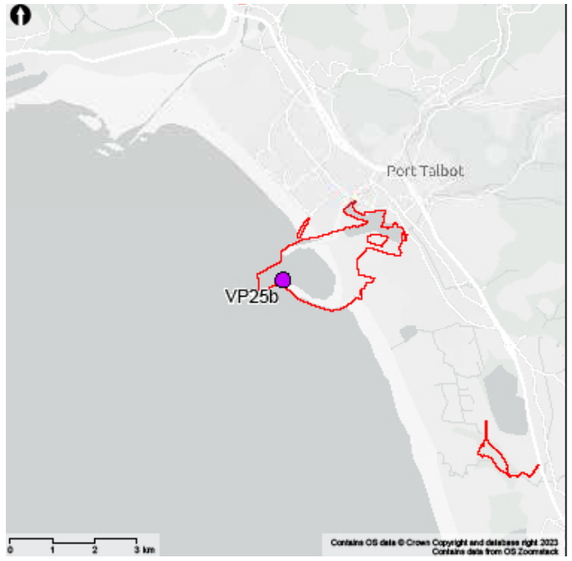
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6 - Haze
7 - Light haze
8 - Clear
9 - Very clear
10 - Exceptionally clear
11 - Pure air

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Viewpoint 25b: Recreational users of Swansea Bay Panorama (looking east)



Location Plan

Viewpoint Photography Details

Viewpoint 25b (VP25b): Recreational users of Swansea Bay (looking east)

Location: Latitude: 51; 34; 27.91 Longitude: 3; 49; 1.61 Altitude: 2m AOD

Camera: Canon EOS 6D

Lens: 50mm on a full frame camera

Height of lens above ground: 1.6m

Enlargement factor: 100% @ A2 (50mm Image)

Approx. Viewing distance: 430mm @ A2 (50mm Image)

Approx. Distance to site: Location is within site

Direction of view: East

Date and Time: 23/07/2024

Weather: Cloudy

Visibility: 8 - Clear

Futute Port Talbot
FLOW EIA Scoping
Appendix K: Viewpoint Photography

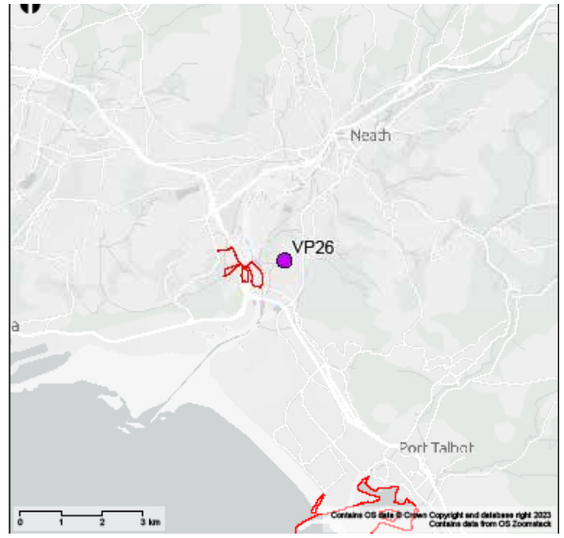
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6 - Haze
7 - Light haze
8 - Clear
9 - Very clear
10 - Exceptionally clear
11 - Pure air

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No winter photo was taken from this location
Extra viewpoint requested by Neath Port Talbot Borough Council after winter photography had been taken



Location Plan

Viewpoint Photography Details

Viewpoint 26 (VP26): Residents on Heol Brynhyfryd

Location: Latitude: 51; 38; 18.59 Longitude: 3; 49; 23.16 Altitude: 33m AOD
Camera: Canon EOS 6D
Lens: 50mm on a full frame camera
Height of lens above ground: 1.6m
Enlargement factor: 100% @ A3 (50mm Image)
Approx. Viewing distance: 430mm @ A3 (50mm Image)
Approx. Distance to site: 630m
Direction of view: West
Date and Time: N/A
Weather: N/A
Visibility: N/A

Winter

Viewpoint 26: Residents on Heol Brynhyfryd 50mm image

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Appendix K: Viewpoint Photography

ABP | FUTURE PORT TALBOT

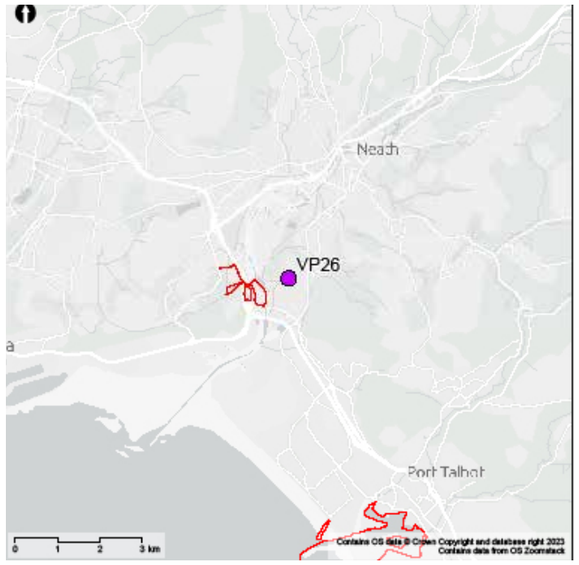
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Viewpoint 26: Residents on Heol Brynhyfryd Panorama



Location Plan

Viewpoint Photography Details

Viewpoint 26 (VP26): Residents on Heol Brynhyfryd

Location: Latitude: 51; 38; 18.59 Longitude: 3; 49; 23.16 Altitude: 33m AOD
Camera: Canon EOS 6D
Lens: 50mm on a full frame camera
Height of lens above ground: 1.6m
Enlargement factor: 100% @ A2 (50mm Image)
Approx. Viewing distance: 430mm @ A2 (50mm Image)
Approx. Distance to site: 630m
Direction of view: West
Date and Time: 24/07/2024
Weather: Cloudy
Visibility: 6 - Haze

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Appendix K: Viewpoint Photography

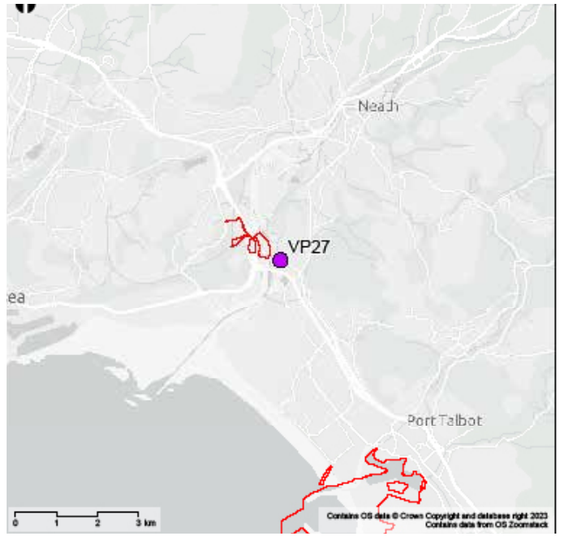
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No winter photo was taken from this location
Extra viewpoint requested by Neath Port Talbot Borough Council after winter photography had been taken



Location Plan

Viewpoint Photography Details

Viewpoint 27 (VP27): Users of Wales Coast Path 37/WCP/9

Location: Latitude: 51; 37; 56.84 Longitude: 3; 49; 50.98 Altitude: 19m AOD
Camera: Canon EOS 6D
Lens: 50mm on a full frame camera
Height of lens above ground: 1.6m
Enlargement factor: 100% @ A3 (50mm Image)
Approx. Viewing distance: 430mm @ A3 (50mm Image)
Approx. Distance to site: 290m
Direction of view: West
Date and Time: N/A
Weather: N/A
Visibility: N/A

Winter

Viewpoint 27: Users of Wales Coast Path 37/WCP/9 50mm image

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FLOW EIA Scoping
Appendix K: Viewpoint Photography

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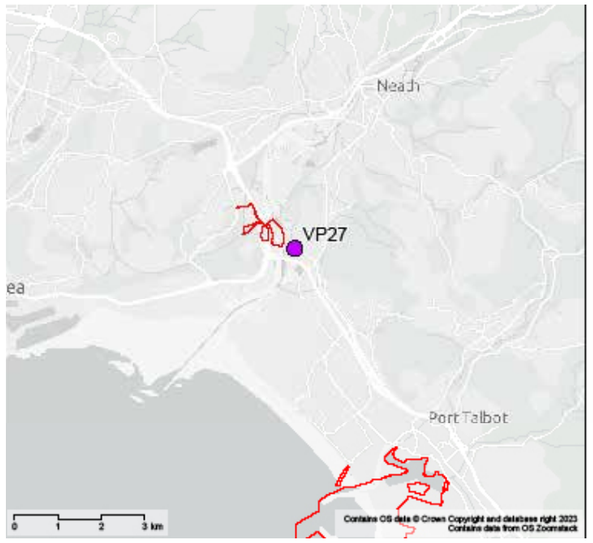
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Viewpoint 27: Users of Wales Coast Path 37/WCP/9 Panorama



Location Plan

Viewpoint Photography Details

Viewpoint 27 (VP27): Users of Wales Coast Path 37/WCP/9

Location: Latitude: 51; 37; 56.84 Longitude: 3; 49; 50.98 Altitude: 19m AOD
Camera: Canon EOS 6D
Lens: 50mm on a full frame camera
Height of lens above ground: 1.6m
Enlargement factor: 100% @ A2 (50mm Image)
Approx. Viewing distance: 430mm @ A2 (50mm Image)
Approx. Distance to site: 290m
Direction of view: West
Date and Time: 24/07/2024
Weather: Cloudy
Visibility: 6 - Haze

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Appendix K: Viewpoint Photography

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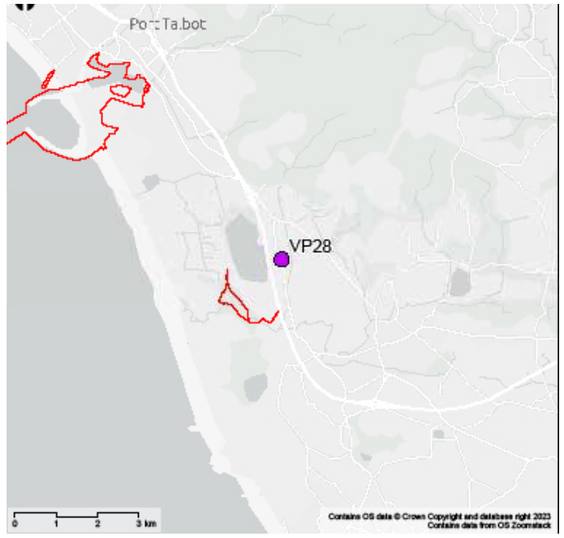
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No winter photo was taken from this location

Extra viewpoint requested by Neath Port Talbot Borough Council after winter photography had been taken



Location Plan

Viewpoint Photography Details

Viewpoint 28 (VP28): Residents on St Davids Park

Location: Latitude: 51; 32; 50.55 Longitude: 3; 43; 38.84 Altitude: 17m AOD

Camera: Olympus E-M10

Lens: 35mm on a cropped fram camera

Height of lens above ground: 1.6m

Enlargement factor: 100% @ A3 (50mm Image)

Approx. Viewing distance: 430mm @ A3 (50mm Image)

Approx. Distance to site: 1km

Direction of view: West

Date and Time: N/A

Weather: N/A

Visibility: N/A

Winter

Viewpoint 28: Residents on St Davids Park 50mm image

Futute Port Talbot
FLOW EIA Scoping
Appendix K: Viewpoint Photography

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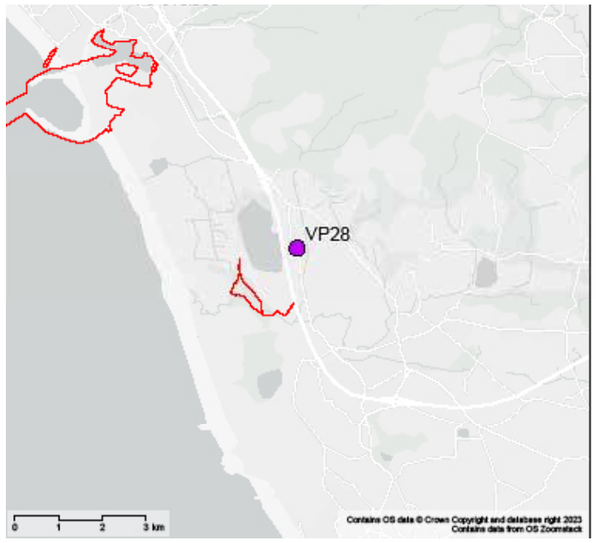
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VISIBILITY SCALE:
1 - Dense fog
2 - Thick fog
3 - Moderate fog
4 - Light fog
5 - Thin fog
6 - Haze
7 - Light haze
8 - Clear
9 - Very clear
10 - Exceptionally clear
11 - Pure air

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001	01.11.2024	KHR	First issue	AH	PW
002	10.12.2024	KHR	EIA Scoping Report Issue	AH	PW



Viewpoint 28: Residents on St Davids Park Panorama



Location Plan

Viewpoint Photography Details

Viewpoint 28 (VP28): Residents on St Davids Park

Location: Latitude: 51; 32; 50.55 Longitude: 3; 43; 38.84 Altitude: 17m AOD

Camera: Olympus E-M10

Lens: 35mm on a cropped frame camera

Height of lens above ground: 1.6m

Enlargement factor: 100% @ A2 (50mm Image)

Approx. Viewing distance: 430mm @ A2 (50mm Image)

Approx. Distance to site: 1km

Direction of view: West

Date and Time: 13/09/2024

Weather: Good

Visibility: 8 - Clear

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Appendix K: Viewpoint Photography

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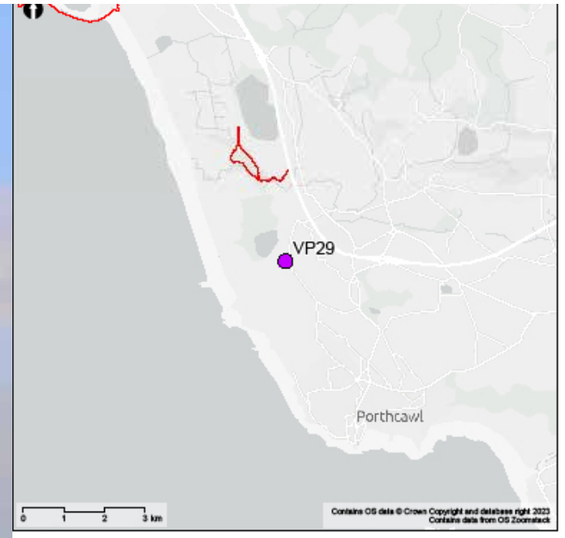
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Viewpoint 29: Visitors to Kenfig NNR Visitor Centre 50mm image



Location Plan

Viewpoint Photography Details

Viewpoint 29 (VP29): Visitors to Kenfig NNR Visitor Centre

Location: No coordinates taken

Camera: Canon EOS 6D

Lens: 50mm on a full frame camera

Height of lens above ground: 1.6m

Enlargement factor: 100% @ A3 (50mm Image)

Approx. Viewing distance: 430mm @ A3 (50mm Image)

Approx. Distance to site: 2.1km

Direction of view: North

Date and Time: 05/03/2024

Weather: Partly Cloudy

Visibility: 7 - Light Haze

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Appendix K: Viewpoint Photography

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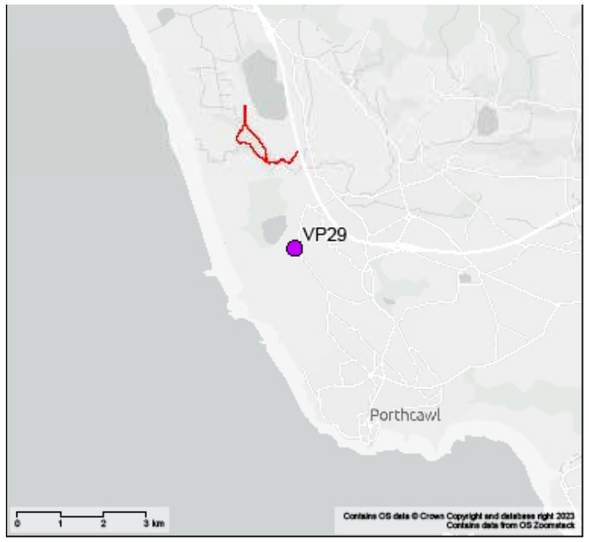
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Viewpoint 29: Visitors to Kenfig NNR Visitor Centre Panorama (Location adjusted at Summer site visit)



Location Plan

Viewpoint Photography Details

Viewpoint 29 (VP29): Visitors to Kenfig NNR Visitor Centre

Location: Latitude: 51; 30; 56.47 Longitude: 3; 43; 43.68 Altitude: 29m AOD
Camera: Olympus E-M10
Lens: 35mm on a cropped frame camera
Height of lens above ground: 1.6m
Enlargement factor: 100% @ A2 (50mm Image)
Approx. Viewing distance: 430mm @ A2 (50mm Image)
Approx. Distance to site: 2.1km
Direction of view: North
Date: 13/09/2024
Weather: Good
Visibility: 8 - Clear

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Appendix K: Viewpoint Photography

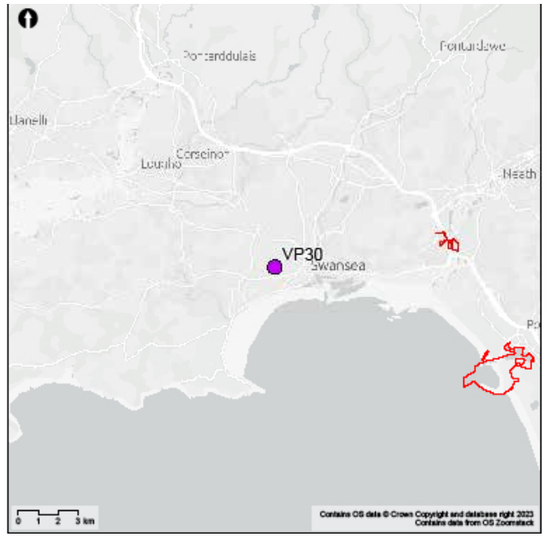
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No winter photo was taken from this location
Extra viewpoint requested by Neath Port Talbot Borough Council after winter photography had been taken



Location Plan

Viewpoint Photography Details

Viewpoint 30 (VP30): Residents on Pant-Y-Celyn Road

Location: Latitude: 51; 37; 14.43, Longitude: 3; 58; 8.68, Altitude: 69.6m AOD
Camera: Canon EOS 6D
Lens: 50mm on a full frame camera
Height of lens above ground: 1.6m
Enlargement factor: 100% @ A3 (50mm Image)
Approx. Viewing distance: 430mm @ A3 (50mm Image)
Approx. Distance to site: 11.7km
Direction of view: Southeast
Date and Time: 0N/A
Weather: N/A
Visibility: N/A

Winter

Viewpoint 30: Residents on Pant-Y-Celyn Road 50mm image

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Appendix K: Viewpoint Photography

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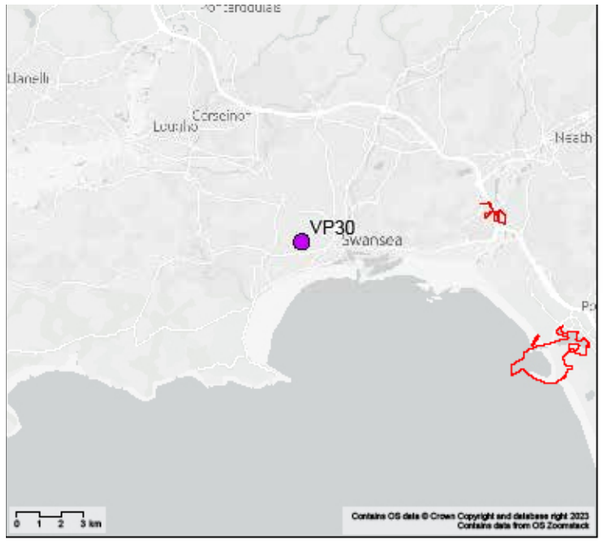
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Viewpoint 30: Residents on Pant-Y-Celyn Road Panorama



Location Plan

Viewpoint Photography Details

Viewpoint 30 (VP30): Residents on Pant-Y-Celyn Road

Location: Latitude: 51; 37; 23.07, Longitude: 3; 57; 52.98, Altitude: 130m AOD

Camera: Canon EOS 6D

Lens: 50mm on a full frame camera

Height of lens above ground: 1.6m

Enlargement factor: 100% @ A2 (50mm Image)

Approx. Viewing distance: 430mm @ A2 (50mm Image)

Approx. Distance to site: 11.3km

Direction of view: Southeast

Date and Time: 24/07/2024

Weather: Cloudy

Visibility: 6 - Haze

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Appendix K: Viewpoint Photography

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Appendix L
Landscape, Seascape and Visual Amenity – Detailed Methodology

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L – Landscape, Seascape and Visual Amenity Detailed Methodology

L.1. Landscape and Seascape Baseline

L.1.1 The landscape and seascape baseline study considers the constituent elements, features and other factors that contribute to existing landscape and seascape character within the study area including:

- the physical influences on the landscape and seascape resource - including topography, geology, soils, microclimate, water bodies and water courses.
- the influence of human activity – including land use, open space, transport routes, public rights of way, national trails, historic green lanes, land management, the character of settlement and buildings and the pattern and type of fields and enclosure.
- the aesthetic and perceptual aspects of the landscape and seascape – including scale, complexity, openness, tranquillity, and wildness; and
- heritage features – including conservation areas, listed buildings, registered parks and gardens and other elements contributing to historic landscape and seascape character.

L.1.2 Key sources of information include OS mapping, aerial photography, and published documents on the local authority websites. In accordance with the guidance in GLVIA 3, existing landscape and seascape character assessments and historic characterisation documents, where appropriate and up to date, are used to inform the Landscape, Seascape and Visual Impact Assessment. The findings of the desk study are reviewed in conjunction with the site survey to identify local landscape character areas (LCA) and Seascape Character Areas (SCA). These are broadly homogeneous units of distinct features and elements.

L.1.3 Once each landscape and seascape element within the study area has been identified, a value for each element is determined. The value of each LCA and SCA is evaluated in accordance with the criteria set out in **Table L.1**.

Table L.1: Landscape and seascape value

Value	Criteria for assessing landscape and seascape value
High	Designated landscape or seascape areas (such as National Landscape, formerly AONB). Landscape or seascape of high scenic quality with a distinctive combination of features, elements and characteristics, outstanding views, and a strong sense of place. A scarce or fragile landscape or seascape with cultural, historic, or ecological elements which make a major contribution to landscape or seascape character. No or very few landscape or seascape detractors. Has components which are difficult to replace (such as mature trees). A tranquil landscape or seascape in good condition, largely intact, with an unspoilt character.
Medium	Landscape or seascape locally designated (such as conservation area, regional park) or locally valued (for its recreational facilities and footpath networks, for instance). Some scenic quality and a moderate sense of place. A landscape or seascape with some distinctive features, elements and characteristics. Some

Value	Criteria for assessing landscape and seascape value
	cultural, historic or ecological elements which contribute to landscape character. Some high use areas, but overall medium tranquility. Few landscape or seascape detractors.
Low	Undesignated landscape or seascape not valued for its scenic quality, with a disparate combination of features, elements and characteristics and a weak sense of place. Mainly common features and few or no cultural, historic or ecological elements that contribute to landscape character. Many landscape detractors. A landscape or seascape of low tranquility.

Based on GLVIA 3 (LI and IEMA, 2013)

L.2. Visual Amenity Baseline

L.2.1 Whilst the landscape and seascape assessments focus on the effects of a proposed development on the landscape or seascape as a resource, the visual amenity assessment examines the effects of the proposed development on people and the views that are experienced by those people. The visual amenity baseline involves identifying sensitive visual receptors (e.g., residents, visitors, and road users) and their key viewpoints, and assessing how the development will impact their views and visual experiences. The criteria for assessing view value are summarised in **Table L.2**.

Table L.2: View values

View value	Criteria for assessing view value
High	A view in which attractive features are dominant or include attractive focal points and/or skyline features. Visual detractors may be present but are not strongly apparent in the composition of the view. A view in a high-quality seascape or landscape such as a National Landscape, designated or identified as of value in a guidebook or tourist literature. A view where the composition is a fundamental aspect of the design or function of a heritage asset and is integral to its setting.
Medium	An unremarkable view where neither attractive nor discordant elements are dominant or form a clearly apparent part of its composition. A view that is undesignated and undocumented.
Low	A view where discordant or unattractive features are dominant or prevalent and/or where such features are focal points and/or skyline features. These views may contain some attractive features, but these are not strongly apparent in the composition of the view. A view that is undesignated and undocumented.

Based on GLVIA 3 (LI and IEMA, 2013)

L.3. Assessment of Landscape and Seascape Effects

L.3.1 The sensitivity of the landscape and seascape was evaluated by considering the existing value of the landscape or seascape and its susceptibility to the type of change arising from the proposed scheme. There can be a complex relationship between the value attached to the seascape or landscape and its susceptibility to change, especially if the change is within or close to a designated seascape or landscape. A designated landscape such as a National Landscape is likely to have a high susceptibility to change but, depending on the type of scheme, it might accommodate the change without detrimental effect on its key characteristics. In this case its susceptibility to

change could be medium or even low. The evaluation of susceptibility to change was based on the criteria set out in **Table L.3**.

Table L.3: Landscape and seascape susceptibility

Susceptibility	Criteria for assessing seascape or landscape susceptibility
High	The overall character and the valued seascape or landscape characteristics, elements and features have a low ability to tolerate the nature and scale of the change resulting from the proposed scheme without permanent serious adverse change to the baseline situation.
Medium	The overall character and the valued seascape or landscape characteristics, elements and features have a moderate ability to tolerate the nature and scale of the change resulting from the proposed scheme, with some adverse changes to the baseline situation.
Low	The overall character and the valued seascape or landscape characteristics, elements and features have a high ability to tolerate the nature and scale of the change resulting from the proposed scheme, with limited adverse changes to the baseline situation.

Based on GLVIA 3 (LI and IEMA, 2013)

L.3.2 The evaluation of sensitivity was based on Seascape or Landscape Value (**Table L.1**) and Susceptibility (**Table L.3**) and is set out in**Error! Reference source not found. Table L.4** and **Table L.5**.

Table L.4: Landscape and seascape sensitivity matrix

Susceptibility	Value		
	High	Medium	Low
High	High	High	Medium
Medium	High	Medium	Low
Low	Medium	Low	Low

Based on GLVIA 3 (LI and IEMA, 2013)

Table L.5: Criteria for landscape and seascape sensitivity

Sensitivity	Criteria for assessing landscape and seascape sensitivity
High	Seascape or landscape of high national importance, rarity, and value with distinctive features/elements with limited ability to accommodate change without incurring substantial loss/gain (i.e., designated areas, registered parks and gardens, country parks and strong sense of place). A high susceptibility to change due to the type of scheme proposed.
Medium	Seascape or landscape of medium value and local or regional recognition of importance, able to accommodate some change (i.e., with features worthy of conservation, some sense of place or value through use or perception). A medium susceptibility to change due to the type of scheme proposed.
Low	Undesignated seascape or landscape of low value, low to medium ability to accommodate change (i.e., non-designated or designated areas of local recognition or areas with little sense of place). A low susceptibility to change due to the type of scheme proposed.

Based on GLVIA 3 (LI and IEMA, 2013)

L.3.3 The magnitude of change to landscape or seascape character was determined by considering:

- The nature of an impact – whether the introduction of a proposed scheme will be of benefit or detriment to the existing landscape or seascape character.
- The scale of the change - extent of the loss of landscape or seascape elements, the degree to which aesthetic features or perceptual aspects of the landscape or seascape are altered (by the removal of hedgerows or introduction of new structures, for example) and whether a key characteristic of the landscape or seascape is altered.
- The geographical extent of the area affected; and
- The duration of the change and its reversibility.

L.3.4 The evaluation of magnitude of change was based on the criteria set out in **Table L.6**.

Table L.6: Magnitude of change to landscape or seascape character

Magnitude	Criteria for assessing magnitude of change
High	Total loss or substantial alteration to key elements/features/characteristics of the character area and/or its setting. Addition of new elements which conflict with key characteristics of the existing landscape or seascape. Changes that alter a substantial proportion of the character area. Introduction of long-term and/or irreversible changes to a character area or its setting.
Medium	Partial loss or alteration to key elements/features/characteristics of the character area and/or its setting. Addition of new elements or features that are prominent in the landscape or seascape, but which do not necessarily conflict with key characteristics of the existing landscape or seascape. Changes that alter part of a character area or its immediate setting. Introduction of medium to long term and/or irreversible changes to part of a character area or its setting.
Low	Slight loss or alteration to one or more key characteristics of the character area and/or its setting. Addition of new elements or features that are largely characteristic of the existing character area and/or its setting. Introduction of short to medium term changes to the character area and/or irreversible changes to a small proportion of the character area.
Negligible	No change to, or barely perceptible loss or alteration to key characteristics of the character area and its setting. Addition of new elements or features that are characteristic of the existing character area and/or its setting. Changes experienced close to the proposed scheme site at a very localised level.

Based on GLVIA 3 (LI and IEMA, 2013)

L.4. Assessment of Visual Effects

L.4.1 The sensitivity of visual receptors was evaluated by considering the value attached to specific views (**Table L.2**) and the susceptibility of visual receptors to changes to views and visual amenity (**Table L.7**) and is set out in **Table L.8** and **Table L.9**. The susceptibility to change depends on the occupation or activity of the receptor and the extent to which their attention is focused on the view and visual amenity.

Table L.7: Visual receptor susceptibility

Susceptibility	Criteria for assessing visual receptor susceptibility
High	Occupiers of residential properties, users of public rights of way, visitors to places whose attention is focused on the landscape.
Medium	People working in or travelling through rural areas whose attention is partially on the landscape. People walking or cycling through urban areas whose views are partially focused on their surroundings. Users of publicly accessible outdoor open space including cemeteries.
Low	People at work, at school and engaging in formal sport. People walking or cycling through urban areas whose attention is focused on their destination rather than enjoying the scenery they are passing through. People travelling at high speed on roads or railways.

Based on GLVIA 3 (LI and IEMA, 2013)

Table L.8: Visual receptor sensitivity matrix

Susceptibility	Value		
	High	Medium	Low
High	High	High	Medium
Medium	High	Medium	Low
Low	Medium	Low	Low

Based on GLVIA 3 (LI and IEMA, 2013)

Table L.9: Criteria for visual receptor sensitivity

Sensitivity	Criteria for assessing visual receptor sensitivity
High	A view of high scenic value. A view identified as of value on an Ordnance Survey map, tourist map or guidebook, or one recorded in art or literature of national significance. A view where the composition was a fundamental aspect of the design or function of a heritage asset and is an integral part of the setting of a heritage asset. A view with cultural associations, including landscapes known historically for their picturesque and landscape beauty, and views which have otherwise become historically cherished and protected.
Medium	A view of medium scenic value. A view where existing adverse elements may form a noticeable part in the composition of the view. A typical and/or representative view. A view where the composition was a peripheral aspect of the design or function of a heritage asset.
Low	A view of low scenic value. An undistinguished or unremarkable view and / or a view where existing adverse elements form a clearly apparent or dominant part of the view / composition of the view.

Based on GLVIA 3 (LI and IEMA, 2013)

L.4.2 The magnitude of change to views was determined by considering:

- The nature of an impact by judging whether the introduction of a proposed scheme would be of benefit or detriment to the existing view. The impact of a proposed scheme can be adverse or beneficial.
- The context of the existing view (e.g., whether it is across a natural landscape or an industrial site).
- The extent to which the view has been altered due to the loss/ addition of features and the proportion of the view the scheme will occupy.
- The scale and appearance of the proposed scheme and the degree of contrast/ integration with the existing view.

- The distance of the visual receptor from the scheme and the angle/ position of view; and
- The duration and reversibility of the effect.
- The size and scale of the effect; and
- The geographical extent of the changes to the view.

L.4.3 The evaluation of the magnitude of change was based on the criteria set out in **Table L.10**.

Table L.10: Magnitude of change to visual amenity

Magnitude	Criteria for assessing magnitude of change
High	Total loss or substantial alteration to key characteristics of the view. Addition of new features or components that are continuously highly visible across the majority of the view and incongruous with the existing view. Substantial changes in close proximity to the visual receptor and within the direct frame of view. Introduction of long term or permanent change uncharacteristic of the view.
Medium	Noticeable change or alteration to one or more key characteristics of the view. Addition of new features or components that may be continuously highly visible across much of the view but are largely characteristic of the existing view. Changes a relatively short distance from the receptor but viewed as one of a series of components in the middle ground of the view. Substantial change partially filtered by intervening vegetation and/or built form or viewed obliquely. Introduction of medium to long term change uncharacteristic of the view and/or permanent changes largely characteristic of the existing view or affecting a small proportion of the view
Low	Slight loss or alteration to one or more characteristics of the view. Addition of new features or landscape components that may be continuously or intermittently visible in part of the view but are largely characteristic of the existing view from a receptor. Changes within the background of the view, viewed as one of a series of components in the wider panoramic view from a receptor. Change largely filtered by intervening vegetation and/or built form or viewed obliquely. Introduction of short to medium term change uncharacteristic of the view and/or long term/permanent changes in a small proportion of the view.
Negligible	No change to, or barely perceptible loss or alteration in the view. Addition of new features or landscape components that are largely inconspicuous and characteristic of the existing view. Changes within the background of the view, viewed as an inconspicuous element within the wider panorama. Change almost entirely obscured by intervening vegetation and/or built form. Short term change affecting a small proportion of the view.

Based on GLVIA 3 (LI and IEMA, 2013)

L.5. Significance of Effects

L.5.1 Effects may be adverse or beneficial. Professional judgement is used to determine the overall level of significance of effects on landscape, seascape and visual receptors in weighing the sensitivity of the receptors against the magnitude of change. The evaluation of the significance of effects on landscape and seascape character and visual amenity is based on the criteria set out in **Table L.12** and **Table L.13**. Effects deemed to be either major or moderate are deemed to be significant and are shown in bold in **Table L.11**.

Table L.11: Significance of effects

Magnitude	**Sensitivity**		
	High	Medium	Low
High	**Major**	**Major/moderate**	**Moderate**/minor
Medium	**Major/moderate**	**Moderate**	**Moderate**/minor
Low	**Moderate**/minor	Minor	Minor/negligible
Negligible	Minor/negligible	Negligible	Negligible

Table L.12: Significance of effects on landscape or seascape character

Significance of effects	**Criteria**
Major beneficial	A clear improvement or enhancement of existing character. Restoration of characteristic features previously wholly or largely lost through inappropriate management or previous development.
Moderate beneficial	A noticeable improvement or enhancement of existing character. Restoration of valued characteristic features previously largely lost through inappropriate management or previous development.
Minor beneficial	A small improvement or enhancement of existing character. Restoration of valued characteristic features previously partly lost through inappropriate management or previous development.
Negligible	Maintenance of the existing character, sense of place and/or local distinctiveness of the landscape.
Minor adverse	A small deterioration in the existing character due to the loss of characteristic features and or the introduction of uncharacteristic features which detract from the sense of place or local distinctiveness. Effects may relate to a small proportion of the character area.
Moderate adverse	A noticeable deterioration in the existing character due to the loss of characteristic features or the introduction of uncharacteristic features or elements which detract from the sense of place or local distinctiveness. Effects may relate to a medium proportion of the character area.
Major adverse	A clear deterioration in the existing character due to the loss of key characteristic features or the introduction of uncharacteristic features or elements which detract from the sense of place or local distinctiveness. Effects may relate to all or a large proportion of the character area.

Based on GLVIA 3 (LI and IEMA, 2013)

Table L.13: Significance of effects on visual amenity

Significance of effects	Criteria
Major beneficial	A substantial improvement, affecting a large extent of the view.
Moderate beneficial	A noticeable improvement, affecting part of the view.
Minor beneficial	A small improvement, affecting a small extent of the view.
Negligible	No discernible deterioration or improvement in the existing view.
Minor adverse	A small deterioration, affecting a small extent of the view.
Moderate adverse	A noticeable deterioration, affecting part of the view.
Major adverse	A substantial deterioration, affecting a large extent of the view.

Based on GLVIA 3 (LI and IEMA, 2013)

Appendix M
Major Accidents and Disasters Screening

Contents

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M – Major Accidents and Disasters Screening

M.1 Initial Screening

M.1.1 An initial hazard and identification assessment using professional judgement in consultation with the designers to develop and understanding of the vulnerability of the Project to major accidents and disasters.

Event categories

M.1.2 Following the categories within the NRR event categories were considered to define the long list of risks occurring or affected by the Project. These were reviewed to determine a credible major accident or disaster pathway.

- Natural Hazards: Includes risks like severe weather, flooding, earthquakes, and volcanic eruptions.
- Human, Animal, and Plant Health: Covers pandemics, emerging infectious diseases, and major outbreaks of animal or plant diseases.
- Major Accidents: Encompasses industrial accidents, transport accidents, and failures of critical infrastructure.
- Societal Risks: Includes public disorder, industrial action, and other societal disruptions.
- Malicious Attacks: Covers terrorism, cyber attacks, and other deliberate acts of harm.

Table M.1: Screening

Event category	Risk Event	Hazard	Receptor	Is the Project in a location which is vulnerable to this hazard?	Is the Project a source of hazard itself?	Could the Project increase the risk to environmental receptors as a result of a major accident or disaster?	Screening rationale
Natural Hazard	Biological hazards	Pandemic similar to COVID-19	Population and human health	**Yes**	No	No	There is a likelihood that a pandemic similar to COVID-19 could occur affecting receptors within the scope of the EIA, as such pandemic is **screened in** for further consideration.
		Animal or insect infestation	Biodiversity	No	No	No	The likelihood of an animal or insect infestation occurring as a direct result of the Project, and/or an interaction between the Project and an external hazard is considered low. As the Project is not itself a source of, nor likely to increase, animal or insect infestation, this environmental effect and is **screened out.**
Natural Hazard	Extreme tectonic event	Earthquakes, Tsunamis, Volcanic eruption	Population and human health Biodiversity Material assets	No	No	No	The British Isles is located in the middle of the Eurasia tectonic plate with the nearest plate boundary located at the mid-Atlantic Ridge. The earthquakes that occur at this plate boundary are too small to produce a tsunami (British Geological Survey, 2024). The Project is not located in an area which would make it vulnerable to extreme tectonic events (earthquakes, tsunamis, volcanic eruption) nor is the Project a source of this hazard itself. As such, there is considered to be no source-pathway-receptor linkage and extreme tectonic event is **screened out**.

Event category	Risk Event	Hazard	Receptor	Is the Project in a location which is vulnerable to this hazard?	Is the Project a source of hazard itself?	Could the Project increase the risk to environmental receptors as a result of a major accident or disaster?	Screening rationale
Natural Hazard	Mass movement/ ground hazards	Major subsidence/settlement	Population and human health Biodiversity Material assets	No	No	No	BGS GeoIndex mass movement layer (British Geological Survey, 2024), indicates there are no mass movement deposits within the EIA Scoping boundary. The most relevant mapped deposits are associated with the sloped landform east of the M4 highway. As there are no deposits located within the EIA Scoping boundary, major subsidence/settlement is **screened out** for further consideration.
Natural Hazard	Extreme weather event	Drought	Population and human health Biodiversity	No	No	No	Wales is categorised by the Met Office (Met Office, 2024) as having a maritime climate where the weather is often cloudy, wet and windy but mild. Therefore, the likelihood of a drought occurring due to prolonged lack of rainfall is low. As the Project is not itself a source of, nor likely to increase the risk of drought, this effect is **screened out.**
Natural Hazard	Extreme weather event	Heatwave	Population and human health Air	**Yes**	No	No	Climate change has resulted in UK summers becoming hotter and drier, leading to acute periods of significantly high temperatures. The UK is also exposed to Spanish plumes which bring hot conditions in summer (Met Office, 2024). There is a likelihood that an extreme weather event (heatwave) could occur. Due to the Project location, extreme weather event (heatwaves) is **screened in** for further consideration.

Event category	Risk Event	Hazard	Receptor	Is the Project in a location which is vulnerable to this hazard?	Is the Project a source of hazard itself?	Could the Project increase the risk to environmental receptors as a result of a major accident or disaster?	Screening rationale
Natural Hazard	Extreme weather event	Wildfires	Population and human health Biodiversity Material assets	No	No	No	The Project is in coastal location, exposing the surrounding vegetation to moisture. Therefore, the likelihood of wildfires occurring in and around the Project is low. As such, there is considered to be no source-pathway-receptor linkage and extreme weather event (wildfire) is **screened out**.
Natural Hazard	Extreme flood event	Inland flood	Population and human health Material assets	**Yes**	No	No	The UK is exposed to Spanish plumes which bring hot conditions in summer as well as intense downpours during summer thunderstorms. In addition, climate change has led to the UK experiencing wetter winters which increase the chance of inland flooding. Due to the Project location, extreme flood event (inland flood) is **screened in** for further consideration.
Natural Hazard	Extreme flood event	Coastal flood	Population and human health Material assets Land, air, water	**Yes**	No	**Yes**	Climate change has led to the UK experiencing wetter winters and more frequent storm events, which increase the chance of coastal flooding. Due to the Project location, extreme flood event (coastal flood) is **screened in** for further consideration.

Event category	Risk Event	Hazard	Receptor	Is the Project in a location which is vulnerable to this hazard?	Is the Project a source of hazard itself?	Could the Project increase the risk to environmental receptors as a result of a major accident or disaster?	Screening rationale
Natural Hazard	Extreme weather event	Tropical storms	Population and human health Biodiversity Material assets	No	No	No	Wales is categorised by the Met Office (Met Office, 2024) as having a maritime climate where the weather is often cloudy, wet and windy but mild. Therefore, the likelihood of a tropical storm occurring is low. As such, there is considered to be no source-pathway-receptor linkage and extreme weather event (tropical storm) is **screened out**.
Natural Hazards	Extreme weather event	Storms	Population and human health	**Yes**	No	No	Climate change has led to the UK experiencing wetter winters and more frequent storm events, which increase the chance of a significant storm event occurring. Due to the Project location, extreme storms are **screened in** for further consideration.
Major Accident	COMAH sites Accidental fire or explosion at an onshore major hazard (COMAH) site Accidental large toxic chemical release from an onshore major hazard (COMAH) site	Major industrial accident	Population and human health Biodiversity	**Yes**	No	No	The Project is in a location where a potential source-pathway-receptor exists between the Project and surrounding COMAH sites, where a major industrial accident could occur. Due to the proximity of the Project to COMAH establishments, it is considered that the Project is vulnerable to accidents from these operations and major industrial accident is **screened in** for further consideration. .

Event category	Risk Event	Hazard	Receptor	Is the Project in a location which is vulnerable to this hazard?	Is the Project a source of hazard itself?	Could the Project increase the risk to environmental receptors as a result of a major accident or disaster?	Screening rationale
Major Accident	Strategic Road Network/Railway	Major transport accident	Population and human health Biodiversity	No	No	No	The Project is located in an area where major transport infrastructure is present (M4, Port Talbot Parkway railway), however there is considered to be no source-pathway-receptor linkage. As the Project could be constructed and continue to operate if a major transport accident were to occur, major transport accident is **screened out.**
Major Accident	Marine accidents	Major marine vessel collision	Population and human health Biodiversity Land, air, water	**Yes**	**Yes**	**Yes**	The Project itself would require the movement of large-scale marine vessels, such that a marine accident could be considered likely to occur. The Project is both vulnerable to a major vessel collision, as well as potentially being the source of a collision risk and therefore major marine vessel collision is **screened in** for further consideration.
		Major maritime pollution incident		**Yes**	**Yes**	**Yes**	During construction there would be considerable marine engineering works, increased vessel movements and landside works close to the marine environment. These could result in an event leading to marine pollution for example vessel collision, major spills and run-off, fire water run-off and leaks from specific construction activities such as quay wall works involving bentonite. In operation the Project would involve an increase in vessel movements from current levels involving new or more

Event category	Risk Event	Hazard	Receptor	Is the Project in a location which is vulnerable to this hazard?	Is the Project a source of hazard itself?	Could the Project increase the risk to environmental receptors as a result of a major accident or disaster?	Screening rationale
							complex operations. Recognising the habitats, species, marine users in the study area the consequence of a marine accident in this location could be considered significant. The Project is both vulnerable to a major pollution incident as well as potentially being the source of an incident and therefore major maritime pollution incident is **screened in** for further consideration.
		Incident (grounding/sinking) of a vessel blocking a major port / WTG breaks free of mooring		**Yes**	**Yes**	**Yes**	The Project is both vulnerable to a vessel grounding as well as potentially being the source of an incident such as WTG breaking free of a mooring during tows and therefore major maritime incident is **screened in** for further consideration.
Major Accident	Critical electricity infrastructure failure	Mass power outage	Population and human health	No	No	No	The Project is heavily reliant on power to operate, however the consequence of a power outage is considered to be low and does not meet the criteria of a significant environmental effect. The Project is not located in an area which has increased vulnerability to critical electricity infrastructure failure such that a mass power outage is considered likely. Mass power outage is **screened out**.

Event category	Risk Event	Hazard	Receptor	Is the Project in a location which is vulnerable to this hazard?	Is the Project a source of hazard itself?	Could the Project increase the risk to environmental receptors as a result of a major accident or disaster?	Screening rationale
Natural hazard	National food shortage	Famine	Population and human health	No	No	No	The likelihood of a famine occurring as a direct result of the Project, and/or an interaction between the Project and an external hazard (national food shortage) is considered low. As such, there is no source-pathway-receptor and famine is **screened out**.
Major accident	Large scale development of land	Displaced populations	Population and human health	No	No	No	The Project does not result in the direct displacement of populations, nor is it considered to be in a location which is vulnerable to displacement. As such, there is no source-pathway-receptor and displaced populations is **screened out.**
Major accident	Act of terrorism	Terrorist attack	Population and human health Material assets, cultural heritage Land, air, water Biodiversity	**Yes**	No	No	The Project is located in an existing operational port, capable of handling cape-size vessels which would be able to contain significant volumes of cargo. The existing Port has a regional role in the import/export of material throughout Wales. The consequence of an act of terrorism in this location could be considered significant, as such terrorist attack is screened in for further consideration.

Event category	Risk Event	Hazard	Receptor	Is the Project in a location which is vulnerable to this hazard?	Is the Project a source of hazard itself?	Could the Project increase the risk to environmental receptors as a result of a major accident or disaster?	Screening rationale
Major accident	Cyber attacks	Data theft, disruption, or destruction	Population and human health Material assets		No	Yes	Many ports rely on advanced and digital technologies for their operations which means they are vulnerable to cyberattacks. The consequences can be financial as well as the potential for negative impacts on safety and the environment. The International Ship and Port Facility Security (ISPS) code brought into UK law under The Ship and Port Facility (Security) Regulations 2004.The Port will complete relevant cyber security risk assessments and the Project will be designed and operated to mitigate the risk of cyber attack. On this basis cyber attack is **scoped out.**
Major accident	Public disorder	Major protest event	Population and human health	**Yes**	No	No	The Project is located in an existing operational port, handling cape-size vessels containing significant volumes of cargo. The existing Port has a regional role in the import/export of material throughout Wales. Due to the regional significance of the Port and the adjacent Tata Steelworks, the Project is considered to be in a location which is vulnerable to public disorder resulting in a major protest event.

Appendix N
Potential Quay Wall Design Options

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No tables.

1N - Introduction

1.1 Overview

1.1.1 As outlined in Chapter 2 – Description of Development, The Project requires the construction of a new quay wall.

1.1.2 There are different options for the way that quay walls can be constructed. There are a number of factors that influence how the quay wall would be constructed including ground conditions, and market skills and availability, programme.

1.1.3 This document summarises each of the potential quay wall design options currently being considered.

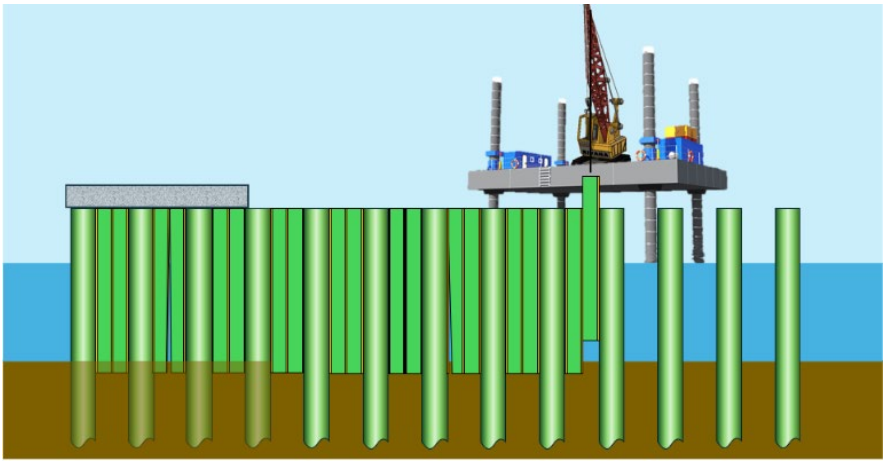
1.1.4 Each quay wall design option is summarised separately and includes a brief description of the key features of each design alongside an indicative graphical representation for visual reference.

2 Potential Quay Wall Design Option Summaries

2.1 Comb-walls

2.1.1 Combi-walls are earth-retaining structures constructed from a combination of steel tubular piles and steel sheet piles, which are interlocked to form a continuous wall. The tubular piles provide high structural strength and load-bearing capacity, while the sheet piles retain backfill materials. During construction, the tubular piles are driven into the ground first, followed by the insertion of sheet piles between them using welded connectors. The system works by transferring soil pressure primarily to the tubular piles and resisting water pressure through both components. An example of a combi-wall system is presented in Figure N1.

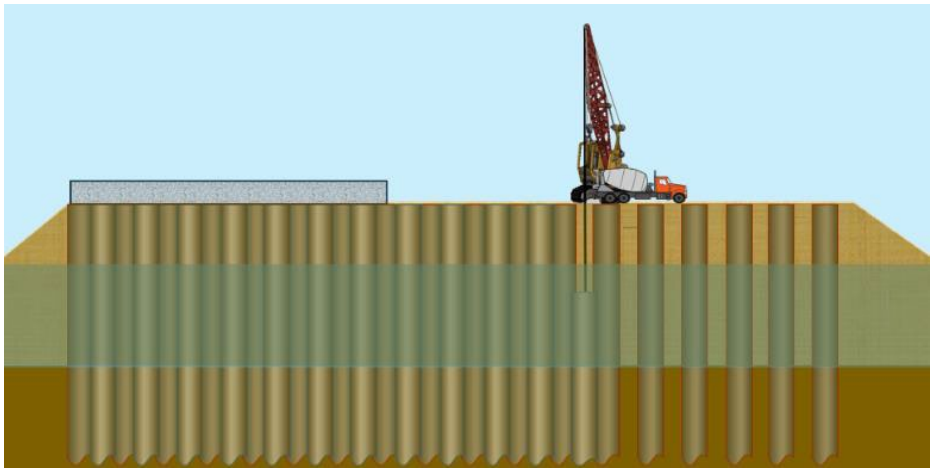
Figure N1: Combi-wall system example



2.2 Secant Piles Walls

Secant pile walls are a type of continuous retaining structure constructed by drilling overlapping reinforced concrete piles. The installed concrete piles alternate between primary (reinforced) and secondary (unreinforced or lightly reinforced) piles to form a retaining quay wall. The construction of secant pile walls involves drilling the secondary piles first, followed by the primary piles that cut into the adjacent ones, creating a “secant” or intersecting connection. Where necessary, a casing would be installed prior to secondary pile installation to provide support for the concrete pile while it is cast. An example of a secant pile wall system is presented in Figure N2.

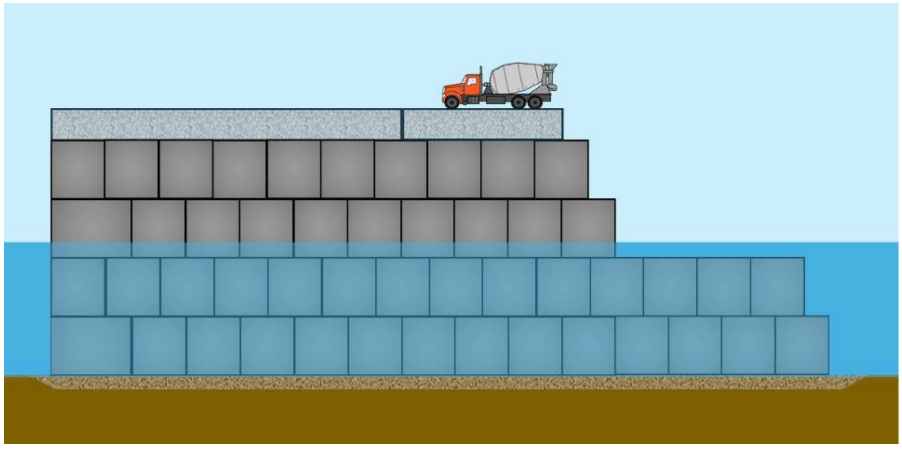
Figure N2: Secant pile wall example



2.3 Blockwork Walls

2.3.1 Blockwork walls are constructed using concrete blocks, which may be solid or hollow, stacked in a staggered pattern to form a stable wall. These blocks are typically laid on a prepared foundation, often with mortar or interlocking features to enhance stability. Blockwork walls are a type of gravity retaining structure which utilises the weight of the component used in construction to retain earth behind it. An example of a blockwork wall system is presented in Figure N3.

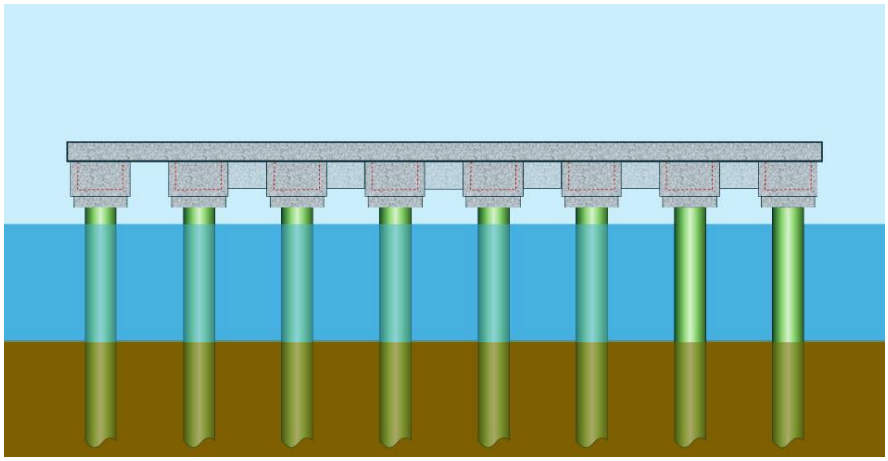
Figure N3: Blockwork Wall Example



2.4 Suspended Deck / Slab Structures on Piles

2.4.1 Suspended deck / slab structures on piles are commonly used in heavy load berths and in scenarios where other quay wall foundation options are not feasible. These structures consist of a reinforced concrete or steel deck installed on top of a grid of reinforced concrete or steel piles. The piles are driven into the underlying ground with the deck / slab installed above the waterline. An example of a suspended deck / slab system is presented in Figure N4.

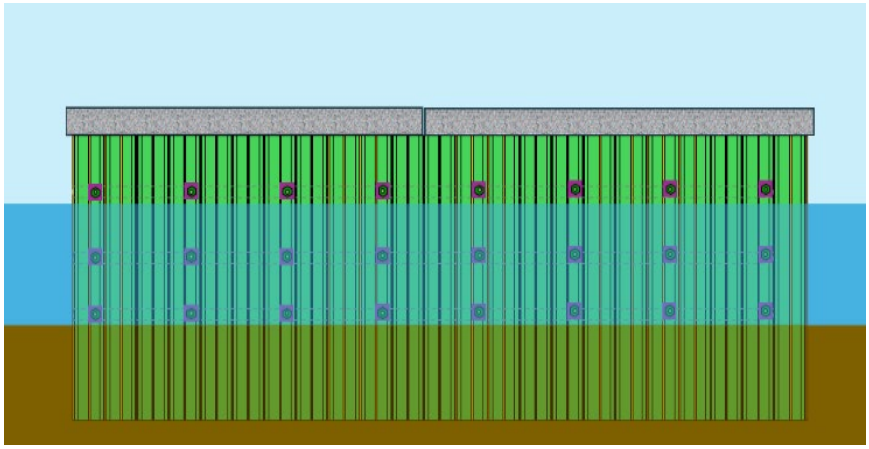
Figure N4: Suspended deck / Slab structures on piles example



2.5 Cofferdam Walls

2.5.1 Cofferdam walls are a type of gravity retaining wall system constructed by driving sheet piles or interlocking steel or concrete panels into the seabed to form an enclosed watertight barrier. Once sealed, the enclosed area is dewatered, allowing excavation and infilling of suitable backfill material, and subsequent installation of overlying deck slabs under dry conditions. An example of a cofferdam wall system is presented in Figure N5.

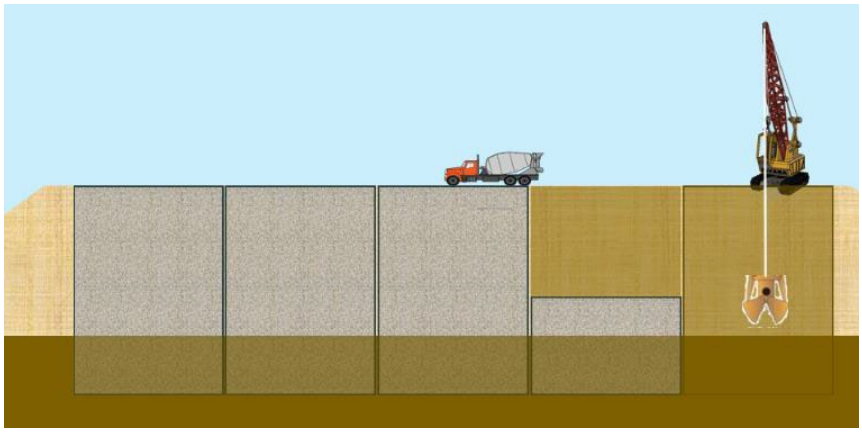
Figure N5: Cofferdam walls example



2.6 Monolith Walls

2.6.1 Monolith walls are a type of gravity retaining structure constructed from a large, solid reinforced concrete blocks or caissons. The component parts are often precast and are floated or lifted into their final position before being placed / sunk onto a prepared foundation, typically a bed of gravel or rock. Multiple monolithic wall units are installed side by side to form a continuous wall. An example of a monolith wall system is presented in Figure N6.

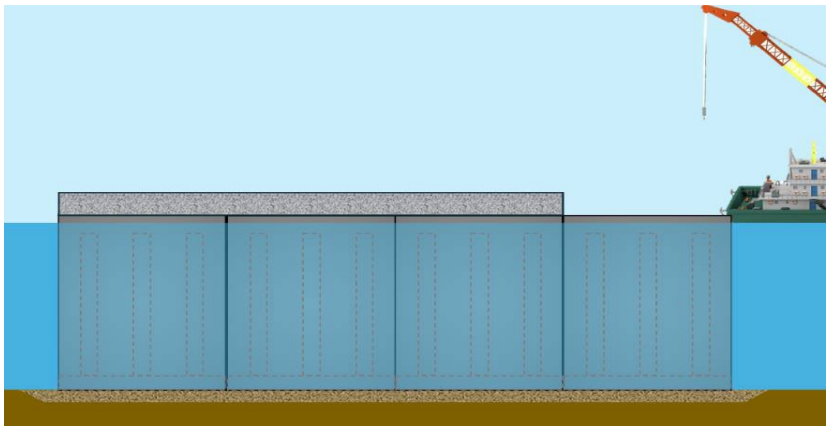
Figure N6: Monolith walls example



2.7 Counterfort Walls

2.7.1 Counterfort walls are reinforced concrete retaining structures which utilise anchoring to resist lateral pressures. Counterfort walls comprise vertical retaining wall and basal slabs supported at regular intervals by counterforts. The counterforts are triangular-shaped concrete ribs or buttresses that extend from the back of the wall onto the top of the basal slab and extend into the retained soil / emplaced backfill material. All elements of the counterfort wall section are cast together to form a single integrated structure. An example of a counterfort wall system is presented in Figure N7.

Figure N7: Counterfort walls example

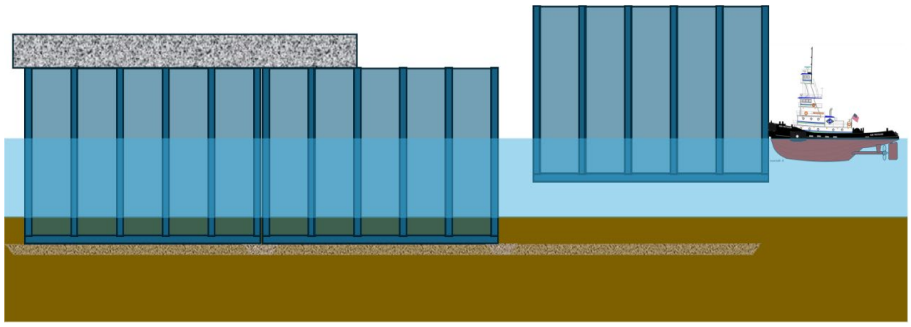


2.8 Caisson Walls

2.8.1 Use of caissons which are a type of gravity retaining structure (utilises the weight of the component used in construction to retain earth behind it). It is used where there are large retained heights combined with a high load capacity requirement on the topside surface. In this case a caisson would look like a large concrete box split in multiple cells (compartments) founded on a dredged surface below the final seabed level required. Thus, the seabed would be dredged to create a pocket in which these large pre-cast concrete box structures would be floated into position. They would then be filled with granular material which will achieve the overall mass required to resist the forces from the retained ground and the loads on the finished

ground surface. An example of a caisson wall system is presented in Figure N8.

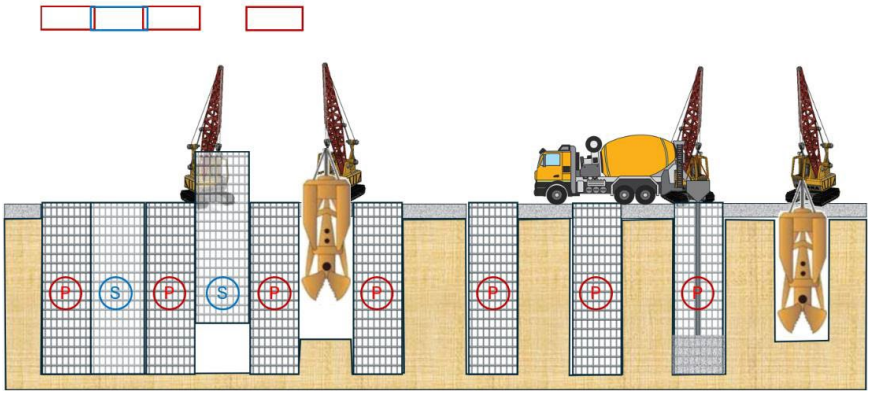
Figure N8: Caisson wall example



2.9 Diaphragm Walls

2.9.1 Diaphragm walls are a type of structural concrete wall, utilising alternating primary and secondary concrete panels, constructed below ground level to provide support and retain soil during deep excavations. The main diaphragm wall would require an anchor wall constructed in the same alignment, sufficiently behind it to provide the right resistance. The anchor wall in turn will be tied to the main diaphragm using tie-rods to connect the two. When complete the area behind the bund in which the diaphragm and anchor walls are constructed will be backfilled with granular material and compacted. An example of a diaphragm wall system is presented in Figure N9.

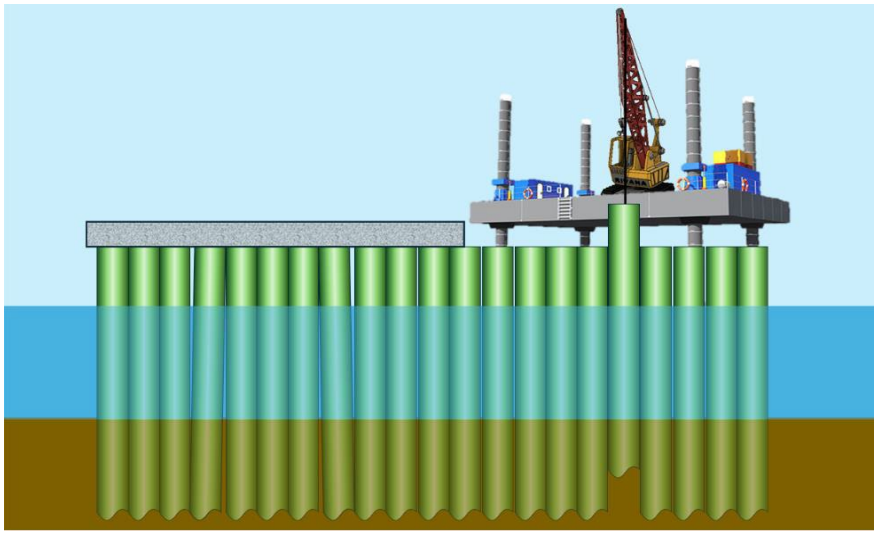
Figure N9: Diaphragm wall example



2.10 Contiguous Walls

2.10.1 Contiguous walls (steel or concrete) are a type of retaining wall constructed using steel or reinforced concrete tubular piles that are constructed side-by-side to form a continuous barrier. Similar to the diaphragm wall this will require an anchor wall behind it, to which it will be connected with tie rods to resist loads. Upon completion of the quay wall and anchor wall, the area between the walls as well as the area between the breakwater and the anchor wall will be backfilled with granular material and compacted. An example of a continuous wall system is presented in Figure N10.

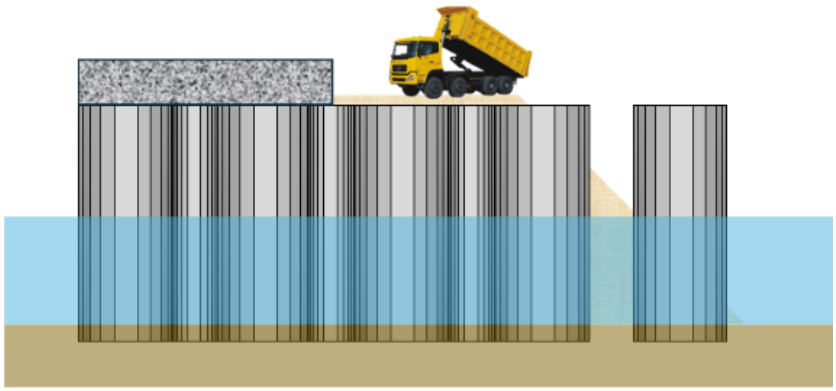
Figure N10: Contiguous wall example



2.11 Cellular Cofferdam

2.11.1 Cellular cofferdam wall structures are typically self-supporting gravity-reliant retaining wall structures. These structures are constructed using interlocking sheet piles which are driven into the underlying to form either circular or 'peanut' shaped structures. These structures are subsequently backfilled in readiness for the installation of the quay deck. An example of a cellular cofferdam wall system is presented in Figure N11.

Figure N11: Cellular Cofferdam example



Glossary and Abbreviations

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Tables

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1 Glossary

2050 Net Zero Emissions Target	Target driven by the legal requirement from the Sixth Carbon Budget by the Climate Change Committee for the UK to bring all greenhouse gas emissions to net zero by 2050
Affected Road Network	Roads that meet the traffic screening criteria
Air Quality Management Area	An area identified by a local authority where the Air Quality Objectives are not likely to be achieved. In Neath Port Talbot County Borough Council (NPTCBC), there is one AQMA in the Taibach/Margam which was declared in 2000 for historic exceedances of the 24-hour PM_{10} objective.
Annual Average Daily Traffic	The total volume of vehicle traffic for a year divided by 365 days
Annual Average Weekday Traffic	The average number of vehicles (such as cars, trucks, or buses) that travel on a road or highway during a typical weekday
Approach Channel Route	An approach channel route is a designated path that ships follow to safely navigate from the open sea to a port or harbour.
As low as reasonably practicable (ALARP)	Involves weighing a risk against the trouble, time and money needed to control it. Thus, ALARP describes the level to which we expect to see risks controlled.
Assembly (foundation)	Connecting all buoyancy elements and bracing that forms the complete foundation
Assimilated law	Assimilated law refers to the body of domestic law in the UK that was originally derived from EU law and continued to be part of UK law after the end of the Brexit transition period on December 31, 2020.
Braces	Structural elements used to reinforce and stabilise frameworks by resisting lateral forces such as wind, or load shifts.
Buoyancy body	A main foundation component like column or pontoon, that provides the buoyancy of the overall platform.
Cairn	Human-made pile/stack of raised stones, usually a marker or burial mound.
Capesize	Capesize ships are bulk carriers, typically used to transport coal, ore and other raw commodities.
Capital dredging	The removal of sediments to create new or expand existing navigational channels, berthing pockets and turning basins to establish new dredge design levels (DDLs). It involves the removal and relocation of natural previously undisturbed seabed to increase water depths.

Carbon Dioxide equivalent (CO_2e)	Normalised unit to measure emissions for every GHG based on the global warming potential of the different GHG compared to carbon dioxide.
Circular Economy	Circular economy is a model for the use of systems and products designed to eliminate the concept of waste, by enabling the recovery and reuse of all materials at the highest value possible at all times. The core principles are i) designing out of waste and negative externalities, ii) keeping products and materials in use at the highest possible value at all times and iii) regenerating the natural ecosystem.
Circular Economy Fund	The Circular Economy Fund in Wales is designed to support the transition towards a circular economy by providing financial assistance to businesses and public bodies. The fund aims to keep resources in use for as long as possible by recovering and regenerating materials at the end of their life, rather than disposing of them
Celtic Freeport Economic Impact Assessment	The Celtic Freeport is a project that covers the ports of Milford Haven and Port Talbot, and includes clean energy developments, fuel terminals, and a power station. The Celtic Freeport Economic Impact Assessment (EIA) is a document that outlines the potential economic benefits of the Celtic Freeport for Wales
Climate resilience	The ability to prepare for, recover from and adapt to the impacts of climate change.
Commercial fishing	Commercial fishing is defined as any legal fishing activity undertaken for declared taxable profit.
Commissioning	The commissioning process is the final set of activities carried out before deployment of the completed platform to its final wind farm site. This involves inspections, assessments and tests of the turbine infrastructure onboard the foundation.
Consent	Permission to construct, operate and maintain the Project through the appropriate legal approval process (e.g., The Infrastructure Consent Order Application).
Construction Logistics Zone	A Construction Logistics Zone (CLZ) is a designated area used to manage the logistics of construction projects.
Contaminant linkage	In risk assessment, a term used to describe when a sensitive receptor is connected to a contaminant source via an exposure pathway: • source – a contaminant or pollutant that is in, on or under the land and that has the potential to cause harm or pollution • pathway – a route by which a receptor is or could be affected by a contaminant

	receptor – something that could be adversely affected by a contaminant, for example a person, controlled waters, an organism, an ecosystem, or Part 2A receptors such as buildings, crops or animals
Crown Estate	The Crown Estate manages the sea bed around England, Wales and Northern Ireland. It coordinates the offshore wind sea bed leasing rounds in these areas. The Energy Act 2004 vests rights to The Crown Estate to license the generation of renewable energy on the continental shelf within the Renewable Energy Zone out to 200nm
Cultural Heritage	Cultural heritage is the tangible and intangible heritage of a group or society that is inherited from past generations. For the purposes of this assessment the Design, Manual for Roads and Bridges definition of “historic monuments, historic groups of buildings and/or historic sites” is used and equates to the term “historic environment”.
Cut and fill	"Cut and fill" is a construction technique used to create a level surface by excavating material from one area (cut) and using it to fill another area (fill). This process is essential for preparing sites for building, road construction, and other infrastructure projects. It helps in achieving the desired elevation and slope, ensuring stability and proper drainage.
Deployment	The process of towing out and installing integrated platforms at offshore Project Development Areas (PDAs).
Designated Historic Asset	Historic asset protected by UK or Welsh legislation.
Developer	Companies specialising in the manufacture, launching, and operation of Offshore Wind Turbine Generators who would be users / tenants within the port of Port Talbot
Developer works	Construction works activities delivered by the Developer once Landlord works have been completed
Development study area	The development study area comprises the Project’s footprint (the EIA Scoping boundary or limits of deviation). Apart from Project’s footprint, the development study area also includes areas required for temporary access, site compounds, working platforms and other enabling activities.
Disaster	A man-made or external hazard (such as an act of terrorism) or a natural hazard (such as an earthquake) with the potential to cause an event or situation that meets the definition of a major accident.
Dock Entrance	Entrance to the Impounded Dock completed in 1898 comprising: • A Lock structure • Lead-in piers (either side of the entrance at the tidal River Afan)

	• Lead-in dolphins (two on the south side of the river and one on the north side of the river)
Domino effect	A chain reaction where one event triggers a series of subsequent events, often leading to larger and more complex disasters.
Dredging	The physical removal of sediments and debris from the seabed or the bottom of lakes, rivers, harbours, and other waterbodies.
EIA Scoping Boundary	The boundary for the purposes of the Environmental Impact Assessment. It consists of the Port, Kenfig Marshalling Yard Site and Jersey Marine Site.
Expansive study area	The expansive study area extends to the availability of construction materials, and capacity of waste management infrastructure and remaining landfill void, within a defined (for example, a mineral and waste planning) region, or – as appropriate – across multiple regions.
Fabrication	The process for constructing the floating foundation components, subassemblies and blocks. For steel foundations this includes steel cutting, forming, welding and painting (optional).
Fisheries Liaison Officer	The role of the FLO is to advise clients and form a positive relationship between proposed or ongoing operations and the fishing industry operating in the same area.
Fishing effort	Fishing effort refers to the amount of fishing activity exerted in a specific area over a defined period of time.
Floating Foundation Substructure	A buoyant steel or concrete substructure only with no Wind Turbine Generator (WTG) components installed.
Floating Offshore Wind (FLOW)	Floating offshore wind refers to an installation created by using the similar wind turbines used for conventional seabed-fixed offshore wind but with the turbines mounted on floating substructures which are secured to the seabed with mooring lines and anchors. For FLOW, the turbines are installed on the foundations substructure in a port, in a process known as turbine integration.
FLOW Port(s)	A port where the maritime and landside infrastructure is configured to support the FLOW industry to provide all or some of the following specialised services -preassembly, installation, operations & maintenance, storage & production, and shipping of components.
Foundation	A buoyant foundation structure which once deployed is anchored to the sea bed via mooring lines.
Foundation Components	The main parts that are assembled to form the completed floating foundation - buoyancy bodies and connecting trusses/braces.
Future Port Talbot (FPT)	A long term programme comprising a series of projects to transform the existing Port of Port Talbot into an energy hub for offshore wind and green energy development.

Greenhouse Gases (GHG)	Gases that contribute to the warming of the earth, as defined by the Kyoto Protocol, measured in Carbon Dioxide equivalent
Green waste	Green waste refers to organic waste that can be composted. This typically includes materials from gardens and parks such as grass clippings, leaves, branches, and other plant-based materials
Ground Investigation (GI)	Completion of surveys (both terrestrial and marine) to allow a detailed examination of the subsurface conditions of a site. This survey aims to gather information about the soil, rock, and groundwater conditions to ensure the safety and feasibility of the proposed construction.
Heavy Duty Vehicles (HDV)	Goods vehicles and buses over 3.5 tonnes gross vehicle weight
Heneb: Glamorgan-Gwent Archaeology	Heneb is an independent organisation dedicated to the conservation, investigation, recording and promotion of the historic environment of Wales and beyond. On 1 April 2024 the four Welsh archaeological trusts merged to form Heneb: the Trust for Welsh Archaeology. Heneb provide Planning Services to the Local Planning Authority. Heneb also maintains the Historic Environment Records (HER) on behalf of the Welsh Ministers.
Highest Astronomical Tide (HAT)	The highest tidal height predicted to occur under average meteorological conditions and any combination of astronomical conditions.
Historic Assets	An identifiable component of the historic environment. It may consist or be a combination of an archaeological site, a historic building or area, historic park and garden or a parcel of historic landscape. Nationally important historic assets will normally be designated.
Hull	The steel main structure of the floating substructure, including buoyancy elements
ICES Division VIIf	Amalgamation of a number of ICES rectangles to create ICES areas.
ICES statistical rectangle	ICES standardise the division of sea areas for statistical analysis. Each ICES statistical rectangle is '30 min latitude by 1 degree longitude' in size which is approximately 30 nautical miles by 30 nautical miles.
IEMA Guidance	This refers to IEMA guide to: Materials and waste in Environmental Impact Assessment. This provides guidance and recommendations for the impacts and effects of materials and waste on the environment.
Import Facility	A quayside facility for offloading WTG components, raw materials, aggregates and foundation components

Impounded Dock	The docks at Port Talbot accessed via the tidal River Afan through the dock entrance. Water levels maintained to a minimum level via inflow to the north of the dock.
Integration	The activity to install the WTG components (nacelle, tower and rotors) onto the foundation substructure, including the cables connection
Intertidal area	The area of the seabed between MHWS and MLWS.
Jersey Marine Site	Approximately 24 ha of terrestrial and intertidal land, north of the existing Port part of the overall Project extent to be used to deliver habitat mitigation and enhancement
Kenfig Marshalling Yard Site	Approximately24 ha of terrestrial land, south of the existing Port part of the overall Project extent to be used to deliver habitat mitigation and enhancement
Kinetic Energy	The energy of motion that powers wind turbines.
Landlord	ABP as landowner of the Port acting as landlord to various tenant who occupy discrete areas within the port estate.
Landlord works	Construction works completed by the landlord
Leasing Round	The process where developers bid for the rights to build and operate offshore wind farms (fixed and floating) in specific areas of the seabed. This process is typically managed by government bodies or organizations like The Crown Estate in England and Wales.
Lee Breakwater	An existing breakwater at the port of Port Talbot extending approximately 650m from the end of the existing Southern Breakwater.
Light Duty Vehicles	Cars and small vans less than 3.5 tonnes gross vehicle weight
Loadout (float-off)	The operation of transferring a foundation from the place of assembly to a sea-borne vessel or to the sea.
Local Highway Authority	With regard to the Project, the Local Highway Authority for non-trunk roads and motorways is Neath Port Talbot County Borough Council. South Wales Trunk Road Agent (SWTRA) is the Local Highway Authority for the strategic road network, including trunk roads and motorways.
Main Breakwater	An existing breakwater at the port of Port Talbot over 1¼ miles long. This is at the southernmost part of the Tidal Harbour.
Maintenance Dredging	Recurrent dredging to maintain or improve existing navigation / port/ marine / waterway, even if a number of years pass between consecutive dredging events. Once a dredging operation has been completed, maintaining the site or port is of great importance to ensure that the initial investment remains intact and functions as planned. Maintenance dredging is undertaken to keep channels, berths and other areas at their

	designed depths. It involves removing recently accumulated sediments such as mud, sand and gravel To be classed as maintenance dredging the activity must take place where: • the level of the seabed to be achieved by the dredging proposed is not lower than it has been at any time during the past 10 years; and • there is evidence that dredging has previously been undertaken to that level (or lower) during that period.
Major Accident	An event that threatens immediate or delayed serious environmental effects to human health, welfare and/or the environment and requires the use of resources beyond those of the client or its appointed representatives to manage.
Manufacture	The process for constructing a complete floating foundation substructure (concrete or steel), including fabrication and assembly
Marine Historic Asset	For the purpose of this assessment, marine historic assets include those within the sea, dock and foreshore (below mean high water springs). Terrestrial historic assets are listed above under 'Historic Assets'.
Marine Licence	The Marine and Coastal Access Act 2009 requires a marine licence to be obtained for licensable marine activities. For licensable activities within 12nm of the Welsh coast the separate marine licence is obtained from Natural Resource Wales (NRW).
Marine Low Water Mark (MLWM)	The average level of low tides over a specific period, typically observed over 19 years.
Marine Offloading Facility (MOLF)	A marine facility where construction materials will import and offload materials for the Project
Marine Works	All Project works below mean high water springs including temporary marine works and their demobilisation.
Mean High Water Springs (MHWS)	The average tidal height throughout the year of two successive high waters during those periods of 24 hours when the range of the tide is at its greatest.
Mean Low Water Springs (MLWS)	A tidal datum that represents the average height of the low waters during spring tides. Specifically, it is calculated as the average height of two successive low waters during the periods when the tidal range is at its greatest, which occurs approximately every 14 days.
Mean Sea Level (MSL)	The average tidal height over a long period of time.
MMO UK annual sea fisheries statistics	Statistics on fishing effort and landings are calculated using data collected and processed by officials of the various Fisheries Administrations in the UK, namely the MMO, Marine Scotland, DAERA, WAG and Departments in Jersey, Guernsey and the Isle of Man. Data for vessels over 10m come primarily

	from the fishing logbook, supported by landing declarations and sales notes. There is no statutory requirement under either EU or national legislation for fishers to declare their catches for vessels 10m and under Historically, information for this sector has been collected with the co-operation of the industry: it comprised log sheets and landing declarations voluntarily supplied by fishers as well as sales notes. This collection of data has now been replaced after the introduction in September 2005 of a scheme of registration for buyers and sellers of first sale fish. Sales notes are now used in addition to the voluntary information from fishers.
Nacelle	It is the housing structure at the top of the wind turbine tower that houses the generator, gearbox, brakes, cooling system and control system. It converts the rotational energy from the rotor into three-phase AC electrical energy.
Navigation Channel	A 4.8km long dredged channel to the Tidal Harbour on an entry heading of approximately 60°N. A 10° change of heading occurs approximately 1.8km from the seaward end of the channel.
Non-Designated Historic Assets	Historic asset considered to have special interest and is a material consideration in planning but is not protected by UK or Welsh legislation.
Northern Breakwater	An existing breakwater at the port of Port Talbot, north of Afon beach, and north of the mouth of the tidal River Afan. This is at the northernmost breakwater.
Notice to Mariners (NtM)	Advises mariners of important matters affecting navigational safety, including new hydrographic information, changes in channels and aids to navigation, and other important data.
National Trip End Model (NTEM)	The National Trip End Model forecasts the growth in trip origin-destinations (or productions-attractions) up to 2051 for use in transport modelling.
Operations and Maintenance (O&M)	Operations: day-to-day management including all the work not covered under maintenance and service. Maintenance of assets: scheduled (that is, planned a long time in advance) maintenance, that may be based on suppliers' recommendations or owner's experience. It includes condition-based or time-based maintenance programmes and planned health and safety inspections. Typical maintenance includes inspection, checking of bolted joints and replacement of wear parts (with design life less than the design life of the project). Maintenance includes the unscheduled interventions in response to events or failures. Interventions may be proactive (before failure occurs, for example responding to inspections or condition monitoring or reactive (after failure that affects generation has occurred). Also included are interventions due to major components not lasting the full design life (even if

	intervention was planned prior to construction) and both on site repair and replacement of large and small components.
Outfit steel	Steel elements welded on the hull of the floating foundation.
Outfitting	All internal and external elements installed in/on the foundation, including equipment, cables, pipes, ducts etc., excluding Outfit steel.
Platform	The integrated wind turbine and floating substructure. The same term is used whether it is in a port or connected via its mooring system at the wind farm site.
Platform Installation	Towing to location, anchoring and cable connection of a complete platform.
Precautionary Principle	Approach to the consideration of potential environmental risks such that they are considered and mitigated even when scientific certainty is not fully established.
Primary materials	Physical substances from non-renewable sources i.e. those that cannot or will not be replaced in short (non-geological) periods of time. Also referred to as 'virgin' materials.
Project	A project as part of overarching FPT programme to develop the existing Port Talbot into a hub to support the offshore wind energy infrastructure industry.
Proximity Principle	The proximity principle refers to the idea that waste should be managed as close as possible to the point of its generation. This principle aims to minimize the environmental impact of transporting waste over long distances, thereby reducing emissions and other associated risks.
Ramsar	A statutory designation related to wetlands of international importance
Recreational fishing	Recreational fishing is defined as any legal fishing undertaken for sport and recreation, from the shore of from a boat.
Representative Concentration Pathways (RCP)	Representative Concentration Pathway 4.5 (RCP 4.5) represents an 'intermediate scenario', RCP 6.0 is the 'medium-high emission' scenario and RCP 8.5 represents the 'high emission' scenario. These projections have been developed by the UK Met Office using the Met Office Hadley Centre climate model and a selection of other global climate models.
Rotor	The rotor is the rotating section of the turbine. It consists of the turbine blades and the hub that connects the blades to the shaft. It extracts kinetic energy from the air and converts this into rotational energy in the drive train.
Self-propelled Modular Transporter (SPMT)	SPMTs are remotely operated flatbed haulers used to transport large and heavy objects around ports and construction sites.
Site of Special Scientific Interest (SSSI)	Legally protected areas with rare or unique wildlife and geology.

Southern Breakwater	An existing breakwater at the port of Port Talbot connected to the Lee Breakwater extending from the southern side of the tidal River Afon.
STATS19	Great Britain's official road traffic casualty database.
Step-wise Approach	Approach set out in Planning Policy Wales (PPW) of a structured method used to ensure that development projects contribute positively to biodiversity and ecosystem resilience.
Sub-assembly	A unit or component that is part of a larger assembly. It is typically made up of multiple parts that are pre-assembled before being integrated into the final product or system.
Sub-lethal	Exposure of an organism to a substance, condition, or stressor at such a level that does not cause death, but may still have significant biological, physiological, or behavioural effects.
Synchro Lift	A heavy lift shore-based platform used for loading out foundations after assembly.
Temporary Safety Zone	Delineates an area in which fishing is restricted to remove the risk of threat or significant harm.
Trip End Model Presentation Program (TEMPro)	The Trip End Model Presentation Program, is designed to allow detailed analysis of pre-processed trip-end, journey mileage, car ownership and population/workforce planning data from the National Trip End Model (NTEM).
Terrestrial Historic Asset	For the purpose of this assessment, terrestrial assets include those on land (above mean high water springs).
The Port	The existing port of Port Talbot
The Project	A project as part of overarching FPT programme to develop the existing Port Talbot into a hub to support offshore wind industry. The focus is on FLOW however the Project will be adaptable to incorporate support of fixed bottom wind staging.
The Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW)	The Royal Commission on the Ancient and Historical Monuments of Wales is responsible for survey and investigation in Wales, including underwater sites. It maintains the National Monuments Record of Wales (NMRW) and manages the Historic Wales portal as an online gateway to all the national and regional records about the historic environment in Wales
Throughput	The amount of material or components required for a period of time.
Tidal Harbour	Existing harbour at Port of Port Talbot formed from the Lee/Southern Breakwater and the Main Breakwater.
Tower	The part of the wind turbine connected to the foundation upon which nacelle and rotor are attached.
Transition Piece	The component connecting the wind tower with the foundation.

Trusses / Braces	A main component of the floating foundation substructure which connects the floating foundations.
Turbine Capacity	Turbine capacity refers to the maximum power a turbine can produce expressed in megawatts (MW).
Ultra Low Emission Vehicles (ULEV)	ULEVs are currently defined as having less than 75 grams of CO2 per kilometre (g/km) from the tail pipe.
Unexploded ordnance (UXO)	Explosive weapons that did not explode when they were released and remain a risk e.g. to seabed users.
Unit	An assembly of subassemblies used in the fabrication of buoyancy bodies.
Vulnerability	The conditions determined by physical, social, economic and environmental factors or processes which increase the susceptibility of an individual, a community, assets or systems to the impacts of hazards
Wet Storage Area	Reference to i) areas where floating foundations are stored prior to integration with the WTG, or ii) areas where completed platforms are stored in the short term prior to collection for deployment.
Waste Framework Directive	The Waste Framework Directive sets the basic concepts and definitions related to waste management, such as definitions of waste, recycling and recovery. It requires that waste is managed without endangering human health and harming the environment.
Whole Life Carbon	The carbon emissions of an item or project, measured across all stages of item or project lifecycle
Wind Turbine Generator (WTG)	Structure and components include nacelle, blades and wind tower sections.

2 Abbreviations

Abbreviation	Definition
AA	Annual Average
AADT	Annual Average Daily Traffic
ABP	Associated British Ports
ADMS	Atmospheric Dispersion Modelling System
AEMP	Adaptive environmental management plan
AEoL	Adverse Effect on Integrity
AEP	Annual Exceedance Probability
AILs	Abnormal Indivisible Loads
AIS	Automatic Identification System
AL	Action Levels
ALARP	As Low As Reasonably Practicable
AOD	Above Ordnance Datum
AONB	Area of Outstanding National Beauty
APIS	Air Pollution Information System
AQAL	Air Quality Assessment Level
AQMA	Air Quality Management Area
AQO	Air Quality Objectives
ATC	Automatic Traffic Counts
AtoN	Aids to Navigation
BEIS	Department for Business, Energy and Industrial Strategy
BGS	British Geological Survey
BoCCW4	Birds of Conservation Concern Wales 4
BODC	British Oceanographic Data Centre
BoQ	Bill of Quantity
BP	British Petroleum
BPEO	Best Practical Environmental Option
BSI	British Standards Institution

BTO	British Trust for Ornithology
BVG	BVG Associates
C&D	Construction and demolition
CA	Conservation Area
CAPEX	Capital Expenditure
CCO	Channel Coastal Observatory
CCRA	Climate Change Risk Assessment
CDE	Construction, Demolition and Excavation
CDM	Construction Design Management
CEA	Cumulative Effects Assessment
CEFAS	Centre for Environment, Fisheries and Aquaculture Science
CEMP	Construction Environmental Management Plan
CFBD	Coastal Flood Boundary Dataset
CHA	Competent Harbour Authority
CIEEM	Chartered Institute of Ecology and Environmental Management
CIfA	Chartered Institute for Archaeologists
CIRIA	Construction Industry Research and Information Association
CL:AIRE	Contaminated Land: Applications in Real Environments
CLOCS	Construction Logistics and Community Safety
CLRA	Contaminated Land Risk Assessment
CO_{2e}	Carbon Dioxide Equilvalent
CoCP	Code of Construction Practice
COLREGS	Convention on the International Regulations for Preventing Collisions at Sea
COMAH	Control of Major Accident Hazards
CoPA	Control of Pollution Act
CPA	Coast Protection Act
CRTN	Calculation of Road Traffic Noise
cSAC	Candidate Special Area of Conservation
CSD	Cutter Suction Dredging

CSM	Conceptual Site Model
CTMP	Construction Traffic Management Plan
DAM	Development Advice Map
DBA	Desk-Based Assessment
DECCA	Diversity, Eextent, Ccondition, Cconnectivity and Aaspects
Defra	Department for Environment, Food and Rural Affairs and Devolved Administrations
DESNZ	Department of Energy Security and Net Zero
DfT	Department for Transport
DHI	Danish Hydraulic Institute
DMRB	Design Manual for Roads and Bridges
DNS	Developments of National Significance
DTM	Digital Terrain Model
EA	Environment Agency
EAF	Electric Arc Furnace
EcIA	Ecological Impact Assessment
EEA	European Economic Area
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
ELIA	Environmental Lighting Impact Assessment
EMP	Environmental Management Plan
EPA	Environmental Protection Act
EPR	Environmental Permitting Regulations
EPUK	Environmental Protection UK
EqIA	Equality Impact Assessment
EQS	Environmental Quality Standards
ERL	Effects Range Low
ERM	Effects Range Median
ES	Environmental Statement
ESDAL	Electronic Service Delivery for Abnormal Loads

EU	European Union
FCA	Flood consequence assessment
FCERM	Flood and Coastal Erosion Risk Management
FEH	Flood Estimation Handbook
FLOW	Floating Offshore Wind
FLOWW	Fishing Liaison with Offshore Wind and Wet Renewables Group
FMfP	Flood Map for Planning
FOWF	Floating Offshore Windfarm
FPT	Future Port Talbot
FRAP	Flood Risk Activity Permit
FSA	Formal Safety Assessment
GCN	Great Crested Newt
GDP	Gross Domestic Product
GGA	Heneb: Glamorgan-Gwent Archaeology
GGBFS	Graulated Granulated Blast Furnace Slag
GHG	Greenhouse Gas
GI	Ground Investigation
GIR	Ground Investigation Report
GLIVIA	Guidelines for Landscape and Visual Impact Assessment
GPP	Guidance for Pollution Prevention
GtGP	Guide to Good Practice in Port Marine Operations
GVA	Gross Value Added
HAT	Highest Astronomical Tide
HAZID	Hazard Identification Workshop
HCI	Household Commercial and Industrial
HDV	Heavy Duty Vehicles
HER	Historic Environment Record
HGV	Heavy Goods Vehicles
HLC	Historic Landscape Character
HMW	High Molecular Weight

HMWB	Heavily Modified Waterbody
HRA	Habitat Regulations Assessment
HRO	Harbour Revision Order
HSE	Health and Safety Executive
HV	High Voltage
IALA	The International Association of Marine Aids to Navigation and Lighthouse Authorities
IAQM	Institute of Air Quality Management
IBA	Important Bird and Biodiversity Area
ICES	International Council for Exploration of the Sea
IDD	Internal Drainage District
IEMA	Institute of Environmental Management and Assessment
IHBC	Institute of Historic Building Conservation
IHRA	Information for Habitat Regulations Assessment
ILP	Institute of Lighting Professionals
IMO	International Maritime Organisation
INNS	Invasive non-native species
IUCN	International Union for Conservation of Nature
IVMS	Inshore Vessel Monitoring System
JNCC	Joint Nature Conservation Committee
LAQM	Local Air Quality Management
LB	Listed Building
LCA	Landscape Character Area
LCRM	Land Contamination Risk Management
LDP	Local Development Plan
LGV	Light Goods Vehicles
LiDAR	Light detection and ranging
LLA	Local Lighthouse Authorities
LLFA	Lead Local Flood Authority
LMP	Lighting Management Plan

LMW	Low Molecular Weight
LNR	Local Nature Reserve
LOAEL	Lowest Observed Adverse Effect Level
LoD	Limits of Deviation
LPS	Local Port Services
LSE	Likely Significant Effect
LUF	Levelling Up Fund
LVIA	Landscape Visual Impact Assessment
MAADs	Major Accidents and Disasters
MAC	Maximum Allowable Concentration
MAGIC	Multi Agency Geographical Information for the Countryside
MAIB	Marine Accident Investigation Branch
mAOD	Metres above Above Ordnance Datum
MARNIS	Maritime Navigation and Information Services
MARPOL	International Convention for the Prevention of Pollution from Ships
MCA	Maritime and Coastguard Agency
MCA	Marine Character Area
MCAA	Marine and Coastal Access Act
MCMS	Marine Safety Management System
MCZ	Marine Conservation Zone
MDEC	Multi-Disciplinary Engineering Consultant
MHCLG	Ministry of Housing, Communities and Local Government
MHWS	Mean High Water Springs
MLWM	Mean Low Water Mark
MLWS	Mean Low Water Springs
MMO	Marine Management Organisation
MMP	Materials Management Plan
MOLF	Marine Offloading Facility
MoRPH	Modular River Physical Habitat
MPA	Mineral Planning Authority

MPA	Mineral Products Association
MPS	Marine Policy Statement
MRS	Metal Recycling Site
MSW	Municipal Solid Waste
MSA	Mineral Safeguarding Area
MSL	Mean Sea Level
NAQO	National Air Quality Objective
NBB	Net Benefits for Biodiversity
NCA	National Character Area
NCR	National Cycle Routes
NL	National Landscape
NLCA	National Landscape Character Area
NMRW	National Monument Record for Wales
NNR	National Nature Reserve
NO_2	Nitrogen Dioxide
NOx	Nitrogen Oxide
NPA	Neath Port Authority
NPPF	National Planning Policy Framework
NPS	National Policy Statement
NPSfP	National Policy Statement for Ports
NPTCBC	Neath Port Talbot County Borough Council
NRA	Navigational Risk Assessment
NRAP	Nature Recovery Action Plan
NRR	National Risk Register
NRW	Natural Resources Wales
NTEM	National Trip End Model
NTSLF	National Tide and Sea Level Facility
NVZ	Nitrate Vulnerable Zone
O&M	Operations and Maintenance
OD	Ordnance Datum

OMHPDL	Open Mosaic Habitat on Previously Developed Land
ONS	Office for National Statistics
oOEMP	Outline Operational Environmental Management Plan
OPRC	Oil Pollution Preparedness and Response
ORE	Offshore Renewable Energy
OS	Ordnance Survey
OWF	Offshore Wind Farm
PAH	Polyaromatic Hydrocarbons
PAS	Publicly available specification
PAS128	Publicly Available Specification 128
PAVIS	Ports and Vessel Information System
PDA	Project Development Area
PDR	Peripheral Distributor Road
PEA	Preliminary Ecology Appraisals
PEC	Pilotage Exemption Certificate
PEDW	Planning and Environmental Decisions Wales
PINS	Planning Inspectorate
PM	Particulate Matter
PM_{10}	Particulate matter with an aerodynamic diameter of less than 10 microns (PM_{10})
$PM_{2.5}$	Particulate matter with an aerodynamic diameter of less than 2.5 microns ($PM_{2.5}$))
PMSC	Port Marine Safety Code
PPG	Pollution Protection Guidelines
PPP	Pollution Prevention Plan
PPV	Peak Particle Velocity
PPW	Planning Policy Wales
PRoW	Public Rights of Way
PSA	Particle size analysis
pSPA	Potential Special Protection Areas
PUW	Port Upgrade Works

RAMS	Risk Assessment and Method Statement
RBD	River Basin District
RBMP	River Basin Management Plan
RCAHMW	Royal Commission on the Ancient and Historical Monuments of Wales
RICS	Royal Institute of Chartered Surveyors
RIGS	Regionally Important Geodiversity Site
RNLI	Royal National Lifeboat Institute
RoRo	Roll-on, Roll-of
RSL	Relative Sea Level
SAB	SuDS Approval Body
SAC	Special Areas of Conservation
SAF	Sustainable Aviation Fuel
SCA	Seascape Character Area
ScotMER	Scottish Marine Energy Research
SEWBReC	South and East Wales Biodiversity Records Centre
SFRA	Strategic Flood Risk Assessment
SHA	Statutory Harbour Authority
SINC	Site of Importance for Nature Conservation
SMP	Soil Management Plan
SO2	Sulphur Dioxide
SOAEL	Significant Observed Adverse Effect Level
SPA	Special Protection Area
SPMT	Self-propelled modular transporter
SPZ	Source Protection Zone
SRN	Strategic Road Network
SSC	Suspended Sediment Concentration
SSSI	Site of Special Scientific Interest
STW	Sewage Treatment Works
SuDS	Sustainable Drainage Systems

SWMP	Site Waste Management Plan
TA	Transport Assessment
TAN	Technical Advice Note
TCE	The Crown Estate
TCPA	Town and Country Planning Act
THC	Total Hydrocarbon Content
TPH	Total Petroleum Hydrocarbons
TSHD	Trailing Suction Hopper Dredging
UCK18	UK Climate Projections 18
UNCLOS III	United Nations Convention on the Law of the Sea III
UK	United Kingdom
UKCP	United Kingdom Climate Projections
UKD	United Kingdom Dredging
UKHO	United Kingdom Hydrographic Office
UXO	Unexploded ordnance
VMS	Vessel Monitoring System
VTM	Vessel Traffic Management
WAG	Welsh Assembly Government
WB	Waterbody
WEEE	Waste Electrical and Electronic Equipment
WFD	Water Framework Directive
WG	Welsh Government
WHA	Waste Hierarchy Assessment
WLC	Whole Life Cycle
WLGA	Welsh Local Government Association
WNMP	Welsh National Marine Plan
WTG	Wind Turbine Generator
YMCA	Young Men's Christian Association
ZOI	Zone of Influence
ZTV	Zone of Theoretical Visibility

3 Symbols and Units of Measurements

Description	
AOD	Above the Ordnance Datum
CH_4	methane
DWT	Deadweight Tonnage
cm	centimetre
CO	carbon monoxide
CO_2	carbon dioxide
dB	decibel
dwt	Deadweight tonnage
Gigawatt (GW)	Unit of power 1 GW = 1,000,000,000 watts
Gigawatt hour (GWh)	Unit of energy.
ha	hectare
hr	Hour
Hz	hertz
kg	kilogram
km	kilometre
km^2	square kilometre
kph	kilometres per hour
LOA	Length overall
m	metre
m^2	square metre
m^3	cubic metre
m^3/d	cubic metres per day
m/s	metres per second
MCM	Million cubic metres
nm	Nautical mile
min	minute
mm	millimetre
mph	miles per hour
MW	megawatt
N	nitrogen
NO	nitrogen oxide

NO_2	nitrogen dioxide
NO_x	nitrogen oxides
pa	per annum
t	tonne
V	Volt
mCD	Metres relative to Chart Datum
HAT	Highest Astronomical Tide
mODN	Metres relative to Ordnance Datum Newlyn