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Morlais Project Environmental Statement

Chapter 17: Water Resources and Flood Risk

Volume III

Applicant: Menter Môn Morlais Limited
Document Reference: PB5034-ES-017
Chapter 17: Water Resources and Flood Risk
Author: Royal HaskoningDHV



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Morlais Project Environmental Statement

Appendix 17.1: Flood Consequence Assessment

Volume III

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Appendix 17.1: Flood Consequence Assessment
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GLOSSARY OF ABBREVIATIONS

BGS	British Geological Survey
CFMP	Catchment Flood Management Plan
DAM	Development Advice Map
DCWW	Dŵr Cymru Welsh Water
ES	Environmental Statement
FCA	Flood Consequence Assessment
HDD	Horizontal Directional Drilling
IoACC	Isle of Anglesey County Council
LFRMS	Local Flood Risk Management Strategy
LiDAR	Light Detection and Ranging
LLFA	Lead Local Flood Authority
mAOD	Metres Above Ordnance Datum
MDZ	Morlais Demonstration Zone
NAI	No Active Intervention
NRW	Natural Resources Wales
PFRA	Preliminary Flood Risk Assessment
PPW	Planning Policy Wales
PU	Policy Unit
RAF	Royal Air Force
SAB	SuDS Approval Body
SAC	Special Area of Conservation
SFCA	Strategic Flood Consequence Assessment
SFRA	Strategic Flood Risk Assessment
SMP	Shoreline Management Plan
SPA	Special Protection Area
SuDS	Sustainable Drainage Systems
TAN	Technical Advice Note

1. INTRODUCTION

1. This Flood Consequence Assessment (FCA) has been prepared to accompany the Environmental Statement (ES) (**Volume I**) for the Morlais Project (the Project) and is included as **Appendix 17.1**.
2. The overall aim of this FCA is to provide justification to regulators and other stakeholders that the Project is appropriate and in line with planning and national policy requirements regarding flood risk.
3. The purpose of this FCA is:
 - To provide information required to support the ES in terms of flooding;
 - To establish whether the Project is in accordance with national and regional policy in relation to flood risk (**Section 2**);
 - To establish whether the Project is likely to be affected by current or future flooding from any source and whether it will increase flood risk elsewhere (**Section 5 to Section 8**);
 - To inform potential mitigation options (**Section 10**); and
 - To provide recommendations on potential measures required to reduce flood risk, where applicable (**Section 10**).
4. The FCA has been prepared in accordance with guidance set out in Planning Policy Wales Edition 10 (December 2018) and the supporting Technical Advice Note (TAN) 15 Development and Flood Risk (July 2004). TAN 15 sets out the Welsh Government policies on different aspects of land use planning in Wales.

2. POLICY, LEGISLATION AND GUIDANCE

5. Key policy and guidance documents considered within this FCA are set out as follows:
 - Planning Policy Wales Edition 10 (Welsh Government, 2018);
 - Technical Advice Note 15 Development and Flood Risk (Welsh Government, 2004);
 - National Strategy for Flood and Coastal Erosion Risk Management in Wales (Welsh Government, 2011);
 - Schedule 3 Flood and Water Management Act 2010 (UK Parliament, 2010); and
 - Statutory standards for sustainable drainage systems (Welsh Assembly Government, 2018).
6. A summary of the latest policy and guidance documents of relevance to this FCA are set out in **Table 2-1**.

Table 2-1 Summary of Key National Policy and Guidance Documents

Policy / Guidance Document	Date	Summary
Planning Policy Wales (PPW) 10 th Edition	December 2018	<p>PPW sets out the Welsh Government's plans to deliver the vision for Wales in accordance with the Well-being of Future Generations Act 2015. It aims to ensure a prosperous and resilient Wales which supports healthy, functioning ecosystems and recognises the limits of the global environment.</p> <p>Issues related to flooding are addressed within the Distinctive and Natural Places theme whereby PPW considers the mitigation of flooding through the provision of Sustainable Drainage Systems.</p> <p>With respect to flooding it outlines the role of planning and the requirement to understand flood risk both now and in the future. It acknowledges the influence that flooding can have on the layout and design of schemes and the potential cumulative effects of Project.</p>
Technical Advice Note (TAN) 15 Development and Flood Risk	July 2004	<p>TAN 15 provides technical guidance which supplements the policy set out in PPW in relation to development and flooding. The aim of TAN 15 is to direct new development away from those areas which are identified as having a high risk of flooding focusing on the provision of new development in Zone A, then Zone B and finally Zone C. It requires a Developer to consider all sources of flood risk.</p> <p>Where development in high risk areas (Zone C) is to be considered, only those that can be justified on the basis of the tests outlined in Sections 6 and 7 of TAN 15 i.e. having passed the justification test and accepted the consequences of flooding, should be located within these areas.</p>
National Strategy for Flood and Coastal Erosion Risk Management in Wales	November 2011	<p>The National Strategy was the first such strategy for Wales, prepared in accordance with the Flood and Water Management Act 2010. It aims to establish an overarching framework for the development of a holistic flood and coastal erosion risk management system fit for Wales. It sets out the following four overarching objectives for the management of flood and coastal erosion in Wales:</p> <ul style="list-style-type: none"> • Reducing the consequences for individuals, communities, businesses and the environment from flooding and coastal erosion; • Raising awareness of and engaging people in the response to flood and coastal erosion risk; • Providing an effective and sustained response to flood and coastal erosion events; and • Prioritising investment in the most at-risk communities.
Schedule 3 Flood and Water Management Act 2010	January 2019	<p>From 7th January 2019, Schedule 3 to the Flood and Water Management Act 2010 makes Sustainable Drainage Systems (SuDS) a mandatory requirement for all new developments in Wales. All new developments of more than one dwelling house or where the construction area is 100 m² or more requires SuDS for surface water.</p> <p>From this date onwards, SuDS on new developments must be designed and built in accordance with the Statutory SuDS Standards published by the Welsh Ministers and SuDS Schemes must be approved by the local authority acting in its SuDS Approval Body (SAB) role, before construction work begins.</p>
Statutory standards for sustainable drainage systems	October 2018	<p>The Flood and Water Management Act 2010 (Schedule 3), came into effect in Wales on 7th January 2019. It requires new developments to include SuDS features that comply with national standards. The Welsh Government published interim national standards on an advisory basis</p>

Policy / Guidance Document	Date	Summary
– designing, constructing, operating and maintaining surface water drainage systems		<p>in January 2016. Following consultation through 2017, the Welsh Ministers interim non-statutory national standards and guidance have formed the basis for the Statutory Standards with minor amendments to take into account comments received throughout the consultations.</p> <p>The statutory standards are for the design, construction, operation and maintenance of SuDS serving new developments in urban or rural areas of more than one dwelling or where the area covered by construction work equals or exceeds 100 m².</p> <p>The statutory standards provide information for designers, property developers, local authorities and other interested parties, such as sewerage undertakers and Natural Resources Wales (NRW). They note that the use of SuDS is a way of helping to achieve sustainable development in both new and existing developments.</p>

7. The following key documents which address issues specific to flood risk are summarised in the sections below:

- Western Wales River Basin District Preliminary Flood Risk Assessment;
- Isle of Anglesey Council Preliminary Flood Risk Assessment;
- Anglesey Local Flood Risk Management Strategy;
- North West Wales Catchment Flood Management Plan; and
- West of Wales Shoreline Management Plan 2.

2.1. WESTERN WALES RIVER BASIN DISTRICT PRELIMINARY FLOOD RISK ASSESSMENT

8. The Western Wales River Basin District Preliminary Flood Risk Assessment (PFRA) was published in December 2011, in accordance with the Flood Risk Regulations 2009. The first PFRA covered a number of Lead Local Flood Authority (LLFA) areas including the Isle of Anglesey, of which the Project is located within the administrative boundary.
9. The Flood Risk Regulations 2009 require PFRAs to be reviewed on a six yearly cycle and local authorities are now in the second cycle of review. NRW published an updated PFRA for the Western Wales River Basin District (in which area the Project is located) in December 2018.
10. This PFRA is intended to assess and identify those areas within Wales that are most at risk of flooding from any source (main river, reservoirs, the sea and surface water). It includes an assessment of significant past flooding that has affected Wales from 2011 onwards and considers the potential adverse consequences of future flooding. Using this information, it identifies those areas within Wales where the most significant flood risks exist.
11. A review of the PFRA has found that the Project is not located in an area that was identified as being at flood risk area during either the first or second cycle. The PFRA indicates that information related to fluvial, coastal / tidal, surface water and reservoir flooding has been published on the long-term flood risk mapping by NRW and this mapping has been reviewed during the development of this FCA.

2.2. ISLE OF ANGLESEY COUNCIL PRELIMINARY FLOOD RISK ASSESSMENT

12. In 2017, as part of the six yearly review process, the Preliminary Flood Risk Assessment (PFRA) for the Isle of Anglesey, carried out by the Isle of Anglesey County Council (IoACC) was reviewed using all relevant current flood risk data and information. The results of the review were agreed with NRW on 7th December 2017.
13. The process included a review of flooding experienced since the first PRFA was published in 2011. It noted that no new information has been identified since the publication of the first PFRA in 2011 and there is no change in the understanding of future flood risk. Therefore, only information within the Western Wales River Basin District PFRA has been considered for relevance to the Project.

2.3. ANGLESEY LOCAL FLOOD RISK MANAGEMENT STRATEGY

14. In February 2013, IoACC published the Anglesey Local Flood Risk Management Strategy (LFRMS). It aimed to improve the understanding and management of flood risk within the County. As the LLFA, IoACC primarily consider local flood risk related to surface water, groundwater and ordinary watercourses.
15. The LFRMS identified key objectives for IoACC which focused on improving understanding of local flood risk, increasing awareness and preparedness, working together to reduce the impact and consequence such that planning decisions are properly informed by flooding issues thereby ensuring a sustainable approach is adopted.
16. A review of the LFRMS identified that most of the flooding on the island is associated with surface water flooding causing overload of the existing systems. This was identified as being particularly prevalent in a number of key urban locations including Holyhead.
17. The LFRMS also notes that:

“In Anglesey flooding attributed directly to groundwater is extremely difficult to apportion as groundwater flooding usually occurs in combination with pluvial and fluvial flooding. As groundwater flooding occurs in low lying areas, basements of residential housing are usually impacted by this type of flooding.

Residents may not even be aware that their property has been flooded or they are aware that flooding has occurred previously (and do not store valuable goods in basements) and do not report incidents to the Council as limited damage to personal belongings has occurred. As such historical records relating to groundwater flooding within Anglesey are limited.”
18. The LFRMS highlights locations at risk of flooding from fluvial sources; however, the Project is not located in proximity to these locations. A review of the sewer and highway flooding locations within the LFRMS indicates historical flooding approximately 2 km to the north-west of the grid connection substation for the Project.
19. Further information related to the flood risk issues identified in the LFRMS has been obtained from the mapping referenced therein to inform the development of this FCA.

2.4. ISLE OF ANGLESEY STRATEGIC FLOOD CONSEQUENCE ASSESSMENT (LEVEL 1)

20. In May 2013, IoACC published the Strategic Flood Consequence Assessment (SFCA) (Level 1). The SFCA is a supporting document to the Anglesey and Gwynedd Joint Local Development Plan (2017) and is a desk-based study compiling all existing information on flooding from all sources. It provides an initial assessment of the proposed growth areas which are located in flood risk areas as well as providing a basis for the application of a sequential approach for the selection of potential development sites.
21. The SFCA focuses on a number of key settlements including Holyhead and identifies a number of key flooding issues in this area including:
- Dŵr Cymru Welsh Water (DCWW) undertaking investment around Holyhead to resolve sewer flooding in the area around Market Square; and
 - Historic fluvial flooding occurring in both the Cae Rhos Estate and Graiglwyd Estate and surface water flooding on Kingsland Road.
22. Further information related to the flood risk issues in these locations has been considered within this FCA.

2.5. NORTH WEST WALES CATCHMENT FLOOD MANAGEMENT PLAN

23. Environment Agency Wales (now part of NRW) published the North West Wales Catchment Flood Management Plan (CFMP) in January 2010. The CFMP considers fluvial risk and covers an area of approximately 3,400 km², which includes the full extent of Anglesey. It identifies the preferred approach and policy aimed at managing flood risk in a number of sub-areas.
24. The Project is located within sub-area 1 – Anglesey. The main source of flood risk within Anglesey is from surface water and sewer surcharge and from the Afon Cefni where there are both river and tidal risks.
25. The preferred policy option in the CFMP for this sub-area is Policy Option 3 (areas of low to moderate flood risk where we are generally managing existing flood risk effectively). Sub-area 1 comprises a relatively large geographical area including all the river catchments draining the Isle of Anglesey and as such the policy is relatively high-level when considering flood risk issues associated with the Project.
26. Therefore, the CFMP has not been considered in further detail within this FCA.

2.6. WEST OF WALES SHORELINE MANAGEMENT PLAN 2

27. The West of Wales Shoreline Management Plan 2 (SMP2) was published by Pembrokeshire Council in June 2012. The West of Wales SMP2 covers the coastline from St Ann's Head in Pembrokeshire to the Great Orme in Llandudno, Conwy. It is one of the largest SMP in the UK covering over 1,000 km of shoreline. However, most of the coastline relating to Anglesey within the SMP2 is covered by Coastal Area G and four Policy Development Zones 16 - 19. The Project is located in Policy Development Zone 17 (Holy Island and West Anglesey).

28. In addition to the overall objectives within the SMP2, it also identifies a number of specific objectives for Policy Development Zone 17. These are summarised as:
- Avoiding reliance on defence particularly where there is a risk of catastrophic failure;
 - Maintaining Holyhead as a viable commercial centre and support opportunities for regeneration;
 - Maintaining operation of Royal Air Force (RAF) Valley;
 - Maintaining the road and rail links to Holyhead and RAF Valley; and
 - Maintaining Holyhead as a functioning port.
29. The preferred policy within the SMP2 for the coastal frontage (Policy Unit 17.14) in the location where the Project proposes to make landfall is for No Active Intervention (NAI) in all epochs. The cliff feature of the Holy Island Coast Special Area of Conservation (SAC) and the Holy Island Coast Special Protected Area (SPA) are located within Policy Unit 17.14 where NAI is the preferred policy for the whole unit, therefore no direct or indirect effects are expected as a result of coastal management policy. The policy set out within the SMP2 has been considered within this FCA when addressing the flood risk issues associated with the proposed landfall.

3. CONSULTATION

30. To inform the development of this FCA a preliminary pre-application advice request was issued to NRW on 27th February 2019. An initial response from NRW to this preliminary pre-application advice request was received via email dated 19th March 2019 (**Annex 1**).
31. Following amendments to the red line boundary for the Project a further email to clarify the flood zones within which it would be located was issued to NRW on 29th March 2019. An updated response was received from NRW on 2nd April 2019 (**Annex 1**), the information from which has been incorporated into this report. The response from NRW is based on the latest red line boundary at the time of writing this report.
32. Post consent and pre-construction, further consultation will be required with NRW as well as IoACC, in their role as LLFA and SAB. Consultation will also be required with DCWW in their role as a Statutory Water and Sewerage Undertaker, in relation to surface water and / or foul water drainage from the Project.
33. Information and guidance provided within the response from NRW has been considered during the development of this FCA.

4. METHODOLOGY

4.1. STUDY AREA

34. The Project will comprise of:
- An offshore development area including the Morlais Demonstration Zone (MDZ);
 - An Export Cable Corridor; and,

- Associated onshore infrastructure contained within an Onshore Development Area (ODA), the boundary of which is provided in **Figure 1-2 (Volume II)**.

35. The key components of the ODA include:

- Landfall works, including:
 - Up to nine Horizontal Direction Drilling (HDD) ducts or trenched equivalents;
 - One transition pit and up to nine draw pits;
 - Up to nine export cable tails (shared with offshore components);
- Landfall substation at Ty-Mawr (hereafter referred to as Landfall Substation);
- A switchgear building at Parc Cybi (hereafter referred to as Switchgear Building);
- A grid connection substation at the existing Orthios Eco-Park to the east of Holyhead (the site of the former Anglesey Aluminium works) (hereafter referred to as Grid Connection Substation);
- Onshore cable route installed between the Landfall Substation, Switchgear Building and Grid Connection Substation.

36. Landfall will be located within the bay on the western coast of Holy Island known as 'Abraham's Bosom'. The landfall consists of exposed rocky shore, backed by a hinterland of coastal heath and farmland. The landfall substation is currently farmed land in the area of Holy Island known as Penrhos Feilw.

37. From the landfall substation location, the onshore cable route will be laid within the minor road network, as much as possible. The cable will be routed via trenching to the Switchgear Building and via open cut trenching, with HDD beneath the A55 and railway line, to the Grid Connection Substation to the east of Holyhead (the site of the former Anglesey Aluminium works).

4.2. DATA SOURCES

38. The key data sources for the analysis of flood risk for the Project are discussed below.

39. The NRW Long Term Flood Risk Maps (Basic View, Detailed View and Development Advice Map) have been used to identify the following flood information:

- Historical flooding;
- Flooding from rivers;
- Flooding from the sea;
- Flooding from surface water; and
- Flooding from other sources.

40. British Geological Survey (BGS) mapping of groundwater aquifers is publicly unavailable for Wales. Therefore, Envirocheck data, Western Wales River Basin District PFRA and the Isle of Anglesey SFCA have been used to assess the information on flooding from groundwater.

41. The NRW Lie Geo-Portal has been used to download available 2 m LiDAR data to assess ground elevations where available. 5 m LiDAR data has also been used to assess ground elevations where 2 m LiDAR is unavailable and this has been supported by Ordnance Survey mapping, where appropriate.

5. LANDFALL AND LANDFALL SUBSTATION

42. Landfall will be located within the bay on the western coast of Holy Island known as 'Abraham's Bosom' (**Figure A17-1-1**).
43. The NRW Development Advice Map indicates that the landfall and landfall substation are located within Zone A, apart from small areas on the foreshore which are within Zone C2 and without significant flood defence infrastructure.
44. The landfall consists of exposed rocky shore, backed by a hinterland of coastal heath and farmland. The landfall substation location will be positioned within a single field to the adjacent to South Stack Road to the west of Tŷ-Mawr Farm.
45. The landfall substation will consist of the following components:
- A fenced compound with hardstanding containing three buildings;
 - Welfare areas comprising site office, welfare facilities and an area of hardstanding for parking; and
 - A facility for electric vehicle charging.

5.1. HISTORICAL FLOODING

46. No historical flooding from rivers and the sea has been identified in relation to the landfall and landfall substation location.

5.2. FLOODING FROM RIVERS

47. A review of the NRW Development Advice Map indicates that there is no flood risk from rivers at the landfall and landfall substation location (**Figure A17-1-1**).

5.3. FLOODING FROM THE SEA

48. A review of the NRW Basic View flood risk map indicates four small areas within the foreshore area as being at risk of flooding from the sea. These are located within the area identified for the HDD or trenched cabling.
49. Two areas in the south west extent of the HDD or trenched cabling area are classified as low risk i.e. between 1 in 1,000 (0.1 %) and 1 in 100 (1 %) chance of flooding from the sea each year.
50. Further north along the coastal frontage there are two areas of the HDD or trenched cabling area classified as being at low risk. Adjacent to these there are two areas classified as being at high risk i.e. greater than 1 in 30 (30 %) chance of flooding each year.

51. The flood risk in these locations are associated with the offshore export cable connecting with the onshore elements and therefore would coincide with below ground elements of the Project only.

5.4. FLOODING FROM GROUNDWATER

52. A review of the Envirocheck data indicated that the majority of the landfall and landfall substation has limited potential for groundwater flooding to occur as shown in **Figure A17-1-2**. The relatively coarse resolution of the data indicates that there may be two small areas where there is potential for groundwater flooding of facilities located below flood level or potential for groundwater flooding to occur at the surface; however, it is unclear if this is in the location of the landfall substation.
53. The Western Wales River Basin District PFRA states that groundwater flood events in Wales are rare. Since 2011 there have been no recorded events of groundwater flooding within the district. The Isle of Anglesey SFCA states that groundwater is not considered to be a significant source of flooding.
54. On the basis of the limited data availability and there being no below ground structures proposed in this location it is considered that there is a negligible risk of flooding from groundwater sources.

5.5. FLOODING FROM SURFACE WATER

55. Within the NRW Basic View flood risk map a linear area to the north of an existing small watercourse is classified as having a low risk i.e. between 1 in 1,000 (0.1 %) and 1 in 100 (1 %) chance of flooding from surface water each year, as shown in **Figure A17-1-3**. The area shown to be at risk of surface water flooding appears to coincide with the watercourse which drains downhill into the sea.
56. This area of flood risk is in proximity to the onshore cable route; however, as the cable will be below ground there will be no risk to the Project or as a result of the proposed works. The remainder of the landfall and landfall substation is not classified as being at risk from surface water flooding.

5.6. FLOODING FROM OTHER SOURCES

57. The NRW Basic View flood risk map indicates that there is no flood risk from reservoirs in the landfall and landfall substation location.

5.7. SUMMARY OF FLOODING

58. A review of the flood risk data in this area indicates that there is a low risk of flooding from all sources including rivers, coastal, groundwater, surface water and reservoirs. There are small areas along the coastal foreshore at increased risk from coastal flooding; however, these are in locations where the cable is below ground and makes landfall via either HDD or trenched cabling.

59. There is also an area with increased surface water flood risk; however, this is associated with an existing watercourse and adjacent to the proposed onshore cable route. Surface water flooding associated with the landfall and landfall substation will be addressed through the development of an appropriate surface water drainage system as discussed in **Section 10.1**.

6. ONSHORE CABLE CORRIDOR

60. The onshore cable will be routed via trenching and starts at the north-east of the landfall and landfall substation location. From there, the majority of the route follows the minor road network towards the A55 and Holyhead to Bangor rail line, as shown in **Figure 4-2 (Volume II)**.

61. The NRW Development Advice Map indicates that the onshore cable route is entirely within Zone A.

6.1. HISTORICAL FLOODING

62. No historical flooding from rivers and the sea has been identified along the onshore cable route.

6.2. FLOODING FROM RIVERS

63. A review of the NRW Development Advice Map indicates that there is no risk of flooding from rivers along the onshore cable route.

6.3. FLOODING FROM THE SEA

64. A review of the NRW Development Advice Map indicates that there is no risk of flooding from the sea along the onshore cable route.

6.4. FLOODING FROM GROUNDWATER

65. A review of the Envirocheck data indicated that the onshore cable route has a variable potential for groundwater flooding over several sections of the western part of the route, as shown in **Figure A17-1-4**. There is:

- Limited potential for groundwater flooding to occur;
- Potential for groundwater flooding of facilities situated below ground level; and,
- Potential for groundwater flooding to occur at surface.

66. Envirocheck data is not available for the eastern part of the onshore cable route.

67. The majority of the onshore cable route, within the Envirocheck dataset, is located in areas either with no designation or with a limited potential for groundwater flooding to occur. The Envirocheck data indicates that a section of the onshore cable route, to the north of Gors Goch, is at increased risk from groundwater flooding.

68. The Western Wales River Basin District PFRA states that groundwater flood events in Wales are rare. Since 2011 there have been no recorded events of groundwater flooding within the district. The Isle of Anglesey SFCA states that groundwater is not considered to be a significant source of flooding.

69. The onshore cable route will be located below ground and within ducting that will protect it from ingress of water. On this basis it is considered that there is a negligible risk of flooding from groundwater sources.

6.5. FLOODING FROM SURFACE WATER

70. Within the NRW Basic View flood risk map the onshore cable route intersects several areas classified as varying from a low to medium to high risk of flooding from surface water, as shown in **Figure A17-1-5**.
71. Areas shown to be at low risk i.e. between 1 in 1,000 (0.1 %) and 1 in 100 (1 %) chance of flooding from surface water each year include the onshore cable route to the east of Bryniau-Geirwon, and to the south-west of the A55 at Penrhos.
72. Areas at medium risk i.e. between 1 in 100 (1 %) and 1 in 30 (30 %) chance of flooding from surface water each year include the onshore cable route to the east of Bryniau-Geirwon, and to the south-west of the A55 at Penrhos.
73. Areas at high risk i.e. greater than 1 in 30 (30 %) chance of flooding from surface water every year include the onshore cable route to the east of Ty-Mawr Farm, and along the road at Dafarch North.

6.6. FLOODING FROM OTHER SOURCES

74. The NRW Basic View flood risk map indicates that there is no flood risk from reservoirs along the onshore cable route.

6.7. SUMMARY OF FLOODING

75. A review of the flood risk data along the onshore cable route indicates that there is a low risk of flooding from rivers, coastal and reservoirs. There are small areas along the onshore cable route where there is an increased risk from groundwater flooding; however, the cable will be located within ducting to prevent water ingress.
76. There are areas with increased surface water flood risk; however, these are adjacent to the proposed onshore cable route and location of the cable below ground is such that the risk of surface water flooding affecting the onshore cable route is low.

7. SWITCHGEAR BUILDING AT PARC CYBI AND GRID CONNECTION SUBSTATION AT ORTHIOS

77. The onshore cable will be routed via trenching to a switchgear building at Parc Cybi and subsequently routed via trenching, with a trenchless crossing under the A55 and rail line, to the grid connection substation at Orthios to the east of Holyhead (the site of the former Anglesey Aluminium works) as shown in **Figure 1-2 (Volume II)**.
78. The NRW Development Advice Map shows that the switchgear building and the grid connection substation are located entirely within Zone A.

7.1. HISTORICAL FLOODING

79. No historical flooding from rivers and the sea has been identified for either the switchgear building or grid connection substation.

7.2. FLOODING FROM RIVERS

80. A review of the NRW Basic View flood risk map indicates that there is no flood risk from rivers for either the switchgear building or grid connection substation.

7.3. FLOODING FROM THE SEA

81. A review of the NRW Basic View flood risk map indicates that there is no flood risk from the sea for either the switchgear building or grid connection substation.

7.4. FLOODING FROM GROUNDWATER

82. The Envirocheck data does not appear to be available for either the switchgear building or grid connection substation.

83. The Western Wales River Basin District PFRA states that groundwater flood events in Wales are rare. Since 2011 there have been no recorded events of groundwater flooding within the district. The Isle of Anglesey SFCA states that groundwater is not considered to be a significant source of flooding.

84. Given the limited information available it is considered that there is a negligible risk of flooding from groundwater sources.

7.5. FLOODING FROM SURFACE WATER

85. Within the NRW Basic View flood risk map the switchgear building is shown to intersect an area indicated as being at low i.e. between 1 in 1,000 (0.1 %) and 1 in 100 (1 %) chance of flooding from surface water each year as shown in **Figure A17-1-6**.

86. The grid connection substation is shown to intersect a number of linear features, identified on mapping as local roads, which are indicated as being at low i.e. between 1 in 1,000 (0.1 %) and 1 in 100 (1 %) chance of flooding from surface water each year.

87. The HDD area for the road and rail crossing relates to a below ground cable route. This is shown to intersect a number of linear features, identified on mapping as existing watercourses / ditches. In these locations the surface water flood risk is indicated as being primarily at low i.e. between 1 in 1,000 (0.1 %) and 1 in 100 (1 %) chance of flooding from surface water each year. Adjacent to these watercourses there are small areas shown to be at medium and high risk of surface water flooding during the 1 in 100 year and 1 in 1,000 year event, respectively. The location of the cable below ground is such that the risk of surface water flooding, in these locations, affecting the onshore cable route is low.

7.6. FLOODING FROM OTHER SOURCES

88. The NRW Basic View flood risk map indicates that there is no flood risk from reservoirs at either the switchgear building or grid connection substation.

7.7. SUMMARY OF FLOODING

89. A review of the flood risk data for both the switchgear building and grid connection substation indicates that there is a low risk of flooding from rivers, coastal, groundwater and reservoirs. There are small areas where there is an increased risk from surface water flooding; however, surface water flooding at the switchgear building and grid connection substation will be addressed through the development of an appropriate surface water drainage system as discussed in **Section 10**.

8. FLOOD RISK VULNERABILITY

8.1. BACKGROUND TO JUSTIFICATION TEST

90. As discussed in **Section 2**, TAN 15: Development and Flood Risk advises on development and flood risk in relation to development and flooding. It provides a framework within which risks arising from river and / or coastal flooding, and from additional run-off from development in any location, can be assessed. Managing flooding is identified as an important part of contributing towards achieving sustainable development.

91. TAN 15 indicates that development considerations related to flooding includes guiding development to locations at little or no risk from river, tidal or coastal flooding, or from run-off arising from development in any location. The overarching aim of the framework is to direct development away from those areas which are at high risk of flooding.

92. The operation of the framework is governed by the Development Advice Map containing three Zones as described in **Table 8-1** which should be used to trigger the appropriate planning tests.

93. TAN 15 states that new development should be directed away from Zone C and towards suitable land in Zone A, otherwise to Flood Zone B, where river or coastal flooding will be less of an issue.

94. In Zone C, a justification test is required along with an assessment of flooding consequences for any new development. Highly vulnerable or emergency services developments should not be permitted in Zone C2. All other new development should only be permitted within Zone C1 and Zone C2 if determined by the planning authority to be justified in that location.

Table 8-1 Composition of Development Advice Map zones

Description of Zone		Use within the precautionary framework
Considered to be at little or no risk of fluvial or tidal / coastal flooding	A	Used to indicate that justification test is not applicable and no need to consider flood risk further.
Areas known to have been flooded in the past evidenced by sedimentary deposits	B	Used as part of a precautionary approach to indicate where site levels should be checked against the extreme (0.1%) flood risk. If

Description of Zone		Use within the precautionary framework
		site levels are greater than the flood levels used to define adjacent extreme flood outline there is no need to consider flood risk further.
Based on Environment Agency extreme flood outline, equal to or greater than 0.1% (river, tidal or coastal)	C	Used to indicate that flooding issues should be considered as an integral part of decision making by the application of the justification test including assessment of consequences.
Areas of the floodplain which are developed and served by significant infrastructure, including flood defences	C1	Used to indicate that development can take place subject to application of justification test, including acceptability of consequences.
Areas of the floodplain without significant flood defence infrastructure	C2	Used to indicate that only less vulnerable development should be considered subject to application of justification test, including acceptability of consequences. Emergency services and highly vulnerable development should not be considered.

95. As indicated in the previous sections of this FCA and confirmed in the NRW consultation response, dated 2nd April 2019, the majority of the Project is located in Zone A with the exception of the point where the cable makes landfall. This connection will be carried out by HDD or trenched cabling where it passes over or in close proximity to Zone C2.
96. In accordance with TAN 15, the Project has been sequentially located such that it is within Zone A and therefore in an area designated as being at little or no risk of fluvial or tidal / coastal flooding.
97. Additionally, in order for the cable to make landfall it will need to cross over land designated as Zone C2; however, it will be located below ground and therefore there will be no flood risk associated with this element.
98. On this basis, it is considered that there is no requirement to consider the justification test further. However, the final decision regarding the justification test will be determined by the planning authority.

8.1.1. Summary of Policy Requirements

99. An extract of the policy requirements related to Zone A from TAN 15 is shown in **Table 8-2**.

Table 8-2 Extract of Policy Requirements from TAN 15

DAM	Development Type (Section 5)	Planning Requirements (Section 4)	Acceptability Criteria (Section 7 & Appendix 1)	Development Advice (Section 5,6,7 & Appendix 1)
A	Emergency services Highly vulnerable development Less vulnerable development Other	<ul style="list-style-type: none"> ▪ Justification test not applicable ▪ Refer to surface water requirements 	<ul style="list-style-type: none"> ▪ No increase in flooding elsewhere 	No constraints relating to river or coastal flooding, other than to avoid increasing risk elsewhere.
B	Emergency services	<ul style="list-style-type: none"> ▪ If site levels are greater than the flood levels used to 	<ul style="list-style-type: none"> ▪ Acceptable consequences for nature of use 	Generally suitable for most forms of development.

DAM	Development Type (Section 5)	Planning Requirements (Section 4)	Acceptability Criteria (Section 7 & Appendix 1)	Development Advice (Section 5,6,7 & Appendix 1)
		define adjacent extreme flood outline there is no need to consider flood risk further <ul style="list-style-type: none"> ▪ Refer to surface water requirements 	<ul style="list-style-type: none"> ▪ Occupiers aware of flood risk ▪ Escape / evacuation routes present ▪ Effective flood warnings provided ▪ Flood emergency plans and procedures ▪ Flood resistant design ▪ No increase in flooding elsewhere 	Assessments, where required, are unlikely to identify consequences that cannot be overcome or managed to an acceptable level. It is unlikely, therefore, that these would result in a refusal of planning consent on the grounds of flooding.
	Highly vulnerable development		<ul style="list-style-type: none"> ▪ Acceptable consequences for nature of use ▪ Occupiers aware of flood risk ▪ Escape / evacuation routes present ▪ Effective flood warning provided ▪ Flood emergency plans and procedures ▪ No increase in flooding elsewhere 	
	Less vulnerable development		<ul style="list-style-type: none"> ▪ Occupiers aware of flood risk ▪ No increase in flooding elsewhere 	
	Other	<ul style="list-style-type: none"> ▪ Refer to surface water requirements 	<ul style="list-style-type: none"> ▪ No increase in flooding elsewhere 	

100. In considering the Project it is necessary to demonstrate that it includes appropriate surface water drainage requirements and that there is no increase in flooding elsewhere, as discussed in **Section 10**.

9. CLIMATE CHANGE

101. The risk of flooding from potential sources to the Project will be amplified as the result of two key physical processes associated with climate change:
- Increase in sea level; and
 - Increase in rainfall duration and / or intensity during events.
102. These processes will lead to an increased risk of flooding risk from the sea and from surface water.
103. When considering new development proposals, TAN 15 states that it is necessary to take account of the potential impact of climate change over the lifetime of Project. The Flood Consequences Assessment: Climate Change Allowances guidance document sets out the climate change allowances that should be used in an FCA to support a planning application and to inform development plan allocations.
104. Guidance provided by NRW has been used when considering appropriate climate change allowances in the following sections.

9.1. TOPOGRAPHIC LEVELS

105. Available LiDAR data has been downloaded from the NRW Lle Geo-Portal. Data with a 2 m resolution composite Digital Surface Model LiDAR is available for part of the onshore cable route and the switchgear building and grid connection substation as shown in **Figure A17-1-7**.
106. For the areas of the Project located outside the extent of the 2 m LiDAR coverage including the landfall, landfall substation and parts of the onshore cable route a review of alternative datasets identified the availability of 5 m resolution LiDAR as shown in **Figure A17-1-8**.
107. The 2 m LiDAR data indicates that the ground elevation at the switchgear building is between approximately 8.2 to 10.2 mAOD.
108. The 2 m LiDAR data indicates that the ground elevation at the grid connection substation is between approximately 5.4 to 8.0 mAOD.
109. In addition to the 2 m LiDAR data, 5 m LiDAR data has been obtained which provides coverage for the whole red line boundary as shown in **Figure A17-1-8**.
110. The 5 m LiDAR data indicates that the ground elevation at the landfall substation varies between approximately 5 mAOD in the vicinity of the transition pit area and 45 mAOD in the vicinity of the landfall substation. It is important to note that this discounts the rocky cliff foreshore as the cable will be below ground in this location.
111. The 5 m LiDAR data indicates that the ground elevation along the onshore cable route varies between approximately 10 mAOD, at the eastern extent, and 60 mAOD, where the cable route passes over an elevated area in the south west of the island.

9.2. SEA LEVEL EFFECTS

112. Present day baseline Extreme Water Levels have been taken from the UK Coastal Flood Boundary Conditions report (2011). To account for climate change the present day baseline Extreme Water Levels have been uplifted in line with TAN 15 and guidance provided in the Flood Consequences Assessment: Climate Change Allowances guidance document (Welsh Government, 2016).
113. The present-day baseline water levels and future extreme water levels relevant to the landfall and landfall substation location are shown in **Table 9-1**. These are based on modelled water levels at node point ID 1002.

Table 9-1 Modelled Extreme Water Levels for landfall and landfall substation location. Node Point ID 1002

Modelled Extreme Water Levels for landfall and landfall substation location.			
Node Point ID 1002			
Return Period	Extreme Water Level (2008)	Extreme Water Level (2094)	Extreme Water Level (2119)
1 in 200	3.54	4.30	4.68
1 in 1000	3.68	4.44	4.82

114. The lowest ground elevation at the landfall and landfall substation location, beyond the foreshore, is approximately 10 mAOD. This is considerably higher than the worst-case modelled future Extreme Water Level of 4.82 mAOD.
115. Therefore, the risk of flooding from the sea is not anticipated to affect the landfall and landfall substation location as a result of climate change over a 100-year period.
116. The present-day baseline and future extreme water levels relevant to both the switchgear building and grid connection substation are shown in **Table 9-2**. These are based on modelled water levels at node point ID 1014.

Table 9-2 Modelled Extreme Water Levels for the switchgear building and grid connection location. Node Point ID 1014

Modelled Extreme Water Levels for the switchgear building and grid connection location.			
Node Point ID 1014			
Return Period	Extreme Water Level (2008)	Extreme Water Level (2094)	Extreme Water Level (2119)
1 in 200	3.93	4.69	5.07
1 in 1000	4.07	4.83	5.21

118. The lowest ground elevation at the switchgear building and grid connection substation is approximately 5.4 mAOD. This is above the worst-case modelled extreme water level of 5.21 mAOD.

119. Therefore, the risk of flooding from the sea is not anticipated to affect the switchgear building or grid connection substation as a result of climate change over a 100-year period.

9.3. SURFACE WATER LEVEL EFFECTS

120. There is the potential for rainfall intensity to increase over the lifetime of the Project. In accordance with key policy documents, set out in **Section 2**, it will be necessary to include SuDS measures into the design of the Project to address increased runoff from hardstanding, buildings or other structures.

121. It will be necessary to include attenuation and storage to limit runoff from the Project and this will need to include an appropriate allowance for climate change in accordance with the lifetime of the development.

10. FLOOD RISK MANAGEMENT MEASURES

10.1. DESIGN MITIGATION

122. As discussed in previous sections, the Project is wholly located within Development Advice Map Zone A, apart from small areas on the foreshore at the landfall and substation location, which are in Zone C2. TAN 15 advises that as the Project is within Zone A the justification test is not applicable, however surface water requirements will apply.

123. The Project will not cross a designated Main River and any crossings over watercourses will be related to Ordinary Watercourses. The crossings will therefore be subject to the consent of the LLFA, which is the Highways department of IoACC.

124. The Project will be designed such that there is minimal impact as a result of any watercourse crossings and that there will be no increase in flood risk.

125. Due to the need to consider surface water requirements, the Project will incorporate measures to minimise the impact of any surface water flooding either to or resulting from the Project. Design mitigation measures include, but are not limited to, the following:

- Development of an appropriate Surface Water Drainage Strategy;
- Use of SuDS measures e.g. swales, permeable surfacing, soakaways; and
- Use of flood resilient building techniques and materials e.g. location of electrical equipment above potential flood levels and use of appropriate quick drying flooring.

126. A Surface Water Drainage Strategy will be developed according to the principles of the SuDS hierarchy and in line with S1 Surface water runoff destination, as set out in the Statutory Standards for sustainable drainage systems (Welsh Government, 2018).

127. Generally, the aim will be to discharge surface water runoff as high up the following hierarchy of drainage options as reasonably practicable:

- Priority Level 1: Surface water runoff is collected for use;
- Priority Level 2: Surface water runoff is infiltrated to ground;

- Priority Level 3: Surface water runoff is discharged to a surface water body;
- Priority Level 4: Surface water runoff is discharged to a surface water sewer, highway drain or another drainage system; or
- Priority Level 5: Surface water runoff is discharged to a combined sewer.

128. Guidance indicates that Priority Level 1 is the preferred (highest priority) and 4 and 5 should only be used in exceptional circumstances.

10.2. SURFACE WATER DRAINAGE – CONSTRUCTION PHASE

129. Trenching for the onshore cable will be undertaken using a large excavator to dig up the ground along the route. Rock breakers will also be required along some sections.
130. Where the route goes through fields the trench will be backfilled with sand and / or stabilised material to a depth of approximately 300 mm above the top of the cables. The material originally removed from the trench will be replaced on top of the stabilised material. Finally, the trench will be topped up with a minimum of 300 mm of topsoil and the land restored as close as possible to its original condition. The cable will be buried to a depth of approximately 1 m, from the surface to the top of the ducts. Up to 30 m working width will be required for plant access, lay down of equipment, top soil, spoil and trench shoring.
131. Cable installation within a road or a verge will follow the methodology of cable installation in a field. However, due to the restricted environment, installation activities will need to be sequenced and material will need to be removed from the site or kept off site until required. A trench will be cut through the road surface and excavated. Once the trench is prepared, the cables or ducts will be laid, and the road reinstated. A working area of approximately 6 m width would suffice for installation in a single lane road.
132. The onshore cable route will cross the A55 and the railway line at either the Penrhos Industrial Estate or at the eastern end of the old Anglesey Aluminium works. HDD will be used to install the cable under the A55 and the railway line. Up to two crossings, each involving six drills, will be required with a drill length of approximately 150 m. Two site areas will be prepared for each HDD crossing; the drill rig site where the HDD enters the ground (up to 2,500 m²), and the exit point on the other side of the crossing (up to 900 m²).
133. When crossing underground services, it is likely that the cable trenches will pass underneath existing services, unless the service is extremely deep. This will be determined through further surveys.
134. The key aims of the Surface Water Drainage Strategy, during construction, will be to minimise water within the working areas, ensure ongoing drainage of surrounding land and that there is no increase in risk of flooding from surface water.
135. Where the onshore cable route crosses watercourses it will be necessary to ensure that flow along the watercourse is maintained and there is no increase in flood risk as a result of the temporary works. The methodology to be used for any temporary construction at crossing points over existing ditches and watercourses shall be agreed, as an Ordinary Watercourse Consent, with the Highways department of IoACC.

10.3. SURFACE WATER DRAINAGE – OPERATIONAL PHASE

136. As set out in **Chapter 4, Project Description** there will be several independent drainage systems for the landfall and landfall substation location as well as for the switchgear building and grid connection substation.
137. The surface water system at each location will collect runoff from buildings and roads. It will include oil interceptors such that all contaminants are removed from the water. The drainage systems will be designed to handle the worst-case scenario in terms of flood risk. The surface water drainage system shall connect into the local sewer system if available or be discharged into a soakaway system to be constructed nearby.
138. Following completion of the Project the onshore cable route shall be located below ground level and as such would have no impact on surface water drainage. Temporary works and access route surfacing shall be removed following completion of construction and therefore would not be required during the operational phase. Existing land drains along the onshore cable route will be reinstated following construction.
139. The surface water drainage requirements for the Project will be dictated by the final Surface Water Drainage Strategy. Changes in surface water runoff as a result of the increase in impermeable area will be attenuated and discharged at a controlled rate.

10.4. FLOOD WARNING AND EVACUATION ROUTE

140. A flood warning and evacuation plan is a list of steps to be taken in case of a flood, although it can also include steps such as taking out the relevant insurance or using recommended flood mitigation products.
141. Both construction phase and operational phase Flood Warning and Evacuation Plans should be developed for each location within the Project. The key flood risk related to the Project is from surface water.
142. It should include practical steps for protecting the Project, be easy to communicate and consider delegated responsibility, or whether personnel are likely to require additional support during a flood event.
143. The following aspects need to be considered within a flood warning and evacuation plan:
- A list of important contacts, utilities companies and contractors;
 - A description or map showing locations of service shut-off points;
 - Basic strategies for protecting property, including moving assets / materials to safety where possible, turning off / isolating services and moving to safety; and
 - Safe access and egress routes.
144. During construction, contractors and operators should liaise with the LLFA and NRW to understand when heavy rainfall is forecast and when a flood warning is issued to allow work to cease, as necessary.

10.5. ACCESS AND EGRESS

145. Access to the landfall and landfall substation would be via South Stack Road or Ty Mawr. This location is relatively remote and access will be required on a 24 hours per day, 7 days per week basis along these roads.
146. The entrance to the landfall substation is anticipated to be on the side of the compound facing the road. A permanent car park is to be located near the entrance within perimeter fencing.
147. There will be a hard core or tarmac access road 5 m to 7 m wide from the road to any outdoor equipment compound. All enclosures or buildings will have a minimum of 1 m gap between all sides and the site boundary for personnel access.
148. The existing road will be used to access the switchgear building. Similarly, the existing road to the Orthios site will be used to access the grid connection substation.

11. SUMMARY

149. The overall aim of this FCA is to provide justification to regulators and other stakeholders that the Project is appropriate and in line with planning and national policy requirements regarding flood risk.
150. A thorough review of all policy, legislation and guidance relevant to the Project has been undertaken. Preliminary pre-application advice has been sought and received from NRW, the information from which has been incorporated into the FCA.
151. As the Project progresses, further consultation will be required with NRW as well as IoACC, in their role as LLFA and SAB. Consultation will also be required with DCWW in their role as a Statutory Water and Sewerage Undertaker, in relation to surface water and / or foul water drainage from the Project.
152. Information on flooding sources has been taken from NRW, BGS, Envirocheck and other key publicly available documents. Ground elevation data has been taken from LiDAR and Ordnance Survey mapping.
153. A review of the flood risk data in the landfall and landfall substation location indicates that there is a low risk of flooding from all sources including rivers, coastal, groundwater, surface water and reservoirs. There are small areas along the coastal foreshore at increased risk from coastal flooding; however, these are in locations where the cable is below ground and makes landfall via either HDD or trenched cabling.
154. There is also an area with increased surface water flood risk; however, this is associated with an existing watercourse and adjacent to the proposed onshore cable route. Surface water flooding associated with the landfall and landfall substation will be addressed through the development of an appropriate surface water drainage system.
155. A review of the flood risk data along the onshore cable route indicates that there is a low risk of flooding from rivers, coastal and reservoirs. There are small areas along the onshore cable

route where there is an increased risk from groundwater flooding; however, the cable will be located within ducting to prevent water ingress.

156. There are areas with increased surface water flood risk; however, these are adjacent to the proposed onshore cable route and location of the cable below ground is such that the risk of surface water flooding affecting the onshore cable route is low.
157. A review of the flood risk data for the switchgear building and grid connection substation indicates that there is a low risk of flooding from rivers, coastal, groundwater and reservoirs. There are small areas where there is an increased risk from surface water flooding; however, surface water flooding at both locations will be addressed through the development of an appropriate surface water drainage system.
158. A summary of the TAN 15 justification test is provided. However, as there are only four small areas at the foreshore of the landfall location that are in Zone C2, and the rest of the Project is within Zone A, further application of the justification test is not required.
159. The effect of climate change on extreme tidal water levels has been reviewed based on NRW guidance. The Project is sufficiently elevated so as to not be affected by increased sea levels caused by climate change up to 2119. Increased rainfall may lead to increased surface water runoff, which will be managed in accordance with information set out within the Surface Water Drainage Strategy.
160. Flood risk management measures are detailed in relation to surface water flooding, which causes the highest risk to the Project. Surface water drainage in both the construction and operational phase is discussed based upon **Chapter 4, Project Description (Volume I)**. In addition, flood warning and evacuation plan guidance is provided, along with information related to access and egress routes.
161. In conclusion, this FCA provides the justification to regulators and other stakeholders that the Project is appropriate and in line with national and local policy requirements regarding flood risk. It is therefore expected that the Project would be acceptable for development by the necessary authorities based on the flood consequences.

12. REFERENCES

- Environment Agency (2011) Coastal Flood Boundary Conditions for UK Mainland and Islands
- Isle of Anglesey County Council (2013) Anglesey Local Flood Risk Management Strategy
- Isle of Anglesey County Council (2013) Strategic Flood Consequence Assessment (Level 1)
- Isle of Anglesey County Council (2017) Anglesey and Gwynedd Joint Local Development Plan 2011 - 2016
- Isle of Anglesey County Council (2017) Isle of Anglesey Preliminary Flood Risk Assessment
- Natural Resources Wales (2010) North West Wales Catchment Flood Management Plan
- Natural Resources Wales (2018) Western Wales River Basin District Preliminary Flood Risk Assessment Report
- Pembrokeshire County Council (2011) West of Wales Shoreline Management Plan 2
- Parliament of the United Kingdom (2010) Flood and Water Management Act 2010
- Welsh Assembly Government (2004) Planning Policy Wales Technical Advice Note 15: Development and Flood Risk
- Welsh Assembly Government (2011) National Strategy for Flood and Coastal Erosion Risk Management in Wales
- Welsh Assembly Government (2016) Flood Consequences Assessment: Climate change allowances
- Welsh Assembly Government (2018) Statutory standards for sustainable drainage systems - designing, constructing, operating and maintaining surface water drainage systems
- Welsh Government (2018) Planning Policy Wales Edition 10



SUPPORTING FIGURES

Figure A17-1-1 Flood Risk from the Sea at Landfall and Landfall Substation Location

Figure A17-1-2 Flood Risk from Groundwater at Landfall and Landfall Substation Location

Figure A17-1-3 Flood Risk from Surface Water at Landfall and Landfall Substation Location

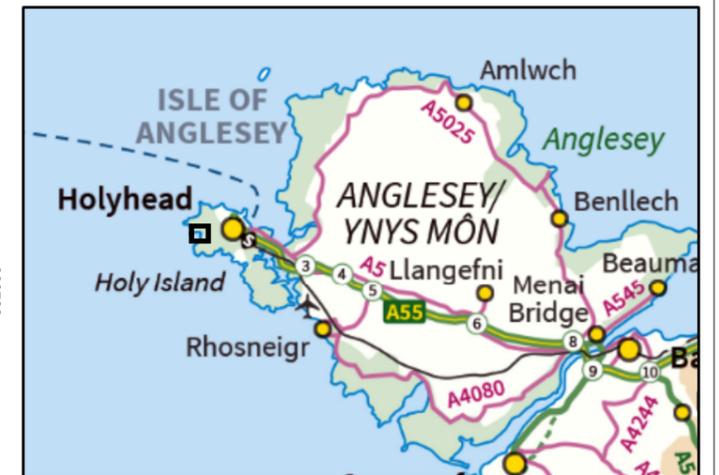
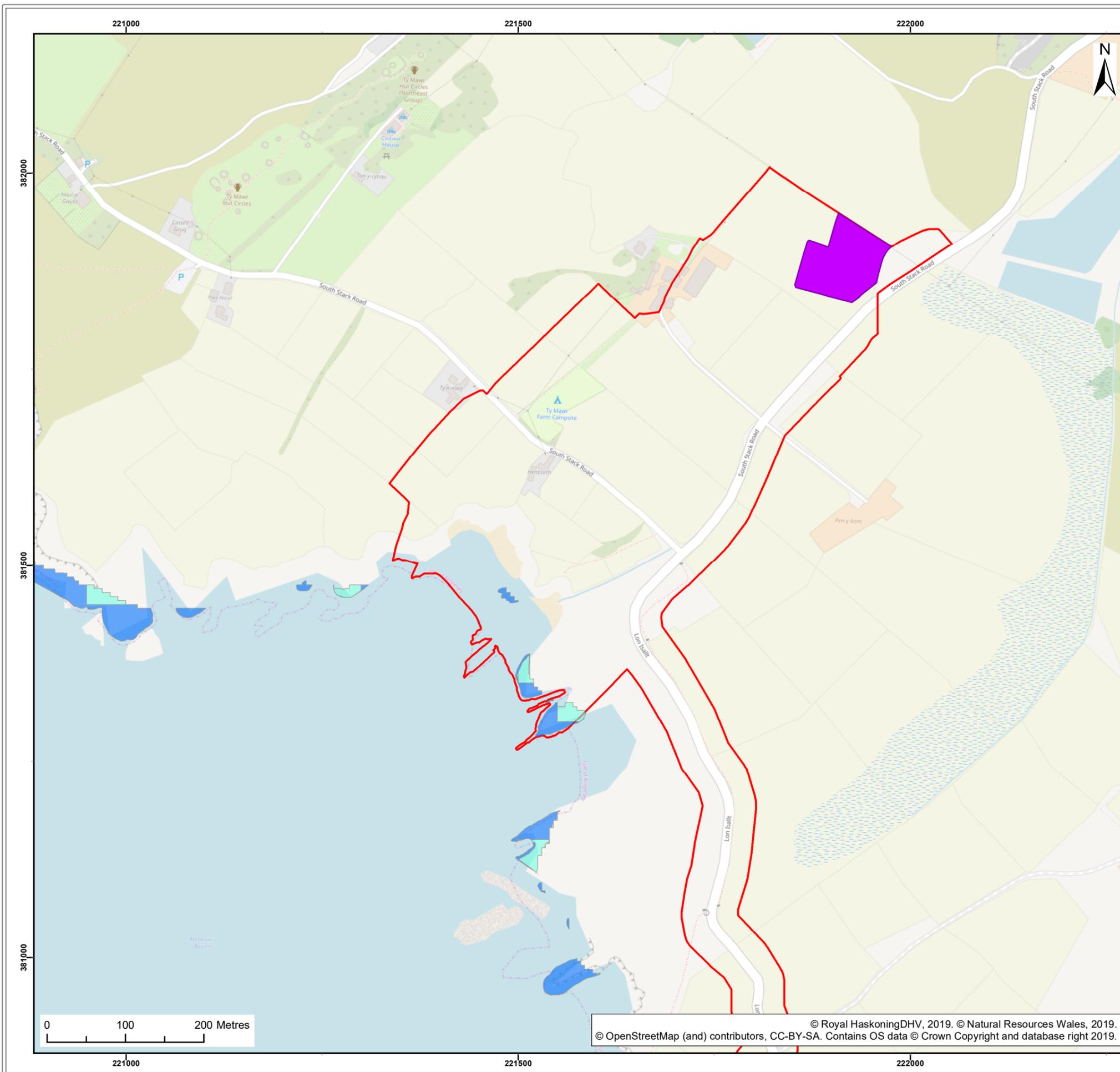
Figure A17-1-4 Flood Risk from Groundwater within the Onshore Development Area

Figure A17-1-5 Flood Risk from Surface Water for the Onshore Cable Corridor

Figure A17-1-6 Flood Risk from Surface Water at the Grid Connection Substation and Switchgear Building

Figure A17-1-7 LiDAR Coverage for the Onshore Development Area (at 2m resolution)

Figure A17-1-8 LiDAR Coverage for the Onshore Development Area (at 5m resolution)



- Legend:
- Onshore Development Area
 - Landfall Substation
- Flood Risk from the Sea**
- High
 - Low

Client:   Project: 

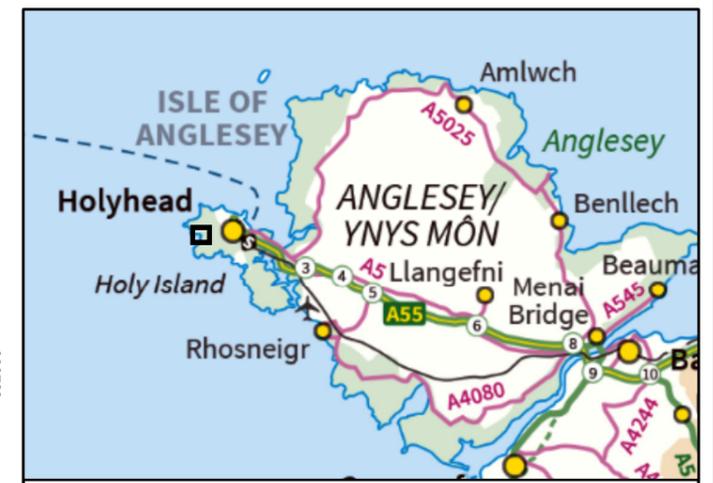
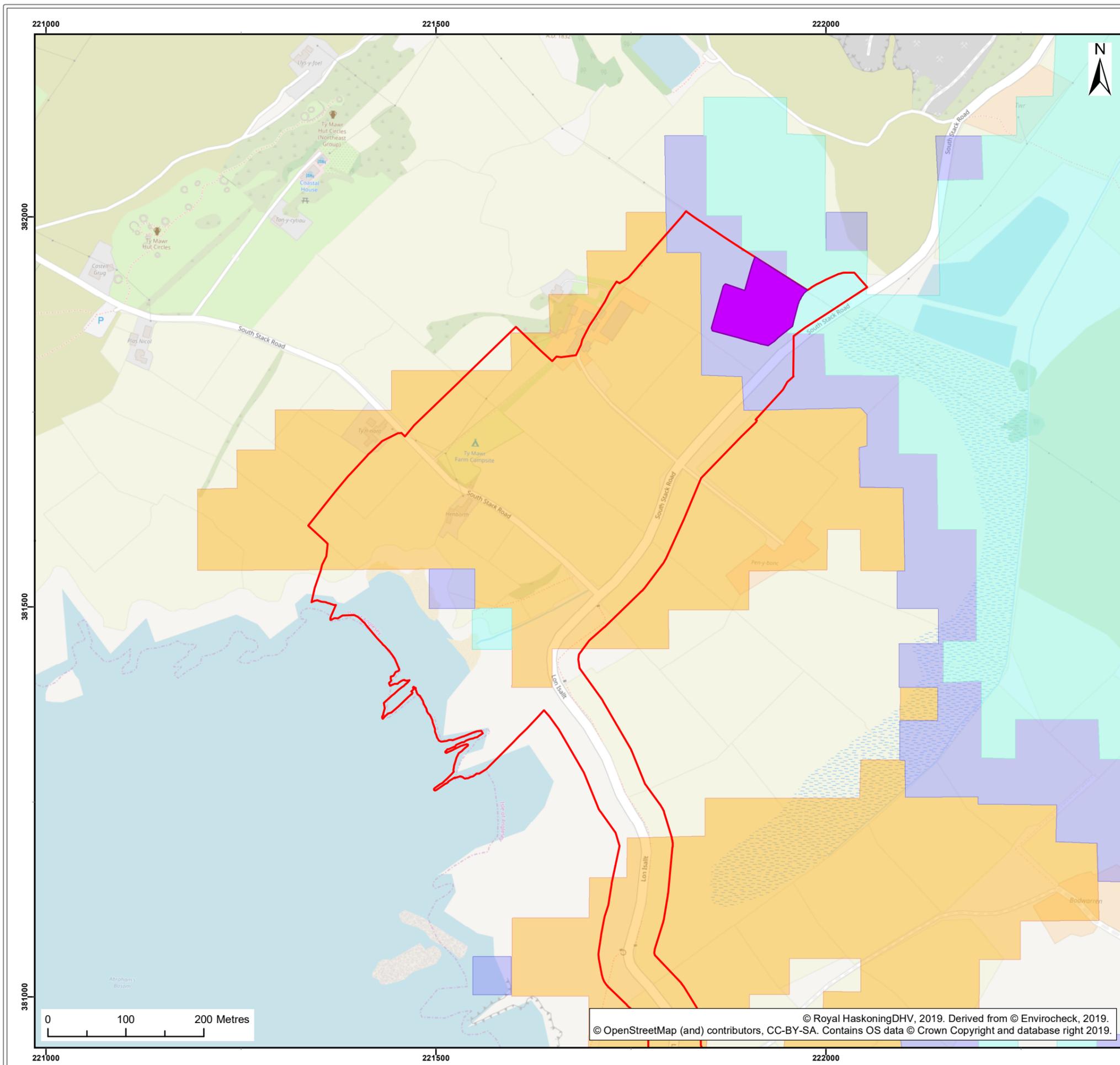
Title: **Flood Risk from the Sea at Landfall and Landfall Substation Location**

Figure: A17-1-1 Drawing No: PB5034-ES-A17-101

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
04	05/07/19	JT	HW	A3	1:5,000
03	02/07/19	JT	HW	A3	1:5,000

Co-ordinate system: British National Grid

 **ROYAL HASKONINGDHV**
 INDUSTRY & BUILDINGS
 2 ABBEY GARDENS
 GREAT COLLEGE STREET
 WESTMINSTER
 LONDON
 SW1P 3NL
 +44 (0)20 7222 2115
 www.royalhaskoning.co.uk



Legend:

- Onshore Development Area
- Landfall Substation

Groundwater Flood Risk

- Limited Potential for Groundwater Flooding to Occur
- Potential Flooding for Groundwater Flooding of Property Situated Below Ground Level
- Potential for Groundwater Flooding to Occur at Surface

Client: Project:

Title:
Flood Risk from Groundwater at Landfall and Landfall Substation Location

Figure: A17-1-2 Drawing No: PB5034-ES-A17-102

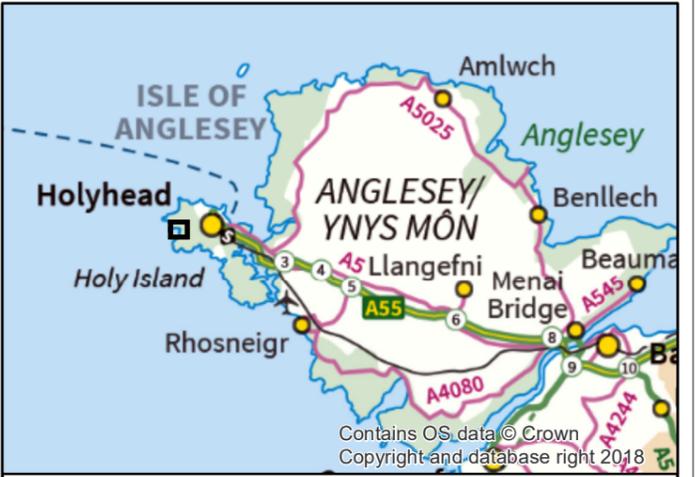
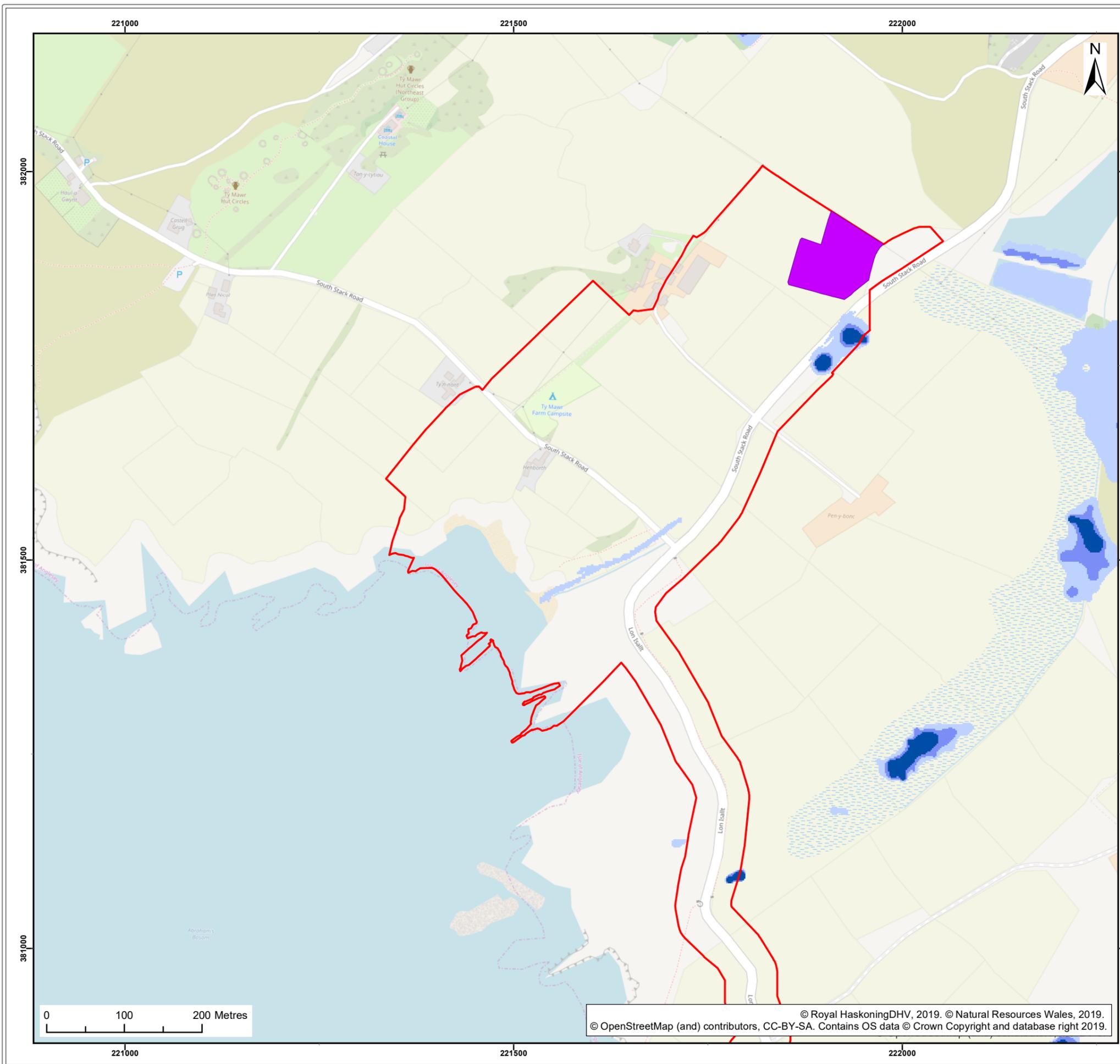
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Co-ordinate system: British National Grid

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ROYAL HASKONINGDHV
INDUSTRY & BUILDINGS
2 ABBEY GARDENS
GREAT COLLEGE STREET
WESTMINSTER
LONDON
SW1P 3NL
+44 (0)20 7222 2115
www.royalhaskoning.co.uk

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- Legend:
- Onshore Development Area
 - Landfall Substation
- Surface Water Flood Extent**
- 1 in 30
 - 1 in 100
 - 1 in 1000

Client: Project:

Title:
Flood Risk from Surface Water at Landfall and Landfall Substation Location

Figure: A17-1-3 Drawing No: PB5034-ES-A17-103

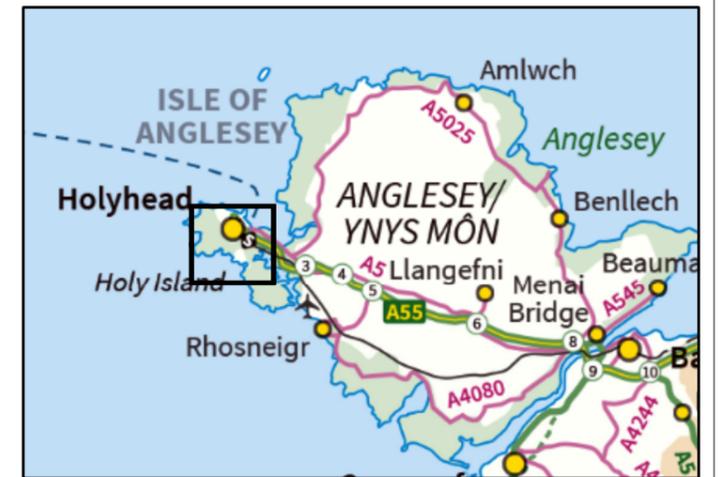
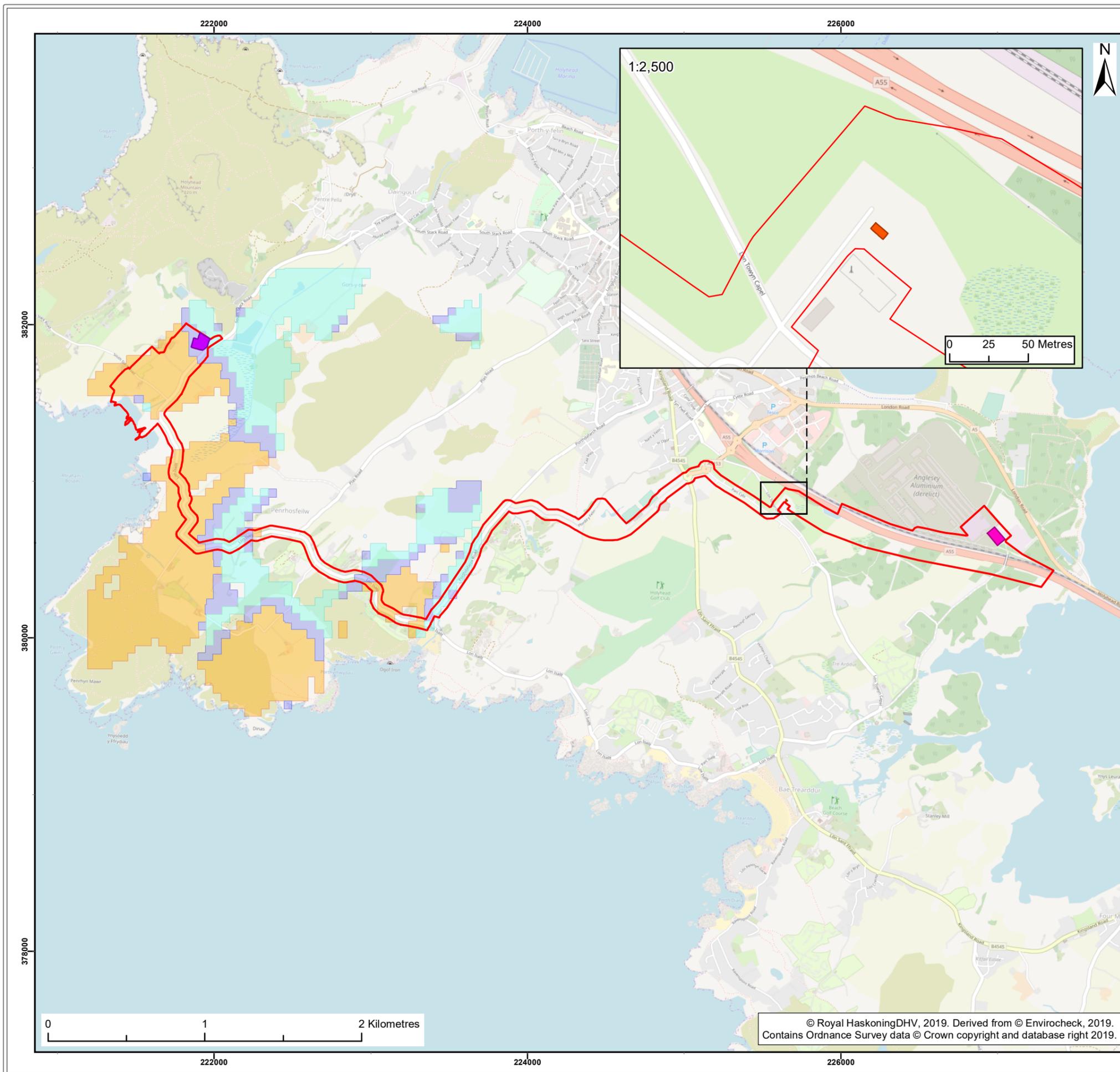
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04	05/07/19	JT	HW	A3	1:5,000
03	02/07/19	JT	HW	A3	1:5,000

Co-ordinate system: British National Grid

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2 ABBEY GARDENS
GREAT COLLEGE STREET
WESTMINSTER
LONDON
SW1P 3NL
+44 (0)20 7222 2115
www.royalhaskoning.co.uk

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Legend:

- Onshore Development Area
- Grid Connection Substation
- Landfall Substation
- Switchgear Building

Groundwater Flood Risk

- Limited Potential for Groundwater Flooding to Occur
- Potential Flooding for Groundwater Flooding of Property Situated Below Ground Level
- Potential for Groundwater Flooding to Occur at Surface

Client: Project:

Title:
Flood Risk from Groundwater within the Onshore Development Area

Figure: A17-1-4 Drawing No: PB5034-ES-A17-104

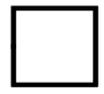
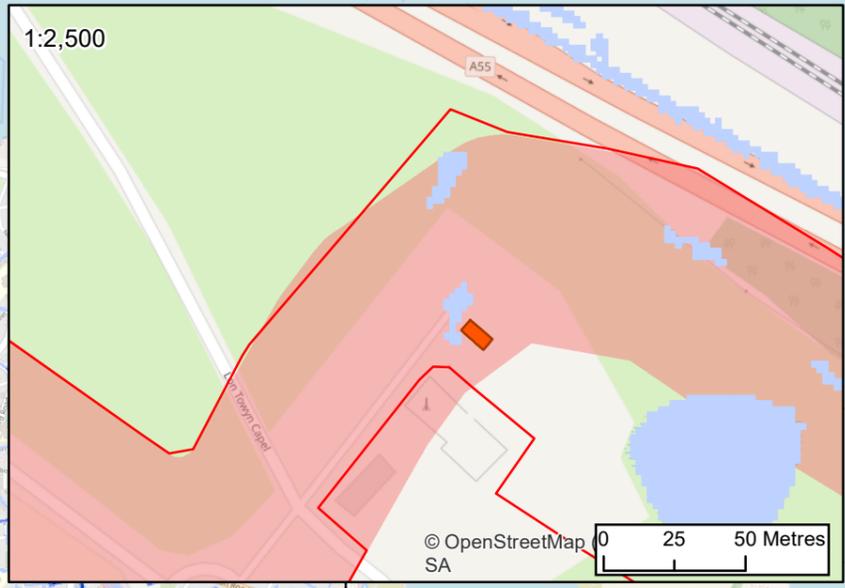
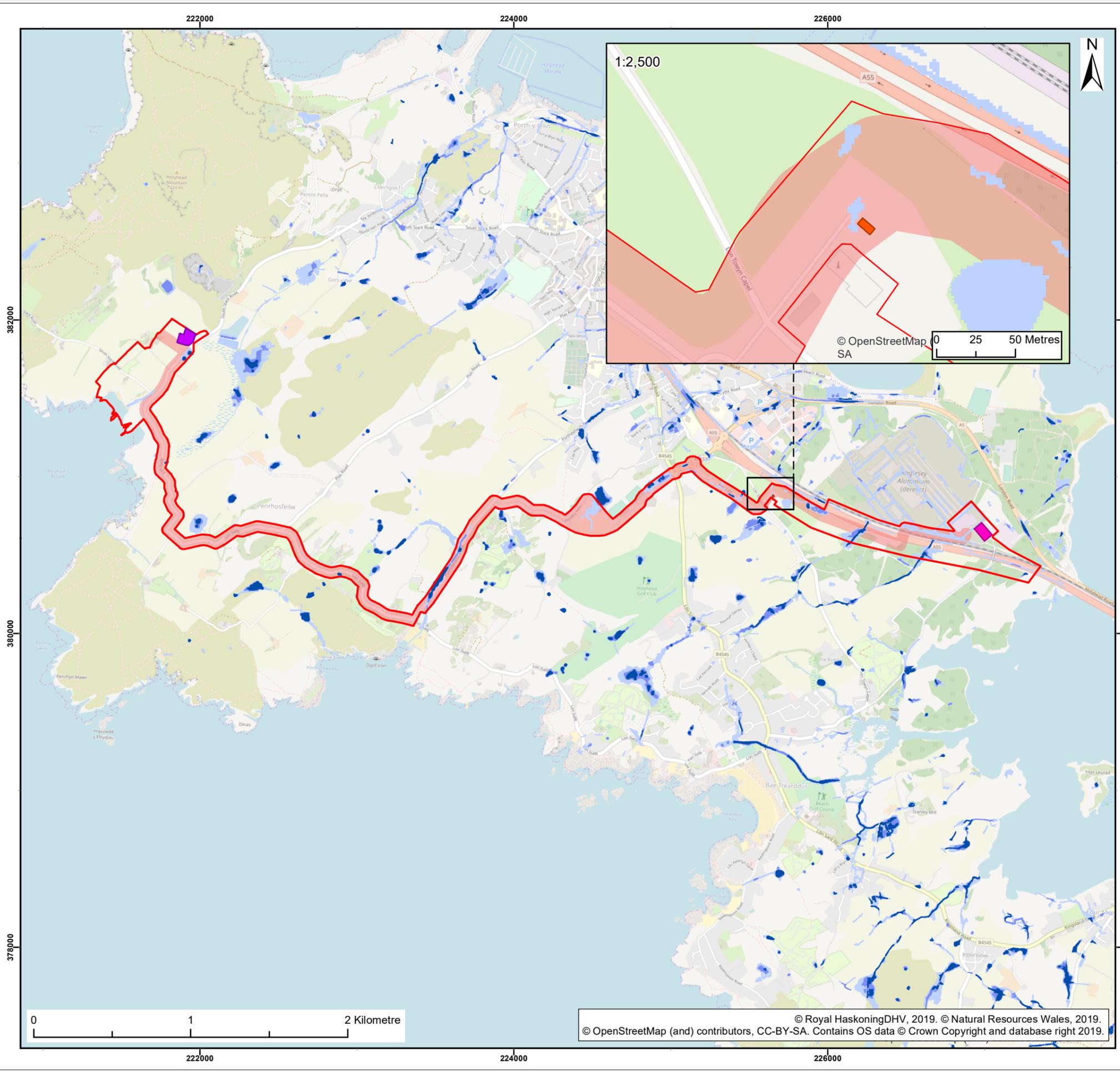
Revision:	Date:	Drawn:	Checked:	Size:	Scale:
04	05/07/19	JT	HW	A3	1:25,000
03	02/07/19	JT	HW	A3	1:25,000

Co-ordinate system: British National Grid

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2 ABBEY GARDENS
GREAT COLLEGE STREET
WESTMINSTER
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- Legend:**
- Onshore Development Area
 - Grid Connection Substation
 - Landfall Substation
 - Switchgear Building
 - Onshore Cable Corridor (Including 30m Buffer Either Side of Road)
- Surface Water Flood Risk Extent**
- 1 in 30
 - 1 in 100
 - 1 in 1000

Client:   Project: 

Title:
Flood Risk from Surface Water for the Onshore Cable Corridor

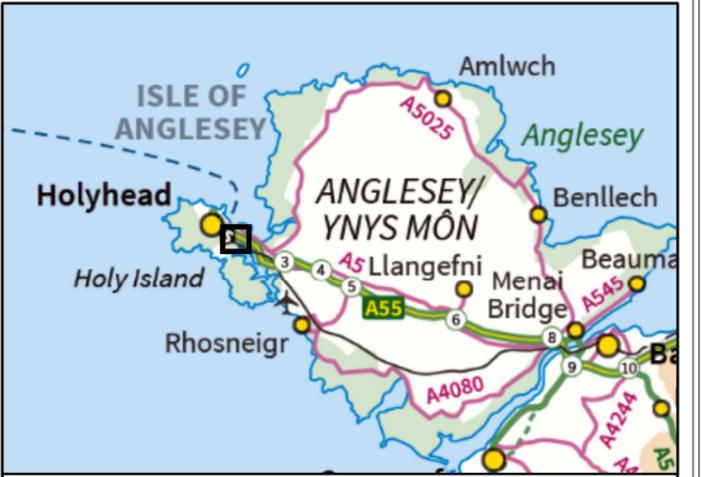
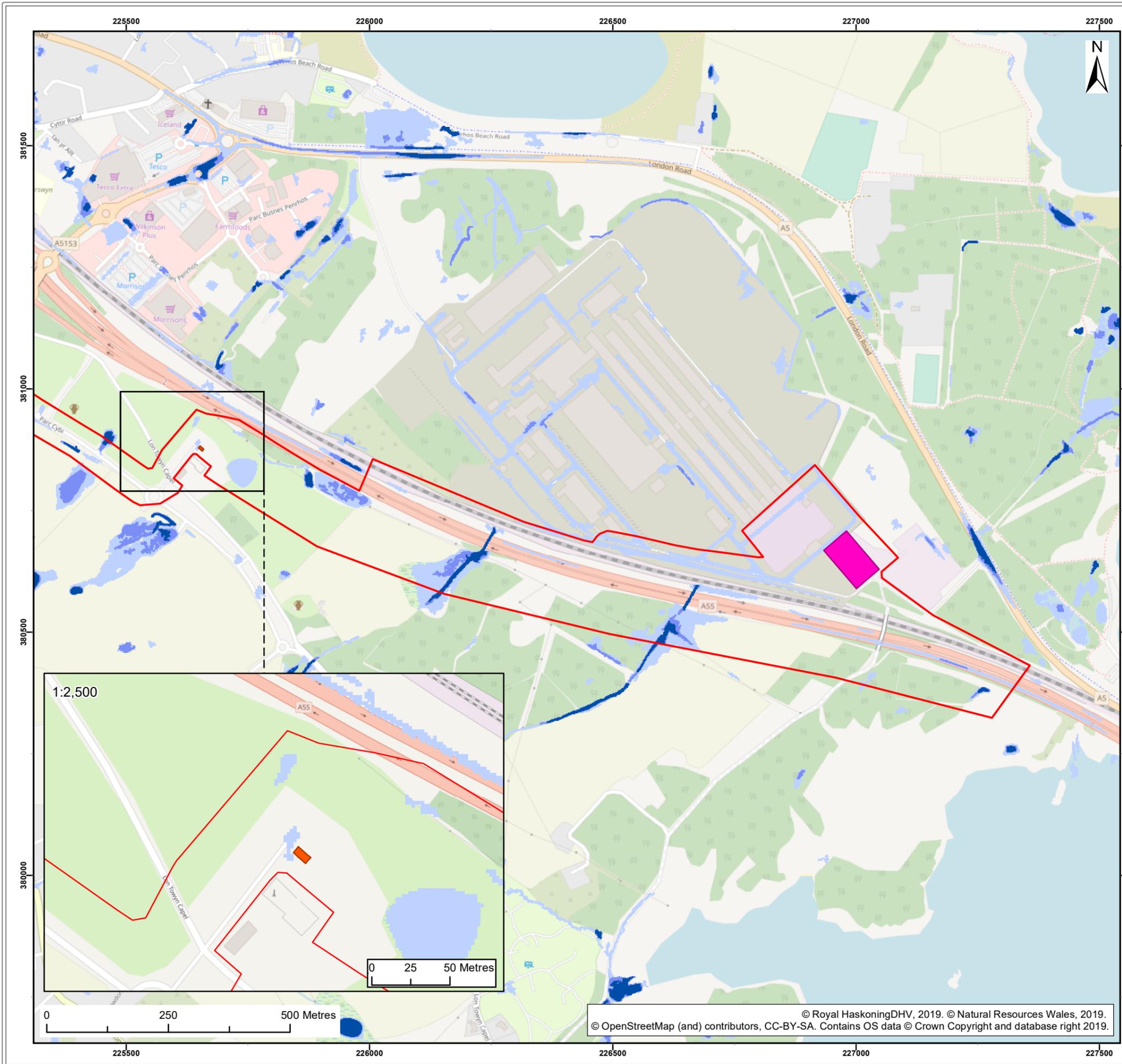
Figure: A17-1-5 Drawing No: PB5034-ES-A17-105

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
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03	02/07/19	JT	HW	A3	1:25,000

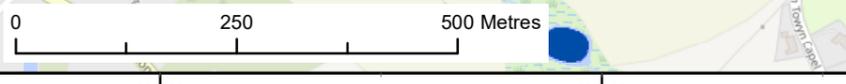
Co-ordinate system: British National Grid

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2 ABBEY GARDENS
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- Legend:
- Onshore Development Area
 - Grid Connection Substation
 - Switchgear Building
- Surface Water Flood Extent**
- 1 in 30
 - 1 in 100
 - 1 in 1000



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Client: Project:

Title:
Flood Risk from Surface Water at the Grid Connection Substation and Switchgear Building

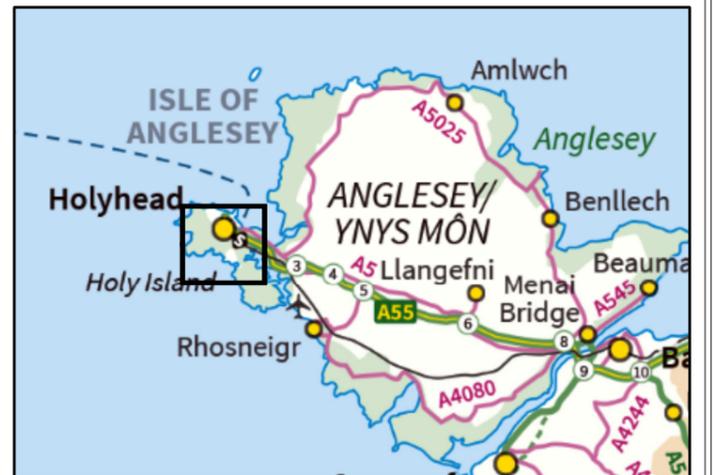
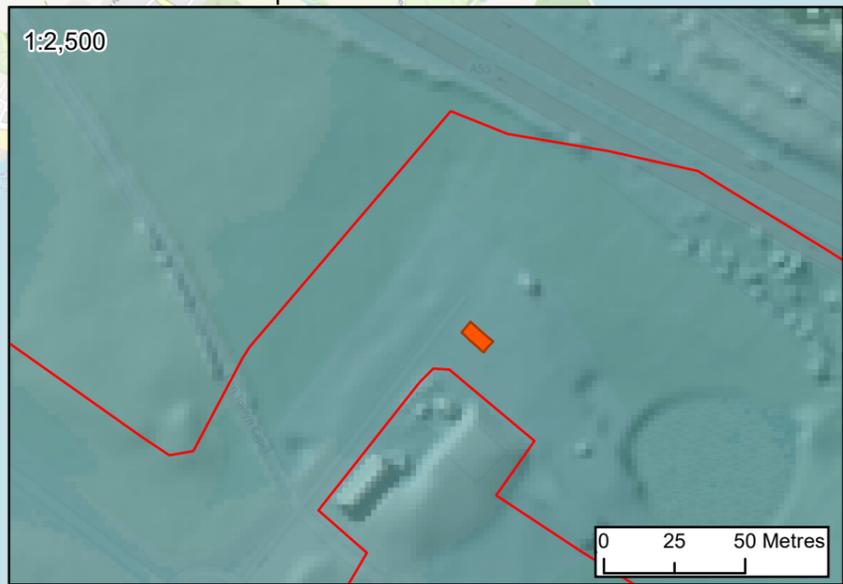
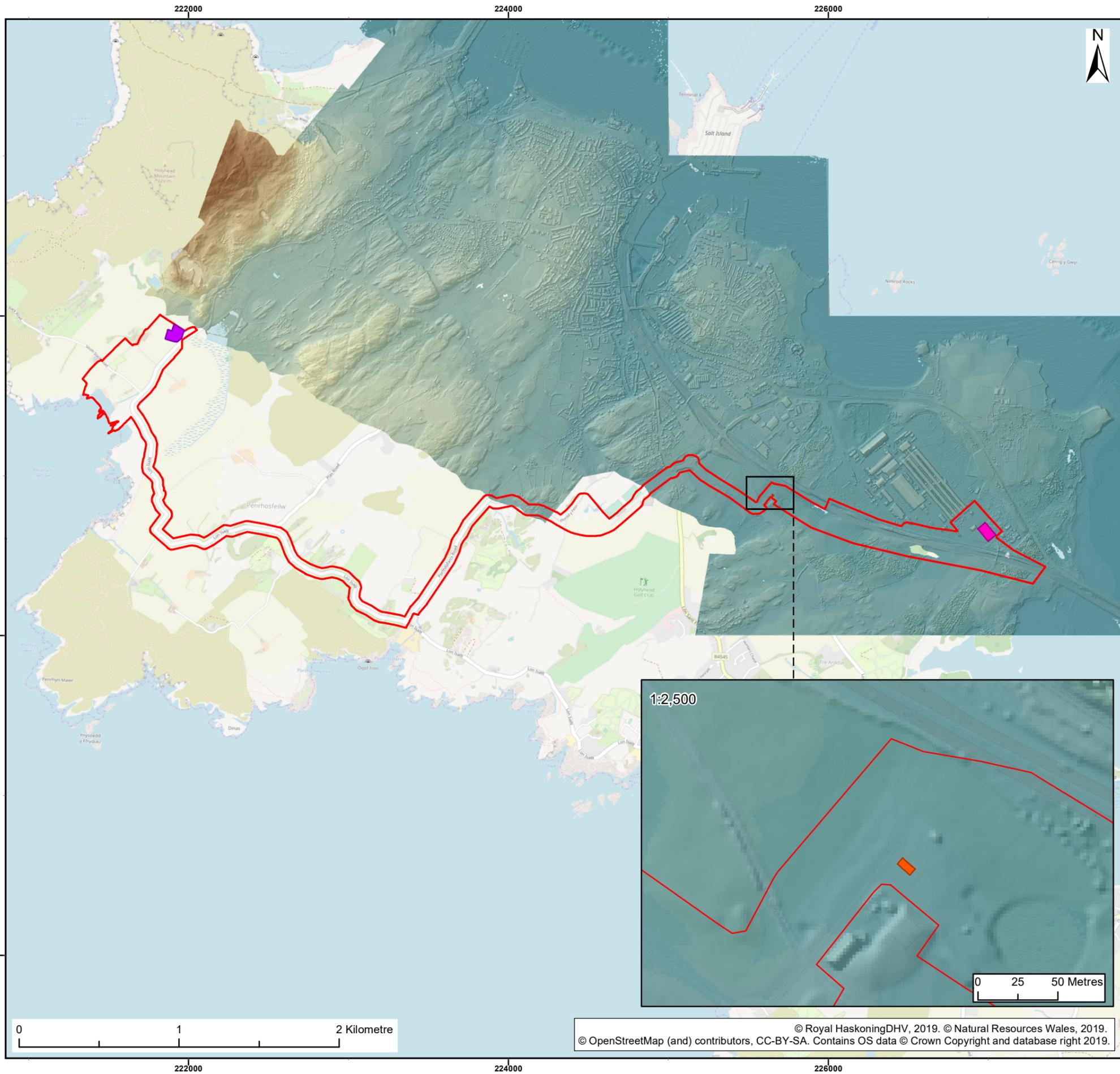
Figure: A17-1-6 Drawing No: PB5034-ES-A17-106

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
04	05/07/19	JT	HW	A3	1:8,000
03	02/07/19	JT	HW	A3	1:8,000

Co-ordinate system: British National Grid

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 INDUSTRY & BUILDINGS
 2 ABBEY GARDENS
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Legend:

Onshore Development Area	80 - 75.01
Grid Connection Substation	75 - 70.01
Landfall Substation	70 - 65.01
Switchgear Building	65 - 60.01
Elevation (m)	
157.82 - 140.01	60 - 55.01
140 - 135.01	55 - 50.01
135 - 130.01	50 - 45.01
130 - 125.01	45 - 40.01
125 - 120.01	40 - 35.01
120 - 115.01	35 - 30.01
115 - 110.01	30 - 25.01
110 - 105.01	25 - 20.01
105 - 100.01	20 - 15.01
100 - 95.01	15 - 10.01
95 - 90.01	10 - 5.01
90 - 85.01	5 - 0.01
85 - 80.01	0 - -2.62

Client: Project:

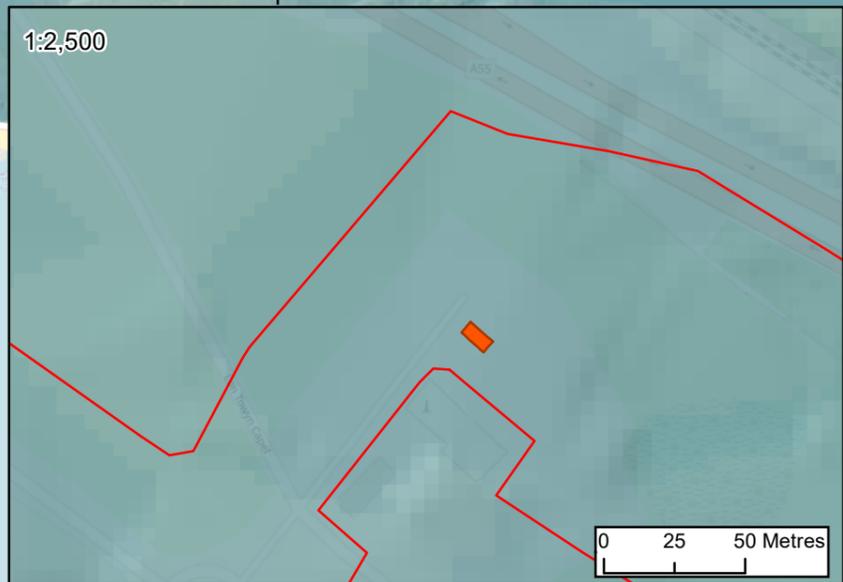
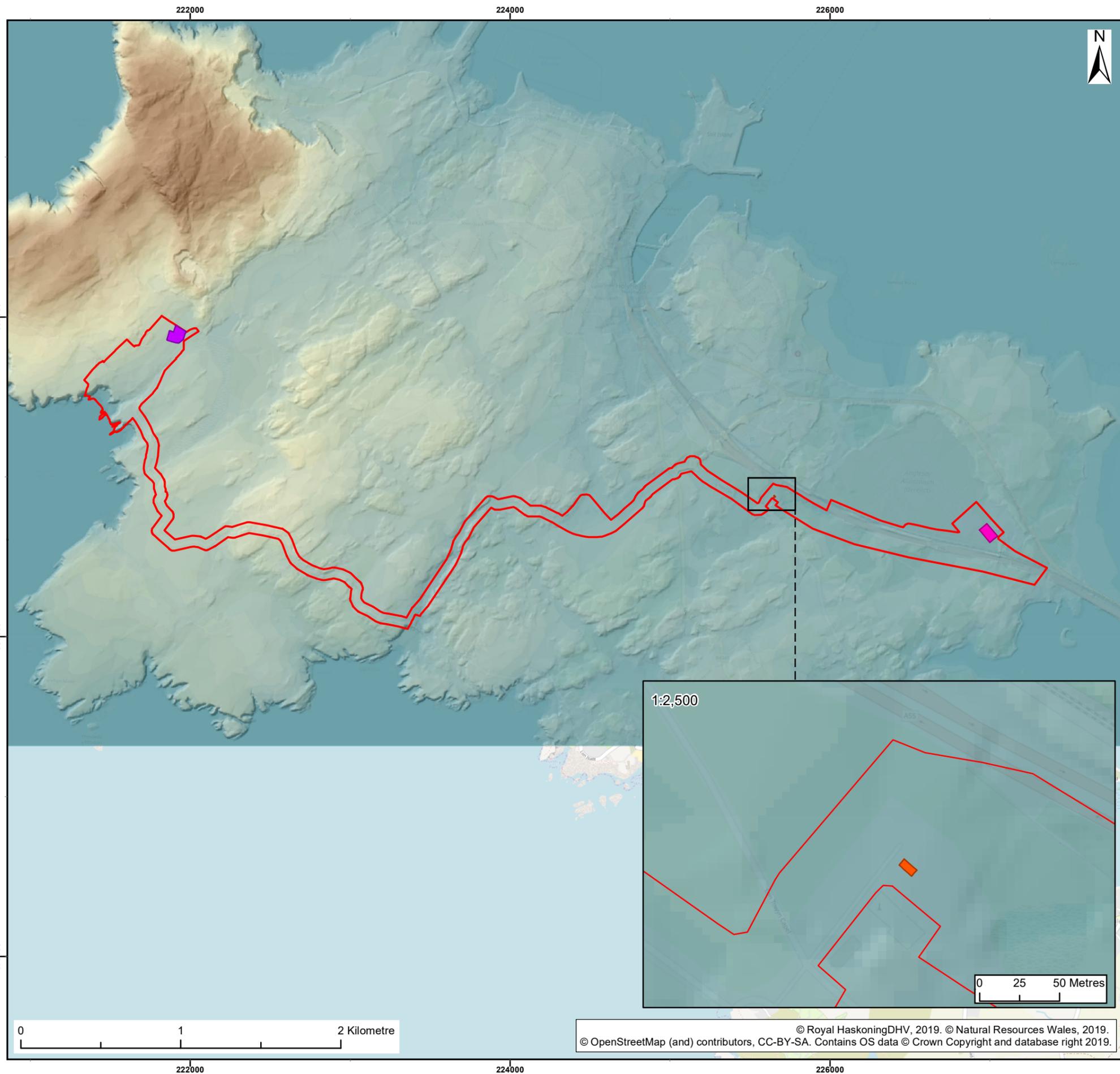
Title:
LiDAR Coverage for the Onshore Development Area
(at 2m resolution)

Figure: A17-1-7 Drawing No: PB5034-ES-A17-107

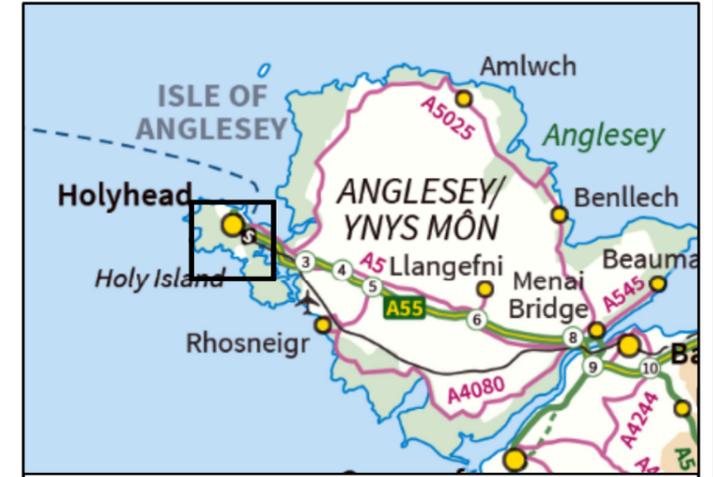
Revision:	Date:	Drawn:	Checked:	Size:	Scale:
04	05/07/19	JT	HW	A3	1:25,000
03	02/07/19	JT	HW	A3	1:25,000

Co-ordinate system: British National Grid

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GREAT COLLEGE STREET
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Legend:

Onshore Development Area	85 - 80.01
Grid Connection Substation	80 - 75.01
Landfall Substation	75 - 70.01
Switchgear Building	70 - 65.01
Elevation (m)	
218.9 - 175.01	65 - 60.01
175 - 150.01	60 - 55.01
150 - 140.01	55 - 50.01
140 - 135.01	50 - 45.01
135 - 130.01	45 - 40.01
130 - 125.01	40 - 35.01
125 - 120.01	35 - 30.01
120 - 115.01	30 - 25.01
115 - 110.01	25 - 20.01
110 - 105.01	20 - 15.01
105 - 100.01	15 - 10.01
100 - 95.01	10 - 5.01
95 - 90.01	5 - 0.01
90 - 85.01	0 - -1.73

Client: Project:

Title:
 LiDAR Coverage for the Onshore Development Area
 (at 5m resolution)

Figure: A17-1-8 Drawing No: PB5034-ES-A17-108

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
04	05/07/19	JT	HW	A3	1:25,000
03	02/07/19	JT	HW	A3	1:25,000

Co-ordinate system: British National Grid

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Morlais Project Environmental Statement

Annex 1: Pre-application advice responses from Natural Resources Wales (March and April 2019)

Volume III

Applicant: Menter Môn Morlais Limited

Document Reference: PB5034-ES-0171

Chapter 17: Water Resources and Flood Risk

Appendix 17.1: Flood Consequence Assessment

Annex 1: Pre-application advice responses from Natural Resources Wales (March and April 2019)

Morlais Document No.:
MOR/RHDHV/APP/0033

Status:
Final

Version No:
F3.0

Date:
July 2019

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RoyalHaskoningDHV
74/2 Commercial Quay,
Commercial Street,
Leith,
Edinburgh,
EH6 6LX.

19th March 2019

Dear Fiona,

PRELIMINARY PRE-APPLICATION ADVICE

DEVELOPMENT: MORLAIS ONSHORE CONNECTION LOCATION: HOLY ISLAND, ISLE OF ANGLESEY

Thank you for your enquiry dated 27th February 2019.

We have considered your enquiry in relation to our Development Planning [Consultations Topics](#) document (September 2018). We advise that the following matters are relevant to your site / proposed development and suggest you consider these further prior to the submission of any planning application.

Flood Risk Management

Less Vulnerable Development in C2

The proposed cable landfall site lies entirely within Zone C2 as defined by the Development Advice Map (DAM) referred to under Technical Advice Note 15: Development and Flood Risk (TAN15) (July 2004).

Therefore, a Flood Consequence Assessment will need to be compiled and submitted which demonstrates that the flood risks can be managed over the lifetime of the development. Sea level rises will need to be considered in line with [CL-03-16 - Climate change allowances for Planning purposes](#). To obtain extreme sea levels, we advise that you contact: datadistribution@cyfoethnaturiolcymru.gov.uk

We refer you to our [website](#) and [Guidance Note 028 Modelling for Flood Consequence Assessments](#) for further advice.

Please note, a submission in line with our advice will enable a better understanding of the risks and consequences of flooding but will not necessarily mean the risks and consequences are demonstrated as being managed acceptably in line with TAN15.

Watercourses

The proposed route does not cross a designated main river and therefore all watercourse crossings will be those of 'ordinary' watercourses. As such the crossings would be subject to the consent of the Lead Local Flood Authority, which in this instance are the Highways department of the Isle of Anglesey County Council.

Care will need to be taken with all watercourse crossings and excavations to prevent pollution. For further guidance please refer to GPP5 and PPG6 at the following link:

<http://www.netregs.org.uk/environmental-topics/pollution-prevention-guidelines-ppgs-and-replacement-series/guidance-for-pollution-prevention-gpps-full-list/>

All oil storage facilities must comply with the Water Resources (Control of Pollution) (Oil Storage) (Wales) Regulations 2016. For further guidance please refer to GPP2 at the following link:

<http://www.netregs.org.uk/environmental-topics/pollution-prevention-guidelines-ppgs-and-replacement-series/guidance-for-pollution-prevention-gpps-full-list/>

Soil stripping should be minimised to prevent run-off in wet weather and any stockpiles of soil should not be located within 10 metres of any watercourse.

The stream draining onto Porth Dafarch beach is of particular concern. The beach is a designated EC bathing water and must comply with strict bacterial standards between May and the end of September. Care should be taken to protect this stream from silty run-off, or dewatering water. If the water in the stream is discoloured, any bacteria present will not be killed by sunlight and will show up in the samples that we collect.

European Protected Species (EPS)

Our records show there may be European protected species on / in the vicinity of the site (otter, great crested newt, myotis bat species, Daubenton's bat, Natterer's bat, noctule bat, pipistrellus bat species, brown long-eared bat and whiskered/Brandt's Bat). We advise liaison with the LPA ecologist to discuss and agree the scope of any surveys required. We refer you to our [website](#) for further advice.

Foul Water

Before deciding a planning application, the LPA needs to be satisfied the foul drainage arrangements for the proposed development are suitable. From the details submitted there is no reference to the foul drainage arrangements for the proposed development, including the construction phase. We recommend you provide details regarding foul drainage arrangements with any planning application.

We refer you to WG Circular 008/2018 on private drainage, and specifically paragraphs 2.3-2.5, which stress the first presumption must be to provide a system of foul drainage discharging into a public sewer.

Groundwater protection and land contamination

Advice on environmental considerations and the assessments needed to support your planning application can be found on our external website.

For advice on how to deal with possible land contamination on your development visit:

<http://naturalresources.wales/guidance-and-advice/business-sectors/planning-and-development/advice-for-developers/land-contamination/?lang=en>

For advice on how to protect groundwater at your development visit:

<http://naturalresources.wales/guidance-and-advice/business-sectors/planning-and-development/advice-for-developers/protecting-groundwater/?lang=en>

Historic Landfill

The proposal site is located within/in close proximity to the following historic landfill sites:

- South Stack: within the area identified for HDD or trenched cabling and the onshore cable route 30m buffer.
- Cae Glas Road: approximately 50m south-east of the HDD area for road and rail crossing.

The Environment Agency provided the Local Authority with Historic Landfill data in 2007. You may wish to consult the Local Authority's Environmental Health department with regard to this aspect.

Landscape

The site is located within the Isle of Anglesey AONB. You are advised to consult with the Local Planning Authority and consider the need for Landscape Assessments in accordance with published best practice guidance.

We refer you to our [website](#) for further advice.

Protected Sites

The site lies within within/in close proximity to the following protected sites:

- Holy Island Coast/Glannau Ynys Gybi SAC/SPA/SSSI: the HDD or trenched cabling area is located partly within this site and sections of the onshore cable route 30m buffer are adjacent to it.
- North Anglesey Marine SAC: the HDD or trenched cabling area is located immediately adjacent to this site and the onshore cable route 30m buffer is within approximately 80m at its closest.
- Anglesey Terns SPA: the HDD or trenched cabling area and sections of the onshore cable route 30m buffer are located immediately adjacent to this site.

Special Area of Conservation/Special Protection Area

The Local Planning Authority is a Competent Authority for the purposes of the *Conservation of Habitats and Species 2017 Regulations*. As such, they must not agree to any plan or project unless they are certain that it will not adversely affect the integrity of a Special Area of Conservation (SAC)/Special Protection Area (SPA).

The Local Planning Authority should carry out a test of likely significant effects (TLSE) for the SAC/SPA, which is required under Regulation 63 of the *Conservation of Habitats and Species Regulations 2017*. This test applies to impacts on the SACs/SPAs from the proposed works, either alone or in combination with other plans and projects.

If the test concludes there is likely to be a significant effect then an appropriate assessment of the impacts on the SAC/SPA from the proposed works, either alone or in combination with other plans and projects, will be required. We would be able to assist with that assessment in our role as the statutory nature conservation body under the above Regulations.

Site of Special Scientific Interest

The Wildlife and Countryside Act 1981 (as amended) places a duty on public authorities in exercising their functions, so far as this is likely to affect the flora, fauna, geological or physiographical features of a SSSI, to take reasonable steps consistent with the proper exercise of their functions to further the conservation and enhancement of those features.

By satisfying the requirements regarding the SAC/SPA, as indicated above, it is likely the requirements for the SSSI will also be met.

We refer you to our [website](#) for further advice.

Provision of Data

In addition to the above, please note, we can also provide certain data free of charge, as set out in our [Open Data Policy](#). Customers can [access our data via our website](#).

Please note the view expressed in this letter is a response to a pre-planning enquiry only. We trust these comments will prove helpful, but they should not set a precedent for any future Natural Resources Wales' response to any formal application for planning permission or other legal consent. Such applications shall be assessed on the information submitted and regulations of relevance at that time. The details contained in this letter are based on the information available to date.

As part of our discretionary advice service we can provide further advice relating to land contamination, groundwater and flood risk prior to your planning application being submitted. There is a charge for this service. Further details are available on our website.

If you have any queries on the above please do not hesitate to contact us.

Yours sincerely,

Chris Jones

Mr. C. Jones
Senior Development Planning Advisor
Development Planning Advisory Service

RoyalHaskoningDHV
74/2 Commercial Quay,
Commercial Street,
Leith,
Edinburgh,
EH6 6LX.

2nd April 2019

Dear Helena,

PRELIMINARY PRE-APPLICATION ADVICE

DEVELOPMENT: MORLAIS ONSHORE CONNECTION LOCATION: HOLY ISLAND, ISLE OF ANGLESEY

Thank you for your enquiry dated 26th March 2019 and updated information about the above proposal. We have revised our original response (dated 19th March 2019) regarding Flood Risk Management and Protected Sites as follows.

We have considered your enquiry in relation to our Development Planning [Consultations Topics](#) document (September 2018). We advise that the following matters are relevant to your site / proposed development and suggest you consider these further prior to the submission of any planning application.

Flood Risk Management

The majority of the site lies within Zone A of the Development Advice Maps (DAM) contained within Technical Advice Note 15: Development and Flood Risk (July 2004), except for where the cable makes landfall and this connection will be carried out by HDD or trenched cabling in Zone C2. Please be aware that the development advice maps are based on current day extreme flood outlines and do not allow for any impacts associated with climate change. It would be appropriate to include a paragraph in the ES regarding ground levels at the Grid Connection Point - Orthios, demonstrating that the ground is elevated above the ESL in 2094 and 2119.

TAN15 advises that for development located in Zone A the justification test is not applicable and surface water requirements apply. The acceptability criteria are for no increase in flooding elsewhere to occur as a result of the development. Given the location of development in Zone A, we advise that surface water requirements should be assessed.

We note it is for the Local Authority's Land Drainage Department to comment on the suitability of these proposals.

Watercourses

The proposed route does not cross a designated main river and therefore all watercourse crossings will be those of 'ordinary' watercourses. As such the crossings would be subject to the consent of the Lead Local Flood Authority, which in this instance are the Highways department of the Isle of Anglesey County Council.

Care will need to be taken with all watercourse crossings and excavations to prevent pollution. For further guidance please refer to GPP5 and PPG6 at the following link:

<http://www.netregs.org.uk/environmental-topics/pollution-prevention-guidelines-ppgs-and-replacement-series/guidance-for-pollution-prevention-gpps-full-list/>

All oil storage facilities must comply with the Water Resources (Control of Pollution) (Oil Storage) (Wales) Regulations 2016. For further guidance please refer to GPP2 at the following link:

<http://www.netregs.org.uk/environmental-topics/pollution-prevention-guidelines-ppgs-and-replacement-series/guidance-for-pollution-prevention-gpps-full-list/>

Soil stripping should be minimised to prevent run-off in wet weather and any stockpiles of soil should not be located within 10 metres of any watercourse.

The stream draining onto Porth Dafarch beach is of particular concern. The beach is a designated EC bathing water and must comply with strict bacterial standards between May and the end of September. Care should be taken to protect this stream from silty run-off, or dewatering water. If the water in the stream is discoloured, any bacteria present will not be killed by sunlight and will show up in the samples that we collect.

European Protected Species (EPS)

Our records show there may be European protected species on / in the vicinity of the site (otter, great crested newt, myotis bat species, Daubenton's bat, Natterer's bat, noctule bat, pipistrellus bat species, brown long-eared bat and whiskered/Brandt's bat). We advise liaison with the LPA ecologist to discuss and agree the scope of any surveys required. We refer you to our [website](#) for further advice.

Foul Water

Before deciding a planning application, the LPA needs to be satisfied the foul drainage arrangements for the proposed development are suitable. From the details submitted there is no reference to the foul drainage arrangements for the proposed development, including the construction phase. We recommend you provide details regarding foul drainage arrangements with any planning application.

We refer you to WG Circular 008/2018 on private drainage, and specifically paragraphs 2.3-2.5, which stress the first presumption must be to provide a system of foul drainage discharging into a public sewer.

Groundwater protection and land contamination

Advice on environmental considerations and the assessments needed to support your planning application can be found on our external website.

For advice on how to deal with possible land contamination on your development visit: <http://naturalresources.wales/guidance-and-advice/business-sectors/planning-and-development/advice-for-developers/land-contamination/?lang=en>

For advice on how to protect groundwater at your development visit: <http://naturalresources.wales/guidance-and-advice/business-sectors/planning-and-development/advice-for-developers/protecting-groundwater/?lang=en>

Historic Landfill

The proposal site is located within/in close proximity to the following historic landfill sites:

- South Stack: within the area identified for HDD or trenched cabling and the onshore cable route 30m buffer.
- Cae Glas Road: approximately 50m south-east of the HDD area for road and rail crossing.

The Environment Agency provided the Local Authority with Historic Landfill data in 2007. You may wish to consult the Local Authority's Environmental Health department with regard to this aspect.

Landscape

The site is located within the Isle of Anglesey AONB. You are advised to consult with the Local Planning Authority and consider the need for Landscape Assessments in accordance with published best practice guidance.

We refer you to our [website](#) for further advice.

Protected Sites

The site lies within within/in close proximity to the following protected sites:

- Holy Island Coast/Glannau Ynys Gybi SAC/SPA/SSSI: the HDD or trenched cabling area is located partly within this site and sections of the onshore cable route 30m buffer are adjacent to it. The area affected includes vegetated seacliffs (a SAC feature) and potentially intertidal SSSI features. The development area, including the onshore cable route 30m buffer, is potential foraging ground for choughs which are a feature of this SPA. The impacts of the loss of this and of disturbance during construction works should therefore be assessed, and the development should be planned to ensure that grazing can continue in adjacent areas e.g. by providing temporary stockproof fencing if necessary.
- North Anglesey Marine SAC: the HDD or trenched cabling area is located immediately adjacent to this site and the onshore cable route 30m buffer is within approximately 80m at its closest.
- Anglesey Terns SPA: the HDD or trenched cabling area and sections of the onshore cable route 30m buffer are located immediately adjacent to this site.

Special Area of Conservation/Special Protection Area

The Local Planning Authority is a Competent Authority for the purposes of the *Conservation of Habitats and Species Regulations 2017*. As such, they must not agree to any plan or project unless they are certain that it will not adversely affect the integrity of a Special Area of Conservation (SAC)/Special Protection Area (SPA).

The Local Planning Authority should carry out a test of likely significant effects (TLSE) for the SAC/SPA, which is required under Regulation 63 of the *Conservation of Habitats and Species Regulations 2017*. This test applies to impacts on the SACs/SPAs from the proposed works, either alone or in combination with other plans and projects.

If the test concludes there is likely to be a significant effect then an appropriate assessment of the impacts on the SAC/SPA from the proposed works, either alone or in combination with other plans and projects, will be required. We would be able to assist with that assessment in our role as the statutory nature conservation body under the above Regulations.

Site of Special Scientific Interest

The Wildlife and Countryside Act 1981 (as amended) places a duty on public authorities in exercising their functions, so far as this is likely to affect the flora, fauna, geological or physiographical features of a SSSI, to take reasonable steps consistent with the proper exercise of their functions to further the conservation and enhancement of those features.

By satisfying the requirements regarding the SAC/SPA, as indicated above, it is likely the requirements for the SSSI will also be met.

We refer you to our [website](#) for further advice.

Provision of Data

In addition to the above, please note, we can also provide certain data free of charge, as set out in our [Open Data Policy](#). Customers can [access our data via our website](#).

Please note the view expressed in this letter is a response to a pre-planning enquiry only. We trust these comments will prove helpful, but they should not set a precedent for any future Natural Resources Wales' response to any formal application for planning permission or other legal consent. Such applications shall be assessed on the information submitted and regulations of relevance at that time. The details contained in this letter are based on the information available to date.

As part of our discretionary advice service we can provide further advice relating to land contamination, groundwater and flood risk prior to your planning application being submitted. There is a charge for this service. Further details are available on our website.

If you have any queries on the above please do not hesitate to contact us.

Yours sincerely,

Chris Jones

Mr. C. Jones
Senior Development Planning Advisor
Development Planning Advisory Service