Awel y Môr Offshore Wind Farm

Category 6: Environmental Statement

Volume 3, Chapter 6: Ground Conditions and Land Use

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AWEL Y MÔR
Offshore Wind Farm

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Glossary of terms

TERM	DEFINITION
Development Consent Order	An order made under the Planning Act 2008 granting development consent for a Nationally Significant Infrastructure Project (NSIP) from the Secretary of State (SoS) for Business, Energy and Industrial Strategy (BEIS).
Export Cable Corridor (ECC)	The area(s) where the export cables will be located connecting Landfall to the OnSS and the OnSS to the existing National Grid Bodelwyddan substation.
ES	Environmental Statement (the documents that collate the processes and results of the EIA).
Horizontal Directional Drilling (HDD)	HDD involves the use of mechanical drill to bore a long hole underground using a drilling rig.
Landfall	The Landfall denotes the location where the offshore export cables are brought ashore and jointed to the onshore export cables in TJBs.
Maximum Design Scenario (MDS)	The maximum design parameters of the combined project assets that result in the greatest potential for change in relation to each impact assessed.
Mitigation	Commitments made by the project to reduce and/or eliminate the potential for significant effects to arise as a result of the project. Mitigation measures can be embedded (part of the project design) or secondarily added to reduce

TERM	DEFINITION
	impacts in the case of potentially significant effects.
Onshore Export Cable Corridor (onshore ECC)	The proposed cable route which represents a corridor, typically 40 m to 60 m wide, within which the cable trenching, haul road and stockpiling areas associated with cable construction, will be undertaken and the cables will be installed.
PEIR	Preliminary Environmental Information Report. The PEIR is written in the style of a draft Environmental Statement (ES) for the statutory consultation. Following that consultation, the PEIR documentation is updated into the final ES that will accompany the applications for the Development Consent Order (DCO) and Marine Licence.
Route section	A defined section of the route
OnSS Access Zone	The area within which the substation construction would take place. This area incorporated both the Substation Footprint and areas of cut and fill required to construct the substation platform
OnSS Footprint	The footprint for the substation which would incorporate appropriate substation technology.
OnSS Cable Corridor Zone	The area which will contain final cable connection into and out of the substation will be made. The route of the cable connections to the substation will be

TERM	DEFINITION
	confirmed following detailed design (post consent). The cable route will be either east or west of the pond located immediately south of the substation.
The Applicant	Awel y Môr Offshore Wind Farm Limited.

Abbreviations and acronyms

TERM	DEFINITION
ALC	Agricultural Land Quality
AyM	Awel y Môr Offshore Wind Farm
BMVAL	Best and Most Versatile Agricultural Land
BGS	British Geological Survey
CIRIA	Construction Industry Research and Information Association
CoCP	Code of Construction Practice
DCC	Denbighshire County Council
DEFRA	Department for Environment, Food & Rural Affairs
ECC	Export Cable Corridor
EIA	Environmental Impact Assessment
EPA	Environmental Protection Act 1990
ES	Environmental Statement
ETG	Expert Topic Group
GPP	Guidance for Pollution Prevention'

TERM	DEFINITION
HDD	Horizontal Directional Drilling
HVAC	High Voltage Alternating Current
LDP	Local Development Plan
MDS	Maximum Design Scenario
MHWS	Mean High Water Springs
MLWS	Mean Low Water Springs
NRW	Natural Resources Wales
NPS	National Policy Statement
NSIP	Nationally Significant Infrastructure Project
CoCP	Code of Construction Practice
OnSS	Onshore Substation
PCL	Potential Contaminant Linkage
PPG	Pollution Prevention Guidelines
PPW	Planning Policy Wales
RIGS	Regionally Important Geological Site
SAC	Special Area of Conservation
SPZ	Source Protection Zone
SSSI	Site of Special Scientific Interest
TAN	Technical Advice Note
TCC	Temporary Construction Compound
TJB	Transitional Joint Bay
UXO	Unexploded Ordnance

Units

UNIT	DEFINITION
km	Kilometre
m	Metre

6 Ground Conditions and Land Use

6.1 Introduction

1 This chapter of the Environmental Statement (ES) considers the likely significant effects associated with the onshore elements of the Awel y Môr Offshore Wind Farm (AyM) on ground conditions and land use.

2 In particular it considers the construction, operational and decommissioning onshore activities.

3 This chapter has been informed by the following ES chapters and technical reports:

- Volume 3, Chapter 1: Onshore Project Description (application ref: 6.3.1);
- Volume 3, Chapter 7: Hydrology, Hydrogeology and Flood Risk (application ref: 6.3.7);
- Volume 8, Document 8.3 Outline Code of Construction Practice (CoCP) (application ref: 8.13)

4 This ground conditions and land use chapter will:

- Describe the existing baseline established from desk studies, dedicated surveys and consultation;
- Outline the potential environmental effects on Ground Conditions and Land Use arising from the onshore elements of AyM, based on the information gathered and the analysis and assessments undertaken;
- Provide an assessment of the potential direct and indirect impacts of the onshore elements of AyM, including the construction and operation and decommissioning phases, on ground conditions and land use;
- Identify any assumptions and limitations encountered in compiling the environmental information; and
- Highlight any necessary monitoring and/or mitigation measures which could prevent, minimise, reduce or offset the possible significant environmental effects identified.

5 The effects considered in this chapter include those on geological conditions and resources that form part of the onshore physical environment. Effects on hydrogeology and groundwater (including groundwater abstractions) are considered in Volume 3, Chapter 7 (application ref: 6.3.7).

6.2 Statutory and policy context

6 This section identifies the legislation and policy that has informed the assessment of effects with respect to ground conditions and land use. Further information on policies relevant to the EIA and their status are provided in Volume 1, Chapter 2: Policy and legislative context (application ref: 6.1.2).

7 A summary of the legislation and policies of relevance to this assessment are provided in the sections below and in Table 1 together with an indication of where each requirement is addressed.

6.2.1 Legislation

8 Specific UK legislation and guidance on the assessment of contaminated land is principally provided under:

- Part 2A of the Environment Protection Act (EPA) 1990,
- The Contaminated Land (Wales) Regulations 2006 (No.2989 W.278) make provision, in relation to Wales, for the identification and remediation of contaminated land under Part 2A of the Environmental Protection Act 1990; and
- The Environment (Wales) Act 2016 is designed to enable a more sustainable and coordinated approach to the planning and management of the natural resources of Wales. Overall, the regime advocates a precautionary approach to dealing with contaminated land, there is clear direction to avoid the "excessive cost burdens" of "wastefully expensive remediation".

9 The normal procedure for assessing land dictates that potential contaminant sources, pathways and receptors should be considered within the context of potential contaminant linkages (PCL's) and that an evaluation of the risks associated with each linkage should drive decisions regarding the status of the land as contaminated, unaffected by contamination or requiring further investigation.

10 Under Part 2A EPA 1990 the starting point should be that land is not contaminated land unless there is reason to consider otherwise. Only land where unacceptable risks are clearly identified, after a risk assessment has been undertaken in accordance with the guidance, should be considered as meeting the Part 2A EPA 1990 definition of contaminated land.

11 Under Part 2A EPA 1990, risks should be considered only in relation to the current use of the land. "Current use" means:

- The use which is being made of the land currently;
- Reasonably likely future uses of the land that would not require a new or amended grant of planning permission;
- Any temporary use to which the land is put, or is likely to be put, from time to time within the bounds of current planning permission; and
- Likely informal use of the land, for example children playing on the land, whether authorised by the owners or occupiers, or not.

12 Further assessment of these sites should be subject to detailed inspection under Part 2A EPA 1990 by Local Authorities and should be classified as Categories 1 to 4. For clarity:

- Category 1: describes land which is clearly problematic;
- Categories 2 and 3: cover the less straightforward land where detailed consideration is needed before deciding whether it is Category 2 (contaminated land requiring remedial action) or Category 3 (not contaminated land); and
- Category 4: describes land that is clearly not contaminated land.

13 The Category 4 test is particularly important in this instance as it defines when land is clearly not 'contaminated land' in the legal sense. It introduces the idea that it would be exceptional for land exhibiting normal background levels of contamination or contaminant levels below published assessment criteria to be considered as 'contaminated land'.

6.2.2 Planning Policy

6.2.3 National Policy Statements

14 The National Policy Statements (NPS) are the principal policy for determining Nationally Significant Infrastructure Projects (NSIP). As such, this assessment has made explicit reference to the relevant NPS requirements.

15 Those relevant to the ground conditions and land use aspects of the onshore elements of AyM are:

- Overarching National Policy Statement for Energy (EN-1, DECC 2011a);
- National Policy Statement for Renewable Energy Infrastructure (EN-3 (DECC 2011b).
- National Policy Statement for Electricity Networks Infrastructure (EN-5 (DECC 2011c).

16 The NPSs provide the main policy tests in relation to AyM. In addition to the current NPS, draft NPSs were consulted upon in November 2021. The draft NPSs have been reviewed to determine the emerging expectations and changes from previous iterations of the NPSs. This includes the Draft Overarching NPS EN-1 (DECC, 2021a) and Draft EN-3 and Draft EN-5 (DECC, 2021b).

17 Elements of NPS EN-1 and the draft NPS EN-1 that are relevant to ground conditions and land use are summarised in Table 1 below. Guidance in relation to renewable energy projects is provided within NPS EN-3 and electricity networks infrastructure in EN-5, however, with regard to ground conditions and land use both EN-3 and EN-5 refer to relevant sections of EN-1 and so are not included in the summary table.

6.2.4 Planning Policy Wales (Edition 11)

18 Planning Policy Wales (PPW) (Edition 11) (Welsh Government, 2021) sets out the land use planning policies of the Welsh Government. It is supplemented by a series of Technical Advice Notes (TAN), Welsh Government Circulars, and policy clarification letters, which together with PPW provide the national planning policy framework for Wales.

19 The primary objective of PPW is to ensure that the planning system contributes towards the delivery of sustainable development and improves the social, economic, environmental and cultural well-being of Wales, as required by the Planning (Wales) Act 2015, the Well-being of Future Generations (Wales) Act 2015 and other key legislation.

20 PPW also provides guidance in relation to Previously Developed Land, Best and Most Versatile Agricultural Land (BMVAL), contaminated land and physical ground conditions and land instability that are summarised below considered and described in Section 6.7 and considered in Section 6.10, Section 6.11 and Section 6.12.

6.2.5 Previously Developed Land

21 PPW has a core aim to encourage the effective use of land by reusing land that has been previously developed (brownfield land), provided that it is not of high environmental value.

6.2.6 The Best and Most Versatile Agricultural Land (BMVAL)

22 PPW states that local planning authorities should consider the benefits of "Best and Most Versatile Agricultural Land" when considering whether significant development of agricultural land is necessary. The BMVAL is defined as Grades 1, 2 and 3a by PPW and some 7% of land in Wales falls within this classification.

6.2.7 Safeguarding Mineral Resources and Infrastructure

23 PPW recognises that access to mineral resources, needs to be safeguarded in order to prevent sterilisation by other forms of permanent development.

6.2.8 Land Contamination

24 PPW directs that planning decisions need to consider the potential hazard arising from contamination along with the results of specialist investigation and risk assessment provided by the developer. Where appropriate, remediation measures and validation verification details should be implemented.

6.2.9 Physical Ground Conditions and Land Instability

25 PPW acknowledges that development of greenfield land or intensification of development can lead to instability affecting both the development and surrounding land. The planning system should consider the direct hazards of ground instability and associated risks to welfare, life and surrounding structures as well as indirect hazards such as mine works and potential release of landfill or mine gas.

Table 1: Legislation and policy context.

LEGISLATION/ POLICY	KEY PROVISIONS	SECTION WHERE COMMENT ADDRESSED
Part 2A of the EPA 1990;	The legislation requires the identification of contamination sources, pathways and receptors which are “likely” to represent an “unacceptable” risk either to human health or the surrounding environment; The legislation in relation to contaminated land thus enables central government to protect and improve environmental quality of historical contamination and in pursuing policies to re-use and redevelop sites ensures developers and local authorities are aware of potential contamination issues.	The identification of potential contamination is presented in Section 6.7.8
The Contaminated Land (Wales) Regulations 2006	The Contaminated Land (Wales) Regulations 2006 make provision, in relation to Wales, for the identification and remediation of contaminated land under Part 2A of the Environmental Protection Act 1990.	The identification of potential contamination is presented in Section 6.7.8

LEGISLATION/ POLICY	KEY PROVISIONS	SECTION WHERE COMMENT ADDRESSED
The Overarching National Policy Statement for Energy (EN-1)	EN-1, paragraph 5.3.3 requires the ES to: "*clearly set out any effects on internationally, nationally and locally designated sites of ... geological conservation importance";*	The effects of onshore infrastructure associated with AyM on designated sites of geological conservation importance are considered in Section 6.7.3
EN-1	EN-1 paragraph 5.3.4 requires the applicant to show how geological interests have been conserved and enhanced	Geological interests have been conserved through sensitive routing of the onshore ECC and siting of the OnSS. As noted in Section 6.7.3, There are no geologically designated sites within the ground conditions and land use study area. Routing and siting considerations are discussed in Volume 1, Chapter 4 Site Selection and Alternatives (application ref: 6.1.4).
EN-1	EN-1, paragraph 5.3.7: avoid significant harm to ... *"geological conservation interests including through mitigation and consideration of reasonable alternatives"* ...; where significant harm cannot be avoided, then	As above, geological interests have been conserved through sensitive routing of the onshore ECC and siting of the OnSS The effects of onshore infrastructure associated with AyM on designated sites of geological conservation importance are considered in Section 6.7.3

LEGISLATION/ POLICY	KEY PROVISIONS	SECTION WHERE COMMENT ADDRESSED
	appropriate compensation measures should be sought,	
EN-1	EN-1, paragraph 5.10.8:*" seek to minimise impacts on the Best and Most Versatile Agricultural Land and to minimise impacts on soil quality taking into account any mitigation measures proposed".* For developments on previously developed land, applicants should ensure that they have considered the risk posed by land contamination.	The effects of onshore infrastructure associated with AyM on agricultural land and soil quality are considered in Section 6.10, Section 6.11 and Section 6.12
EN-1	EN-1, paragraph 5.10.8: *"For developments on previously developed land, applicants should ensure that they have considered the risk posed by land contamination".*	Routing and siting considerations that are discussed in Volume 1, Chapter 4 Site Selection and Alternatives (application ref: 6.1.4). Although the onshore infrastructure does not utilize previously developed land, an assessment of the potential for impacts to occur from contamination is provided in Section 6.10 and Section 6.11 Section 6.7.7

LEGISLATION/ POLICY	KEY PROVISIONS	SECTION WHERE COMMENT ADDRESSED
EN-1	EN-1 paragraph 5.10.9 states that *'Applicants should safeguard any mineral resources on the proposed site as far as possible, taking into account the long-term potential of the land use after any future decommissioning has taken place.'*	The effects of onshore infrastructure associated with AyM on mineral safeguarding areas is considered in Section 6.10.6
Draft NPS EN-1	Draft NPS EN-1 paragraph 5.4.3: "*clearly set out any effects on internationally, nationally and locally designated sites of ... geological conservation importance";*	The effects of onshore infrastructure associated with AyM on designated sites of geological conservation importance are considered in Section 6.7.3
Draft NPS EN-1	Draft NPS EN-1 paragraph 5.4.4 requires the applicant to show how geological interests have been conserved and enhanced	Geological interests have been conserved through sensitive routing of the onshore ECC and siting of the OnSS. As noted in Section 6.7.3, There are no geologically designated sites within the ground conditions and land use study area. Routing and siting considerations are discussed in Volume 1, Chapter 4 Site Selection and Alternatives (application ref: 6.1.4).

LEGISLATION/ POLICY	KEY PROVISIONS	SECTION WHERE COMMENT ADDRESSED
Draft NPS EN-1	Draft NPS EN-1, paragraph 5.4.6: states that development should avoid significant harm to … *"geological conservation interests including through mitigation and consideration of reasonable alternatives"* …; where significant harm cannot be avoided, then appropriate compensation measures should be sought,	As above, geological interests have been conserved through sensitive routing of the onshore ECC and siting of the OnSS The effects of onshore infrastructure associated with AyM on designated sites of geological conservation importance are considered in Section 6.7.3
Draft NPS EN-1	Draft NPS EN-1, paragraph 5.11.8: states that the applicant should '*seek to minimise impacts on the Best and Most Versatile Agricultural Land'* and to '*minimise impacts on soil quality taking into account any mitigation measures proposed. For developments on previously developed land, applicants should ensure that they have considered the risk posed by land contamination.'* Paragraph 5.11.8 of the Draft NPS EN-1 adds that where contamination is present, applicants should consider opportunities for remediation where possible. Applicants are	The effects of onshore infrastructure associated with AyM on agricultural land and soil quality are considered in Section 6.10, Section 6.11 and Section 6.12 As set out in Section 6.7.8 no contamination sources have been identified along the route of the onshore ECC or OnSS location. As such, there is no anticipated requirement for remediation. An outline Pollution Prevention and Emergency Incident Response Plan (PPEIRP), has been provided as part of the outline Code of Construction Practice (CoCP - Volume 8,

LEGISLATION/ POLICY	KEY PROVISIONS	SECTION WHERE COMMENT ADDRESSED
	encouraged to develop and implement a Soil Management Plan which could help minimise potential land contamination.	Document 8.3 Outline Code of Construction Practice (application ref: 8.13)) and sets out procedures to be followed should sources of contamination be discovered during construction phase works. All construction work will be undertaken in accordance with a Soil Management Plan (SMP) an outline version of which is provided in Volume 8, Document 8.3 Outline Code of Construction Practice (application ref: 8.13) that sets out the principles to be followed when the final SMP is finalised.
Draft NPS EN-1	Draft NPS EN-1 paragraph 5.11.9 states that *'Applicants should safeguard any mineral resources on the proposed site as far as possible, taking into account the long-term potential of the land use after any future decommissioning has taken place.'*	The effects of onshore infrastructure associated with AyM on mineral safeguarding areas is considered in Section 6.10.6
Planning Policy Wales (PPW)	Previously developed (also referred to as brownfield) land should, wherever possible, be	Routing and siting considerations that are discussed in Volume 1, Chapter 4 (application

LEGISLATION/ POLICY	KEY PROVISIONS	SECTION WHERE COMMENT ADDRESSED
	used in preference to greenfield sites where it is suitable for development.	ref: 6.1.4). Although the onshore infrastructure does not utilize previously developed land, an assessment of the potential for impacts to occur from contamination is provided in Section 6.10 and Section 6.11
PPW	Paragraph 3.59 Land in grades 1, 2 and 3a should only be developed if there is an overriding need for the development, and either previously developed land or land in lower agricultural grades is unavailable, or available lower grade land has an environmental value recognised by a landscape, wildlife, historic or archaeological designation which outweighs the agricultural considerations.	A detailed routing and siting appraisal was undertaken in order to determine the location of onshore infrastructure for AyM (see Volume 1, Chapter 4 (application ref: 6.1.4)). This routing avoided high quality agricultural land where possible, with the majority of the route on Grade 3b (moderate soils). Further detail is provided in Section 6.7.3 Soils. An assessment of the effects on soils is presented in Section 6.10, Section 6.11 and Section 6.12
PPW	Paragraph 5.14.7 It is important that access to mineral resources, including secondary, recycled and marine dredged materials, which society may need, as well as the minerals related infrastructure to deliver this	Details of mineral resources are presented in Section 6.7.10

LEGISLATION/ POLICY	KEY PROVISIONS	SECTION WHERE COMMENT ADDRESSED
	need, is safeguarded in order to prevent sterilisation by other forms of permanent development.	An assessment of the effects on mineral safeguarding areas is presented in Section 6.10 and Section 6.11
PPW	Paragraph 6.9.18 Planning authorities should consider the nature, scale and extent of land contamination which may pose risks to health and the environment so as to ensure the site is capable of effective remediation and is suitable for its intended use.	An assessment of the potential for impacts to occur from contamination is provided in Section 6.10, Section 6.11 and Section 6.12
PPW	Paragraph 6.9.23 When considering development proposals planning authorities should consider the nature, scale and extent of ground instability which may pose direct risks to life and health, buildings and structures, or present indirect hazards associated with ground movement, including mine entry collapse, which provide potential pathways for the migration to the surface of landfill or mine gases.	Consideration of potential effects on stability from mining is provided in Section 6.7.9

6.2.10 Denbighshire County Council Local Policy

26 The Denbighshire County Council Local Development Plan (LDP) was adopted by Denbighshire County Council (DCC) in June 2013 and is supported by several adopted and draft Supplementary Planning Guidance (SPG) documents.

27 Policy BSC 2 - Brownfield development priority, states that Development proposals in Lower Growth Towns, Llangollen, Rhuddlan and villages with development boundaries as defined in the inset maps will be directed towards previously developed land, except where greenfield land is allocated for development in the LDP.

28 The onshore infrastructure for AyM does not utilise brownfield land with the onshore Export Cable Corridor (ECC) routed predominantly within agricultural (greenfield) land, however, the majority of below ground infrastructure does not preclude land remaining 'greenfield'.

29 The reinstatement of land above the buried cable will allow agricultural operations to re-commence once the cable has been installed. Field drainage will be reinstated and the indicative minimum burial depth (from ground surface to the top of the cable ducting), will allow cultivation of land.

30 The siting of above ground infrastructure (the OnSS) was informed by a number of siting considerations that are discussed in Volume 1, Chapter 4 (application ref: 6.1.4).

31 An assessment of the potential for impacts to occur from contamination is provided in Section 6.10, Section 6.11 and Section 6.12.

6.2.11 Guidance

32 The following guidance documents have been referenced when devising the assessment methodology:

- A key item of guidance is the Environment Agency's (EA) Model Procedures; Contamination Risk Management (LCRM) (which supercedes CLR11 replaced in December 2019), which indicates that a Conceptual Site Model (CSM) should identify those contamination sources, pathways and receptors which are “likely” to represent an “unacceptable” risk either to human health or the surrounding environment. The LCRM states this can be used in Wales but NRW guidance (Land Contamination: Our Role in Managing and Dealing with Land Contamination) should be used for any different requirements;
- Contaminated Land Statutory Guidance 2012 (ref: WG19243) was issued by the Welsh Government and is intended to explain how Local Authorities should implement the regime as detailed by EPA 1990, including how they should go about deciding whether land is contaminated land in the legal sense of the term;
- Construction Industry Research and Information Association (CIRIA) C552 (Contaminated Land Risk Assessment. A guide to good practice) examines the risk assessment of contaminated land and explains the key elements of risk assessment practices and procedures; and
- Environmental impact assessment guidance produced by CIRIA, Institute of Environmental Management and Assessment (IEMA) and the Highways Agency in the Design Manual for Roads and Bridges, Volume 11 Environmental Assessment.

6.3 Consultation and scoping

33 Consultation with regards to the scope of the ground conditions and land use assessment has been undertaken via the Scoping Report (Innogy, 2020), via the Hydrology and Flood Risk Expert Topic Group (ETG) process, comprising discussion with Natural Resources Wales (NRW) and DCC, and through statutory consultation.

34 A Scoping Opinion for AyM was sought from the Planning Inspectorate (PINS) which included a consultation response from NRW (PINS, 2020). This included responses to the proposed assessment methodology for further consideration.

35 AyM statutory consultation, under Section 42 of the Planning Act 2008, ran from 31 August to 11 October 2021, a period of six weeks. A Preliminary Environmental Information Report (PEIR) was published as part of formal consultation which provided preliminary information on Ground conditions and land use within Volume 3, Chapter 6: Ground Conditions and Land Use.

36 Further statutory consultation was undertaken in February 2022 on areas where the Order Limits (OL) extend beyond those included in the PEIR that were consulted on in Autumn 2021.

37 Consultation has been undertaken in relation to the scope of the ground conditions and land use assessment and to discuss any specific requirements for mitigation measures.

38 The baseline assessment was completed through a desk-study exercise, including data requests from and consultation with relevant statutory bodies.

39 Table 2 below summarises the issues relevant to this chapter which have been highlighted by consultees and indicates how, if possible, these issues have been addressed.

Table 2: Summary of consultation relating to Ground Conditions and Land Use.

DATE AND CONSULTATION PHASE/ TYPE	CONSULTATION AND KEY ISSUES RAISED	SECTION WHERE COMMENT ADDRESSED
1st October 2020 Expert Topic Group Meeting	ETG members agreed the overall assessment strategy and areas to be included in the assessment	The Scope and Methodology, as agreed by ETG, is provided in Section 6.4
July 2020 Scoping Opinion	The Planning Inspectorate agreed that operational impacts on geology and ground conditions and associated impacts on human and environmental receptors can be scoped out of the assessment	Operational impacts on geology and ground conditions have been scoped out of this assessment
July 2020 Scoping Opinion	The Inspectorate agreed that loss of agricultural land from operation of underground cables can be scoped out of the assessment but covered under Construction Management	The onshore export cable corridor (onshore ECC) does, indeed, route through areas of predominantly agricultural land. Whilst there is predicted to be a temporary impact upon agricultural land during the construction phase, the reinstatement of land above the buried cable will allow agricultural cultivation to re-commence once the cable has been installed.

DATE AND CONSULTATION PHASE/ TYPE	CONSULTATION AND KEY ISSUES RAISED	SECTION WHERE COMMENT ADDRESSED
		Field drainage will be reinstated and the indicative minimum burial depth (from ground surface to the top of the cable ducting), will allow cultivation of land. Measures to reduce the impact of construction works upon agricultural operations are included in the Outline Code of Construction Practice (outline CoCP) (application ref: 8.13)).
July 2020 Scoping Opinion	The Planning Inspectorate notes the concerns of Conwy Borough Council in relation to the potential for AyM to continue to sterilise mineral deposits during the operation phase. The Inspectorate does not agree to scope this matter out.	Consideration of the impacts upon minerals safeguarding areas is provided in Section 6.10
July 2020 Scoping Opinion	The Planning Inspectorate noted that the Scoping Report states that within the PEIR and the ES, the	The study area has been refined since EIA Scoping and is set out in Section 6.4.1.

DATE AND CONSULTATION PHASE/ TYPE	CONSULTATION AND KEY ISSUES RAISED	SECTION WHERE COMMENT ADDRESSED
	study area for geology and ground conditions will be refined to follow the proposed onshore cable route and the substation location more closely	
July 2020 Scoping Opinion	The Applicant should make effort to consult with the relevant consultation bodies regarding mineral safeguarding areas to determine whether there is planning permission sought or granted to extract the minerals and how best to avoid mineral sterilisation.	Consultation with DCC has taken place via the ETG process and through Statutory Consultation. The impact of the onshore infrastructure on mineral safeguarding areas is considered in Section 6.10
July 2020 Scoping Opinion	The Planning Inspectorate noted that the Scoping Report includes information regarding coal mining within the onshore search area but makes no reference to other types	Baseline information on mining is provided in Section 6.7.9. There is no record of any mining underlying the site, although some historic lead mines occur to the north west (750m from the study area) near Bodelwyddan but pose no

DATE AND CONSULTATION PHASE/ TYPE	CONSULTATION AND KEY ISSUES RAISED	SECTION WHERE COMMENT ADDRESSED
	of mining (such as metal mining). The ES should include pertinent information on all old mining infrastructure that have potential to cause geo-environmental hazards to AyM	significant risk as they are small scale mines, with a very limited extent, historically exploiting lead mineralisation mapped along linear faults in the Clwyd Limestone. On this basis, potential impacts on the proposed development arising from historical mining is scoped out of the subsequent construction or operational assessment as there is no pathway between the mining and the onshore elements of AyM.
July 2020 Scoping Opinion	The Planning Inspectorate asked for clarification of text relating to potential impacts arising during operation that could result in impacts to soil and groundwater during decommissioning.	Activity during operation will be limited to periodic inspection and maintenance activity of infrastructure within the onshore ECC. Oil filled cables will not be used (and so the cable installation does not represent a source of pollution during operation of AyM due to leakage), and any repair activity would be of a

DATE AND CONSULTATION PHASE/ TYPE	CONSULTATION AND KEY ISSUES RAISED	SECTION WHERE COMMENT ADDRESSED
		similar nature to the construction phase (albeit at a much reduced scale). The OnSS would contain potential pollutants which could include cooling oils, lubricants, fuels, greases, etc. The design, maintenance and operation of the facility would follow good practice in line with the prevailing future guidance and legislation with regard to measures such as the storage and management of potentially polluting substances, emergency spill response procedures, clean up and control of any potentially contaminated surface water runoff and routine inspection to prevent or contain leaks of any pollutants Based on the desk based research there is no evidence to suggest the proposed site is contaminated. Therefore, the potential for release of potentially contaminative substances during

DATE AND CONSULTATION PHASE/ TYPE	CONSULTATION AND KEY ISSUES RAISED	SECTION WHERE COMMENT ADDRESSED
		operation that could result in significant effects during decommissioning are considered negligible and are not considered further.
October 2021 Section 42 Consultation Response	Natural Resources Wales (NRW) noted that the majority of the cable corridor from the location where the offshore export cables are brought ashore and jointed to the onshore export cables (the Landfall) to substation will be across agricultural land with minor potential to encounter land historically affected by contamination. The main areas of concern would be road and railway crossings at landfall.	The comment from NRW reflects the preliminary findings of this assessment at PEIR which are confirmed in Section 6.10
October 2021 Section 42 Consultation Response	NRW understand that targeted site investigations for land contamination would be	This is noted

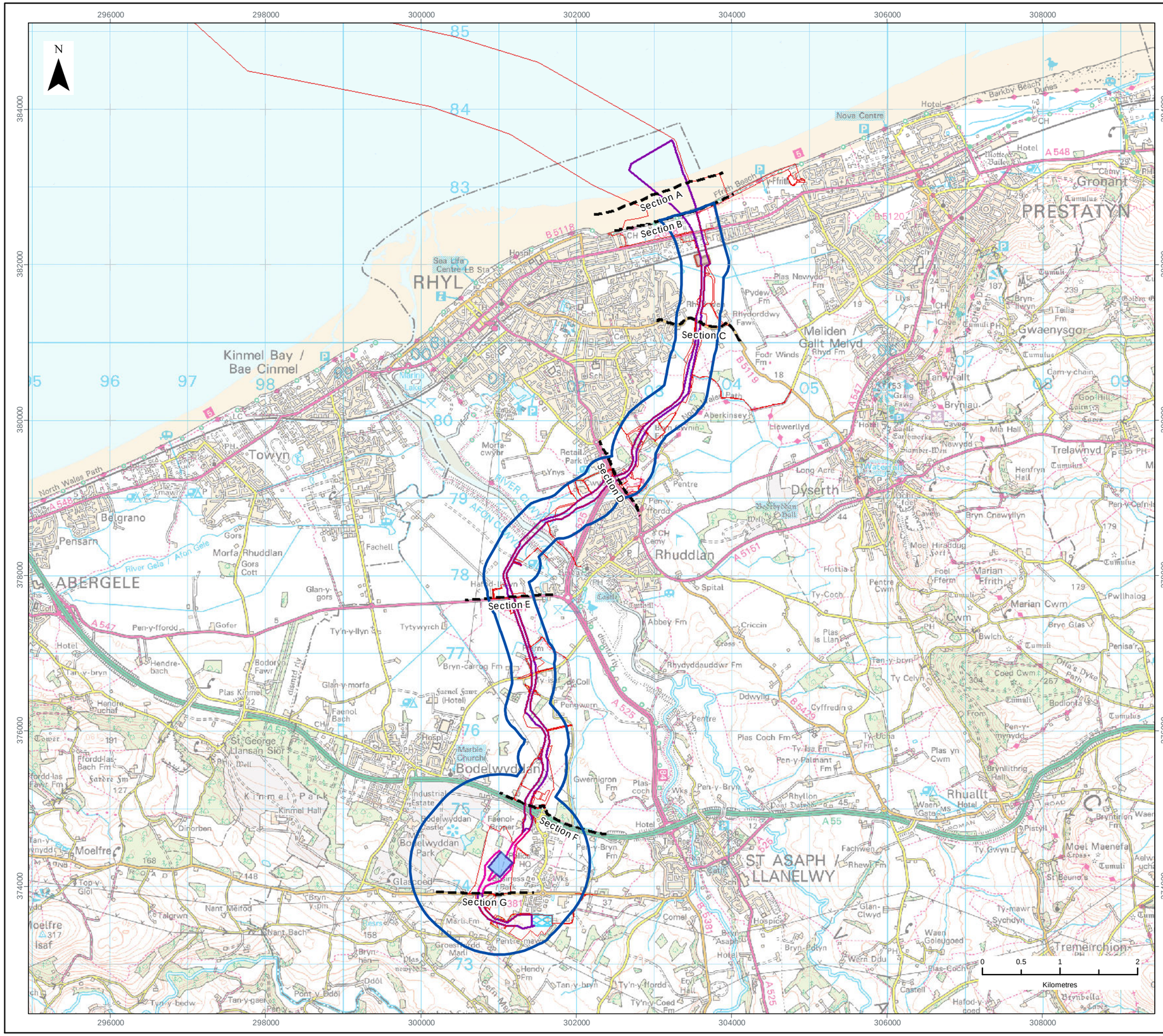
DATE AND CONSULTATION PHASE/ TYPE	CONSULTATION AND KEY ISSUES RAISED	SECTION WHERE COMMENT ADDRESSED
	completed in these areas. NRW agree with this proposal and advise that the format should follow our guidance: A Guide for Developers (Wales) (May 2017)	
October 2021 Section 42 Consultation Response	There is potential for unsuspected contamination to be found during the work and a strategy to deal with this will be required.	The potential for unsuspected contamination is noted in Section 6.10. An outline Pollution Prevention and Emergency Incident Response Plan (PPEIRP), has been provided as part of the outline Code of Construction Practice (CoCP - Volume 8, Document 8.3 Outline Code of Construction Practice (application ref: 8.13)) and sets out procedures to be followed should sources of contamination be discovered during construction phase works.
October 2021 Section 42 Consultation Response	Overall, NRW note that the risk of the Landfall construction to land	This is noted and aligns with the assessment findings in Section 6.10.

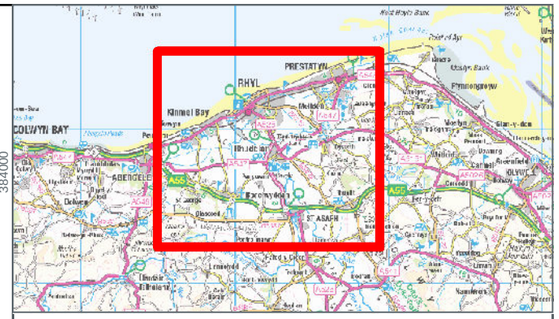
DATE AND CONSULTATION PHASE/ TYPE	CONSULTATION AND KEY ISSUES RAISED	SECTION WHERE COMMENT ADDRESSED
	contamination is considered low and agree with this conclusion.	

6.4 Scope and methodology

6.4.1 Study area

40 The ground conditions and land use study area is shown on Figure 1 and comprises the onshore elements of AyM (as described in Volume 3, Chapter 1 (application ref: 6.3.1)) from mean high-water spring (MHWS) to the National Grid Bodelwyddan substation connection point to the south of St Asaph Business Park, plus a 1 km buffer around the proposed onshore substation (OnSS), and a 250 m buffer around the Landfall and the onshore export cable corridor (onshore ECC) (including access routes and temporary construction compound (TCC) areas). The buffer distances align to those used for the hydrology and hydrogeology assessment presented in Chapter 7 (application ref: 6.3.7) and are considered appropriate for data collection and assessment taking into account the nature of the development and likely zone of influence on geological and land use receptors. The 250m buffer is from relatively shallow excavations for the onshore ECC, with no disturbance outside the OL and reinstatement of current land use following construction. The wider 1km buffer for the OnSS reflects the permanent nature of this development with potentially for activities such as piling during construction. The study area and available data have been discussed and agreed with stakeholders





LEGEND

- Order Limits
- Onshore Cable Route Section Breaks
- Proposed Onshore Export Cable Corridor
- Proposed Substation Cable Corridor Zone
- Proposed Transition Joint Bay Construction Compound
- Unlicenced Work Zone
- Proposed Onshore Substation (OnSS) Footprint
- Study Area

0 0.5 1 2
Kilometres

PROJECT TITLE:

AWEL Y MÔR OFFSHORE WINDFARM

FIGURE TITLE:

STUDY AREA

VER	DATE	REMARKS	Drawn	Checked
1	26/02/2022	ES Issue	JRS	MF

FIGURE NUMBER:

FIGURE 1

SCALE:	PLOT SIZE:	DATUM:	COORDINATE SYSTEM:
1:50,000	A3	ODN	British National Grid

Fferm Wynt Alltraeth
AWEL Y MÔR
Offshore Wind Farm

P:\05356 - GoBe Consultants Ltd\00009 Awel y Mor\Tech\GIS\Dwgs\Wking\202201 Environmental Statement\Chapter 3.6 - Ground Conditions and Landuse\05356.00009.0291.0 Study Area.mxd

6.4.2 Baseline data

41 Baseline data with respect to ground conditions and land use has been taken from publicly available information and open source data from a range of sources. The data review includes:

- Lle Geo-Portal, Welsh Government and Natural Resources Wales (NRW):
  - Historic and active landfill sites; and
  - Groundwater Source Protection Zones (SPZ);
  - Permitted industrial and Commercial facilities.
  - Agricultural Land Classification.
- British Geological Survey (BGS) GeoIndex mapping:
  - Geology – artificial ground, mining, superficial deposits and bedrock geology;
  - Borehole data.
  - Mineral Resource Map for North West Wales
  - Statutory and non-statutory environmental designations.
- Cranfield Soil and Agrifood Institute Soilscapes map viewer:
  - Soil type and character.
- Denbighshire County Council:
  - Local Development Plan (2013);
- Landmark Information Group (Jan 2021): Envirocheck Report, Order Number 271180872_1_1.
- The British Geological Survey (1973 and 1985) 1:50,000 Series Solid and Drift Geology Map England and Wales, Sheet 107 – Denbigh.
- The Coal Authority (Jan 2021): Interactive Map, accessed via Interactive Map Viewer | Coal Authority.
- Zetica UXO (Jan 2021): Risk Maps, accessed via: Risk Maps | Zetica UXO.
- Public Health England (Jan 2021): UK Radon Map, accessed via: UKradon - UK maps of radon.
- Highways England (August 2019): CD 622, Managing Geotechnical Risk, Revision 0.

- CIRIA, Contaminated land risk assessment: A guide to good practice (CIRIA C552), 2001. [Online].

42 Third party data from bodies such as DCC and NRW website has been used to characterise the geological features and identify any geological designated areas.

6.4.3 Assessment Methodology

43 There are no published guidelines or criteria for assessing and evaluating effects on ground conditions and land use within the context of an EIA. In the absence of this, the proposed assessment is based on a methodology derived from the Institute of Environmental Management and Assessment (IEMA) guidance and the Land Contamination Risk Management (LCRM) (which supercedes CLR11 replaced in December 2019). The methodology sets out a list of criteria for evaluating the environmental effects and is outlined in Volume 1, Chapter 3: EIA Methodology (application ref: 6.1.3).

44 Professional judgement and a qualitative risk assessment methodology have been used to assess the findings in relation to each of these criteria to give an assessment of significance for each potential impact.

45 Once the degree of impact and l sensitivity has been assessed these are then combined to determine the likelihood of each potential overall effect occurring.

46 This approach provides a mechanism for identifying the areas where site specific mitigation measures will be required, in addition to embedded mitigation, and for identifying mitigation measures appropriate to the risk presented by the development proposals (see Section 6.9 for further description of mitigation measures). This approach also allows effort to be focused on reducing risk where the greatest benefit may result.

6.5 Assessment criteria and assignment of significance

47 The approach for determining the significance of effects is a two stage process that involves defining the sensitivity of the receptors and the magnitude of the impacts on those receptors. This section describes the criteria applied in this chapter to assign values to the sensitivity of receptors and the magnitude of potential impacts. Unless stated otherwise, the terms used to define sensitivity and magnitude are based on those used in the Design Manual for Roads and Bridges (DMRB) methodology (DMBR 2009), which is described in more detail in Volume 1, Chapter 3 (application ref: 6.1.3).

6.5.1 Sensitivity of Receiving Environment

48 The criteria for sensitivity used in this chapter are outlined in Table 3 below. Whilst a sensitivity category of 'very high' is proposed as a potential category for sensitivity criteria within the DMRB methodology, for the purposes of the assessment of ground conditions and land use effects, the categories within the range of 'high' to 'negligible' are considered to appropriately cover the potential receptors. Where a receptor could be placed within more than one category of sensitivity, professional judgement has been applied to determine which category is appropriate.

Table 3: Sensitivity/importance of the environment.

RECEPTOR SENSITIVITY/ IMPORTANCE	DESCRIPTION	RECEPTOR
High	High importance and rarity, national level and limited potential for substitution	Special Area of Conservation (SAC) with important geomorphological or geological features. Sites of Special Scientific Interest (SSSI) with important geomorphological or geological features.

RECEPTOR SENSITIVITY / IMPORTANCE	DESCRIPTION	RECEPTOR
		ALC Grades 1, 2 - Excellent to Good Quality agricultural land. Presence of regulatory determined contaminated land as per (Part 2A EPA 1990 designated). AyM construction workers
Medium	High or medium importance and rarity, district or regional level, limited potential for substitution	Regionally Important Geological Site (RIGS). ALC Grades 3a and 3b - Moderate to Good Quality Land capable of producing a moderate range of crops. Areas of potential concern identified by Local Authority under their statutory investigation of contaminated land (under Part 2A; EPA 1990).
Low	Medium or low importance and rarity, local or district level	Common geological features of limited use for knowledge/study ALC Grades 4 and 5 Poor to Very Poor Quality– Improved grassland and rough grazing.
Negligible	Very low importance and rarity, local level	No areas of previously developed land with no areas of potential concern relating to contaminated land identified.

49 It should be noted that the sensitivity criteria adopted for land quality relating to contamination was based on the tolerance of a receptor site to change i.e. that known contaminated receptor sites will be more sensitive to the ground-breaking aspects of the onshore elements of AyM, during the construction phase, than receptor sites where no contamination is present.

6.5.2 Magnitude of Impact

50 The magnitude of impact upon ground conditions and land use is determined by defining the impact on the resource, as defined in the matrix presented at Table 4. This approach uses the term "beneficial" for an advantageous or positive impact on an environmental resource or receptor or "adverse", for a detrimental or negative impact on an environmental resource or receptor. Definitions of magnitude are based on those used in the Design Manual for Roads and Bridges (DMRB) methodology (DMBR 2009), which is described in more detail in Volume 1, Chapter 3 (application ref: 6.1.3).

Table 4: Impact magnitude definitions.

MAGNITUDE	DEFINITION
High	Adverse Long term or permanent loss of resource and/or quality and integrity of resource; likely to cause exceedance of statutory objectives and/or breaches of legislation; severe damage to key characteristics, features or elements.
	Beneficial Large scale or major improvement of resource quality; extensive restoration or enhancement; major long-term improvement of attribute quality (Beneficial).
Medium	Adverse Loss of resource, but not adversely affecting the overall integrity; partial loss of/damage to key characteristics, features or elements with/without exceedance of

MAGNITUDE	DEFINITION
	statutory objectives or with/without breaches of legislation.
	Beneficial Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality.
Low	Adverse Some measurable change in attributes, quality or vulnerability; reversible or minor loss of, or alteration to, one (maybe more) key characteristics, features or elements.
	Beneficial Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring.
Negligible	Adverse Very minor or no loss or detrimental alteration to one or more characteristics, features or elements; impact of insufficient magnitude to affect the use/integrity).
	Beneficial Very minor or no benefit to or positive addition of one or more characteristics, features or elements; impact of insufficient magnitude to affect the use/integrity.

6.5.3 Significance of Effects

51 The significance of the effect upon ground conditions and land use is determined by correlating the magnitude of the impact and sensitivity of the receptor, as defined in the matrix presented at Table 5. Where a range of significance is presented in Table 5, the final assessment for each effect is based upon expert judgement.

52 Adverse and beneficial effects of moderate and above are considered significant in EIA terms. All beneficial effects and adverse effects below moderate are not considered significant in EIA terms. The broad definitions of the terms used are set out in Volume 1, Chapter 3 (application ref: 6.1.3).

Table 5: Matrix to determine effect significance.

		SENSITIVITY			
		HIGH	MEDIUM	LOW	NEGLIGIBLE
ADVERSE MAGNITUDE	HIGH	Major	Major	Moderate	Minor
	MEDIUM	Major	Moderate	Minor	Negligible
	LOW	Moderate	Minor	Minor	Negligible
	NEGLIGIBLE	Minor	Minor	Negligible	Negligible
BENEFICIAL MAGNITUDE	NEGLIGIBLE	Minor	Minor	Negligible	Negligible
	LOW	Moderate	Minor	Minor	Negligible
	MEDIUM	Major	Moderate	Minor	Negligible
	HIGH	Major	Major	Moderate	Minor

Note: Effects of 'moderate' significance or greater are defined as significant with regards to the EIA Regulations 2017[i]

[i] The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017.

6.6 Uncertainty and technical difficulties encountered

53 The assessment is based on publicly available data obtained from NRW, DCC and commercial data supply companies, as well as additional information supplied from stakeholders during the scoping and consultation stages. This can be limited to availability and level of information available from these bodies

54 Overall a moderate to high level of certainty has been applied to the assessment for the onshore ECC and OnSS. The information accessible in order to complete the assessment is considered sufficient to establish the comprehensive baseline within the AyM onshore ground conditions and land use study area, therefore, there are no data limitations that would affect the conclusions of this assessment. There were no areas of concern or potential significance with no data available.

55 The Maximum Design Scenario (MDS) identified in Section 6.8 has been selected as it is considered to have the potential to result in the greatest impact on an identified receptor or receptor group. This scenario has been selected from the details provided in the onshore project description (Volume 3, Chapter 1 (application ref: 6.1.3)). Effects of greater significance are not predicted to arise should any alternative development scenario to that assessed here be taken forward in the final design scheme.

6.7 Existing environment

56 This section describes the potential environmental receptors within the ground conditions and land use study area where significant effects may arise as a result of the MDS. Observations from the baseline survey and desk study have been included where relevant.

57 The onshore ECC has been broken down into a number of Route Sections which describe the route in relation to significant local features. The Route Sections are listed in Table 6 along with a short description defining the extent of each respective Route Section. A more detailed description is provided in Volume 3, Chapter 1 (application ref: 6.3.1).

Table 6: Route sections for the onshore ECC.

ROUTE SECTION – FULL NAME	DESCRIPTION
Route Section A – Intertidal Area	MHWS to MLWS
Route Section B – Intertidal to B5119	MHWS to B5119
Route Section C – B5119 to A525	Agricultural land to east and south of Rhyl – generally low lying
Route Section D: A525 to A547	Includes the River Clwyd crossing and associated trenchless crossing works
Route Section E: A547 to A55	Agricultural land that is slightly more undulating near the A55
Route Section F: A55 to B5381 including OnSS	Trenchless crossing re-emergence for A55 crossing, OnSS Footprint OnSS Access Zones and OnSS Cable Corridor Zone to Glascoed Road (B5381)
Route Section G: B5381 to National Grid Connection	From Glascoed Road (B5381) to the National Grid substation

6.7.1 General description and land use

58 Land use within the ground conditions and land use study area is predominantly agricultural, situated between the settlements of Rhyl, Rhuddlan and St Asaph. The River Clwyd crosses the study area, flowing from St Asaph northward to the west of Rhyl. A number of other NRW designated main rivers also cross or are evident within the onshore ECC and the wider ground conditions and land use study area.

59 The coastal area at Landfall is between the densely populated settlements of Rhyl and Prestatyn. Pedestrian footpaths are present directly adjacent to the beach, as is a golf course and caravan park. Man-made sea-defences including imported rocks are present, along with groynes which serve shingle and sand beaches. The onshore cable connection will employ trenchless techniques to install cables beneath the golf course, caravan park and sea defences.

60 Land to the east and south of Rhyl is predominantly agricultural, low lying land with a network of drainage ditches. Hedgerows and woodland are scarce and limited to areas of some field boundaries.

61 Land to the south west of the River Clwyd crossing is predominantly agricultural, with flat, low lying land within the Clwyd valley, close to the estuary. Further south towards the A55 and beyond, land begins to rise up with more undulating topography. Field boundaries are typically well established hedgerows and sometimes drystone walls. Woodlands and hedges are more common in this area.

6.7.2 Topography

62 Ground level data across the onshore ECC area has been obtained from publicly available 1m resolution aerial photogrammetry (LiDAR) data[ii]. Analysis of the data indicates that ground elevations to the south of Landfall, to the east of Rhyl, are relatively flat with shallow gradients. The lowest elevations are noted around the Rhyl Cut watercourse at around 4.0 m above Ordnance Datum (aOD), rising to over 12 m aOD south of Dyserth Road. The agricultural land to the south east of Rhyl remains flat at about 12 m aOD before gently falling to the south of Rhyl as the onshore ECC passes into the Clwyd valley. Elevations within the onshore ECC adjacent to Glanffyddion Cut are at about 4.1 m aOD to the confluence with the Clwyd Estuary.

[ii] Lle Geo-Portal for Wales, Lle - Grid Products Available for Download on Lle (gov.wales), accessed March 2021

63 The agricultural land to the west of the Clwyd Estuary is flat and at similar elevations observed in the onshore ECC to the east of the estuary crossing point. Elevations remain at or around 4.1 m aOD within the onshore ECC further south, to the A547 Abergele Road crossing. South of Abergele Road the land begins to rise gradually from around 4.1 m aOD in the north of the onshore ECC to 10.0 m aOD or greater at Sarn Lane. South of Sarn Lane the onshore ECC crosses relatively flat agricultural land, with elevations between 9.0 and 11.0 m aOD before rising further south up to the A55 which is at an elevation of over 20.0 m aOD.

64 From the A55 ground levels continue to rise in the onshore ECC to the proposed OnSS footprint and TCC which is at elevations ranging from 27.0 m aOD to the north of the OnSS TCC to over 50.0 m aOD at the B5381. From the B5381 the onshore ECC continues south and then east before connecting to the existing National Grid Bodelwyddan substation that is located to the south of St Asaph Business Park. Ground levels south of the B5381 rise from around 52.0 m aOD to over 60.0 m aOD before falling again further east, to around 42.0 m aOD at the existing National Grid Bodelwyddan substation.

6.7.3 Designated sites

65 There are no geologically designated sites within the ground conditions and land use study area.

6.7.4 Soils and Agricultural Land Classification

66 The onshore ECC crosses a range of soil types (UK Soil Observatory Description), including:

- Sand dune soils;
- Loamy and clayey soils; and
- Sandy soils.

67 The route has also been assessed using Agricultural Land Classification as the majority of the route crosses farming land. The Agricultural Land Classification provides a method for assessing the quality of farmland to enable informed choices to be made about its future use within the planning system. It is the only approved system for grading agricultural land quality in England and Wales.

68 Welsh Government has provided a Predictive Agricultural Land Classification Map. The Predictive Agricultural Land Classification Map uses the best available information to predict the Grade of land on a national basis. It has been designed to help local planning authorities, developers, surveyors and land use managers make informed long term decisions over the use of land in the planning system and to target survey work to the most appropriate locations. The land within the Predictive Agricultural Land Classification Map is categorised into one of the following grades:

- Grade 1: excellent quality agricultural land
- Grade 2: good quality agricultural land
- Grade 3a: good to moderate quality agricultural land
- Grade 3b: moderate quality agricultural land
- Grade 4: poor quality agricultural land
- Grade 5: very poor quality agricultural land
- Urban

69 The majority of the route is dominated by Grade 3a and 3b Agricultural Land Classification and is therefore considered to be of moderate to good quality. Table 7 summarises the agricultural land classification within each Route Section.

Table 7: Agricultural Land Classification by Route Section.

ROUTE SECTION – FULL NAME	AGRICULTURAL QUALITY	SENSITIVITY
Route Section A – Intertidal Area	Predominantly grade 3b (moderate)	Medium
Route Section B – Intertidal to B5119	Partly urban (11.5%), mainly grade 3b (good to moderate) (72.5%) with minor amounts of grade 3a (11.5%)	Medium

ROUTE SECTION – FULL NAME	AGRICULTURAL QUALITY	SENSITIVITY
Route Section C – B5119 to A525	Section of grade 2 (good)(42%), with grade 3a (good to moderate)(25%) and grade 3b (moderate) (30%)	Medium to High
Route Section D: A525 to A547	Predominantly grade 3b (moderate)(83%) with minor section of grade 2 along River Clwyd (7%)	Medium
Route Section E: A547 to A55	Predominantly grade 3a (good to moderate) (65%) with 35% grade 3b(moderate)	Medium
Route Section F: A55 to B5381 including OnSS	Grade 3a (good to moderate) (100%)	Medium
Route Section G: B5381 to National Grid Connection	Partly urban (90%), limited grade 3b (good to moderate)(10%)	Low to Medium

6.7.5 Geological Setting

70 The Landfall site is located at Ffrith Beach, on the coastline between Rhyl and Prestatyn. The Irish Sea extends northwards from the coast.

71 NRW and the Joint Nature Conservation Committee websites were reviewed for details of geological sites of SSSI and geological conservation review sites (GCRs). There are no geological designations or RIGS within the environs of the Study Area.

72 The ground conditions and land use study area includes a number of areas associated with geological setting. Definitions of the geological features are provided below and their locations are identified in Figure 2 to Figure 11.

Superficial Geology

73 BGS Borehole records indicate that significant thicknesses of superficial deposits may be present along the onshore ECC.

74 The onshore ECC crosses over marine beach deposits (sand) offshore and blown sand where it reaches Landfall. Further inland the route crosses over tidal flat deposits (clay, silt, sand), till (diamicton) and glaciofluvial deposits (sand and gravel) as described in Table 8.

75 From examination of both the geological map (Geological Survey of Great Britain (1973 and 1985) 1:50,000 Series Solid and Drift Geology Map England and Wales, Sheet 107 – Denbigh, the following deposits are evident (See Figure 2 to Figure 6):

- Present beach and other intertidal deposits (blown sand) – closest to the current coastline;
- Raised marine deposits including littoral sand and gravel and intertidal and subtidal silt and clay – extending approximately 1km inland and parallel with the coast; and
- Glacial meltwater deposits of sand and gravel – occurring sporadically directly inland from the raised marine deposits.

76 The remainder of the study area is dominated by glacial till, which comprises reddish brown sandy clay, although there are areas where the till is thin or absent and bedrock is marked at or near the surface.

77 The majority of drift geology in the rest of the study area, (i.e. beyond the links) is glacial till, is considered to be a common geological resource throughout North Wales and is therefore considered to be of low sensitivity.

78 Superficial material covering the majority of the onshore Order Limits (OL) (which defines all onshore infrastructure and works including the Landfall, onshore ECC, OnSS, temporary construction compounds and access arrangements), is glacial till (diamicton) which is highly variable in composition and may contain lenses of sand and gravel which can support perched water tables. These are likely to be discontinuous and limited in extent and as such can have limited groundwater potential. The variable composition of the till indicates that it may act as a confining layer to the underlying bedrock in some areas. The remaining area of the onshore OL comprises glaciofluvial deposits (sand and gravel); and tidal flats (clay, silt and sand).

79 Sensitivity in terms of land quality is partially dependant on the ground water vulnerability and the subsequent sensitivity to potential pollution (see Chapter 7, Hydrology, Hydrogeology and Flood Risk (application ref: 6.3.7).

80 Table 8 summarises superficial geology by Route Section.

Table 8: Superficial Geology.

ROUTE SECTION – FULL NAME	SUPERFICIAL DEPOSITS	SENSITIVITY
Route Section A – Intertidal Area	Marine beach deposits – sand	High
Route Section B – Intertidal to B5119	Blown sand – sand Tidal flat deposits – clay, silt and sand Till - diamicton	Medium
Route Section C – B5119 to A525	Till – diamicton Glaciofluvial deposits – sand and gravel	Low
Route Section D: A525 to A547	Glaciofluvial deposits – sand and gravel	Low

ROUTE SECTION – FULL NAME	SUPERFICIAL DEPOSITS	SENSITIVITY
	Tidal flat deposits – clay, silt and sand	
Route Section E: A547 to A55	Tidal flat deposits – clay, silt and sand Till – diamicton	Low
Route Section F: A55 to B5381 including OnSS	Till – diamicton	Low
Route Section G: B5381 to National Grid Connection	Till - diamicton	Low

Bedrock Geology

81 British Geological Survey data shown on Figure 7 to Figure 11 indicates that the local bedrock underlying the onshore ECC comprises sedimentary rocks of carboniferous to triassic age, younging northwards.

82 From north to south, the bedrock comprises:

- Kinnerton Sandstone Formation;
- Warwickshire Group; and
- Clwyd Limestone Group.

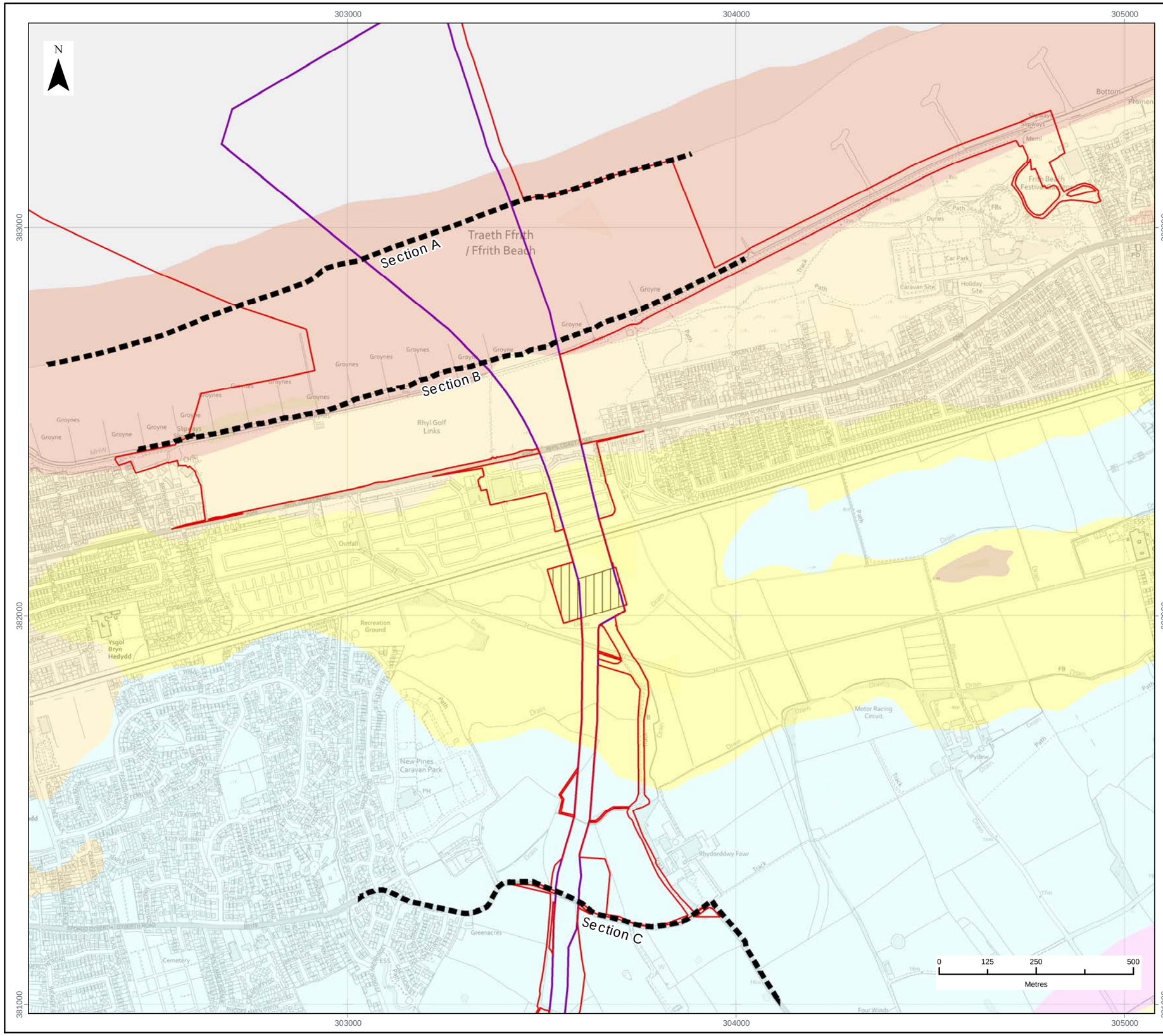
83 A summary of the bedrock geology is described in Table 9.

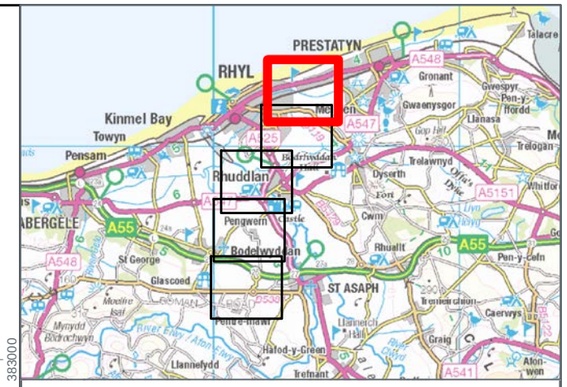
Table 9: Bedrock Geology.

AGE/UNIT	DESCRIPTION	LOCATION(S) PRESENT	**SENSITIVITY**
Triassic Kinnerton Sandstone Formation	Sandstone, red-brown to yellow, generally pebble-free, fine- to medium-grained,	Route Section A Route Section B Route Section C	High

AGE/UNIT	DESCRIPTION	LOCATION(S) PRESENT	SENSITIVITY
	cross-stratified. Dominantly aeolian.	Route Section D Route Section E	
Permian – Carboniferous Warwickshire Group	Predominantly red, brown or purple-grey sandstone, siltstone and mudstone, some grey strata, coals not common, local conglomerates, localised beds of Spirorbis limestone.	Route Section E Route Section F	Low
Carboniferous Clwyd Limestone Group	Diverse range of limestone facies with subordinate sandstone and mudstone units and exhibiting local dolomitisation. Records the initiation and growth of a carbonate platform along the northern flank of the Wales-Brabant Massif.	Route Section F Route Section G	Low to medium

84 Given that there are no geological designations or RIGS sites associated with the solid geology in the study area, and that geological features within the onshore OL and environs are common and of limited use for knowledge/study, the sensitivity of solid geology throughout the study area is considered to be low.





LEGEND

- Order Limits
- Onshore Cable Route Section Breaks
- Proposed Onshore Export Cable Corridor
- Proposed Transition Joint Bay Construction Compound

Superficial Geology

- Blown Sand - Sand
- Marine Beach Deposits
- Peat
- Tidal Flat Deposits - Clay, Silt And Sand
- Till, Devensian - Diamicton
- Glaciofluvial Sheet Deposits, Devensian - Sand And Gravel

PROJECT TITLE:

AWEL Y MÔR OFFSHORE WINDFARM

DRAWING TITLE:

SUPERFICIAL GEOLOGY (DRIFT)

VER	DATE	REMARKS	Drawn	Checked
1	26/02/2022	ES Issue	JRS	MF

FIGURE NUMBER:

FIGURE 2

SCALE:	PLOT SIZE:	DATUM:	COORDINATE SYSTEM:
1:10,000	A3	ODN	British National Grid

Fferm Wynt Alltraeth
AWEL Y MÔR
Offshore Wind Farm

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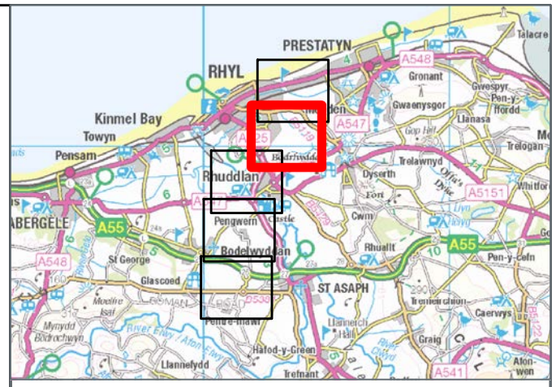
Section D



LEGEND

- Order Limits
- Onshore Cable Route Section Breaks
- Proposed Onshore Export Cable Corridor

Superficial Geology

- Alluvium - Clay, Silt, Sand And Gravel
- Blown Sand - Sand
- Tidal Flat Deposits - Clay, Silt And Sand
- Till, Devensian - Diamicton
- Glaciofluvial Sheet Deposits, Devensian - Sand And Gravel
- Lacustrine Deposits - Clay And Silt

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Metres

PROJECT TITLE:

AWEL Y MÔR OFFSHORE WINDFARM

DRAWING TITLE:

SUPERFICIAL GEOLOGY (DRIFT)

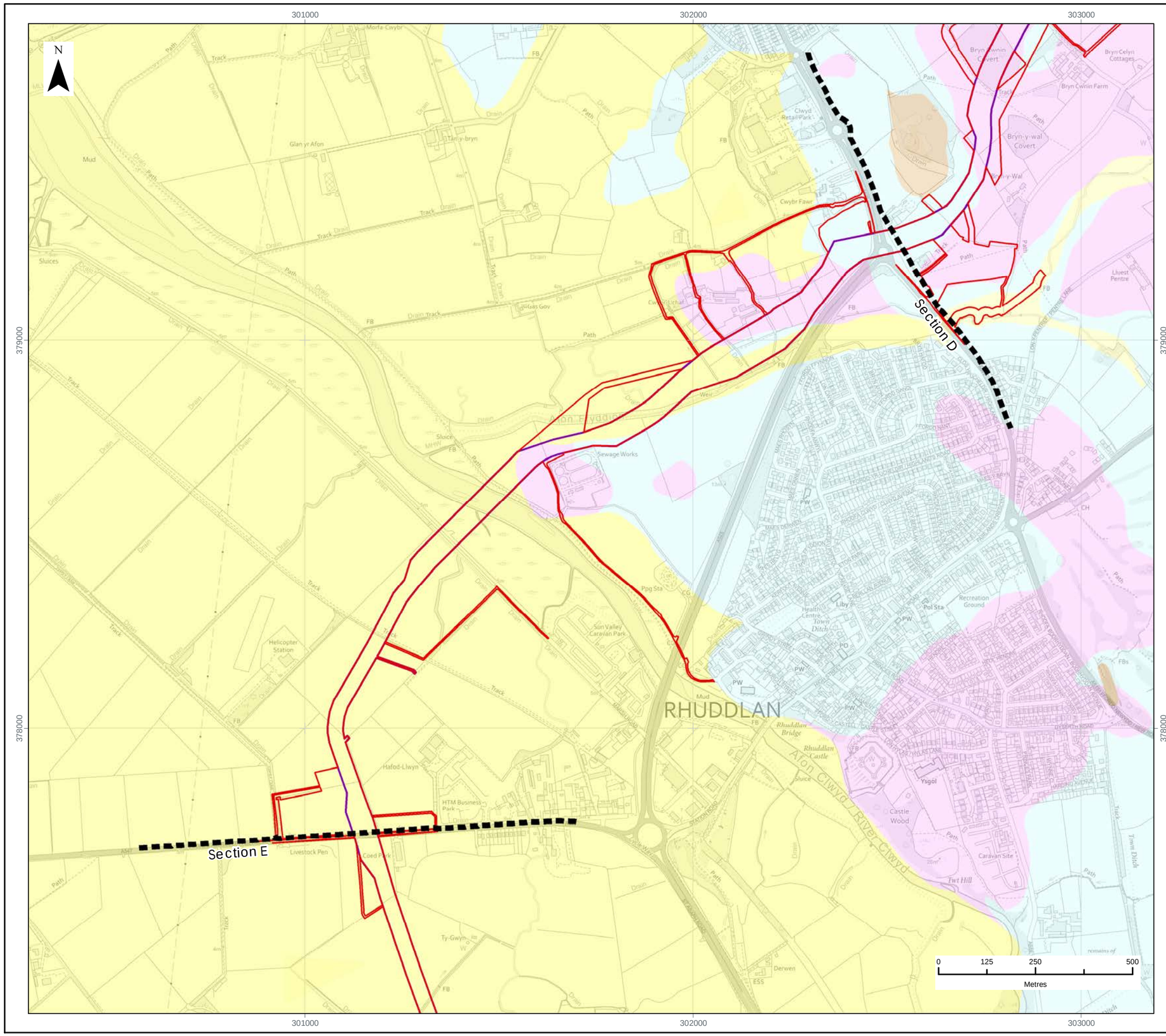
VER	DATE	REMARKS	Drawn	Checked
1	26/02/2022	ES Issue	JRS	MF

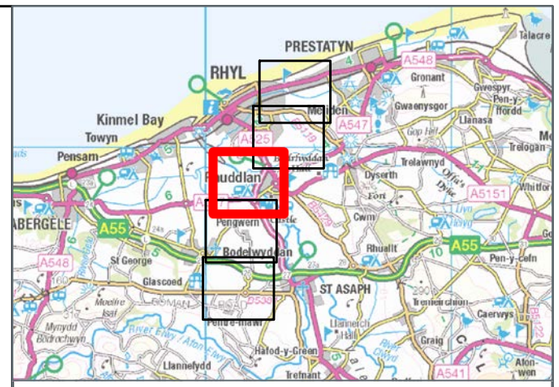
FIGURE NUMBER:

FIGURE 3

SCALE:	PLOT SIZE:	DATUM:	COORDINATE SYSTEM:
1:10,000	A3	ODN	British National Grid

Fferm Wynt Alltraeth
AWEL Y MÔR
Offshore Wind Farm





LEGEND

- Order Limits
- Onshore Cable Route Section Breaks
- Proposed Onshore Export Cable Corridor

Superficial Geology

- Peat
- Tidal Flat Deposits - Clay, Silt And Sand
- Till, Devensian - Diamicton
- Glaciofluvial Sheet Deposits, Devensian - Sand And Gravel
- Lacustrine Deposits - Clay And Silt

PROJECT TITLE:

AWEL Y MÔR OFFSHORE WINDFARM

DRAWING TITLE:

SUPERFICIAL GEOLOGY (DRIFT)

VER	DATE	REMARKS	Drawn	Checked
1	26/02/2022	ES Issue	JRS	MF

FIGURE NUMBER:

FIGURE 4

SCALE:	PLOT SIZE:	DATUM:	COORDINATE SYSTEM:
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Fferm Wynt Alltraeth
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Offshore Wind Farm

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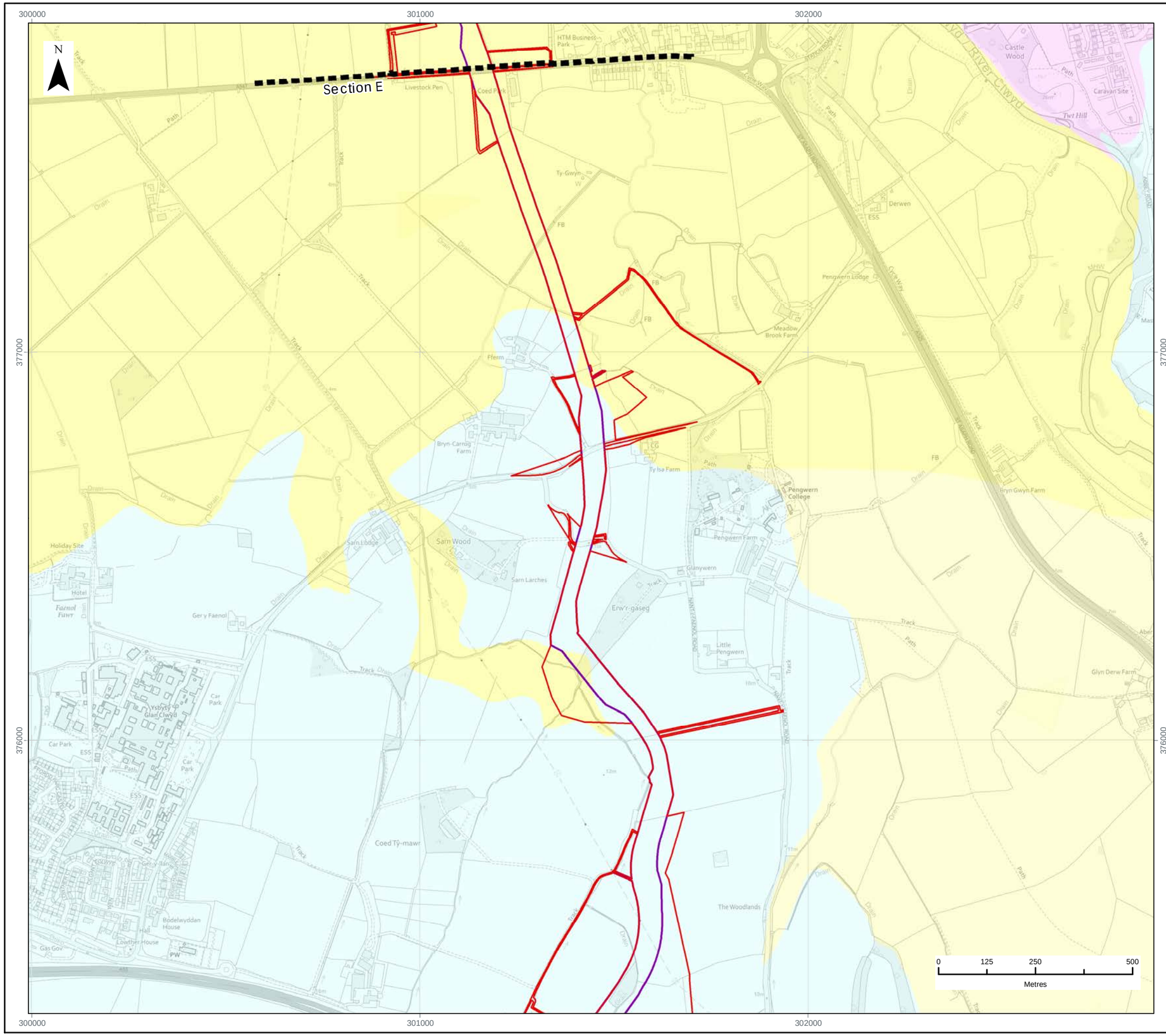

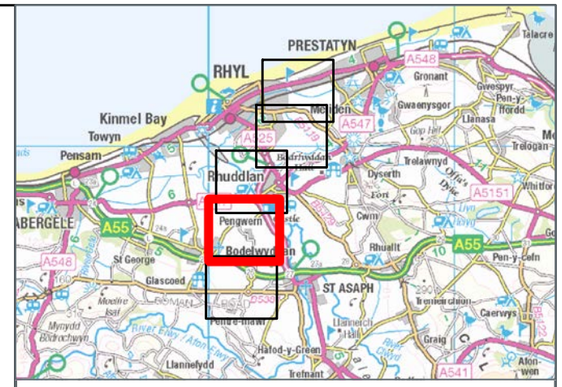

LEGEND

- Order Limits
- Onshore Cable Route Section Breaks
- Proposed Onshore Export Cable Corridor

Superficial Geology

- Alluvium - Clay, Silt, Sand And Gravel
- Tidal Flat Deposits - Clay, Silt And Sand
- Till, Devensian - Diamicton

PROJECT TITLE:

AWEL Y MÔR OFFSHORE WINDFARM

DRAWING TITLE:

SUPERFICIAL GEOLOGY (DRIFT)

VER	DATE	REMARKS	Drawn	Checked
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FIGURE NUMBER:

FIGURE 5

SCALE:	PLOT SIZE:	DATUM:	COORDINATE SYSTEM:
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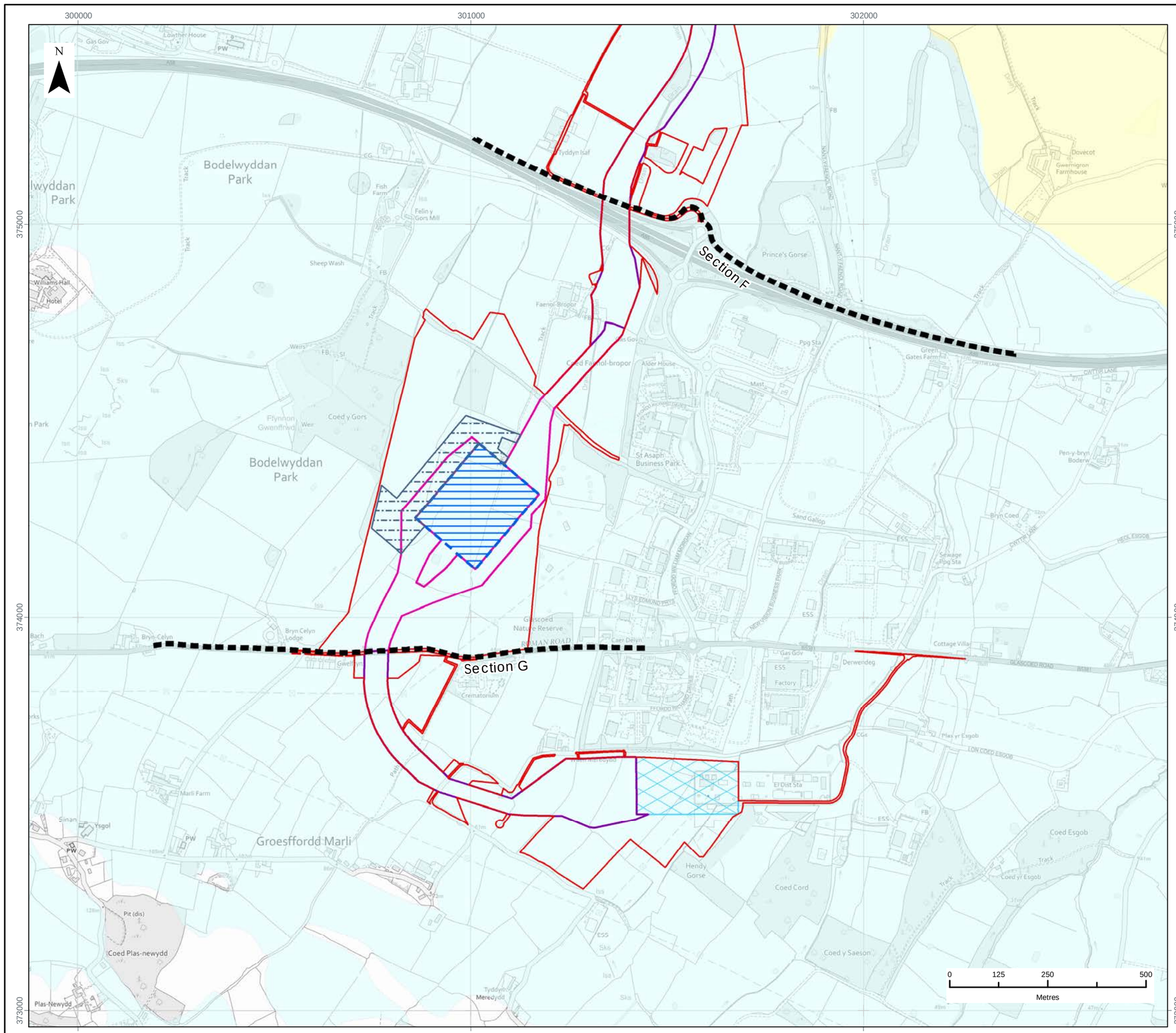

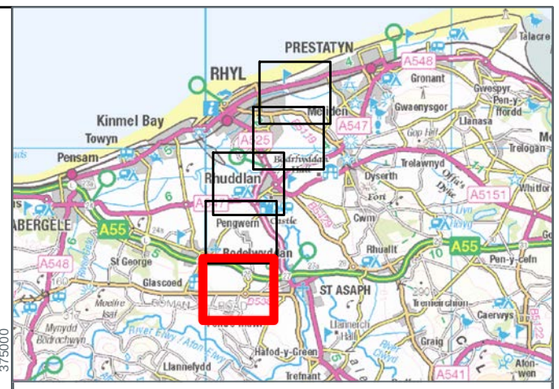

LEGEND

- Order Limits
- Onshore Cable Route Section Breaks
- Proposed Onshore Export Cable Corridor
- Proposed Substation Cable Corridor Zone
- Proposed Onshore Substation (OnSS) Footprint
- Unlicenced Work Zone

Superficial Geology

- Alluvium - Clay, Silt, Sand And Gravel
- Till, Devensian - Diamicton

PROJECT TITLE:

AWEL Y MÔR OFFSHORE WINDFARM

DRAWING TITLE:

SUPERFICIAL GEOLOGY (DRIFT)

VER	DATE	REMARKS	Drawn	Checked
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FIGURE NUMBER:

FIGURE 6

SCALE:	PLOT SIZE:	DATUM:	COORDINATE SYSTEM:
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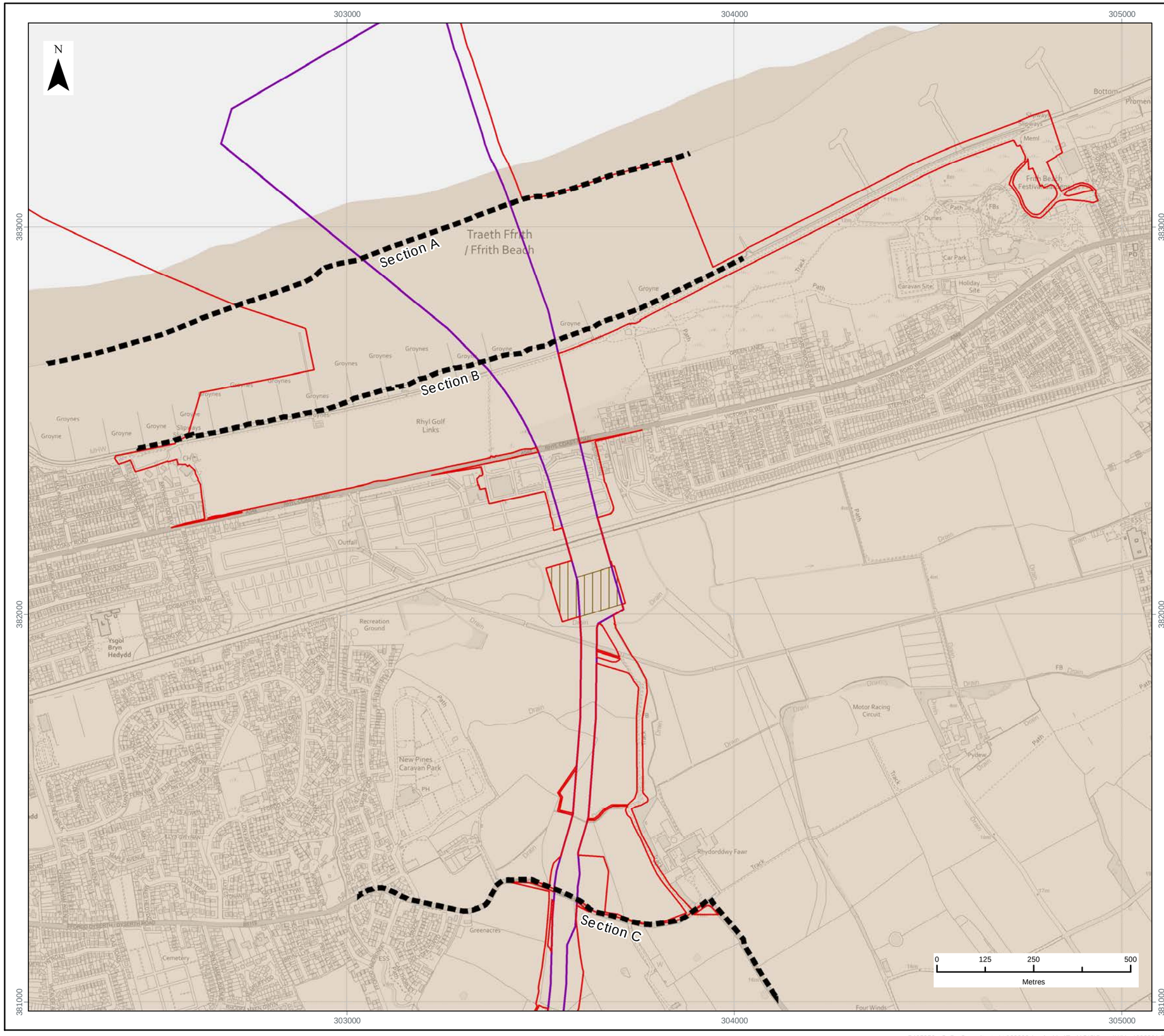

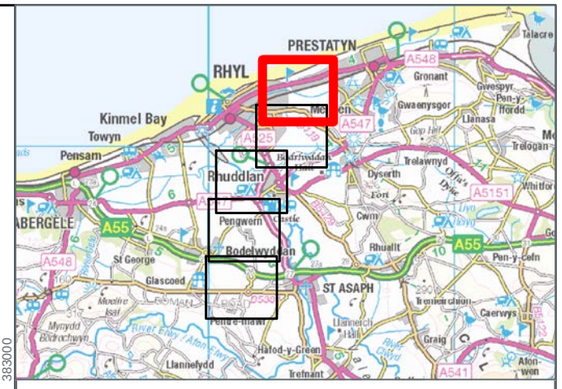

LEGEND

- Order Limits
- Onshore Cable Route Section Breaks
- Proposed Onshore Export Cable Corridor
- Proposed Transition Joint Bay Construction Compound

Bedrock Geology

- Kinnerton Sandstone Formation - Sandstone (Triassic)

PROJECT TITLE:

AWEL Y MÔR OFFSHORE WINDFARM

DRAWING TITLE:

BEDROCK GEOLOGY (SOLID)

VER	DATE	REMARKS	Drawn	Checked
1	26/02/2022	ES Issue	JRS	MF

FIGURE NUMBER:

FIGURE 7

SCALE:	PLOT SIZE:	DATUM:	COORDINATE SYSTEM:
1:10,000	A3	ODN	British National Grid

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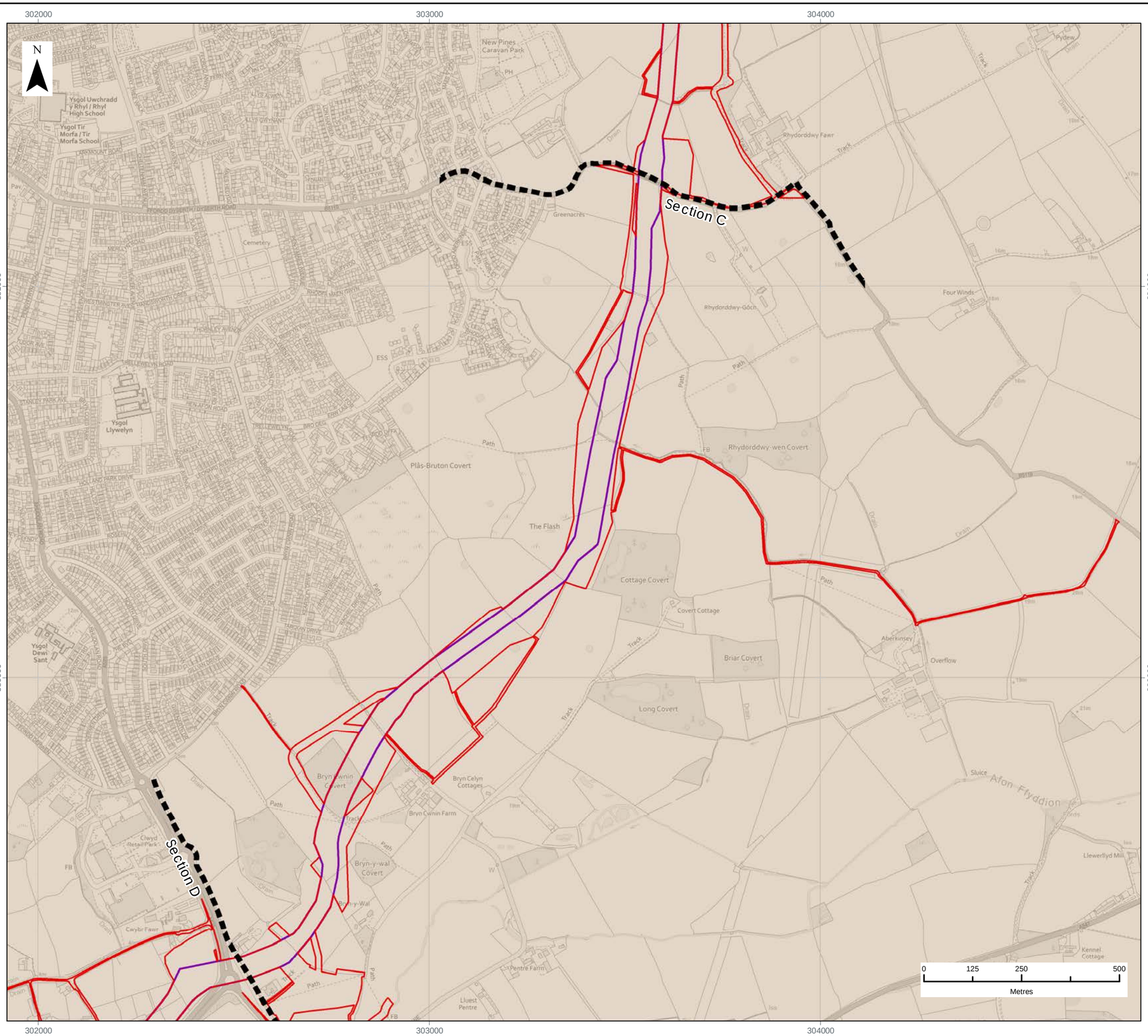

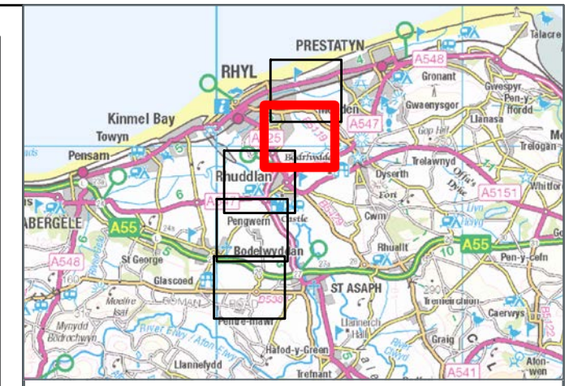

LEGEND

- Order Limits
- Onshore Cable Route Section Breaks
- Proposed Onshore Export Cable Corridor

Bedrock Geology

- Kinnerton Sandstone Formation - Sandstone (Triassic)

PROJECT TITLE:

AWEL Y MÔR OFFSHORE WINDFARM

DRAWING TITLE:

BEDROCK GEOLOGY (SOLID)

VER	DATE	REMARKS	Drawn	Checked
1	26/02/2022	ES Issue	JRS	MF

FIGURE NUMBER:

FIGURE 8

SCALE:	PLOT SIZE:	DATUM:	COORDINATE SYSTEM:
1:10,000	A3	ODN	British National Grid

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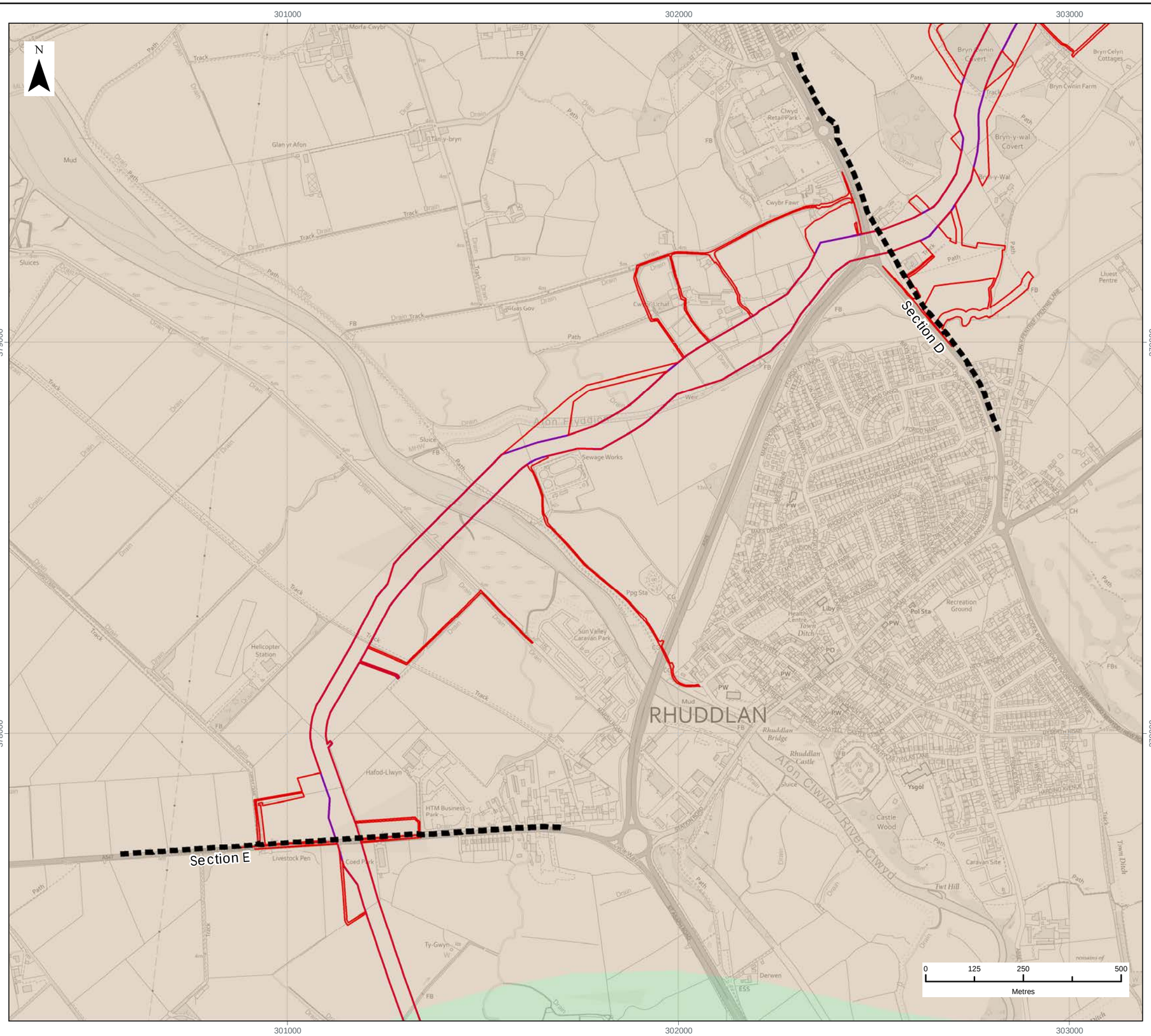

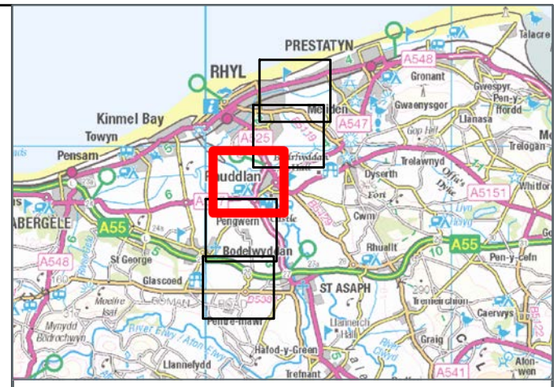

LEGEND

- Order Limits
- Onshore Cable Route Section Breaks
- Proposed Onshore Export Cable Corridor

Bedrock Geology

- Kinnerton Sandstone Formation - Sandstone (Triassic)
- Warwickshire Group - Mudstone, Siltstone And Sandstone (Carboniferous-Permian)

PROJECT TITLE:

AWEL Y MÔR OFFSHORE WINDFARM

DRAWING TITLE:

BEDROCK GEOLOGY (SOLID)

VER	DATE	REMARKS	Drawn	Checked
1	26/02/2022	ES Issue	JRS	MF

FIGURE NUMBER:

FIGURE 9

SCALE:	PLOT SIZE:	DATUM:	COORDINATE SYSTEM:
1:10,000	A3	ODN	British National Grid

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Offshore Wind Farm

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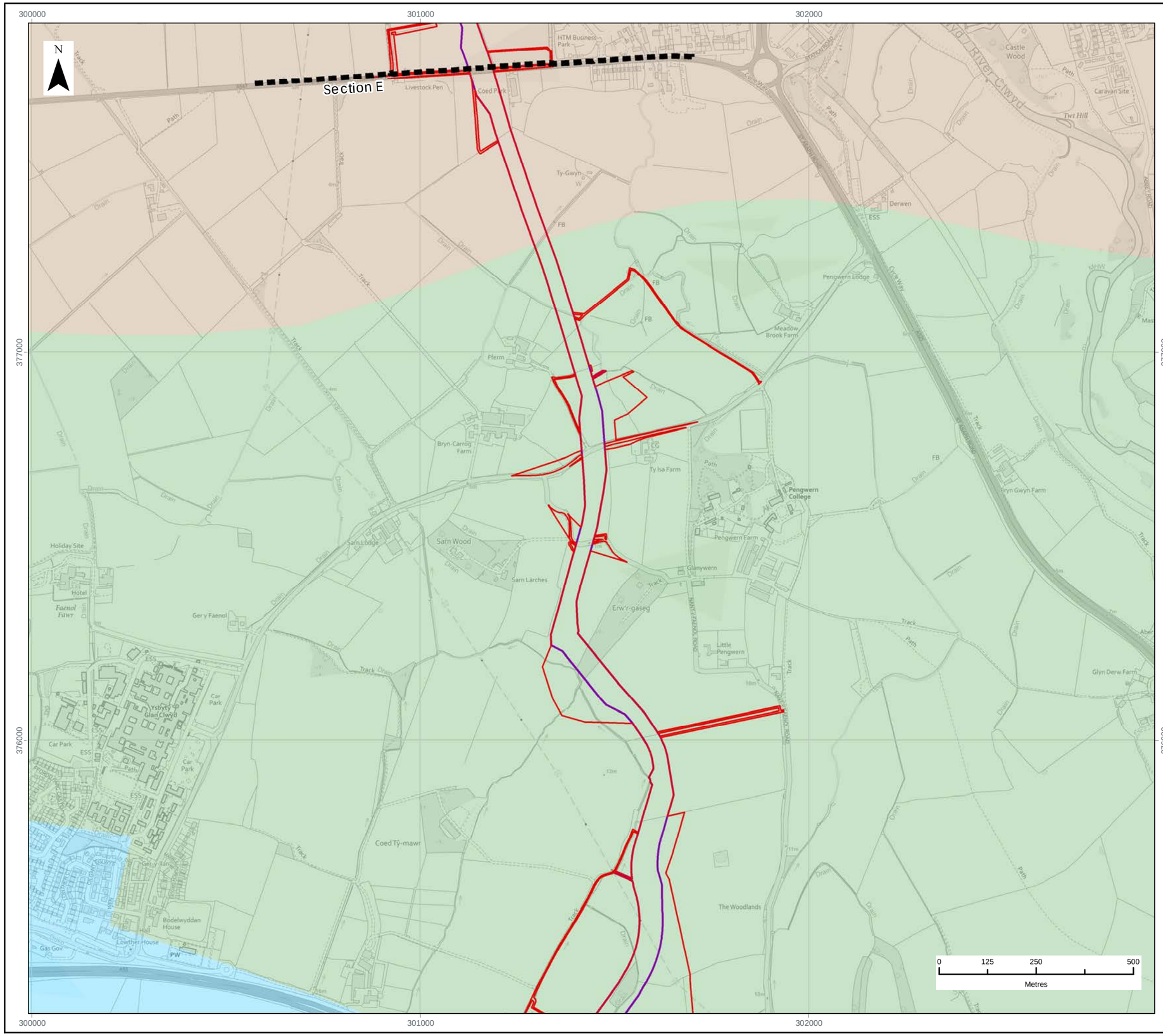

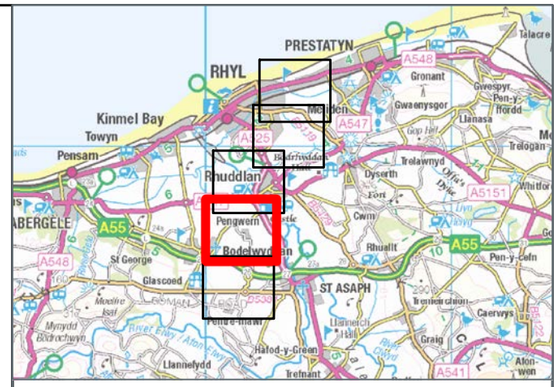

LEGEND

- Order Limits
- Onshore Cable Route Section Breaks
- Proposed Onshore Export Cable Corridor

Bedrock Geology

- Kinnerton Sandstone Formation - Sandstone (Triassic)
- Warwickshire Group - Mudstone, Siltstone And Sandstone (Carboniferous-Permian)
- Clwyd Limestone Group - Limestone (Carboniferous)

PROJECT TITLE:

AWEL Y MÔR OFFSHORE WINDFARM

DRAWING TITLE:

BEDROCK GEOLOGY (SOLID)

VER	DATE	REMARKS	Drawn	Checked
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FIGURE NUMBER:

FIGURE 10

SCALE:	PLOT SIZE:	DATUM:	COORDINATE SYSTEM:
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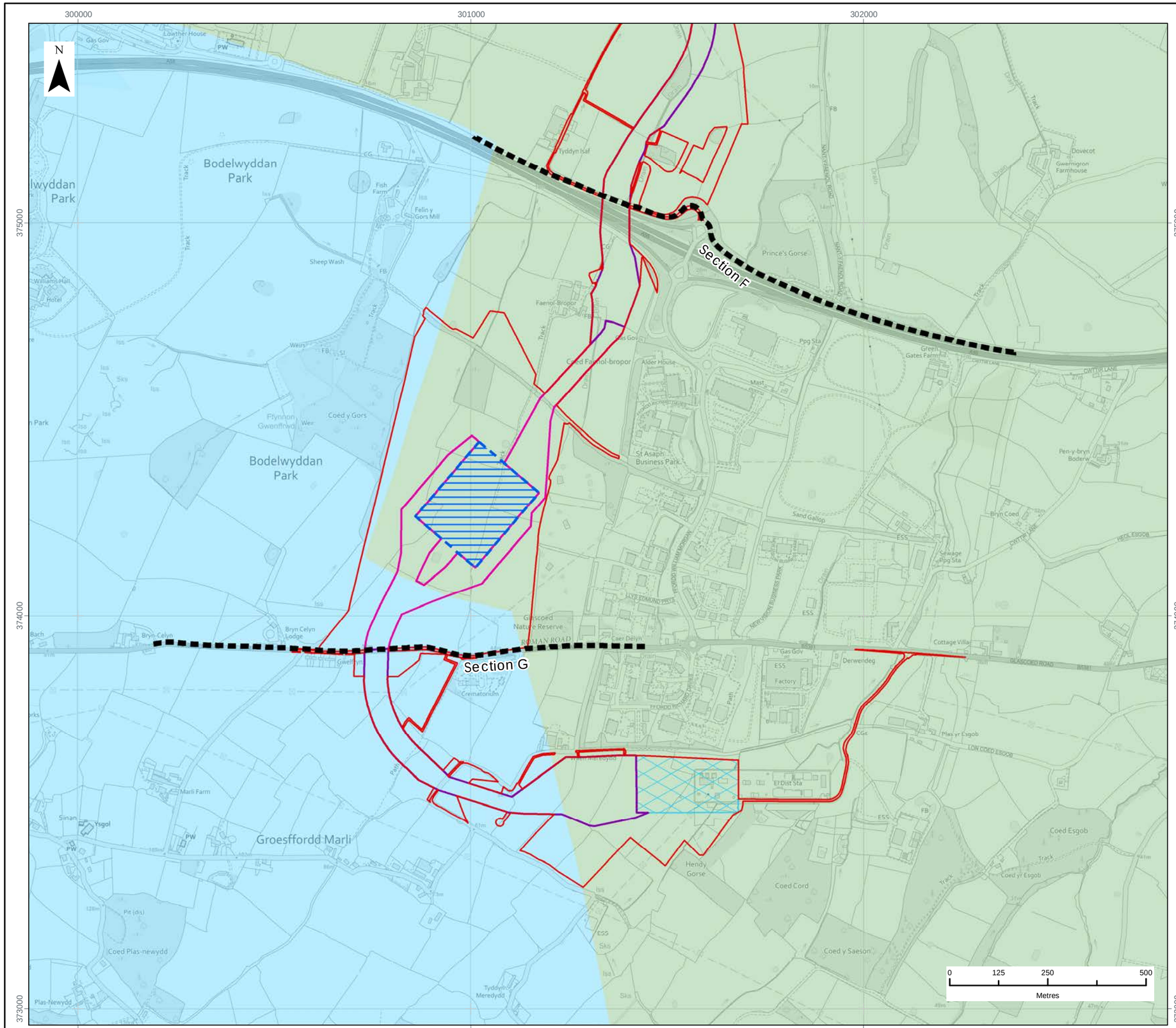

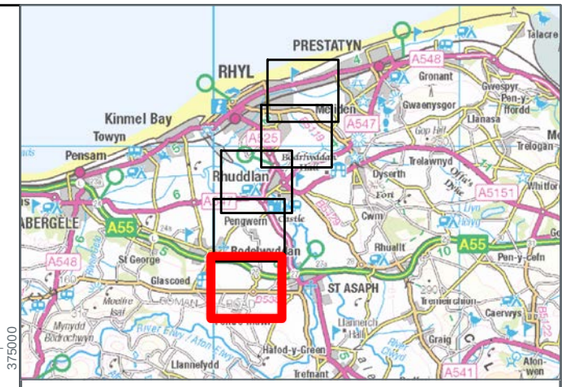

LEGEND

- Order Limits
- Onshore Cable Route Section Breaks
- Proposed Onshore Export Cable Corridor
- Proposed Substation Cable Corridor Zone
- Proposed Onshore Substation (OnSS) Footprint
- Unlicenced Work Zone

Bedrock Geology

- Warwickshire Group - Mudstone, Siltstone And Sandstone (Carboniferous-Permian)
- Clwyd Limestone Group - Limestone (Carboniferous)

PROJECT TITLE:

AWEL Y MÔR OFFSHORE WINDFARM

DRAWING TITLE:

BEDROCK GEOLOGY (SOLID)

VER	DATE	REMARKS	Drawn	Checked
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FIGURE NUMBER:

FIGURE 11

SCALE:	PLOT SIZE:	DATUM:	COORDINATE SYSTEM:
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6.7.6 Hydrogeological Conditions

85 The hydrogeological setting of the onshore OL and ground conditions is provided within Volume 3, Chapter 7: Hydrology, Hydrogeology and Flood Risk (application ref: 6.3.7).

6.7.7 Radon and Ground Gas

86 As part of a contaminated land risk assessment, ground gases are considered as a potential source of contamination that could affect construction workers or AyM onshore infrastructure, although there is no evidence of gases generated from contaminated sources, there remains the potential for naturally occurring ground gases in the form of Radon which should be considered.

87 The UK Radon Plan indicate that the majority of the onshore ECC is located in an area where <1% of homes are at or above the National Radiological Protection Board (NRPB) action level and therefore the risk of significant ingress of radon into structures on-site is considered low. Between 1% and 3% of homes in the area immediately adjacent to OnSS location immediately west of St Asaph Business Park are at or above the NRPB action level. Current advice confirms that protection measures would not be required for any permanently enclosed structure. The potential increases to the south of the route, towards St Asaph Business Park.

88 Given the anticipated ground conditions the risk associated with ground gas is considered generally low risk in accordance with BS8576 The risk associated with ground gas on construction workers and human receptors is low (and so magnitude of impact would be negligible), this has been excluded from the assessment, however where structures are proposed a site specific evaluation of radon should be considered based upon detailed design (post consent).

6.7.8 Historical Past Use and Contaminated Land Use

89 As part of the contaminated land risk assessment, potential contaminated historical sites and land uses that could be considered as potential receptors or could affect construction workers, AyM onshore infrastructure are considered. The 1:10,000, 1:2,500 and 1:1,250 scale historical maps for the study area have been reviewed. In general, these show that the study area has been predominantly under agricultural use, with scattered settlements, from the 1800s to the present day.

90 Whilst the historical maps do not show evidence of potentially contaminative land use within the study area it has been noted that agricultural land use may result in some very limited contamination. Contamination from agricultural land use may result from a number of activities and include, for example, usage of pesticides and fertilizers, small spillages and leakages of fuel or oil and deposition of waste materials. The majority of the study area is located away from farm infrastructure so risk from contamination is considered to be very low.

91 The NRW website was consulted for the presence of landfills (authorised and historic). The search identified no authorised landfills within 1km of the onshore ECC, however one historic landfill (RHU/011/95) was located adjacent to the onshore ECC at NGR 302300, 379300, previously licenced for inert waste. There is no evidence of this on site. The former landfill is considered to present a very low risk given the nature of the fill material (inert). A number of sources were consulted for evidence of other potentially polluting activities in the study area comprising:

- Records provided by DCC with regard to sources of contamination noted that there are no areas of potentially contaminated land have been identified within 500m of the study area. This also concurs with searches of historic plans which found no evidence of past contaminative uses.
- Waste Management Sites – The NRW website was consulted for the presence of waste sites (authorised and historic). The search identified no waste sites within 1km of the study area.
- Pollution Incidents - The NRW website was consulted for details of pollution incidents. No pollution incidents have been noted by the NRW either within or adjacent (within 1km) to the study area.

92 Contaminated land on construction workers and human receptors from pre-existing ground conditions has been effectively ruled out of the assessment as no contamination sources have been identified along the route. Therefore risk modelling utilising source-pathway–receptor assessment techniques is not required, however, to account for unforeseen contamination being encountered an assessment of risk has been included in Section 6.10.5.

6.7.9 Historical Mining

93 A review of historical mining has been undertaken to consider whether the onshore infrastructure associated with AyM has the potential to disturb, or be impacted by, former mine workings. here is no record of any mining underlying the site, although some historic lead mines occur to the north west (750m from the study area) near Bodelwyddan but pose no significant risk as they are small scale mines, with a very limited extent, historically exploiting lead mineralisation mapped along linear faults in the Clwyd Limestone. The Clwyd Limestone is not significantly developed on the site., and so the risk of disturbance is low and the magnitude of impact would be negligible.

94 There are no records of any mining underlying the Landfall, onshore ECC or OnSS areas, although some historic lead mines occur to the north west of the OnSS (750m from the site) near Bodelwyddan but pose no significant risk as they are small scale mines historically exploiting lead mineralisation on faults in the Clwyd Limestone.

95 Historical plans available from the BGS online indicate the workings do not appear to extend beneath the Landfall, onshore ECC or OnSS areas. Historical mapping indicates there are no historical mine shafts within the OL.

96 The Clwyd Limestone is not significantly developed near the proposed onshore infrastructure for AyM.

97 The onshore elements of AyM are not within a coal mining reporting area and there are no significant coal bearing bedrock units present.

98 On this basis, potential impacts on former mine workings, or on the proposed development arising from historical mining, is scoped out of the subsequent construction or operational assessment as there is no pathway between the mining and the onshore elements of AyM.

6.7.10 Mineral Resources

99 Consideration is given to the mineral resource in the area that could be affected by the onshore infrastructure. A number of sand and gravel areas fall into the Category 1 Aggregates Safeguarding Area. These areas comprise sands and gravels as indicated on the superficial geology plan (see Figure 2) in two main areas along the beach as blown sand and superficial fluvioglacial deposits along the cable route in Route Sections A, C and D. A number of sand and gravel areas fall into the Category 1 Aggregates Safeguarding Area. These areas comprise sands and gravels as indicated on Figure 2 in two main areas along the beach as blown sand and superficial fluvioglacial deposits along the onshore ECC in Route Sections A, C and D.

100 There is no evidence of any planning permissions being granted and areas along Route Sections C and D are not in areas likely to be utilised for mineral exploitation, particularly the blown sand along the beach front. The sand and gravel deposits have been identified but are very unlikely to be exploited as they are located in Route Sections C and D along the best quality agricultural land at or close to residential development. The Denbighshire County Council Local Development Plan 2006 to 2021 identifies the location of the proposed OnSS as a Minerals Safeguarding area for Limestone (Route Section F). On the basis of the abundant nature of mineral deposits in the wider area and reduced likelihood of their extraction within the study area due to the mineral resources being in areas of better quality agricultural land and near housing that minerals resources are to be of '**low sensitivity'**.

6.7.11 Unexploded Ordnance (UXO)

101 A review of areas impacted by UXO has been undertaken to consider whether the onshore infrastructure associated with AyM has the potential to be impacted by UXO.

102 There was no evidence of any areas impacted by UXO along the onshore corridor route and Study Area. The entire length of the route is identified as a Low Risk site. There are former Army Camps used during the First World War at Kinmel Park near Bodelwyddan, but these pose no risk to the development.

6.8 Key parameters for assessment

103 The MDS criteria identified in Table 10 have been selected as those having the potential to result in the greatest effect on an identified receptor or receptor group. These criteria have been selected from the details provided in the onshore project description (Volume 3, Chapter 1 (application ref: 6.3.1)). Effects of greater significance are not predicted to arise should any other development scenario, based on details within the project design envelope, to that assessed here be taken forward in the final design scheme. The MDS takes into consideration designed-in mitigation as described in Section 6.9.

Table 10: Maximum design scenario.

POTENTIAL EFFECT	MAXIMUM ADVERSE SCENARIO ASSESSED	JUSTIFICATION
CONSTRUCTION		
Impacts on soil quality – cable route infrastructure; and Impacts on minerals safeguarding	The assessment considers the extent of the onshore ECC and associated haul roads, access tracks and TCCs	The MDS includes the maximum corridor width, within which the final cable route will be located and so represents the greatest area of land disturbance.
	The assessment considers construction TCCs would cover the indicative maximum area of 32,500m^2	The maximum area of TCC has been used.
	The cables will be installed in one trench per circuit	

POTENTIAL EFFECT	MAXIMUM ADVERSE SCENARIO ASSESSED	JUSTIFICATION
	(maximum of 2 trenches for up to 2 circuits), with each trench up to 5 m wide and up to 2 m deep	The maximum number of cable trenches and cable depth has been used.
Impacts on soil quality – OnSS	The assessment considers an Air Insulated Substation (AIS), technology option as this has a greater development footprint in comparison to a Gas Insulated Substation (GIS)	Disturbance to existing ground conditions will result from the OnSS construction and so a maximum footprint for the OnSS Construction Zone (assumes AIS is selected technology) OnSS Access Zone and OnSS Cable Corridor Zone has been assessed.
	A number of zones relating to the OnSS have been identified to create the design envelope. The development of the entire area within these zones has been assessed and will be further refined during detailed design: • The OnSS Cable Corridor Zone will contain the final cable connection into and out of the OnSS. The route of the cable connections to the OnSS will be confirmed following detailed design (post consent).	

POTENTIAL EFFECT	MAXIMUM ADVERSE SCENARIO ASSESSED	JUSTIFICATION
	• The OnSS Access zone represents the area within which the final OnSS access track (both construction and operational) will be routed. The route of the construction and operational access will be confirmed following detailed design (post consent)	
Impacts on soil quality – cable route infrastructure – trenchless crossings	Trenchless crossings required for Landfall; larger surface watercourses; some utility crossings. The indicative maximum HDD depth will be 20 m with up to 8 drives required per crossing point	Trenchless crossing techniques present areas of greater depth of disturbance and a risk of indirectly contaminating surface soils from drilling fluids and the movement of excavated earth/ sediments.
	Trenchless crossing TCCs would be located at each end of the major crossings, requiring an associated compound with permeable surfacing up to 100 m x 80 m	
Impacts on soil quality – TJB construction	Trenchless crossing techniques will be used from Landfall to cross the coastal flood defence line, A548 Rhyl Coast Road and North Wales Main Line railway.	The MDS includes the maximum number of cables anticipated at Landfall and therefore, the maximum working corridor required.

POTENTIAL EFFECT	MAXIMUM ADVERSE SCENARIO ASSESSED	JUSTIFICATION
	Land take for Transitional Joint Bay (TJB) TCC during construction 15,000(m^2) (150 m x 100 m) Permanent land take for TJBs during O&M (1200 m^2) (60 m x 20 m)	Several access options for Landfall are included in the MDS.
OPERATION		
Impact on soil resources and quality from cable route infrastructure; and impacts on minerals safeguarding areas	A maximum cable corridor width, based upon two export circuits each in a 5 m wide swathe, with a minimum spacing of 500 m between joint pits has been used.	To represent the maximum potential footprint covered by the operational infrastructure
Impact on soil resource and quality from OnSS	A maximum OnSS foot print (based upon Air Insulated Switchgear (AIS)) of 250 m x 200 m and access track length of 380m and 10m wide have been used.	To represent the maximum potential footprint covered by the operational infrastructure
Impacts on soil resource and quality from landfall	A maximum TJB land take of 1200 m^2) (Two TJBs, each 30 m x 20 m)	To represent the maximum potential footprint covered by the operational infrastructure

POTENTIAL EFFECT	MAXIMUM ADVERSE SCENARIO ASSESSED	JUSTIFICATION
DECOMMISSIONING		
Impacts on soil quality – decommissioning of onshore ECC	Buried cables would be de-energized with the ends sealed and left in place to avoid ground disturbance	The onshore export cable remaining in situ provides potential lateral pathways for water flow which could indirectly affect water quality.
Impacts on soil quality – decommissioning of OnSS and TJB	Removal of the OnSS including areas of hardstanding and the removed of TJB at Landfall.	Removal of all infrastructure represents greatest disturbance
CUMULATIVE EFFECTS		
Effects during construction	Overlap of construction phase with construction of nearby developments.	Overlapping construction phases would be the period of highest risk due to receptors being affected by more than one Project.

6.9 Mitigation Measures

104 Mitigation measures that were identified and adopted as part of the evolution of the project design (embedded into the project design) and that are relevant to ground conditions and land use are listed in Table 11. The mitigation includes embedded measures such as design changes and applied mitigation which is subject to further study or approval of details; these include avoidance measures that will be informed by pre-construction surveys, and necessary additional consents where relevant. The composite of embedded and applied mitigation measures apply to all parts of the AyM development works, including pre-construction, construction, O&M and decommissioning

Table 11: Mitigation measures relating to Ground Conditions and Land Use.

PARAMETER	MITIGATION MEASURES
GENERAL	
Project design	Careful routing of the onshore ECC and design of key crossing points to avoid key areas of sensitivity.
CONSTRUCTION	
Pollution Prevention and Emergency Incident Response Plan	All construction work will be undertaken in accordance with a Pollution Prevention and Emergency Incident Response Plan (PPEIRP), secured as part of the CoCP which forms a requirement of the DCO. An outline version of the PPEIRP is provided as Appendix 6 of the CoCP (application ref: 8.13.6). The outline PPEIRP sets out the principles to be followed when the final PPEIRP is finalised that will include the following measures. ▲ Areas at risk of spillage, such as vehicle maintenance areas and hazardous substance stores (including fuel, oils, drilling fluids and chemicals) will be bunded and carefully sited to minimise the risk of hazardous substances entering drainage systems or local watercourses. ▲ Additionally, the bunded areas will have impermeable bases to limit the potential for migration of contaminants into groundwater following any leakage/spillage. ▲ Bunds used to store fuel, oil etc. will have a 110% capacity. The outline PPEIRP (application ref: 8.13.6) sets out the pollution prevention measures, and emergency incident responses, which will be implemented by the Applicant and its contractors during construction

PARAMETER	MITIGATION MEASURES
Good practice	• All construction work will be undertaken in accordance with the CoCP, an outline version of which is provided in the Outline Code of Construction Practice (application ref: 8.13) that sets out the principles to be followed when the final CoCP is finalised and secured as part of the CoCP which forms a requirement of the DCO. The CoCP will include good practice guidance including, but not limited to: • Control of Water Pollution from Construction Sites – Guidance for Consultants and Contractors CIRIA (C532) (CIRIA 2001); • CIRIA – SuDS Manual (C753) (CIRIA, 2015b); • No discharge to main river watercourses will occur without permission from NRW (SuDS Manual); • Wheel washers and dust suppression measures to be used as appropriate to prevent the migration of pollutants (SuDS Manual); • Regular cleaning of roads of any construction waste and dirt to be carried out (SuDS Manual). •
Soil Management Plan	All construction work will be undertaken in accordance with a Soil Management Plan (SMP). An Outline Soil Management Plan (SMP) is provided as Appendix 4 to the outline CoCP (application ref: 8.13.4) an outline version of which is provided (application ref: 8.13). The outline SMP sets out the principles to be followed when the final SMP is finalised and agreed with DCC as part of the CoCP which forms a requirement of the DCO.

PARAMETER	MITIGATION MEASURES
	▲ The Outline SMP (application ref: 8.13.4) provide details of mitigation measures and best practice handling techniques to safeguard soil resources by ensuring their protection, conservation and appropriate reinstatement during the construction of the onshore works.
OPERATION	
General	The OnSS would contain potential pollutants which could include cooling oils, lubricants, fuels, greases, etc. The design, maintenance and operation of the facility would follow good practice in line with the prevailing future guidance and legislation with regard to measures such as the storage and management of potentially polluting substances, emergency spill response procedures, clean up and control of any potentially contaminated surface water runoff and routine inspection to prevent or contain leaks of any pollutants Although the impact to agricultural soils has been scoped out, where required good practice will be undertaken to excavate and replace without impacting soil quality significantly during any cable replacement.

PARAMETER	MITIGATION MEASURES
DECOMMISSIONING	
General	Decommissioning practices will incorporate measures like the construction phase, to prevent pollution. These measures will include emergency spill response procedures, control of surface water and clean up and remediation of any contaminated soils. Exposed cables ducts will be sealed with an appropriate water proofing material to mitigate flood risk or creation of preferential flow pathways. A decommissioning plan will be required by the DCO, to include protection of the water environment, based on guidance and best practice that will be appropriate at the time of decommissioning.

6.10 Environmental Assessment: Construction Phase

105 The impacts of the onshore construction of AyM have been assessed on ground conditions and land use in the onshore study area. The following sections describe the potential impacts during the construction phase of the onshore elements of AyM.

106 The onshore ECC has been designed to avoid where possible, known areas of potential concern to minimise excavation of potentially contaminated material.

107 A description of the potential effect on ground conditions and land use receptors caused by each identified impact is given below. In general however, the environmental effects arising from the construction of the onshore elements of AyM are temporary, as they only occur during the construction phase.

6.10.1 Impacts on soil quality – cable route infrastructure

108 Mitigation to ensure soils are protected during the development process will be undertaken and will be managed through planning and regulatory control and operation of best practice site management techniques. The mitigation proposed to protect soils is outlined in the following section and in the outline SMP that is provided within the outline CoCP (application ref: 8.13).

109 Site clearance and preparation works for installation of the onshore export cables, cable joint bays and the preparation of access routes have the potential to impact the soil quality. Potential impacts identified include:

- Over compaction of agricultural and amenity soils caused by the use of heavy machinery onsite;
- Over compaction of agricultural and amenity soils caused by storage of construction equipment at the site;
- Structural deterioration of soil materials during excavation, soil handling, storage and replacement;
- Erosion and loss of soils during soil handling, storage and replacement; and
- Homogenisation and loss of characteristic horizons during excavation, storage and replacement.
- These direct impacts on soil quality can also have potential indirect impacts on soil fertility and drainage.

110 The site clearance and preparation work for installation of the onshore export cables and cable joint bays will cover a corridor of land up to 40-60m width and 12km length. The soil is generally of moderate to good quality classed as primary agricultural land (Grade 3a to 3b) with some limited Grade 2 sections where it is outside urban or industrialised areas. Therefore based on the criteria in Table 3, sensitivity is assessed as medium.

111 The construction methodology chosen ensures that the direct impacts on soil resulting from excavation will be limited spatially to the onshore ECC and temporally to a one off process of excavation, storage and replacement. Given the overall scale of the agricultural resource and chosen construction methodology, the impact should be short term and of low magnitude.

112 The potential for long-term impacts resulting from the construction works is assessed as low, although careful soil handling will be required in order to preserve soil, structure, texture and avoid compaction within sensitive locations such as productive arable fields or high quality pasture. The principles that will be adopted to manage potential impacts upon soil during construction within the onshore ECC are set out in the outline SMP, provided as part of the outline CoCP (application ref: 8.13).)

113 Given the features affected, i.e. agricultural soils, roadsides and amenity land; plus the limited and temporary nature of the works, there will not be considerable, permanent/irreversible changes over the majority of the soils.

114 It is therefore assessed as a negligible adverse magnitude of impact across the study area.

115 Given the **medium sensitivity** and the **negligible magnitude** of impact for all soil grades, the overall significance of the impacts on physical parameters of soil quality is ***minor adverse*** and therefore not significant.

6.10.2 Impacts on soil quality – OnSS

116 The soils within the OnSS development area (comprising the OnSS and associated TCC, access zones and cable entry/exit zones), are slightly sandy loamy soils in an area of generally moderate to good soils. No differentiation regarding the nature of the soil between the cable route and the proposed OnSS location has been made, the soil is classed as having **medium** sensitivity.

117 The clearance and preparation of the OnSS and associated OnSS TCC, will involve similar construction machinery and processes to installation of the onshore ECC and therefore similar impacts are anticipated in terms of the physical parameters of soil quality within the OnSS and associated TCC, access zones and cable entry/exit zones (compaction, structural deterioration during excavation and storage, homogenization and loss of characteristic horizons as set out in Section 6.10.1).

118 Soil will also be removed and used for landscaping or sterilised under the foundation footprint of the OnSS and therefore the soils will be subject to an irreversible change over the whole feature. Given the discrete nature of the impact (limited to the footprint of the OnSS) the magnitude of the impact is assessed as **low** resulting in an effect of ***minor adverse*** and therefore not significant.

119 There is potential for mobilisation of bulk materials such as concrete or entrainment of stockpiled material from excavations during OnSS construction to result in watercourses or drainage ditches becoming restricted or blocked. This could impact flow regimes and could result in an increase in localised land contamination. However through strict management protocols set out in the outline PPEIRP within the outline CoCP the potential impact would be mitigated, and the magnitude of the impact is assessed as **low** resulting in an effect of ***minor adverse*** and therefore not significant.

6.10.3 Impacts on soil quality – TJB construction

120 Transition joint bays will be located to the south of the railway. These bays are described in Volume 3, Chapter 1 (application ref: 6.3.1). The bays will be located within an area of tidal flat soils, formed beyond the marine beach and blown sand deposits, the sensitivity of which has been assessed as **medium** (see Section5.599.0).

121 The clearance and preparation of the TJB site will involve similar construction machinery and processes to installation of the onshore ECC and therefore similar impacts to those described in Section 6.10.1), are anticipated as for the onshore export cable works.

122 Based on the proposed construction methodology (as set out in Volume 3, Chapter 1 (application ref: 6.3.1)), impacts are likely to be associated with localised excavation and therefore the magnitude has been assessed as **negligible**, giving an effect of ***minor adverse*** and therefore not significant.

6.10.4 Impacts on soil quality – trenchless crossings

123 As set out for the onshore ECC works above (Section 6.10.1), implementation of the mitigation measures in the form of a PPEIRP as discussed at Section 6.9 and the measures proposed within the outline CoCP would ensure that the potential for incidents detrimental to land quality occurring is minimised and would reduce the magnitude of the impact of any such incidents.

124 The potential impact would arise from the drilling activity and could lead to bentonite and or drilling fluids/ hydraulic fluids being released into the soils and or ground water. In consideration of the pollution prevention measures within the PPEIRP, techniques would be managed effectively with a negligible magnitude of impact and located away from sensitive receptors.

125 Overall, it is predicted that the impact on ground conditions and land quality from HDD crossings (or other trenchless crossings) would be direct and of an intermittent nature and of short duration. The sensitivity of the receptors, the immediate subsurface geology is considered to be **low (see** Table 8**)** and the magnitude is deemed to be **negligible**. The effect would therefore be ***negligible adverse***, which is not significant in EIA terms.

6.10.5 Contaminated land: risk to construction workers and human receptors from unexpected contamination

126 As set out in Section 6.7.8 the potential for contaminants contained within excavated ground and stockpiled materials is very unlikely. If it does occur the contamination is likely to be associated with previous farming practices such as usage of pesticides and fertilizers, small spillages and leakages of fuel or oil and deposition of waste materials. If disturbed during construction works there is a possibility that sources of contamination could be mobilised causing potential harm on construction workers and/or human receptors.

127 The outline PPEIRP sets out procedures to be followed should sources of contamination (e.g. buried asbestos) be discovered during construction. If unexpected contamination is encountered or suspected, the works would cease in that area and assessment by a suitably qualified land contamination specialist would be made to determine appropriate actions. Soil (soil vapour/ groundwater) samples would be collected and analysed. The risks associated with contamination would be assessed. When required, a remediation strategy would be designed and agreed with NRW and DCC before implementation.

128 Sensitivity of receiving environment is **high** (humans see Table 3) but magnitude of impact is expected to be **negligible**, the effect is ***minor adverse*** and therefore not significant.

6.10.6 Impacts on areas of mineral safeguarding

129 As noted in Section 6.7.10, the study area includes areas of safeguarded deposits of minerals and aggregates that occur along the onshore ECC in Route Sections A, C and D (areas of sand and gravel), and the OnSS (limestone) and there is potential for the construction of onshore elements of AyM to preclude mineral extraction in these areas. These areas are defined as Minerals Safeguarding areas within the DCC LDP and are considered to be of low sensitivity.

130 A search of the DCC planning website has not shown any extant planning permissions for mineral extraction in these areas. The sensitivity is low due to the abundant nature of the sand and gravels and reduced likelihood of it ever being extracted in the study area because its either located on higher quality farmland or near housing.

131 The construction of the proposed OnSS will lead to sterilisation of minerals resources during construction, however, the proposed OnSS construction area and TCC area is small in comparison to the remaining available minerals resource area.

132 The sensitivity of the receptors is **low** and the magnitude is deemed to be **negligible**. The effect would therefore, be ***negligible adverse*** which is not significant in EIA terms.

6.11 Environmental Assessment: Operational Phase

133 The impacts of the operation and maintenance of AyM have been assessed on ground conditions and land use in the onshore study area. A description of the potential ground conditions and land use receptors caused by each identified impact is given below.

6.11.1 Impacts on soil resource - cable route infrastructure

134 The following section considers the potential impact of a reduction in available soil resource through the presence of the onshore ECC during the operation of AyM. The onshore cable would be buried underground. The construction phase would include restoration of the land above the cable to its former land use. As noted in Volume 3, Chapter 1: Onshore Project Description (application ref 6.3.1), activity during operation will be limited to periodic inspection and maintenance activity of infrastructure within the onshore ECC. Oil filled cables will not be used (and so do not represent a source of pollution), and any repair activity would be of a similar nature to the construction phase (albeit at a much reduced scale).

135 It is predicted that the permanent impact through loss of soil resource would be limited to short duration during any repair activity. The sensitivity of the receptors land quality ranges from **low** to **medium** and the magnitude of impact is deemed to be **negligible**. The effect would therefore be ***negligible to minor adverse***, which is not significant in EIA terms.

6.11.2 Impacts on soil resource - OnSS

136 The following section considers the potential impact of a reduction in available soil resource through the presence of the OnSS during the operation of AyM. The development of the OnSS and associated permanent access from Glascoed Road to the OnSS would result in permanent loss of soil resource through being excavated or covered by development that would be direct and of a medium to long duration. The soil resource that would be affected is Grade 3a (good to moderate), and so the sensitivity of the receptor is considered to be **medium.**

137 The proposed OnSS footprint (5 ha for an AIS type substation) and operational access track (0.38 Ha) is small in comparison to the remaining available Grade 3a soil resource, and so the magnitude of impact is deemed to be **negligible**. The effect would, therefore, be ***minor adverse*** which is not significant in EIA terms.

6.11.3 Impacts on soil resource - Landfall infrastructure

138 The following section considers the potential impact of a reduction in available soil resource through the presence of landfall infrastructure during the operation of AyM. The Landfall site would include up to two TJBs and a temporary working area located to the south of the railway. The temporary working area would be restored to its former land use at the end of the construction phase. TJBs are proposed to be buried, leaving a concrete manhole approximately 20 m x 5 m per TJB.

139 The development of the TJBs would result in permanent loss of soil resource through being excavated or covered by development that would be direct and of a medium to long duration. The soil resource that would be affected is Grade 3b (good to moderate), and so the sensitivity of the receptor is considered to be **medium.**

140 The proposed TJBs would have a footprint of 20 square metres that is very small in comparison to the remaining available Grade 3b soil resource, and so the magnitude is deemed to be **negligible**. The effect would, therefore, be ***minor adverse*** which is not significant in EIA terms.

6.11.4 Impacts on soil quality - OnSS

141 The OnSS would contain potential pollutants which could include cooling oils, lubricants, fuels, greases, etc that could affect soil quality if released during operation. As set out in Section 6.10.2 the soil at the OnSS location is classed as having **medium** sensitivity

142 The design, maintenance and routine inspection of the OnSS would prevent or contain leaks of cooling oil etc. from the OnSS, thereby mitigating against the potential for release of these potential contaminants into the surrounding soils and geology. Any such maintenance would follow good practice in line with the prevailing future guidance and legislation (as mentioned in Table 11), which would include specific measures to minimise the risk of a pollution event.

143 Through the adoption of good practice the magnitude of impact is deemed to be **negligible**

144 It is predicted that the impact on soil quality would be direct and of a continuous nature and of medium to long duration. The sensitivity of the receptors is considered to be **medium** and the magnitude of impact is deemed to be **negligible**. The effect would therefore be ***Minor adverse***, which is not significant in EIA terms.

6.11.5 Impacts on areas of mineral safeguarding

145 As noted in Section 6.7.10, the study area includes areas of safeguarded deposits of minerals and aggregates that occur along the onshore ECC in Route Sections A, C and D (areas of sand and gravel), and the OnSS (limestone) and there is potential for the operation of onshore elements of AyM to preclude mineral extraction in these areas. These areas are defined as Minerals Safeguarding areas within the DCC LDP and are considered to be of low sensitivity.

146 A search of the DCC planning website has not shown any extant planning permissions for mineral extraction in these areas. The sensitivity is low due to the abundant nature of the sand and gravels and reduced likelihood of it ever being extracted in the study area because its either located on higher quality farmland or near housing.

147 The proposed OnSS will lead to permanent sterilisation of minerals resources, however, the proposed OnSS footprint and permanent access road is small in comparison to the remaining available minerals resource area.

148 The sensitivity of the receptors is **low** and the magnitude is deemed to be **negligible**. The effect would therefore, be ***negligible adverse*** which is not significant in EIA terms.

6.12Environmental Assessment: Decommissioning Phase

149 During decommissioning phase, the impacts on ground conditions and land use will be similar to those assessed for the construction phase. Good practice measures (similar to those identified within the outline CoCP) would be employed during decommissioning. A decommissioning plan that will be secured through the DCO would be agreed with statutory authorities at the time of decommissioning

150 Post-decommissioning phase, the long term effects of the decommissioned onshore elements of AyM are described below.

6.12.1 Impacts on Soil quality – cable route infrastructure

151 With respect to the buried onshore cables, these are likely to be left in place after decommissioning. At the present time, allowing the cables to remain in place is considered an acceptable option with minimal environmental impact. Jointing bays may be removed, depending on agreements reached with the statutory authorities in place at the time. Removal of any impermeable structures would return the site to its pre-Project state.

152 Overall, it is predicted that the impact of the decommissioned cable route on land quality in the maximum adverse scenario (i.e. jointing bays left in situ) would be direct and of a continuous nature and of long duration. The sensitivity of the receptors ranges from **low** to **high** and the magnitude is deemed to be **negligible**. The effect would, therefore, be ***negligible to minor adverse***, which is not significant in EIA terms.

6.12.2 Impacts on Soil quality – OnSS and TJB

153 It is anticipated that the OnSS and TJB would be gradually dismantled on site with certain infrastructure removed for recycling/re-use. Following this, the area is likely to be remediated and restored.

154 The decommissioning works may involve removal of some or all of the impermeable hard-standing surfacing and restoration of the permeable greenfield land present prior to the construction of the OnSS. This action would result in the surface ground conditions being returned to its pre-development state. Specific decommissioning requirements and potential concerns with regards to ground conditions and land use would be discussed with Denbighshire County Council, NRW and any other relevant statutory consultees at the time.

155 Overall, it is predicted that the impact of the decommissioned OnSS on land quality would be direct and of a continuous nature and of long duration. The sensitivity of the receptors soils is considered to range from **low** to **medium** and the magnitude of impact is deemed to be **negligible** given there would be no increase in the level of effect predicted for construction and operation phases. The effect would therefore be ***negligible to minor adverse***, which is not significant in EIA terms.

6.13Environmental assessment: cumulative effects

156 The cumulative impacts of the onshore elements of AyM have been assessed on ground conditions and land use receptors in the onshore study area. A list of other major developments has been compiled for the onshore assessment of cumulative effects, which includes other projects that are considered likely to be present in the area of the onshore works once AyM is operational, or where there may be some overlap in respective construction phases and in decommissioning if appropriate. The full list of unscreened cumulative sites are listed in Volume 1, Annex 3.1: Cumulative Effects Assessment (application ref: 6.1.3.1). Projects that are identified within the study area and have been given further consideration listed in Table 12.

157 It is anticipated that other projects of significance would be constructed in accordance with a CoCP during construction and, if appropriate, an Environmental Permit or Environmental Management Plan during operation.

Table 12: Projects considered within the Ground Conditions and Land Use cumulative effect assessment.

DEVELOPMENT TYPE	PROJECT	STATUS	DATA CONFIDENCE ASSESSMENT/ PHASE	TIER
Coastal Defence Infrastructure	Central Prestatyn Coastal Defence Scheme comprising the formation of flood embankments ramps outfall structures and rock armour including landscaping habitat enhancements works	Application submitted and under consideration	The site is located between Rhyl and Prestatyn and involves construction of an earth embankment set back from the existing frontline defences that follows the boundary of Rhyl Golf Club, adjacent to the A548, Rhyl Coast Road.	Tier 1
Energy	40/2018/1036 Gas fired power plant at St Asaph Business Park	Consented (construction not commenced)	The plant will include up-to two gas generators, to provide a maximum generation capacity of 5 MW, associated transformers, amenity cabins for the operator, gas station kiosk, and waste oil tanks. The consented site is approximately 850m to the east of the OnSS and on the eastern side of St Asaph Business Park.	Tier 1

DEVELOPMENT TYPE	PROJECT	STATUS	DATA CONFIDENCE ASSESSMENT/ PHASE	TIER
Energy	Elwy Solar Energy Farm	Application submitted and under consideration	This site is located entirely on agricultural land which comprises Grade 3b and Grade 3a agricultural land. Given the existing / historic agricultural use of the site there are not envisaged to be any significant sources of potential contaminative concern. Most of the soil will not be physically impacted from the development. The proposed development is temporary and is a reversible feature, once decommissioned the site's former agricultural use can be restored.	Tier 1
Residential	198 Bedroom Care Home	Consented (construction not commenced)	A 1.6Ha site approximately 50m from the AyM OL Potential contaminative effects during construction only.	Tier 1
Industrial	7 Industrial Units	Consented (2018)	Erection of 7 no. industrial units with associated parking, landscaping, access road and external storage areas	1

DEVELOPMENT TYPE	PROJECT	STATUS	DATA CONFIDENCE ASSESSMENT/ PHASE	TIER
			approximately 200m to the east of the proposed OnSS.	

158 With regard to land quality the distance from the proposed power plant to the onshore elements of AyM of approximately 850m, alongside the presence of other built development between the power plant and AyM OL, mean that significant cumulative effects are not likely to occur.

159 The proposed care home is separated from the AyM OL by Ffordd William Morgan which is located on an embankment and another minor road that represent a topographic and physical barrier between the two development areas. The care home scheme will need to implement a Construction Environment Management Plan (CEMP) that will contain pollution control measures and that has been approved by DCC in advance of construction works commencing.

160 Trenchless crossing techniques will be used by AyM to install cables beneath the proposed coastal defence works and so there will be no direct interaction between the two projects or cumulative effect. The proposed coastal defence scheme works are scheduled for completion in 2025, before onshore works for AyM commence in 2026 and the scheme includes pollution prevention measures. The application includes pollution prevention measures alongside a commitment that these measures will be included into the Environmental Action Plan for the project.

161 The Elwy Solar Farm proposals are separated from the OL by Nant y Faenol road and farmland. The application documents include a commitment to provide a Construction Environment Management Plan (CEMP) that will include appropriate measures to prevent the release of polluting substances for approval by DCC

162 The planning conditions associated with the consented industrial units have required the provision of a Construction Method Statement that has been reviewed and approved by DCC and include mitigation measures to control release of polluting materials.

163 Given the requirements to control potential adverse effects of any development on ground conditions, appropriate mitigation would be in place for these schemes to secure approval. Therefore no significant cumulative ground conditions effects arising during the construction phase of proposed new developments are likely. Furthermore, it is not expected that the AyM would have an impact on any of the measures that other developments within the vicinity of the onshore works would need to incorporate during the construction phase of these developments to prevent detrimental effects upon ground conditions elsewhere.

164 With regard to land use, two of the sites (the care home and the gas power plant), are located within allocated land that has been considered appropriate for development by DCC and the gas plant site is located on Previously Developed Land. Although the care home site appears to have been used for grazing, the magnitude of impacts from the combined use of this and the OnSS remains as **low** resulting in an effect of **minor adverse** and therefore not significant.

165 As noted in Table 12, the proposed solar farm is temporary and is a reversable feature, once decommissioned the site's former agricultural use can be restored. The proposed coastal defences are scheduled for completion prior to the commencement of AyM and so there would be no cumulative construction effects and no operational effects as the installation of cables for AyM will be via trenchless crossing technique.

166 Therefore, given the consideration set out above, there is no potential for cumulative effects to occur..

6.13.1 Further mitigation and future monitoring

167 No further mitigation or monitoring measures are considered necessary.

6.14Inter-relationships

168 This chapter has considered the effect of the onshore elements of AyM on ground conditions and land use in relation to the proposed onshore infrastructure. Effects on water quality and flood risk are considered in Volume 3, Chapter 7 (application ref: 6.3.7). Effects on offshore water quality are considered in Volume 2, Chapter 3 (application ref: 6.2.3).

169 The potential for effects of AyM to result in consequential effects on other receptors would be controlled by the measures set out in this chapter. The effects identified within this chapter are predicted to be ***minor*** or ***negligible*** adverse. None of these effects would be significant in EIA terms. Given the localised nature of the effects, there is not considered to be potential for significant inter-related effects on any offshore receptors.

170 There are not considered to be any significant inter-related effects between offshore and onshore parts of AyM in terms of ground conditions and land use.

6.15Transboundary effects

171 The likely effects of the onshore elements of AyM would be localised. It is not considered likely that there would be any transboundary effects in relation to ground conditions and land use.

6.16Summary of Effects

172 The potential ground conditions and land use receptors in the study area comprise soils, construction workers who may be exposed to ground contamination and minerals safeguarding areas. These receptors vary in their environmental sensitivity from low to high.

173 The assessed magnitude of the various identified impacts of AyM on ground conditions and land use, primarily soils vary from minor to negligible (adverse). Overall, through the implementation of mitigation measures, including those specified in the outline CoCP, it is considered that the likely overall effect of AyM on ground conditions and land use throughout the construction, operation and decommissioning of AyM is not significant in EIA terms.

Table 13: Summary of effects.

IMPACT	MAGNITUDE	SENSITIVITY OF RECEPTOR	MITIGATION MEASURES	RESIDUAL EFFECT
CONSTRUCTION				
Impact on soil quality - cable route installation:	Negligible	Medium	SMP provided as part of the outline CoCP	***Minor adverse*** (Not Significant)
Impact on soil quality – OnSS	Low	Medium	SMP provided as part of the outline CoCP	***Minor adverse*** (Not Significant)
Impact on soil quality - TJBs	Negligible	Medium	SMP and PPEIRP provided as part of the outline CoCP	***Minor adverse*** (Not Significant)
Impact on soil quality - trenchless crossings	Negligible	Low	PPEIRP provided as part of the outline CoCP	***Negligible adverse*** (Not Significant)
Contamination risk to construction	Negligible	High	PPEIRP provided as part of the outline CoCP	***Minor adverse*** (Not Significant)

IMPACT	MAGNITUDE	SENSITIVITY OF RECEPTOR	MITIGATION MEASURES	RESIDUAL EFFECT
workers and human receptors				
Impacts on areas of mineral safeguarding	Negligible	Low	None required	***Negligible adverse*** (Not Significant)
OPERATION				
Impact on soil resource - cable route installation:	Low to Medium	Negligible	None required	***Negligible to Minor adverse*** (Not Significant)
Impact on soil resource - OnSS	Medium	Negligible	None required	***Minor adverse*** (Not Significant)
Impact on soil resource - Landfall infrastructure	Medium	Negligible	None required	***Minor adverse*** (Not Significant)

IMPACT	MAGNITUDE	SENSITIVITY OF RECEPTOR	MITIGATION MEASURES	RESIDUAL EFFECT
Impacts on soil quality - OnSS	Medium	Negligible	None required	***Minor adverse*** (Not Significant)
Impacts on areas of mineral safeguarding	Negligible	Low	None required	***Negligible adverse*** (Not Significant)
DECOMMISSIONING				
Decommissioning of cable route	Negligible	Low to high	None required	***Negligible to minor adverse*** (Not Significant)
Decommissioning of OnSS and TJBs: Land Quality	Negligible	Low to medium	None required	***Negligible to Minor adverse*** (Not Significant)
CUMULATIVE				
Potential cumulative effects on land use arising from the proposed care home are predicted to remain as **low** resulting in an effect of ***minor adverse*** and therefore not significant. The proposed solar farm is temporary and is a reversible feature, once decommissioned the site's former agricultural use can be restored. Therefore, no further assessment in relation to cumulative effects is therefore required.				

IMPACT	MAGNITUDE	SENSITIVITY OF RECEPTOR	MITIGATION MEASURES	RESIDUAL EFFECT
INTER RELATIONSHIP				
It is not considered likely that there would be any interrelationship effects in relation to land quality and ground conditions				
TRANSBOUNDARY EFFECTS				
It is not considered likely that there would be any transboundary effects in relation to land quality and ground conditions				

6.17References

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Errata List

Updated Table 7

In response to ExQ1.9.6, the Applicant wishes to provide an updated version of Table 7 which corrects errors present in the submitted version and provides a breakdown of Grade 3 for route section G along with the percentage of Agricultural Land Classification within the draft order limits.

"Table 7: Agricultural Land Classification by Route Section"

ROUTE SECTION – FULL NAME	AGRICULTURAL QUALITY	SENSITIVITY
Route Section A – Intertidal Area	Intertidal area not covered by Agricultural Land Classification	N/A
Route Section B – Intertidal to B5119	Partly urban (9%), mainly grade 3b (good to moderate) (83%) with minor amounts of grade 3a (4%)	Medium
Route Section C – B5119 to A525	Section of grade 2 (good)(22%), with grade 3a (good to moderate)(56%) and grade 3b (moderate) (16%) Very small percentage within grade 1 (excellent), however, this is an operational access that is currently an access track (so there would be no	Medium

ROUTE SECTION – FULL NAME	AGRICULTURAL QUALITY	SENSITIVITY
	reduction in available grade 1 land)	
Route Section D: A525 to A547	Sections of grade 2 (good) along River Clwyd (that would be avoided by trenchless installation) and between Rhyl and Rhuddlan (22%). Predominantly grade 3b (moderate) (64%) with some grade 3a (good to moderate)(11%)	Medium
Route Section E: A547 to A55	Split equally between grade 3a (good to moderate) (48%) with and grade 3b(moderate) (49%)	Medium
Route Section F: A55 to B5381 including OnSS	Predominantly grade 3a (good to moderate) (68%) with grade 3b (moderate) (28%)	Medium
Route Section G: B5381 to National Grid Connection	Predominantly grade 3b (moderate) (68%) with grade 3a (good to moderate) (28%) (good to moderate) (12%)	Medium

TJB Footprint

The Applicant notes that an error has occurred in paragraph 140 where the Transition Joint Bay (TJB) footprint is mistakenly referred to as being "20 square metres". This should instead read as "20 x 5 metres".

The Applicant can confirm that this does not alter the conclusions of the assessment.

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Windmill Hill Business Park
Whitehill Way
Swindon