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Morlais Project Environmental Statement

Chapter 18: Ground Conditions and Contamination

Volume I

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GLOSSARY OF ABBREVIATIONS

AONB	Area of Outstanding Natural Beauty
BGS	British Geological Survey
BGL	Below Ground Level
CIA	Cumulative Impact Assessment
CIRIA	Construction Industry Research and Information Association
CDM	Construction Design Management
CEMP	Construction Environmental Management Plan
CIA	Cumulative Impact Assessment
CMS	Construction Method Statement
CoCP	Code of Construction Practice
DCO	Development Consent Order
DECC	Department of Energy and Climate Change
DEFRA	Department for Environment, Food and Rural Affairs
ECC	Export Cable Corridor
EIA	Environmental Impact Assessment
EPA	Environmental Protection Act
ES	Environmental Statement
HDD	Horizontal Directional Drilling
HVDC	High Voltage Directional Current
IoACC	Isle of Anglesey County Council
IPC	Infrastructure Planning Commission
JLDP	Joint Local Development Plan
LNR	Local Nature Reserve
m	Metre
MMP	Material Management Plan
MPA	Mineral Planning Authority
NPS	National Policy Statement
NRW	Natural Resources Wales
NSIP	Nationally Significant Infrastructure Project
O&M	Operations and Maintenance
PAH	Polycyclic Aromatic Hydrocarbon
PCB	Polychlorinated biphenyl
PCOC	Potential Contaminant of Concern
PPE	Personal Protective Equipment
PPG	Pollution Prevention Guidance
PPMP	Pollution Prevention Management Plan
PRA	Preliminary Risk Assessment
PWS	Private Water Supplies
RIGS	Regionally Important Geological Site
RPE	Respiratory Protective Equipment
SAC	Special Area of Conservation

SgZs	Groundwater Safeguard Zones
SPA	Special Protection Area
SPZ	Source Protection Zone
SSSI	Site of Special Scientific Interest
SVOC	Semi Volatile Organic Compound
SWMP	Site and Excavated Waste Management Plan
UNESCO	United Nations Educational, Scientific and Cultural Organisation
VOC	Volatile Organic Compound
WCS	Worst Case Scenario
WFD	Water Framework Directive
WS	Wildlife Site

GLOSSARY OF TERMINOLOGY

Term	Definition
Code of Construction Practice (CoCP)	A document detailing the overarching principles of construction, contractor protocols, construction-related environmental management measures, pollution prevention measures, the selection of appropriate construction techniques and monitoring processes.

18. GROUND CONDITIONS AND CONTAMINATED LAND

18.1. INTRODUCTION

1. This chapter of the Environmental Statement (ES), prepared by Royal HaskoningDHV, considers the potential impacts of the proposed Morlais Project (the Project) relating to ground conditions and contamination. The assessment focusses on the potential presence of contamination and pollutant linkages to sensitive receptors such as site workers, future users, geology, surface water and groundwater as a result of the construction, operation and decommissioning of the Project.
2. This chapter does not assess potential impacts on soil quality in the context of an agricultural resource or an ecosystem service; this is discussed separately in **Chapter 25, Socio-Economics, Tourism and Recreation**. Potential impacts to the groundwater and surface waters not relating to contamination are discussed in **Chapter 17, Water Resources and Flood Risk**.
3. The chapter provides an assessment of the potential impacts and associated mitigation for the construction, operation and decommissioning of the Project. The assessment also considers the cumulative impacts of the Project. The proposed methodology adhered to for the Environmental Impact Assessment (EIA) and Cumulative Impact Assessment (CIA) is discussed in **Section 18.4**.
4. Because of the close association between ground conditions, groundwater, surface water and ecology topics, this chapter should also be read in conjunction with the other related ES chapters (and their appendices and supporting documents). The relevant chapters are:
 - **Chapter 7**, Metocean Conditions and Coastal Processes;
 - **Chapter 8**, Marine Water and Sediment Quality;
 - **Chapter 17**, Water Resources and Flood Risk;
 - **Chapter 19**, Onshore Ecology; and
 - **Chapter 25**, Socio-Economics, Tourism and Recreation.

18.2. LEGISLATION, GUIDANCE AND POLICY

5. The assessment within this section has been guided and informed by the following key relevant legislation, guidance and policy. Further detail on legislation and policy in relation to the wider Project is provided in **Chapter 2, Policy and Legislation**.

18.2.1. Legislation

6. The following UK legislation is considered the most relevant to ground conditions and contamination:
 - The Environmental Permitting (England and Wales) Regulations (2010);
 - The Water Resources Act 1991, as amended by the Water Act 2003;
 - Environmental Protection Act (1990) Part 2A;

- Environment (Wales) Act 2016;
- The Water Environment (Water Framework Directive) (England and Wales) Regulations (2017);
- Environmental Damage (Prevention and Remediation) Regulations 2009 (SI 153); and
- HSE Construction (Design and Management CDM) Regulations (2015).

18.2.2. Guidance

7. The following UK guidance is considered the most relevant to ground conditions and contamination:

- Environment Agency and DEFRA Pollution Prevention for Businesses (2016);
- Environment Agency Model Procedures for the Management of Land Contamination, Contained Land Report 11 (CLR11);
- CIRIA Publication C532 Control of Water Pollution from Construction Sites (2011);
- CIRIA Publication C650 Environmental Good Practice on Site (2005);
- CIRIA Publication C503 Environmental Good Practices Working on Site (2000);
- CIRIA Publication C502 Environmental Good Practice on Site (2000);
- CIRIA Publication C665 Assessing Risks Posed by Hazardous Ground Gases to Buildings (2007);
- DEFRA Construction Code of Practice for the Sustainable Use of Soil on Construction Sites (2009);
- British Standard BS10175 Investigation of Potentially Contaminated Sites; and
- British Standard BS5930 Code of Practice for Site Investigations.

18.2.3. Policy - National Policy Statements

8. Although this Project is not seeking a Development Consent Order (DCO), its size (up to 240 MW) means it is of equivalent scale and magnitude as a Nationally Significant Infrastructure Project (NSIP). Guidance that is relevant to assessing impacts on ground conditions and contamination for NSIPs are set out within National Policy Statements (NPS) which are the principal decision-making documents for NSIPs.
9. The assessment of potential impacts within this chapter has therefore been undertaken with specific reference to the relevant National Policy Statements (NPS). The specific assessment requirements for soils, geology and ground conditions in the NPS are detailed in the overarching statement for Energy (EN-1) (Department of Energy and Climate Change (DECC) 2011a) as stated in **Table 18-1** below.

Table 18-1 NPS Assessment Requirements Relevant to Ground Conditions and Contamination

NPS Requirement	NPS Reference	ES Reference
EN-1 Overarching NPS for Energy		
'Where the development is subject to EIA [Environmental Impact Assessment] the applicant should ensure that the ES [Environmental Statement] clearly sets out any effects on internationally, nationally and locally designated sites of ecological or geological conservation importance, on protected species and on habitats and other species identified as being of principal importance for the conservation of biodiversity. The applicant should provide environmental information proportionate to the infrastructure where EIA is not required to help the Infrastructure Planning Commission (IPC) consider thoroughly the potential effects of a proposed project'.	Section 5.3	Existing environment is discussed in Section 18.5 . Impacts are set out in Section 18.6 .

18.2.4. Planning Policy Wales

10. The planning policy for Wales is set out within the Planning Policy Wales (Welsh Government, 2018). The planning policy document outlines the Welsh Government's approach to facilitating the delivery of the aims set out in Energy Wales: A Low Carbon Transition (Welsh Government, 2012b), as well as UK wide and European renewable energy targets, including obligations under the Renewable Energy Directive (2009/28/EC).
11. The policy recognises the importance and need to protect and enhance areas of geodiversity within Wales, with planning authorities encouraged to conserve and enhance designated sites (e.g. SSSIs, UNESCO Global Geoparks). The policy also encourages, where possible, development on previously developed land but recognises the constraints that land contamination may pose on site selection for future developments without remediation, thus reducing the risks to human health.

18.2.5. Local Planning Policy

12. The onshore elements of the Project fall within the Isle of Anglesey County Council (IoACC) local authority boundary, policies relevant to ground conditions and geology are discussed below. A number of policies are inter-linked with **Chapter 17, Water Resources and Flood Risk** and **Chapter 19, Onshore Ecology**.

18.2.6. Joint Local Development Plan (Anglesey and Gwynedd)

13. **Table 18-2** below provides details on the policies of the Anglesey and Gwynedd Joint Local Development Plan (JLDP) which are relevant to ground conditions and geology.

Table 18-2 Relevant Local Planning Policies of the Joint Local Development Plan

Policy	Policy Purpose
Policy AND 3: Other Renewable Energy and Low Carbon Technologies	Proposals for renewable and low carbon energy technologies, other than wind or solar, which contribute a low carbon future will be permitted, provided that the proposal conforms to the following criteria... <i>"All impacts on landscape character, heritage assets and natural resources have been adequately mitigated, ensuring that the special qualities of all locally, nationally and</i>

Policy	Policy Purpose
	<i>internationally important landscape, biodiversity and heritage designations, including, where appropriate, their settings are conserved or enhanced'</i>
Strategic Policy PS 19: Conserving and where appropriate enhancing the Natural Environment	<p>The Councils will manage development so as to conserve and where appropriate enhance the Plan area's distinctive natural environment, countryside and coastline, and proposals that have a significant adverse effect on them will be refused unless the need for and benefits of the development in that location clearly outweighs the value of the site or area and national policy protection for that site and area in question. When determining a planning application, consideration will need to be given to the following:</p> <ol style="list-style-type: none"> 1. Safeguard the Plan area's habitats and species, geology, history, the coastline and landscapes; 2. Protect or where appropriate enhance sites of international, national, regional and local importance and, where appropriate, their settings in line with National Policy; 3. Have appropriate regard to the relative significance of international, national, regional or local designations in considering the weight to be attached to acknowledge interests, ensuring that any international or national responsibilities and obligations are fully met in accordance with National Policies.
Policy AMG 6: Protecting Sites of Regional or Local Significance	<p>Proposals that are likely to cause direct or indirect significant harm to Local Nature Reserves (LNR), Wildlife Sites (WS) or Regionally Important Geological / Geomorphological Sites (RIGS) will be refused, unless it can be proven that there is an overriding social, environmental and/or economic need for the development, and that there is no other suitable site that would avoid having a detrimental impact on sites of local nature conservation value or local geological importance.</p> <p>When a development is granted, it will be necessary to ensure that there are appropriate mitigation measures in place. It will be possible to use planning conditions and/or obligations in order to safeguard the site's biodiversity and geological importance.</p>

14. **Table 18-3** sets out national and regional policies of direct relevance to Ground Conditions and contamination.

Table 18-3 National and Regional Policy Requirements Relevant to Ground Conditions and Contamination

Policy Description	Reference	ES Reference
Planning Policy Wales		
Where land contamination issues arise, the planning authority will require evidence of a detailed investigation and risk assessment prior to the determination of the application to enable beneficial use of land, unless it can already be established that remedial measures can be employed.	6.9.19	A desk-based review of the potential for contamination within the project area has been conducted as part of the Preliminary Risk Assessment (Appendix

Policy Description	Reference	ES Reference
		18.1, Volume III) to inform the impact assessment. The impacts of the proposed Project are included within Section 18.6 .
Anglesey and Gwynedd Joint Local Development Plan (JLDP)		
Planning permission will be refused where the proposed development would have an unacceptable adverse impact on: 7. The health, safety or amenity of occupiers of local residences, other land and property uses or characteristics of the locality due to increased activity, disturbance, vibration, noise, dust, fumes, litter, drainage, light pollution, or other forms of pollution or nuisance	Policy PCFF 2: Development Criteria	Potential construction impacts to human health are discussed in Section 18.6.4.6 .
1. All impacts on landscape character, heritage assets and natural resources have been adequately mitigated, ensuring that the special qualities of all locally, nationally and internationally important landscape, biodiversity and heritage designations, including, where appropriate, their settings are conserved or enhanced; 3. That the proposal is mitigated to ensure that there aren't any significant unacceptable effects on sensitive uses located nearby; 4. Where appropriate, that the proposal does not have a significant unacceptable effect on the quality and supply of water;	Policy ADN 3: Other Renewable Energy and Low Carbon Technologies	An impact assessment on geological designated sites is presented in Section 18.6.4.1 , including any proposals for mitigation.

18.2.7. Anglesey Area of Outstanding Natural Beauty Management Plan 2015-2020

15. The Isle of Anglesey Area of Outstanding Natural Beauty (AONB) Management Plan 2015-2020 was produced through collaboration of Natural Resources Wales (NRW) and IoACC. It determines what actions are required to ensure that the special qualities of the AONB are conserved and enhanced for future generations.
16. Policies NE 2.1, NE 2.2 and NE 2.3 of the AONB Management Plan relate to Soil, Air and Water and require community involvement in protecting soils and water from pollution with monitoring and promotion of water efficiency measures. All policies are translated into an action plan produced following public and stakeholder consultation.

18.2.8. Impact Assessment Guidance

17. The assessment methodology used in this chapter follows the methodology set out in **Chapter 5, EIA Methodology**. There is no specific assessment guidance to reference in relation to this topic.

18.3. CONSULTATION

18. Consultation is key driver of the EIA and ES and is an ongoing process throughout the lifecycle of the Project, from the initial stages through to consent and post-consent.

19. **Table 18-4** provides a summary of the consultation responses that have been received as a response to the scoping reports relevant to ground conditions and contamination.

Table 18-4 Consultation Responses

Consultee	Date/Document	Comment	Response
NRW	2015 Scoping Comments	Identifying the key impact pathway/receptor combinations will help focus any additional evidence or data collection to most effectively inform the assessment of impacts within the EIA process. We would encourage engagement and with all relevant stakeholders to discuss the need for and scope of any additional data gathering before work commences.	Agreed, stakeholder consultation to define scope and data gaps will be important in determining the level of detail required for approval of ES. Additional consultation was undertaken with comments from the 2017 and 2018 scoping rounds included below in this table.
IoACC	2017 Scoping Comments	Works have the potential to impact small drinking water supplies (PWS); and Historic landfills within the area, potential for land contamination across the area during ground works.	A desk-based review of the potential for contamination within the project area has been conducted as part of the Preliminary Risk Assessment (Appendix 18.1, Volume III) to inform the impact assessment. The impacts of the proposed Project are included within Section 18.6 .
IoACC	2017 Scoping Comments	Concern with ongoing issue associated with contamination in the former Anglesey Aluminium site.	A desk-based review of the potential for contamination within the Project area has been conducted as part of the Preliminary Risk Assessment (Appendix 18.1, Volume III) to inform the impact assessment. The impacts of the proposed Project are included within Section 18.6 .
IoACC	2017 Scoping Comments	Potential land contamination should be considered if cables cross former Anglesey Aluminium land to Orthios site.	A desk-based review of the potential for contamination within the Project area has been conducted as part of the Preliminary Risk Assessment (Appendix 18.1, Volume III) to inform the impact assessment. The impacts of the proposed Project are included within Section 18.6 .
Planning Inspectorate	2018 Scoping Comments	The Scoping Report anticipates that there would be no impacts on geological features due to the limited nature of the onshore development, and because all works would be expected to be located within surface soils (except the landfall installation	Noted. An assessment of the potential impacts to geology is included within Section 18.6 .

Consultee	Date/Document	Comment	Response
		<p>which would require either open trenching or horizontal directional drilling through rock). The Applicant therefore proposes to scope out impacts to geology features. However, Table 7-3 states that the significance of impacts is unknown (although predicted to be negligible).</p> <p>Part of Anglesey are designated as a UNESCO Geopark, although the extent of the designation has not been identified within the Scoping Report. It is acknowledged that the Applicant intends to lay the majority of the onshore cable within or adjacent to existing road infrastructure (Section 5.1.3), however, there is no detailed cable route at present and there is no definitive location for the onshore substation. There is also a need for short sections of cable route to cross unmade ground (Section 8.6.1.1 of Scoping Report). These points combine and accordingly, it would be premature to scope this matter out of the ES.</p>	
Planning Inspectorate	2018 Scoping Comments	Preliminary Risk Assessment: the potential for land contamination in the onshore environment should be identified through a Preliminary Risk Assessment.	A Preliminary Risk Assessment for the Project has been completed and is included as Appendix 18.1, Volume III .
NRW (for PINS)	2018 Scoping Comments	There is the potential for works associated with the proposal to cause land contamination and the Applicant should be mindful of this. Once the landfall location has been finalised, we will need further information of the site setting regarding the potential for land contamination (a Preliminary Risk Assessment) and a water feature survey. The water feature survey should be carried out along all the cable routes and around any buildings, compounds and substations for the development.	<p>A Preliminary Risk Assessment for the Project has been completed and is included as Appendix 18.1, Volume III.</p> <p>An assessment of the water environment is included in Chapter 17, Water Resources and Flood Risk.</p>
NRW (for PINS)	2018 Scoping Comments	<p>Requirement for a Preliminary Risk Assessment:</p> <p>Follow the risk management framework provided in CLR11 'Model Procedures for the</p>	A Preliminary Risk Assessment for the Project has been completed and is included as Appendix 18.1, Volume III .

Consultee	Date/Document	Comment	Response
		<p>Management of Land Contamination' when dealing with land affected by contamination (EA, 2004).</p> <p>Refer to the Environment Agency 'Guiding Principles for Land Contamination' (which has been adopted by NRW) for the type of information required in order to assess risks to controlled waters from the Site (EA, 2010). The local authority can advise on risk to other receptors, e.g. human health.</p>	
IoACC	2018 Scoping Comments	Several RIGS sites are either captured or in close proximity to the onshore scoping area and impacts upon them should be mitigated.	An assessment of the potential impacts to geology is included within Section 18.6 .
IoACC	2018 Scoping Comments	Potential for land contamination should be considered if the cables are directed across the former Anglesey Aluminium land to the Orthios site for connection to the grid (paragraph 8.2.2).	A desk-based review of the potential for contamination within the Project area has been conducted as part of the Preliminary Risk Assessment (Appendix 18.1, Volume III) to inform the impact assessment. The impacts of the proposed Project are included within Section 18.6 .
IoACC PINS & NRW	2018 Scoping Comments	The Scoping Report (at 7.3.1.1) refers to parts of Holy Island/Anglesey being designated as a UNESCO Geopark. This is factually incorrect as the whole of the island benefits from the UNESCO designation and this should be reflected in the ES.	Acknowledged. A desk-based review of designated sites within the Project area, including the UNESCO geopark, has been completed as part of a Preliminary Risk Assessment (Appendix 18.1, Volume III).
IoACC Revised Scheme & NRW	2018 Scoping Comments	<p>The report states that 'due to limited nature of the onshore development it is anticipated that there would be no impacts on the geology environment'. Whilst we agree with this statement in the main, it is necessary to point out that the onshore scoping area captures, or is in close proximity to, a number of RIGS sites. These are:</p> <p>Pen Las Rock RIGS, Penrhofeilw; South Stack Moor and South Stack RIGS, Holyhead; Porthdafarch RIGS, Holyhead; Rhosygader RIGS, Trearddur;</p>	An assessment of the potential impacts to geology is included within Section 18.6 .

Consultee	Date/Document	Comment	Response
		<p>Porth y Post RIGS, Trearddur; Porth y Pwll, Trearddur; and Penrhos Drumlin RIGS, Holyhead.</p> <p>Any impacts on the RIGS sites in question must be adequately considered and mitigated where necessary.</p>	
NRW	2018 Scoping Comments	<p>The potential for the works to cause land contamination should be considered in the ES. Once the landfall location has been finalised, a Preliminary Risk Assessment for land contamination and a water feature survey should be undertaken. The water feature survey should be carried out along the onshore cable routes and around any buildings, compounds and substations for the development.</p>	<p>A Preliminary Risk Assessment is included as Appendix 18.1, Volume III.</p> <p>An Extended Phase 1 Habitat Survey was carried out between September and November 2018, as discussed in Chapter 19, Onshore Ecology, which surveyed all water features along the cable route, this was then used to inform the characterisation of the baseline water environment as discussed in Chapter 17, Water Resources and Flood Risk.</p>
NRW	2018 Scoping Comments	<p>The requirements for a preliminary risk assessment are:</p> <ul style="list-style-type: none"> Follow the risk management framework provided in CLR 11, model procedures for the management of land contamination, when dealing with land affected by contamination (EA, 2004). Refer to the Environment Agency 'Guiding Principles for Land Contamination' (which has been adopted by NRW) for the type of information required in order to assess risks to controlled waters from the site (EA, 2018). The local authority can advise on risk to other receptors, e.g. human health. 	<p>A Preliminary Risk Assessment is included as Appendix 18.1, Volume III.</p>
NRW	2018 Scoping Comments	<p>As noted earlier in this scoping opinion, the onshore area covers, or is in close proximity to, a number of RIGS sites and impacts on the RIGS sites in question must be adequately considered and mitigated where necessary. As such, we disagree that onshore geology should be scoped out of the ES.</p>	<p>An assessment of the potential impacts to geology is included within Section 18.6.</p>

20. Consultation phases are explained further in **Chapter 6, Consultation**.

18.4. METHODOLOGY

18.4.1. Study Area

21. The onshore infrastructure for the proposed Project will include the following elements:

- Landfall cable installation works;
- Landfall substation at Ty-Mawr (hereafter referred to as the landfall substation);
- Onshore cable route joint bays (along onshore cable route between landfall substation and grid substation);
- Onshore cable circuits installed between landfall and grid connection;
- A switchgear building at Parc Cybi (hereafter referred to as the switchgear building); and
- A grid connection substation at Orthios (hereafter referred to as the grid connection substation).

22. A full description of the above infrastructure is provided in **Chapter 4, Project Description**.

23. The study areas are defined by the distance over which impacts on ground conditions and contamination from the Project may occur and by the location of any receptors that might be affected by those potential impacts. This has been established by professional judgement supported by the Preliminary Risk Assessment (PRA) (**Appendix 18.1, Volume III**).

24. The proposed onshore development area, as outlined in **Chapter 4, Project Description**, is the largest area over which direct impacts could be experienced. At this stage, the direct impact study area includes an additional buffer of 1 km. However, contamination sources are only considered within a 250 m buffer of the proposed onshore development area, the risks associated with contamination sources at distances greater than 250 m are thought to decrease with increasing distance and so have not been assessed as part of the PRA.

18.4.2. Data Sources – Desk Study

25. The following data sources have been used to inform this ES:

- Morlais Project PRA (**Appendix 18.1, Volume III**);
- Envirocheck Report (Ref 196332764_1_1) comprising historical maps, environmental sensitivity data and regulatory records;
- British Geological Survey (BGS) online geology viewer;
- The Coal Authority interactive online viewer;
- UK Radon Website (Public Health England);
- Environmental data available on the data.gov.uk website (DEFRA); and
- Publicly available aerial imagery (Google Earth).

26. A site walkover was also undertaken.

18.4.3. Assessment of Ground Conditions

27. The assessment of ground conditions has followed a phased risk-based approach including consideration of potential sources, pathways and receptors to identify potential pollutant linkages that may result in unacceptable risks to receptors from ground contamination. For a risk to exist, all three elements (defined below) must be present.
- Source: A potentially polluting activity or existing ground contamination;
 - Pathway: A route or means by which a receptor could be exposed to or affected by contamination; and
 - Receptor: Something that could be adversely affected by contamination.
28. A PRA was undertaken to determine whether or not the Project poses potentially unacceptable risks to sensitive receptors.
29. The PRA is a desk-based study that forms the initial step in the assessment of potentially contaminated land. Within the PRA, risks are assessed qualitatively and are defined in terms of whether or not they are likely to be 'unacceptable'. If a pollutant linkage is established, then a potentially 'unacceptable' risk exists. It may be possible to manage the risk through design measures, use of protective equipment or procedures during construction. The risk assessment is conservative, therefore, where the presence of contamination or a viable pathway is uncertain, it is assumed that a pollutant linkage exists until proved otherwise by further investigation.

18.4.4. Impact Assessment Methodology

30. The methodology adopted for the assessment of potential impacts follows the generic EIA methodology as presented in **Chapter 5, EIA Methodology** and is based on the following principles:
- The type of effect (long term, short term or intermittent; positive, negative or neutral);
 - The probability of effect occurring;
 - The sensitivity of the receptor (according to the criteria set out in **Table 18-5**); and
 - The magnitude (severity) of the effect (according to the criteria set out in **Table 18-7**).

18.4.4.1. Sensitivity

31. The sensitivity of receptors is assessed according to the criteria set out in **Table 18-5** and is based on the capacity of receptors to tolerate change and whether or not increased risks would be acceptable within the scope of the prevailing legislation and guidelines. Note that human health is considered a high sensitivity receptor in all cases. The degree of change that is considered to be acceptable is dependent on the value of a receptor, which is discussed below.

Table 18-5 Definitions of Sensitivity Levels for Ground Conditions and Contamination

Criteria	Examples
High	Human Health Construction workers Site operatives

Criteria	Examples
Has very limited or no capacity to accommodate physical or chemical changes; or Is an international or nationally important resource.	General public (off-site) Controlled Waters Groundwater Source Protection Zone (SPZ) 1 / 2 (including unpublished abstraction wells). Surface Waters with Water Framework Directive 'High' status objective. Surface water or groundwater supporting internationally designated or nationally important conservation site (e.g. Special Areas of Conservation, Special Protection Area, Ramsar site / Site of Special Scientific Interest) or fishery.
Moderate Has limited capacity to accommodate physical or chemical changes or influences. Is a regionally important resource.	Controlled Waters Principal Aquifer (resource potential) Groundwater SPZ Total Catchment. Licenced groundwater / surface water abstractions. Surface waters with Water Framework Directive Status / Potential objective 'Good'. Surface water or groundwater supporting regionally important wildlife sites (Local Nature Reserve, Site of Nature Conservation Interest) or commercial aquaculture.
Low Has moderate capacity to accommodate physical or chemical changes. Is a locally important resource.	Controlled Waters Secondary A / Undifferentiated Aquifer (resource potential). Unlicensed water supplies. Surface waters with Water Framework Directive Status / Potential objective 'Moderate' / 'Poor'. Surface water or groundwater supporting locally important wildlife or amenity site.
Negligible Is generally tolerant of physical or chemical changes. Is of no significant resource value.	Controlled Waters Secondary B Aquifer / water-bearing Unproductive Strata (resource potential). Surface waters with Water Framework Directive Status / Potential objective 'Bad'.

18.4.4.2. Value

32. The sensitivity assessment takes into account how 'acceptable' changes to the availability or quality of a particular resource would be. This is dependent on the value of that resource which is assessed based on its strategic or geographic importance (**Table 18-6**).

Table 18-6 Definition of value of levels for ground conditions and contamination

Value	Definition
High	Is an international or nationally important resource
Medium	Is a regionally important resource
Low	Is a locally important resource
Negligible	Is of no significant resource value

33. It should be noted that high value and high sensitivity are not necessarily linked within a particular impact. A receptor could be of high value (e.g. Groundwater SPZ 1 areas) but have a low or negligible physical/ecological sensitivity to an effect.

18.4.4.3. Magnitude

34. Potential effects may be adverse, beneficial or neutral. The magnitude of an effect is assessed qualitatively, according to the criteria set out in **Table 18-7**. The following definitions apply to time periods used in the magnitude assessment:

- Long-term: >5 years;
- Medium-term: 1 to 5 years; and
- Short-term: <1 year.

35. For human health, magnitude reflects the likely increase or decrease in exposure risk for a receptor. For controlled waters, magnitude represents the likely effect that an activity would have on resource usability or value, at the receptor. Magnitude is therefore affected by the distance and connectivity between an impact source and the receptor.

Table 18-7 Magnitude of Effect Criteria and Examples

Criteria	Human Health Risk Proposed Development or activity is <i>likely</i> to result in:	Controlled Waters Physical, biological or chemical effects on groundwater or surface water <i>likely</i> to result in:
High Permanent or large-scale change affecting usability, risk or, value over a wide area, or certain to affect regulatory compliance.	Permanent or major change to existing risk of exposure (Adverse / Beneficial). Unacceptable risks to one or more receptors over the long-term or permanently (Adverse). Prosecution e.g. under health and safety legislation (Adverse). Remediation and <i>complete</i> source removal (Beneficial). Construction workers at risk due to lack of appropriate personal protective equipment (Adverse).	Permanent, long-term or wide scale effects on water quality or availability (Adverse / Beneficial). Permanent loss or long-term derogation of a water supply source of a water supply source resulting in prosecution (Adverse). Change in WFD water body status / potential or its ability to achieve WFD status objectives in the future (Adverse / Beneficial). Permanent habitat creation or complete loss (Adverse / Beneficial). Measurable habitat change that is sustainable / recoverable over the long-term (Adverse / Beneficial).
Moderate Moderate permanent or long-term reversible change affecting usability, value, or risk, over the medium-term or local area; possibly affecting regulatory compliance.	Medium-term or moderate change to existing risk of exposure (Adverse / Beneficial). Unacceptable risks to one or more receptors over the medium-term (Adverse). Serious concerns or opposition from statutory consultees (Adverse).	Medium-term or local scale effects on water quality or availability (Adverse / Beneficial). Medium-term derogation of a water supply source, possibly resulting in prosecution (Adverse). Observable habitat change that is sustainable / recoverable over the medium-term (Adverse / Beneficial). Temporary change in status / potential of a WFD waterbody or its ability to meet objectives (Adverse / Beneficial).
Low	Short-term temporary or minor change to existing risk of exposure (Adverse / Beneficial).	Short-term or very localised effects on water quality or availability. (Adverse / Beneficial).

Criteria	Human Health Risk Proposed Development or activity is <i>likely</i> to result in:	Controlled Waters Physical, biological or chemical effects on groundwater or surface water <i>likely</i> to result in:
Temporary change affecting usability, risk or value over the short-term or within the site boundary; measurable permanent change with minimal effect usability, risk or value; no effect on regulatory compliance.	Unacceptable risks to one or more receptors over the short-term (Adverse).	Short-term derogation of a water supply source (Adverse). Measurable permanent effects on a water supply source that do not impact on its operation (Adverse). Observable habitat change that is sustainable / recoverable over the short-term (Adverse / Beneficial). No change in status / potential of a WFD waterbody or its ability to meet objectives (Neutral).
Negligible Minor permanent or temporary change, indiscernible over the medium- to long-term short-term, with no effect on usability, risk or value.	Negligible change to existing risk of exposure. Activity is <i>unlikely</i> to result in unacceptable risks to receptors (Neutral).	Very minor or intermittent impact on local water quality or availability (Adverse / Beneficial). Usability of a water supply source will be unaffected (Neutral). Very slight local changes that have no observable impact on dependent receptors (Neutral). No change in status / potential of a WFD waterbody or its ability to meet objectives (Neutral).

18.4.4.4. Impact Significance

36. The impact significance assessment combines receptor sensitivity with effect magnitude, as shown in **Table 18-8**. Assessment of impact significance is qualitative and reliant on professional experience, interpretation and judgement. The matrix should therefore be viewed as a framework to aid understanding of how a judgement has been reached, rather than as a prescriptive, formulaic tool.

Table 18-8 Impact Significance Assessment

Magnitude	Sensitivity			
	High	Moderate	Low	Negligible
High	Major	Major	Moderate	Minor
Moderate	Major	Moderate	Minor	Minor
Low	Moderate	Minor	Minor	Negligible
Negligible	Minor	Minor	Negligible	Negligible

37. Following initial assessment, if the impact does not require additional mitigation (or none is possible) the residual impact will remain the same. If, however, additional mitigation is proposed there will be an assessment of the post-mitigation residual impact.

38. As with the definitions of magnitude and sensitivity, the matrix used for a topic is clearly defined by the assessor within the context of that assessment. The impact significance categories are divided as shown in **Table 18-9**.

Table 18-9 Impact Significance Definitions

Impact Significance	Definition
Major	Very large or large change in receptor condition, both adverse or beneficial, which are likely to be important considerations at a regional or district level because they contribute to achieving national, regional or local objectives, or could result in exceedance of statutory objectives and / or breaches of legislation.
Moderate	Intermediate change in receptor condition, which are likely to be important considerations at a local level.
Minor	Small change in receptor condition, which may be raised as local issues but are unlikely to be important in the decision-making process.
Negligible	No discernible change in receptor condition.
No Impact	No change, therefore no impact on receptor condition.

39. Note that for the purpose of the EIA, major and moderate impacts are deemed to be 'significant'. In addition, whilst minor impacts are not significant in their own right, it is important to distinguish these from other non-significant impacts as they may contribute to significant impacts cumulatively or through interactions.

18.4.5. Cumulative Impact Assessment

40. **Chapter 5, EIA Methodology** provides a general methodology with regards to the Cumulative Impact Assessment (CIA).
41. The CIA involves consideration of whether impacts on a receptor can occur on a cumulative basis between the Project and other activities, projects and plans for which sufficient information regarding location and scale exist.
42. The potential for cumulative effects has been considered for the construction, operation and decommissioning of the onshore development area cumulatively with other onshore projects.
43. The CIA is presented in **Section 18.6.7**.

18.4.6. Assumptions and Limitations

44. This assessment is based on a range of publicly available information and data from bodies such as NRW and Local Authorities. The direct assessments and judgements given in this report are limited by the finite data on which they are based. However, there is a level of uncertainty associated with extrapolation of site-specific data or non-site data to other locations within the study area, particularly where the study area is large as is the case of the Project.

18.5. EXISTING ENVIRONMENT

45. This section describes the existing environment in relation to ground conditions and contamination. It has been informed by the site walkover, review of published documents and the PRA. The baseline for the physical environment includes the following areas:

- Landfall and landfall substation – this includes landfall, transition pit, cabling laydown and access and landfall substation location. These components of the Project are located adjacent to Abraham's Bosom and South Stack Road.
- Onshore cable route, which is approximately 8.1 km in length, is the route by which the cable will take between landfall and the grid connection.
- Grid connection point – the grid connection point will be via the switchgear building at Parc Cybi and a 132 kV grid connection substation at Orthios.

18.5.1. Site Setting

46. The onshore study area is largely agricultural in nature, which represents potential for both diffuse and point sources of pollution to be present in relation to current agricultural activities. Settlements within or adjacent to the proposed onshore development include Kingsland town, developed areas also have the potential for historic sources of ground contamination.

47. The landfall for the Project is located within Abraham's Bosom on Holy Island, this area consists of an exposed rocky shore, backed by a hinterland of coastal heath and farmland. The landfall station is currently farmed land. From the landfall substation at Ty-Mawr, the onshore cable route mainly follows the minor road network to the A55 and Holyhead to Bangor railway line. The cable will be routed via trenching to a switchgear building at Parc Cybi and be subsequently routed via trenching, with a trenchless crossing under the A55 and rail line, to a substation at Orthios east of Holyhead (the site of the former Anglesey Aluminium Works).

18.5.2. Physical Environment

18.5.2.1. Geology

48. Information on the geological conditions within the study area has been collated from BGS datasets including 1: 50,000 scale geological mapping. The anticipated geological sequence for the landfall, landfall substation, onshore cable route, switchgear building, and grid connection substation as shown on the BGS online viewer, is outlined in **Table 18-10**.

Table 18-10 Geology

Stratum	Unit	Description
Superficial Deposits (units not present within all areas of the project boundary)	Till	Description not provided.
	Glaciofluvial Deposits	Sand and gravel.
	Alluvium	Normally soft to firm consolidated, compressible silty clay, but can contain layers of silt, sand, peat and basal gravel. A stronger desiccated surface zone may be present.

Stratum	Unit	Description
Bedrock	South Stack Formation – Psammite and Pelite	Grey to white turbiditic metasandstone and interbedded blue-grey silty mudstone.
	New Harbour Group	Chlorite-muscovite schist and phyllite, semipelite predominates with subsidiary psammite. Metabasaltic rock and calcsilicate rock locally. Abundant sheet like units of metamafic rock (amphibolite) occur locally.
	Dykes	Several dykes, comprised of gabbro, microgabbro and diorite are present along the proposed route of the site.

49. Holy Island is included within a UNESCO Geopark and there are several RIGS (largely related to Precambrian rock formations and glacial deposits) recorded within both the onshore development area or close proximity to it, details of the RIGS sites include:

- Pen Las Rock RIGS;
- South Stack Moor and South Stack RIGS;
- Porthdafarch RIGS;
- Rhosygader RIGS;
- Porth y Post RIGS;
- Porth y Pwll Trearddur RIGS; and
- Penrhos Drumlin RIGS.

50. Due to the designations given to both the island as a whole and individual areas, the geological sensitivity is considered to be **high**.

18.5.2.2. Hydrology and Surface Drainage

51. Information provided within the PRA indicates that the Project is located within the Crigyll Caradog surface water catchment area. 67 records of inland rivers were identified within the onshore development area, of these 52 are present at the ground surface and 15 are recorded as underground. The inland rivers identified as considered to be comprised of small streams and drainage ditches. There are three lakes recorded within the onshore development area. Within 250 m, there are 125 additional surface water features identified.

52. The coastal area surrounding the onshore development area, including the landfall location, are in an area designated as at risk of extreme flooding from rivers and sea without defences (Zone 2).

53. No surface water abstraction points were identified both within the onshore development area or within 1 km.

54. The sensitivity of hydrology within the onshore development area is considered to be **low**, this designation has been given due to the nature of surface water features both within and in close proximity to the onshore development area and the lack of surface water abstraction points.
55. The baseline hydrology is described in more detail in **Chapter 17, Water Resources and Flood Risk**.

18.5.2.3. Hydrogeology

56. The superficial Till deposits, which is the dominant superficial deposit within the onshore development area, are classified as a Secondary Undifferentiated Aquifer, this classification is given when it has not been possible to attribute either category A or B to a rock type.
57. The superficial Glaciofluvial and Alluvial deposits within the onshore development area are classified as Secondary A Aquifers, this type of aquifer is composed of permeable layers capable of supporting water supplies at a local rather than a strategic scale, and in some cases forming an important source to base flow to rivers.
58. The underlying New Harbour Group and South Stack Formation are classified as Secondary B Aquifers which are defined as comprising predominantly lower permeability strata which may in part have the ability to store and yield limited amounts of groundwater by virtue of localised features such as fissures, thin permeable horizons and weathering.
59. There are no groundwater abstraction points or SPZ recorded within the onshore development area or within 1 km.
60. Due to the Secondary A aquifer designation of the Glaciofluvial and Alluvial deposits, and Secondary Undifferentiated Aquifer of the Till deposits, the sensitivity of areas underlain by these deposits is considered to be **low**. With regards to the Secondary B designation of the underlying bedrock and the absence of a SPZ, the sensitivity is considered to be **negligible**.

18.5.2.4. Land Quality

61. The research undertaken to inform the PRA indicates that a large proportion of the Project is located in areas predominantly utilised for agricultural purposes. Historical OS maps for the landfall, landfall substation, onshore cable route, switchgear building, and grid connection substation areas show a limited number of individual properties recorded since the earliest available historical map (1888) and are probably associated with agricultural activities. There is the potential for both diffuse and point sources of pollution to be present in relation to historical and current agricultural activities within the landfall, landfall substation, onshore cable route, switchgear building, and grid connection substation areas, no other activities were identified that could give risk to land contamination within these areas.
62. The onshore cable route, switchgear building, and grid connection substation also cross/are located within close proximity to a number of potential sources of contamination. The potential sources are:
 - A railway line Chester and Holyhead railway adjacent to the grid connection substation, recorded from 1888-1896 to the present day);

- A HGV fuel station (located adjacent to the onshore cable route, information provided in the production of the PRA does not indicate whether the fuel station is currently operational);
- Aluminium works (recorded adjacent to the railway line at the eastern end of the cable route near to the proposed grid connection substation, recorded from 1969 – 2014);
- Electricity substation (recorded adjacent to the onshore cable route from 1986 until present); and
- The A55 road (adjacent to the railway line, currently in use).

63. These potential sources of contamination may be associated with a wide range of contaminants including, but not limited to, herbicides, hydrocarbons, metals, polychlorinated biphenyl (PCBs), asbestos, volatile organic contaminants (VOCs) and semi-volatile organic contaminants (SVOCs).

64. The landfall and landfall substation and onshore cable route are located in areas where less than 1 % of properties are above the radon action level, as such no radon protection measures would be considered necessary within this section of the proposed development for new buildings, conversions or extensions to existing ones. The switchgear building, and grid connection substation are located within an area where more than 30 % of properties are above the radon action level, as such full radon protection measures would be necessary within this area of the proposed Project for new buildings, conversions or extensions to existing ones.

18.5.2.5. Human Health

65. The required onshore infrastructure comprises landfall works, onshore cable installation, landfall substation, switchgear building and grid connection substation. Haul and access roads will also be required during the construction period.
66. During construction of the onshore infrastructure, the critical human health receptors would be adults involved with construction activities, adjacent off-site residents, site users and adults engaged in other off-site commercial operations. Post-completion, the critical human health receptors will be site users and those engaged in future maintenance / construction activities and off-site commercial workers and residents.
67. On-site receptors could be exposed to contaminants of concern through dermal contact, ingestion and inhalation. Exposure to off-site receptors would be confined to ingestion and inhalation of fugitive dusts. The sensitivity of all these receptors is considered to be **high**.

18.5.3. Sensitive Land Use

68. The proposed Project is located within or in close proximity to the following designated areas:
- AONB – Ynys Mon / Anglesey;
 - Environmentally Sensitive Areas – Ynys Mon / Anglesey;
 - Special Areas of Conservation (SAC) – Gogless Môn Forol / North Anglesey Marine and Glannau Ynys Gybi / Holy Island Coast;

- Special Protection Areas (SPA) – Morwenoliaid Ynys Môn / Anglesey Terns and Glannau Ynys Gybi / Holy Island Coast;
- Site of Special Scientific Interest (SSSI) – Glannau Ynys Gybi / Holy Island Coast;
- Ancient Woodland – Name not supplied; and
- RIGS - Pen Las Rock, South Stack Moor and South Stack, Porthdafarch, Rhosygader, Porth y Post, Porth y Pwll Trearddur and Penrhos Drumlin.

69. Glannau Ynys Gybi / Holy Island Coast SAC includes a variety of Annex I habitats that are the reason for designation: vegetated sea cliffs and extensive cliff crevice and grassland communities. It is also the most important site in North Wales for European dry heaths.
70. Glannau Ynys Gybi / Holy Island Coast SPA supports a resident population of chough *Pyrrhocorax pyrrhocorax* which depends on a diverse mix of habitats.
71. Glannau Ynys Gybi / Holy Island Coast SSSI is a component of the SAC and SPA and is designated for a variety of vascular plants (heathland and maritime species), birds (seabirds, peregrine, chough and heathland species), invertebrates and geology.
72. Within 250 m of the proposed project boundary there are four records of Ancient Woodland (names not supplied in the available information) and on Site of Special Scientific Interest (Beddmanarch-Cymyran) which is designated as a SSSI as it supports a variety of coastal habitats. Further information regarding designated sites can be found in **Chapter 19, Onshore Ecology**.

18.6. IMPACT ASSESSMENT

18.6.1. Overview of Potential Impacts

73. This section details the impact assessment and proposed mitigation for the construction, operation and decommissioning phases of the Project, based upon the worst-case scenario with regards to receptor sensitivity and value (with embedded mitigation), and the magnitude of the potential impact (as detailed in **Section 18.4.4**).

18.6.2. Mitigation

74. All construction work has the potential to impact on land and water quality and human health, through spillages, mobilisation of sediment and contaminants by surface run-off or disturbance of contaminated ground. Embedding mitigation into the project design is a type of primary mitigation and is an inherent aspect of the EIA process. Menter Môn has committed to a number of techniques and engineering designs/modifications as part of the Project (embedded mitigation through design), during the pre-application phase in order to avoid a number of impacts or reduce impacts as far as possible. A full account of embedded mitigation measures is contained in **Chapter 4, Project Description**.
75. Where embedded mitigation measures have been developed into the design of the Project with specific regard to ground conditions and contamination, these are described in **Table 18-11**.

76. Additional mitigation measures are also included to follow best practice and policy requirements. These mitigation measures are described in **Table 18-12**.

Table 18-11 Embedded Mitigation for Ground Conditions

Parameter	Mitigation Measure Embedded into the Project Design
Land quality	Avoidance of construction in areas of historic development, including all historic pits and areas of infilled land identified. Should any unanticipated contamination be encountered during the work, work should be halted and a written statement on how contamination will be dealt with should be agreed with the local authority.

Table 18-12 Additional Mitigation through Best Practice and Policy for Ground Conditions

Parameter	Mitigation Measure through Best Practice and Policy
Code of Construction Practice (CoCP)	Environmental best practice would include both the now revoked Environment Agency best practice guidelines (e.g. Pollution Prevention Guidance (PPG) PPG1, PPG5, PPG6 and PPG22) and current best practice guidelines.
Construction Design Management Regulation (CDM, 2015)	<ul style="list-style-type: none"> All works/operations to be carried out by appropriately trained personnel; Appropriate personal protective equipment (PPE) and working practices to be adopted by construction workers, including subcontractors, and health and safety measures would be undertaken to mitigate any short-term risk during construction; and Development of CDM site specific risk assessment.
Construction Environmental Management Plan (CEMP) and Pollution Prevention and Management Plan (PPMP)	Adherence to a CEMP and PPMP, including Incident/Emergency Response Plans. Incident/Emergency Response Plan which will be drafted in advance of any construction works. The CEMP will provide a protocol under which the environmental risk mitigation and other specific remedial measures will be defined and executed.
CL:AIRE Industry Code of Practice for waste management	Adoption of a CL:AIRE Industry Code of Practice to manage excavated soils on site, thereby maximise sustainability and providing an audit trail to demonstrate the appropriate use of materials. A Material Management Plan (MMP) will be drafted in advance of any construction works. Validation of materials imported to site in line with pre-agreed assessment criteria to ensure that they are suitable for proposed end use. A Site and Excavated Waste Management Plan (SWMP) for the Project will be developed.
Environment Agency groundwater protection pollution prevention guidance (PPG)	Best practice guidance including the Environment Agency PPG notes and guidance from the Construction Industry Research and Information Association (CIRIA).
General best practice	Store oils and fuel within designated areas above ground in impervious storage bunds with a minimum of 110 % capacity to contain any leaks or spillages. Carry out regular inspections of oil and fuel storage areas. Restrict refuelling activities to designated areas where impermeable surfaces and drip trays are utilised. Have spill kit available for use on site always. All staff to have site inductions where appropriate use of chemical and fuels on site are discussed.

Parameter	Mitigation Measure through Best Practice and Policy
	<p>A pollution prevention plan and incident response plan will be incorporated into the environmental management plan. This is to be agreed with NRW and follow industry best practice.</p> <p>Storage of hazardous materials will be done with due care and if adequate store locations cannot be identified within the site compound, these materials will be stored off-site in a secure location.</p> <p>A protocol for dealing with potentially contaminated materials will be utilised during the construction works.</p>
Groundwater quality	<p>A hydrogeological risk assessment to ensure the protection of groundwater where abstractions are present, this should include a detailed hydrogeological risk assessment of the effects of horizontal directional drilling (HDD). This assessment and the proposed methods used to avoid contamination should be agreed with NRW.</p>

77. Any further mitigation measures suggested within this chapter are therefore considered to be additional to this mitigation.

18.6.3. Worst Case Scenario

78. **Chapter 4, Project Description** presents the parameters for the worst-case scenario with respect to impacts associated with the construction, operation and decommissioning of the onshore infrastructure for the Project. The key activities which could result in potential impacts and that are relevant to this chapter are summarised below:

- Impacts associated with HDD at the landfall;
- Impacts associated with trenching at the landfall and along the onshore cable corridor - trenching will be undertaken using a large excavator to dig up the ground along the route, with a rock breaker being required along some sections;
- Impacts associated with excavation of the transition pits using an excavator;
- Landfall substation and associated buildings requiring excavation of materials to form foundations; and
- Impacts associated with inland substation, switchgear building and grid connection substation requiring excavation of materials to form foundations, including the potential for piles.

18.6.4. Potential Impacts During Construction

18.6.4.1. Construction Impact 1: Impacts on Designated Geological Sites

79. The Island of Anglesey is a designated UNESCO Geopark, the Holy Island Coast is also a designated SSSI and there are several RIGS associated with glacial deposits and Precambrian rocks both within and in close proximity to the onshore development area. During construction, direct impacts to the designated geological sites may occur due to the intrusive nature of earthworks including trenching, HDD (at the landfall location) and piling (if required).

80. It is likely that trenching activities will predominantly be located within the superficial deposits, with some areas potentially impacting bedrock where superficial deposits are recorded as

absent, e.g. in some areas of the cable route. Bedrock will be impacted by areas where HDD or piling is required.

81. Impacts relating to offshore cable installation are assessed in **Chapter 7, Metocean Conditions and Coastal Processes**.
82. Due to the designation of the geology as a UNESCO Geopark within the onshore development area, it is considered to be of **high** sensitivity. The impacts are predicated to be of local spatial extent, of short-term duration (related to the working areas only) and of intermittent occurrence. The magnitude of effect is therefore considered to be **negligible**. The potential impact to designated geological sites is deemed to be **minor adverse**.

18.6.4.1.1. Mitigation

83. With the exception of landfall and HDD crossing points, excavation works are proposed to be conducted within the superficial deposits thus minimising the potential impacts to the designated geological sites. HDD is deemed necessary at a number of locations within the onshore development area, mitigation of the impacts to geology would involve limiting these activities where possible and/or avoiding particularly sensitive areas.

18.6.4.1.2. Residual Impact

84. The magnitude of effect remains **negligible** with the potential impact to designated geological sites remains as **minor adverse** which is not significant in EIA terms.

18.6.4.2. Construction Impact 2: Impacts on Groundwater Quality in the Superficial Secondary Aquifers During Earthwork Activities

85. Direct impacts to the Secondary A and Secondary Undifferentiated Aquifers (and by extension private water supplies, if present) within the superficial deposits may occur due to the intrusive nature of earthworks, trenching and piling (if required). The significance of the disturbance will be dependent on the depth of the aquifer unit in relation to the proposed depth of the excavation.
86. During construction, surface layers will be excavated, allowing increased infiltration of rainwater and surface run-off to the subsurface. This could potentially mobilise any residual contamination already present in overlying strata which could potentially migrate into the underlying shallow superficial aquifers. Excavation within areas previously identified as sources of potential contaminants of concern during the PRA, e.g. the former Anglesey Aluminium Works, are considered to be higher risk activities as the potential to disturb residual contamination is greater than in the large section of the proposed onshore development which crosses agricultural land where areas of significant contamination are not anticipated.
87. It is also anticipated that potentially polluting substances and activities could be introduced during the construction works.
88. The secondary aquifers which form part of the superficial deposits are considered to be of **low** sensitivity. Any potentially polluting incidents that occur during the construction phase are predicated to be of local spatial extent within each aquifer unit, of short-term duration (related to the working areas only), of intermittent occurrence and high reversibility. The magnitude of effect

is therefore considered to be **low**. The potential impact to the superficial secondary aquifers is deemed to be **minor adverse**.

18.6.4.2.1. Mitigation

89. As detailed in **Section 18.6.2**, mitigation measures through design include the avoidance of construction activities in areas of historical development (where possible), including all historic pits and area of infilled land that has previously been identified. In addition to these measures, cable installation activities will be designed to ensure that they will not impact groundwater in any significant manner through shallow excavations (approximately 1.7 m deep).
90. Where it is not possible to avoid areas of previous development, e.g. the grid connection point, the accidental release of contaminants will be mitigated through adherence to a CoCP (**Document MOR/RHDHV/DOC/0076, Outline Code of Construction Practice**), CEMP and PPMP, including Incident/Emergency Response Plans.
91. Should any unanticipated contamination be encountered during the work, work should be halted in the area of contamination and a written statement on how contamination will be dealt with should be agreed with the local authority.

18.6.4.2.2. Residual Impact

92. Following the implementation of these mitigation measures, the magnitude of effect is deemed to be **negligible**, the potential for earthworks activities to impact groundwater within the superficial deposits is considered to be of **negligible** significance which is not significant in EIA terms.

18.6.4.3. Construction Impact 3: Impacts on Groundwater Quality in the Secondary B Bedrock Aquifers Resulting from HDD

93. Direct impacts to the Secondary B Aquifers (and by extension private water supplies, if present) may occur from deep ground workings related to HDD operations for cable installation beneath surface infrastructure and watercourses. There is potential for drilling mud to leak along the drill path, or from the immediate area, which could cause contamination of groundwater. The volume of drilling fluid that could be released is dependent on a number of factors, including the size of the fracture, the permeability of the geological material, the viscosity of the drilling fluid, and the pressure of the hydraulic drilling system.
94. Due to the Project not being located within a SPZ and the absence of groundwater abstraction points, the sensitivity of the Secondary B Aquifers associated with the underlying bedrock is considered to be **negligible**.
95. The impacts of construction activities are predicted to be of local spatial extent (occurring only at trenchless crossing locations) and of intermittent occurrence. The magnitude of effect is therefore considered to be **negligible**.
96. The potential impact to the Secondary B Aquifers is deemed to be **negligible** significance.

18.6.4.3.1. Mitigation

97. Although the potential impact to the Secondary B Aquifers is deemed to be of **negligible** significance, where it is not possible to avoid areas of previous development, e.g. the grid connection point, best practice will be followed during constructions works, by adherence to the CoCP (**Document MOR/RHDHV/DOC/0076, Outline Code of Construction Practice**), a CEMP and a PPMP including an Incident/Emergency Response Plan. Adherence to these measures will reduce the potential impacts to the deeper groundwater should accidental release of contamination occur.
98. Should any unanticipated contamination be encountered during the work, work should be halted and a written statement on how contamination will be dealt with should be agreed with the local authority.

18.6.4.3.2. Residual Impact

99. The potential impact to the Secondary B Aquifers remains as **negligible** significance which is not significant in EIA terms.

18.6.4.4. Construction Impact 4: Impact on Groundwater Quality in the Secondary B Bedrock Aquifers Resulting from Piling

100. Direct impacts to the Secondary B Aquifers of the South Stack Formation and New Harbour Group (and by extension private water supplies, if present) may occur as a result of piling. Piling may be required to provide foundations for the landfall substation, switchgear building and grid connection substation. Piling has the potential to create preferential pathways through Till deposits allowing potential contamination of the underlying Secondary B Aquifers.
101. The PRA (**Appendix 18.1, Volume III**) shows that a large section of the onshore development area crosses agricultural land where areas of contamination are not anticipated. Piling activities, if required, are not anticipated to be undertaken within areas identified within the PRA as potential sources of contamination.
102. Due to the Project not being located within a SPZ and the absence of groundwater abstraction points both within the onshore development area and within 1 km, the sensitivity of the Secondary B Aquifers is considered to be **negligible**.
103. The impacts of construction activities are predicted to be of local spatial extent (occurring only at piling locations) and of intermittent occurrence. The magnitude of effect is therefore considered to be **negligible**.
104. The potential impact to the Secondary B Aquifers from piling activities is deemed to be of **negligible** significance.

18.6.4.4.1. Mitigation

105. Although the potential impact to the Secondary B Aquifers is deemed to be of **negligible** significance, where it is not possible to avoid areas of previous development, e.g. the grid connection point, best practice will be followed during constructions works, by adherence to the

CoCP (**Document MOR/RHDHV/DOC/0076, Outline Code of Construction Practice**), a CEMP and a PPMP including an Incident/Emergency Response Plan. Adherence to these measures will reduce the potential impacts to the deeper groundwater should accidental release of contamination occur.

106. If piling is required in areas previously identified as potential sources of contamination, additional mitigation measures may be required prior to piling activities commencing, this may include a ground investigation to identify areas of concern and/or remediation.
107. Should any unanticipated contamination be encountered during the work, work should be halted and a written statement on how contamination will be dealt with should be agreed with the local authority.

18.6.4.4.2. Residual Impact

108. The potential impact to the Secondary B Aquifers from piling activities is deemed to be of **negligible** significance which is not significant in EIA terms.

18.6.4.5. Construction Impact 5: Impact on Surface Waters from Contamination of Groundwaters and Subsequent Discharge

109. As discussed previously there is the potential for groundwater to become contaminated during the earthworks associated with construction. A large section of the onshore development area crosses agricultural land where areas of significant contamination are not anticipated. Within areas previously identified as potential sources of contamination, e.g. the former Anglesey Aluminium works, earthworks associated with construction have the potential to disturb pre-existing contamination.
110. Contamination within the groundwater could migrate laterally and potentially discharge into surface waters both within the onshore development area and the surrounding areas where there is a hydraulic connection. However, the presence of Alluvium, particularly in high risk areas, may significantly delay the potential migration of contaminants encountered or disturbed during excavations associated with the Project within the shallow groundwater. Piling has the potential to introduce new preferential pathways for contamination into the deeper Secondary B Aquifers of the bedrock.
111. It is considered that surface waters represent a **low** sensitivity receptor, this designation has been given due to the nature of surface water features both within and in close proximity to the project boundary and the lack of surface water abstraction points.
112. The effect is predicted to be of local spatial extent, of intermittent occurrence and high reversibility. The magnitude of effect is therefore, considered to be **low**.
113. The potential impact to surface waters is deemed to be **minor adverse**.

18.6.4.5.1. Mitigation

114. As detailed in **Section 18.6.2**, mitigation measures through design include the avoidance of construction activities in areas of historical development (where possible), including all historic

pits and area of infilled land that has previously been identified. Where it is not possible to avoid areas of previous development, e.g. the grid connection point, the accidental release of contaminants will be mitigated through adherence to a CoCP (**Document MOR/RHDHV/DOC/0076, Outline Code of Construction Practice**), CEMP and PPMP, including Incident/Emergency Response Plans. Adherence to these measures will reduce the potential impacts to the deeper groundwater should accidental release of contamination occur.

Should any unanticipated contamination be encountered during the work, work should be halted and a written statement on how contamination will be dealt with should be agreed with the local authority. **Figure 18-1 (Volume II)** illustrates the known areas of contamination within the vicinity of the grid connection substation.

18.6.4.5.2. Residual Impact

115. It is anticipated that after adopting the outline mitigation measures, specifically the adherence to the Environment Agency pollution prevention guidance, the magnitude of effect is considered to be **negligible** and the potential impact would be **negligible** which is not significant in EIA terms.

18.6.4.6. Construction Impact 6: Impacts to Human Health

116. The excavation of the cable trench, earthworks and piling (if required) for the landfall substation, switchgear building and grid connection substation, movement and stockpiling of soils have the potential to mobilise existing ground contamination (where present), which could result in impacts on human health through dermal contact, inhalation and ingestion.
117. The PRA (**Appendix 18.1, Volume III**) showed that a large section of the onshore development area crosses agricultural land where areas of significant contamination are not anticipated. However, there are parts of the onshore development area that crosses potentially contaminated land including a railway and aluminium works.
118. Potential Contaminants of Concern (PCOC) could be present in the proposed onshore development area and represent a risk to construction workers, the public, and future site end-users if exposed during construction activities. Construction activities, particularly earthworks associated with the proposed Project could disturb and expose construction workers to localised made ground soils and potential soil and / or groundwater contamination associated with historical and current land uses within the study area. Construction activities could create pollutant linkages through ingestion, inhalation and direct dermal contact pathways.
119. In the event of exposing soils and stockpiling construction waste (including excavated materials), dust could be generated during dry and windy conditions. Under these conditions, construction workers and the general public, such as users of neighbouring sites and surrounding residents, could temporarily be exposed to contamination via the inhalation of potentially contaminated dusts.
120. The sensitivity of human health as a receptor (construction workers, site operatives and the general public (off-site)), is considered to be **high**.

- 121. The impacts are predicted to be of local spatial extent (localised to the work areas), of short-term duration, of intermittent occurrence and high reversibility (only occurring during the works).
- 122. The magnitude of effect is therefore considered to be **low**. The impact would therefore be considered to be **moderate adverse**.

18.6.4.6.1. Mitigation

- 123. Mitigation will consist of a Site and Excavated Waste Management Plan (SWMP), to ensure that any waste arising is closely monitored, and that waste prevention, re-use or recycling opportunities are maximised. The appropriate waste management route is confirmed following a waste hierarchy assessment. An outline waste assessment report is provided in **Appendix 18.2 (Volume III)**.
- 124. A written scheme (based on the Model Procedures for the Management of Land Contamination, CLR11) for the management of contamination of any land and groundwater would be submitted and approved by the local authority. The document will also provide procedures to follow in the event of encountering unexpected contamination and will include proposals to deal with any waste soils excavated during the works.

18.6.4.6.2. Residual Impact

- 125. Following the implementation of mitigation, the magnitude of effect is **negligible**, the residual impact is predicted to be **negligible** which is not significant in EIA terms.
- 126. Further discussion of human health can be found in **Chapter 25, Socio-economics, Tourism and Recreation**.

18.6.4.7. Construction Impact 7: Impacts on Controlled Waters as a Result of Construction Activities

- 127. There is a possibility that the hydraulic regime of the local area will be affected by the Project. Backfilling the cable trench with less compacted soil could potentially influence the groundwater regime by altering porosity and creating preferential groundwater flow paths.
- 128. Shallow groundwater within superficial deposits is considered to be of **low** sensitivity. The impacts are predicted to be of local spatial extent (localised to the work areas), of short-term duration, of intermittent occurrence and high reversibility (occurring only during the works). The magnitude of effect is therefore considered to be **low**.
- 129. Due to the **low** sensitivity of the receptor and the **low** magnitude of effect, the overall impact during the construction works is therefore considered to be of **minor adverse** significance.

18.6.4.7.1. Mitigation

- 130. Mitigation measures may be required in areas previously identified as potential sources, this may include a ground investigation to identify areas of concern, backfilling with a low permeability material in these areas and/or remediation.

18.6.4.7.2. Residual Impact

131. Following the implementation of mitigation, the magnitude of effect is considered to be **negligible**, the residual impact is predicted to be **negligible** which is not significant in EIA terms.

18.6.5. Potential Impacts During Operation

132. There are unlikely to be any significant additional impacts from the operation of the Project. Routine Operation and Maintenance (O&M) activities will follow standard procedures therefore minimising any potential impacts. Non-routine maintenance will be subject to robust and effective planning and risk assessment procedures.

18.6.6. Potential Impacts During Decommissioning

133. This section describes the potential impacts of the decommissioning of the onshore infrastructure with regards to impacts on ground conditions. Further details are provided in **Chapter 4, Project Description**.
134. In relation to the onshore cable, the programme for decommissioning is expected to include onshore cables remaining in situ where either buried beneath a road or verge. Where the cable has been laid on the surface, it will be removed. If any portion of the cable is to remain in situ, the ends will be terminated.
135. In relation to the landfall substation, switchgear building and grid connection substation, the programme for decommissioning is expected to be similar in duration to the construction phase. The detailed activities and methodology would be determined later within the project lifetime, but are expected to include:
- Dismantling and removal of outside electrical equipment from site located outside of the landfall substation, switchgear building and grid connection substation;
 - Removal of cabling from site;
 - Dismantling and removal of electrical equipment from within the onshore project substation/switchgear buildings;
 - Removal of landfall substation, switchgear building, grid connection substation and minor services equipment;
 - Demolition of the support buildings and removal of fencing;
 - Landscaping and reinstatement of the site (including land drainage); and
 - Removal of areas of hardstanding.
136. Whilst details regarding the decommissioning of the landfall substation, switchgear building and grid connection substation are currently unknown, considering the worst-case scenario which would be the removal and reinstatement of the current land use at the site, it is anticipated that the impacts would be similar or less than to those during construction.
137. The decommissioning methodology would need to be finalised nearer to the end of the lifetime of the Project to be in line with current guidance, policy and legislation at that point. Any such

methodology would be agreed with the relevant authorities and statutory consultees. The decommissioning works could be subject to a separate licencing and consenting approach.

18.6.7. Cumulative Impacts

138. This section describes the CIA for ground conditions and contamination, taking into consideration other plans, projects and activities. The assessment of cumulative impact has been undertaken as a two-stage process, with the first stage comprising an assessment of all the impacts from the previous sections for the potential to act cumulatively with other projects. This summary assessment is set out in **Table 18-13**.

Table 18-13 Potential cumulative impacts

Impact		Potential for Cumulative Impact	Rationale
Construction			
1	Impacts to coastline, including designated areas of outstanding beauty.	Yes	Impacts to interest features of designated sites may be exacerbated by other projects.
2	Contamination of secondary aquifers as a result of construction activities.	Yes	Impacts to secondary aquifers may be exacerbated by other projects.
3	Impacts on groundwater quality in secondary aquifers resulting from trenchless crossing technique (e.g. HDD) conduit construction and piling.	Yes	Impacts to secondary aquifers may be exacerbated by other projects.
4	Impacts on the quality and quantity of surface waters fed by groundwater during construction.	Yes	Impacts to surface waters may be exacerbated by other projects.
5	Impacts to human health, including construction workers and public during any excavations associated with construction.	No	The impacts will be confined to the work area.
6	Impacts on shallow groundwater due to changes to the hydraulic regime as a result of the construction works.	Yes	Impacts to groundwater may be exacerbated by other projects.
Operation			
As discussed previously, there are unlikely to be any significant cumulative impacts from the operation of the Project.			
Decommissioning			
The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and agreed with the regulator. A decommissioning plan will be provided. As such, cumulative impacts during the decommissioning stage are assumed to be the same as those identified during the construction stage.			

139. The second stage of the CIA is an assessment of whether there is a spatial or temporal overlap between the extent of potential effects of the onshore infrastructure and the potential effects of other projects scoped into the CIA upon the same receptors. To identify whether this may occur, the potential nature and extent of effects arising from all projects scoped into the CIA has been identified in **Table 18-14**. Where there is an overlap, an assessment of the cumulative magnitude of effect is provided.



Table 18-14 Project screening for CIA for Ground Conditions and Contaminated Land

Project	Online Reference	Current Status	Description	Distance (km)	Discussion	Potential for Cumulative Impact
Extensions to dwelling	FPL/2019/23	Consented 13/03/19, construction status unknown	Full application for the subdivision of existing dwelling into two dwellings together with alterations and extensions at Cefn Coch, Trearddur Bay. EIA not required	0	Due to the nature and scale of the project no cumulative effects on onshore ground conditions and contamination are considered likely.	No
Holyhead Premier Inn	MAO/2019/1	Operational	Minor amendments to scheme previously approved under planning permission 19C842E/1/TR/ECON so as to amend the plans of the approved scheme	0	No cumulative effects for onshore geology and ground conditions as project already operational.	No
Parc Cybi	FBL/2018/25	Application validated, awaiting decision	Erection of a building to be used as a builder's merchant with warehouse and sales floor areas (general use), construction of a new vehicular site access, storage yard, loading areas together with soft and hard landscaping areas at Parc Cybi	0	Overlapping proposed project boundaries may result in impacts of a direct and/or indirect nature on geology, controlled waters, human health and ground conditions.	Yes
Roadking Parc Cybi	19C842M/1/ECON	Consented, construction status unknown	Application to discharge conditions relating to planning permission 19C842M/1/ECON on land adjacent to Roadking, Parc Cybi, Holyhead.	0	Overlapping proposed project boundaries may result in impacts of a direct and/or indirect nature on geology ground conditions, however, due to incorporation of a CEMP and the nature of the development, there will be no cumulative impacts on geology and ground conditions.	No



Project	Online Reference	Current Status	Description	Distance (km)	Discussion	Potential for Cumulative Impact
Change of use to residential property	FPL/2018/58	Consented, construction status unknown	Full application for the change of use part of the existing garage into a self-contained annexe at Maes y Geiniog, Penrhos Feilw, Caergybi / Holyhead.	0.25	Due to the nature and scale of the development no cumulative effects on onshore ground conditions and contamination are considered likely.	No
Penrhos Coastal Park	RM/2018/6	Consented, construction status unknown	Reserved matters application including details of the appearance, landscaping, layout and scale for raised boardwalk footways within woodlands to provide locations for artworks, pond edge access and viewing decks, outdoor learning area, bird and squirrel feeding locations, bird watching hides, picnic area enhancement, interpretation and directional signage, cycle parking, vehicle access turning and parking, waste storage and collection bins on part of the publicly accessible area approved under outline planning permission 46C427K/TR/EIA/ECON at the Penrhos Coastal Park, Holyhead at Land and Lakes Penrhos Coastal Park Holyhead.	0.35	Due to the nature of the development no cumulative effects on onshore ground conditions and contamination are considered likely.	No
Amendments to construction at industrial unit	MAO/2018/1	Consented, construction status unknown	Minor amendments to scheme previously approved under planning permission 19C689P/1/VAR so as to amend the materials at Uned/Units 6 / 8, Parc Ddiwyddianol Penrhos Industrial Estate, Caergybi / Holyhead.	0.4	Due to proximity of the development to the Project there is the potential for cumulative impacts of a direct and/or indirect nature on geology, controlled waters and ground conditions.	Yes
Conversion of outbuilding	FPL/2018/55	Consented, construction status unknown	Full application for the conversion of outbuilding into a holiday accommodation together with the installation of a package treatment plant at Penrhyn Owen	0.4	Due to proximity of the development to the Project there is the potential for cumulative impacts of a direct and/or indirect nature	Yes



Project	Online Reference	Current Status	Description	Distance (km)	Discussion	Potential for Cumulative Impact
					on geology, controlled waters and ground conditions.	
Penrhos Industrial Estate	FPL/2019/55	Application validated: 06/03/2019	Full application for the erection of an industrial unit on land at Block D Stad Ddiwydiannol Penrhos Industrial Estate, Caergybi/Holyhead	0.5	Due to proximity of the development to the Project there is the potential for cumulative effects of a direct and/or indirect nature on geology, controlled waters and ground conditions.	Yes
Amendments to construction at industrial unit	19C779N/VAR	Consented, construction status unknown	Application under Section 73 for the variation of conditions (02) (non-food retail) and (12) (as approved drawings) of planning permission reference 19C779A and condition (01) (non-food retail) of planning application 19C779J (Erection of a A1 class retail) so as to allow the sale and display of convenience and comparison goods together with the formation of one unit in lieu of two units at Uned 1 ag Uned 2 / Unit 1 and Unit 2, Parc Busnes Penrhos Business Park, Caergybi / Holyhead.	0.6	Due to proximity of the development to the Project there is the potential for cumulative effects of a direct and/or indirect nature on geology, controlled waters and ground conditions.	Yes

18.6.7.1. Cumulative Impacts during Construction

140. A number of projects have been identified that could result in cumulative impacts; however, it is assumed that they will be constructed with relevant mitigation measures embedded within their design. These measures should prevent significant adverse impacts on ground conditions or contamination occurring as a result, therefore it is considered that there is no pathway for cumulative impacts.

18.6.7.2. Cumulative Impacts during Operation

141. There are unlikely to be any pathway cumulative impacts from the operation of the Project. Routine O&M activities will follow standard procedures therefore minimising any potential impacts.

18.6.7.3. Cumulative Impacts during Decommissioning

142. No decision has been made regarding the final decommissioning policy for the onshore infrastructure as it is recognised that industry best practice, rules and legislation change over time. However, the landfall substation, switchgear building, and grid connection substation will likely be removed and reused or recycled. It is expected that the onshore cables will be removed and recycled, with the transition bays and cable ducts (where used) left in-situ. The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and agreed with the regulator. A decommissioning plan will be provided. As such, impacts no greater than those identified for the construction phase are expected for the decommissioning phase.

18.6.8. Inter-relationships

143. **Table 18-15** lists out the inter-relationships between this chapter and other chapters within the ES.

Table 18-15 Inter-topic relationships

Topic and description	Related chapter	Where addressed in this chapter	Rationale
Impacts to coastline, including designated geological sites.	Chapter 7, Metocean and Coastal Processes	Section 18.6.4 – 18.6.6	The Project could indirectly impact designated geological sites by affecting erosion and deposition processes.
Impacts to coastline, including designated geological sites.	Chapter 8, Marine Water and Sediment Quality	Section 18.6.4 – 18.6.6	The Project could indirectly impact designated geological sites by affecting erosion and deposition processes.

Topic and description	Related chapter	Where addressed in this chapter	Rationale
Impacts on quality and quantity of surface waters fed by groundwater during construction.	Chapter 17, Water Resources and Flood Risk	Section 18.6.4 – 18.6.6	Any Project-related impacts on the quality and quantity of surface waters could impact upon the hydraulically connected groundwaters.

18.6.8.1. Interactions

144. The impacts identified and assessed in this chapter have the potential to interact with each other, which could give rise to synergistic impacts as a result of that interaction. The worst-case impacts assessed within the chapter take these interactions into account and for the impact assessments are considered conservative and robust. For clarity the areas of interaction between impacts are presented in **Table 18-16**, along with an indication as to whether the interaction may give rise to synergistic impacts.



Table 18-16 Potential interactions between impacts

Potential interaction between impacts							
Construction	Impacts on Designated Geological Sites	Impacts on Groundwater Quality in the Superficial Secondary Aquifers During Earthwork Activities	Impacts on Groundwater Quality in the Secondary B Bedrock Aquifers Resulting from HDD	Impact on Groundwater Quality in the Secondary B Bedrock Aquifers Resulting from Piling	Impact on Surface Waters from Contamination of Groundwaters and Subsequent Discharge	Impacts to Human Health	Impacts on Controlled Waters as a Result of Construction Activities
Impacts on Designated Geological Sites	-	No	No	No	No	No	No
Impacts on Groundwater Quality in the Superficial Secondary Aquifers During Earthwork Activities	No	-	Yes	Yes	Yes	No	Yes
Impacts on Groundwater Quality in the Secondary B Bedrock Aquifers Resulting from HDD	No	Yes	-	Yes	Yes	No	Yes



Potential interaction between impacts							
Construction	Impacts on Designated Geological Sites	Impacts on Groundwater Quality in the Superficial Secondary Aquifers During Earthwork Activities	Impacts on Groundwater Quality in the Secondary B Bedrock Aquifers Resulting from HDD	Impact on Groundwater Quality in the Secondary B Bedrock Aquifers Resulting from Piling	Impact on Surface Waters from Contamination of Groundwaters and Subsequent Discharge	Impacts to Human Health	Impacts on Controlled Waters as a Result of Construction Activities
Impact on Groundwater Quality in the Secondary B Bedrock Aquifers Resulting from Piling	No	Yes	Yes	-	Yes	No	Yes
Impact on Surface Waters from Contamination of Groundwaters and Subsequent Discharge	No	Yes	Yes	Yes	-	No	Yes
Impacts to Human Health	No	No	No	No	No	-	No
Impacts on Controlled Waters as a Result of Construction Activities	No	Yes	Yes	Yes	Yes	No	-
Operation							



Potential interaction between impacts							
Construction	Impacts on Designated Geological Sites	Impacts on Groundwater Quality in the Superficial Secondary Aquifers During Earthwork Activities	Impacts on Groundwater Quality in the Secondary B Bedrock Aquifers Resulting from HDD	Impact on Groundwater Quality in the Secondary B Bedrock Aquifers Resulting from Piling	Impact on Surface Waters from Contamination of Groundwaters and Subsequent Discharge	Impacts to Human Health	Impacts on Controlled Waters as a Result of Construction Activities
There are unlikely to be inter-topic effects from the operation of the Project. Routine Operation and Maintenance (O&M) activities will follow standard procedures therefore minimising any potential impacts. Non-routine maintenance will be subject to robust and effective planning and risk assessment procedures.							
Decommissioning							
It is anticipated that the decommissioning impacts will be similar in nature to those of construction.							

18.7. SUMMARY

145. The proposed development is located within an area which has a number of sensitive land uses including AONB, Environmentally Sensitive Areas, SSSI, SPA and SACs. In addition to these sensitive land uses, the whole of the Island of Anglesey is a designated UNESCO Geopark.
146. A summary of the findings of the ES for ground conditions and contamination is presented in **Table 18-17**. In accordance with the assessment methodology, this table should only be used in conjunction with the additional narrative explanations provided in **Section 18.4.4**. This demonstrates that provided mitigation measures (both embedded and additional) are in place to prevent impacts on receptors the project is anticipated to be **negligible** in relation to ground conditions and contamination.



Table 18-17 Potential Impacts Identified for Ground Conditions and Contamination

Potential Impact	Receptor	Sensitivity	Magnitude	Significance	Additional Mitigation Measures	Residual Impact
Construction						
Impact 1: Impacts on designated geological sites	Geology	High	Low	Minor Adverse	N/A	N/A
Impact 2: Impacts on Groundwater Quality in the Superficial Secondary Aquifers During Earthwork Activities	Secondary A and Undifferentiated Aquifers	Low	Low	Negligible	N/A	N/A
Impact 3: Impacts on Groundwater Quality in the Secondary B Bedrock Aquifers Resulting from HDD	Secondary B Aquifers	Negligible	Negligible	Negligible	N/A	N/A
Impact 4: Impact on Groundwater Quality in the Secondary B Bedrock Aquifers Resulting from Piling	Secondary B Aquifers	Negligible	Negligible	Negligible	N/A	N/A
Impact 5: Impact on Surface Waters from Contamination of Groundwaters and Subsequent Discharge	Surface Waters	Low	Low	Minor	Adherence to the Environment Agency pollution prevention guidance.	Negligible
Impact 6: Impacts to Human Health	Humans	High	Low	Moderate Adverse	Appropriate personal protective equipment (PPE) and working practices to be adopted by construction workers, including subcontractors, and health and safety measures would be undertaken to mitigate any	Negligible



Potential Impact	Receptor	Sensitivity	Magnitude	Significance	Additional Mitigation Measures	Residual Impact
					short-term risk during construction.	
Impact 7: Impacts on Controlled Waters as a Result of Construction Activities	Controlled waters	Low	Low	Minor Adverse	Use of lower permeability material to backfill trenches in areas identified as being/in close proximity to potential sources.	Negligible

18.8. REFERENCES

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