

Gilfach Holiday Village, Aberaeron

Desk Study Report & Walkover Report
April 2018



Gilfach Holiday Village, Aberaeron

Desk Study Report & Walkover Report

Client: **AVON Estate Ltd**

Report Status: **FINAL**

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BEng

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Approved By: Paul Williams
BSc CEng MICE

Date: April 2018

EXECUTIVE SUMMARY

Datrys have been employed by AVON Estate Ltd to carry out a desk study and a walkover survey for the proposed redevelopment of Gilfach Holliday Village, Llwyn Celyn, Aberaeron. The primary focus of the desk study was to evaluate the risk associated with ground conditions and historical uses of the site.

The site is located south west of Aberaeron and shares a cliff face with the Irish Sea. Historical maps indicate that the site was undeveloped prior to the construction of the farm and more recently the holiday village. The conceptual contamination model has indicated that there is a low risk of ground contamination.

The report utilises information obtained from a variety of sources such as Groundsure data, ordnance survey maps, BGS geological maps, flood risk maps, Natural Resources Wales, Ceredigion council and well-founded anecdotal evidence.

SITE SPECIFIC CHECKLIST

Possible Risk	Risk present on site			Appropriate Investigation/comments
	yes	no	unknown	
Utilities				
Electric	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Cables to be traced prior to construction
Gas (Wales and West)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Gas supply on site - to be amended with new layout
Foul sewer (DCWW)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	No sewer in proximity
Surface water sewer (DCWW)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	No sewer in proximity
Combined sewer (DCWW)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	No sewer in proximity
BT (BT)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	no maps present.
Existing Site Layout				
Site topography	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Site has steep falls, existing retaining structures
Boundary conditions	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	retaining structures and steep embankments
Vegetation within/near site	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	species to be investigated
Areas of fill (made ground)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Made ground assumed to be present throughout the existing site, Samples to be tested after the demolition phase
Highways				
Highways to be retained	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Existing private access road to be modified.
Section agreement required	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Road is private with no alteration to entrance
Junction visibility	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Not applicable
Footpaths	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Not applicable
Highway drainage	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Gullies to be designed for new road and parking
Existing Structures				
Structures to be retained	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	TBC (assumed some to be retained/refurbished)
Structures to be demolished	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Existing structures at risk from cliff erosion to be removed
Structural defects	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Structures in adjacent sites	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Flooding				
Known flooding	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Watercourse within/near site	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Site adjacent to sea and river
Pooling within site	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Minor surface flooding to existing site, levels to be amended
Groundwater	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Site investigation to confirm ground water level
Drainage				
Existing drainage	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Existing drainage to be traced. Possibly incorporated into the new design otherwise removed
Attenuation	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Not applicable
Soakaways	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Not applicable
Headwall/discharge point	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	To be confirmed via trace/inspection
Section agreement	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	agreement required with NRW for surface water and foul discharge. NRW attended site and started discussions.
Below & Above Ground Workings				
Mineshafts etc. within vicinity	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Please refer to Groundsure data for further information
Contamination				
Known contamination	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Made ground	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Assumed present due to ground level alterations
Utilities	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Possible contamination from made ground backfill
Demolished Structures	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Not applicable
External contamination sources	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Low risk, no further testing required
Vegetation (Japanese Knotweed etc.)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Nothing recorded. Site assumed clean of vegetation contamination

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Appendix B Groundsure Data

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1. INTRODUCTION

The project involves two stages consisting of the removal of the existing static caravans and hardstanding to the north with the introduction of soft landscaping, and the subsequent development of 42 new static units and their associated ancillaries. The development is being undertaken due to the adjacent cliff being eroded by the sea.

The study has been undertaken with reference to guidance in the `Development of Land Affected by Contamination : A Guide for Developers` prepared by the Welsh Local Government Association & Environment Agency Wales 2012, `Model Procedures for the Management of Land Contamination` (CLR11) and the BSI publication `Investigation of Potentially Contaminated Sites – Code of Practice` (BS10175). This report presents the findings of the preliminary risk assessment, detailing the particular site characteristics and identifying potential contamination, environmental and geo-environmental factors which could impact upon the site development.

This report details the investigations that were undertaken into the site and provides a general background to the site's history, discusses any concerns that may exist with the ground and the likely cause, and recommends suitable intrusive investigation methods that will be necessary in order to inform the foundation design.

This report has been prepared for the sole use of the Client, for the purposes described and no extended duty of care applies to other parties. The comments given, and opinions expressed, in this report are based on the available information at the time of the study. However, there may be outstanding information and data which becomes available at a later date which has an impact on the overall conclusions.

2. DESK STUDY

A desk study is a means of obtaining important site information prior to undertaking an intrusive site investigation. The principal aims of the desk study are to:

- Identify onsite services.
- Determine the likely ground strata so that appropriate plant and methodology can be selected for the intrusive site investigation.
- Ascertain the presence of any existing hazards and assess their risk.
- Understand how the site history may affect the performance of the new structures.
- Highlight particulars to look out for when carrying out the walkover survey and intrusive investigation.
- Determine the most appropriate methods for further site investigation.
- Determine the likely presence of any contamination on the site and the location of any potential sources of contamination close to the site.
- Determine the requirement for Radon and/or Methane protection under the proposed structures.

Information was obtained from a variety of sources such as Groundsure data, ordnance survey maps, BGS geological maps, flood risk maps, the local council and well-founded anecdotal evidence. Statutory undertakers have been consulted to obtain the locations of any services and apparatus within or near to the site (see **Appendix A**).

2.1 Site Location & Aerial Plan

The site is located in Rhos on Sea at grid reference SN 43558 61236.



Figure 1. Site location plan



Figure 2. Site location aerial map

2.2 Site History

Maps of the site have been obtained spanning the period between 1887 and 2014 with key maps displayed below. Principal observations concerning the site are described below:

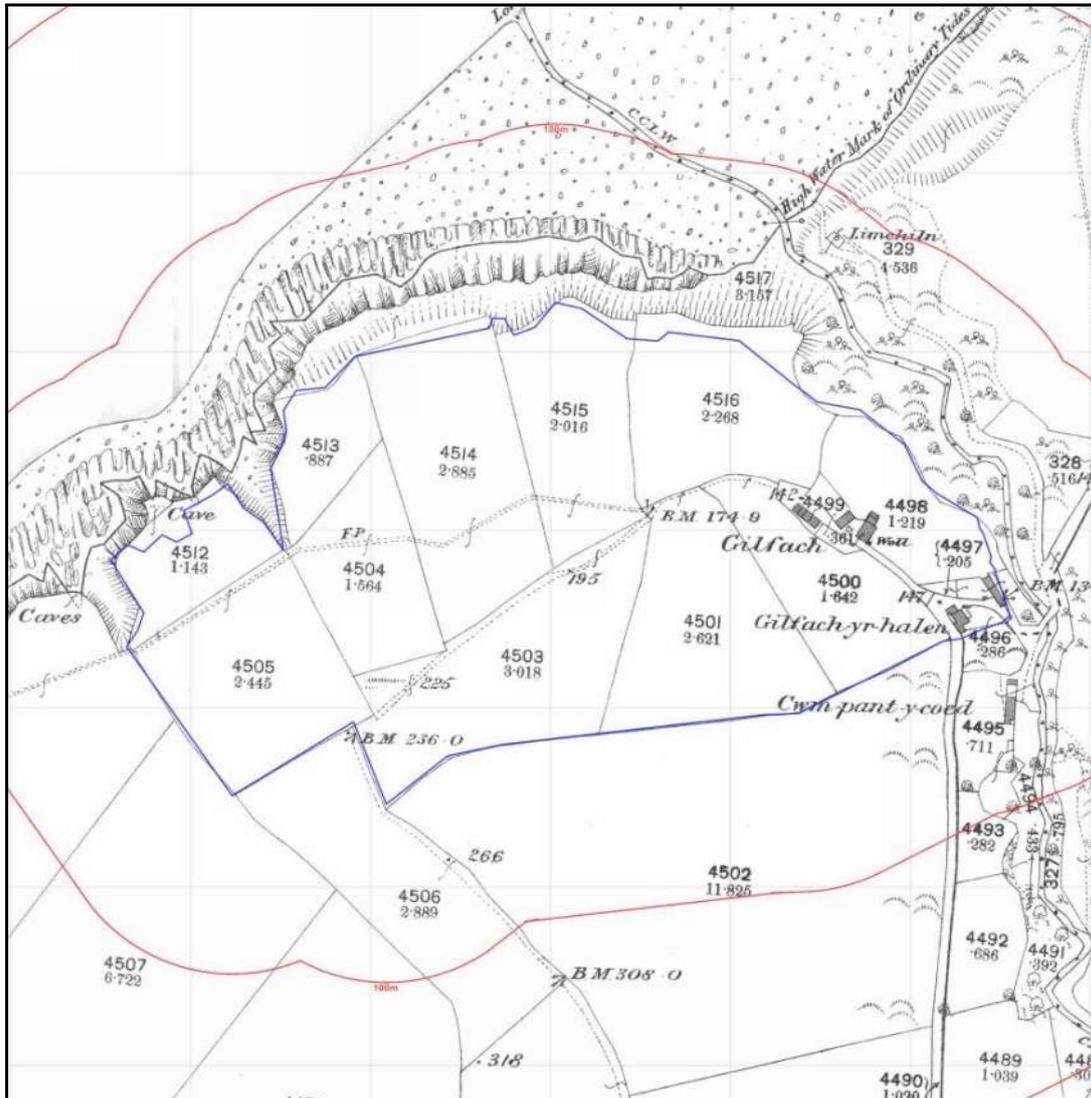


Figure 3. 1890 – The site contains Gillfach with the majority of the site being utilised for agriculture.

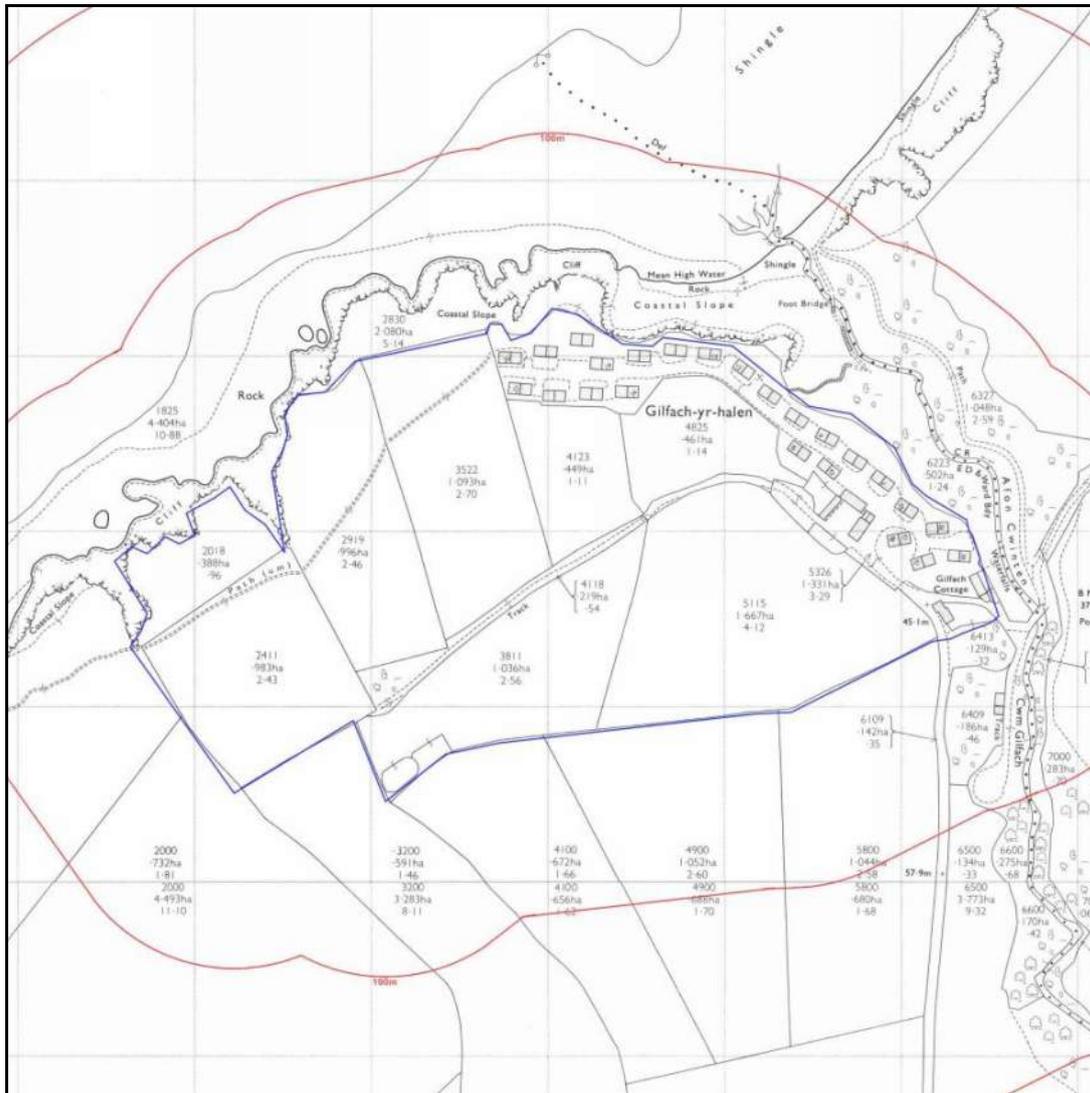


Figure 4. 1974 – The north side of the site has been developed into Gilfach-yr-halen. The line of the coast has altered due to erosion. The majority of the site remains undeveloped.

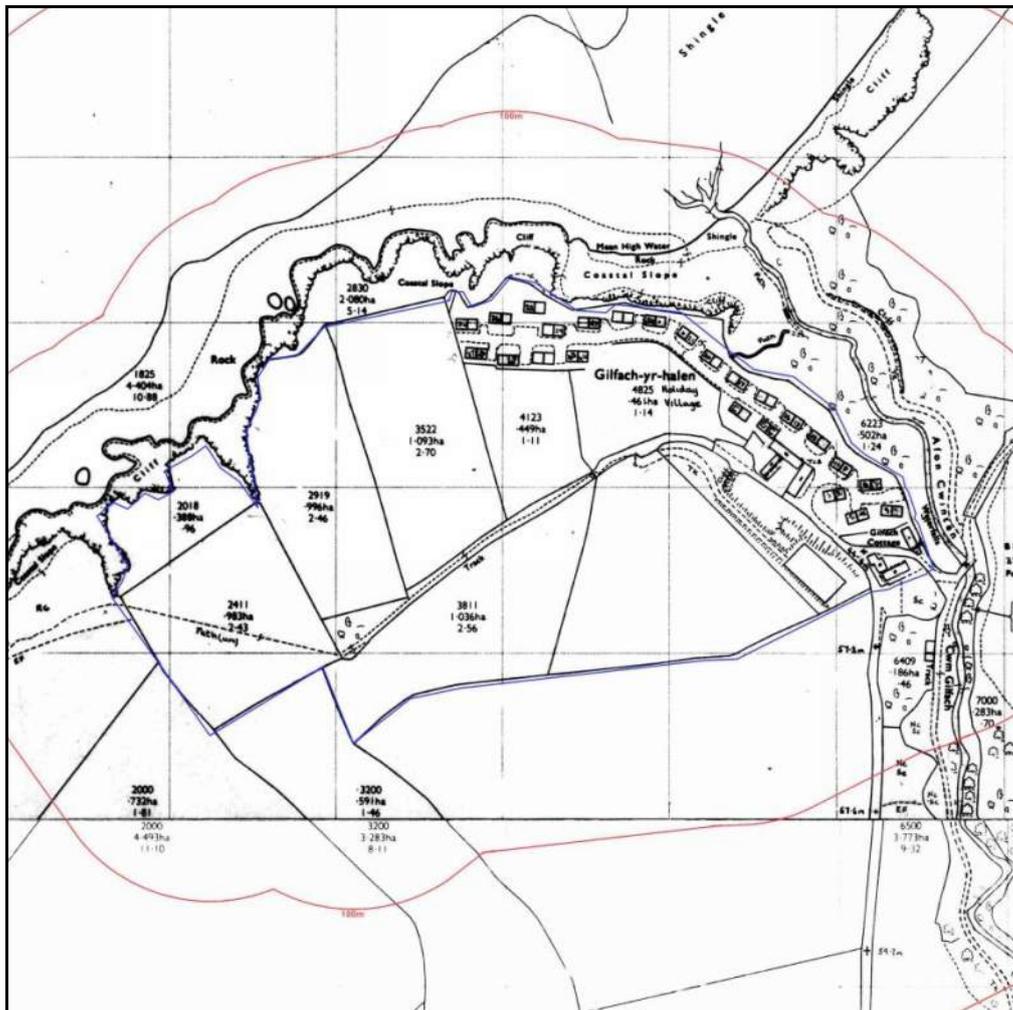


Figure 5. 1991 – The site remains relatively unchanged with the exception of the tennis courts located on the south east corner.



Figure 6. 2014 – The site has not undergone any further changes. Minor coastal erosion has been recorded.

2.3 DESK STUDY CHECKLIST OUTPUT

A checklist of potential issues has been completed for the site. The main potential hazards are detailed below. The full checklist is given in Appendix A.

1. Water course in or near the site

The site is located adjacent to the sea and the Afon Cwinton. The sea cliff is located along the north and north west boundary, with the Afon Cwinton located east and north east of the site. The river is approximately site level near the access bridge but falls to sea level via a number of water falls.

The site is located within Zone D, MU9.1 of the Cardigan Bay Shoreline Management Plan. The Management Plan has stated that the current erosion of the cliffs will continue at a very slow pace (with more rapid erosion of the clay cliffs). The long term evaluation is that local erosion is likely to continue but will be constrained eventually as hard rock cliffs become more prominent, resulting in a reduction in drift. Due to this existing and future erosion of the site the client has proposed to remove the existing chalets at risk of erosion and replace with soft landscaping. The site will be expanded onto the hill south of the existing development which is at no risk from coastal erosion within the lifespan of the proposed structures.

Both Developer Advice Maps and Natural Resources Wales indicate that the site is not at risk from fluvial or surface water flooding.

2. Trees within the vicinity of the site

The site currently contains areas of vegetation which include small mature trees and hedges. The proposed site layout indicates that the units will be located in an area away from the trees with the boundary utilising the existing hedges that are assumed to have a small root system.

The existing site contains mature trees near the cliff and river. The trees are deemed to be a sufficient distance away from the development and thus present no risk to the required structural slab. However, areas in proximity to the trees (existing buildings near the river) will require further investigation if these are to be

redeveloped. If trees are to be incorporated into the design then the design engineer must be notified to determine the potential risk.

3. Changes in ground level

Information gathered from the existing topo and Ordinance Survey Maps indicate the site is located on the side of hill that falls down towards the sea (north) and river (east). The ground level at the bottom units of the proposed has been recorded as 60.00 m.A.O.D with the top units (plot 42) at 77.00m.A.O.D. Due to the variation in levels of approximately 17m, the site has an average fall of 1:5.8. It's expected that the site strata will not comprise of fill at the proposed location for the units although fill is anticipated at the location of the existing caravans due to the alteration in level during development.

4. Likely problems with foundations associated with the ground material

The British Geological Survey has no information on the superficial deposit within the site, however the nearby superficial deposits is Diamicton Till and is assumed to overlay the bedrock within the site. The Till Superficial Deposits formed up to 2 million years ago in the Quaternary Period. The assumed Till is underlain with a sedimentary rock (assumably sandstone or mudstone) and thus can easily be fractured. The bedrock was formed approximately 433 to 444 million years ago in the Silurian Period. The bedrock is assumed to be located at shallow depths.

5. Soft deposits

The risk of soft spots is minimal due to the assumed shallow bedrock on site. Intrusive investigation will be required to provide more information.

6. Is the ground water likely to attack concrete within the site?

Chloride and sulphate content will be tested to determine the onsite risk.

7. Mining or Quarrying

There are no recorded underground workings within 1000m of the site. Two caves have been recorded, one on the west corner and one 59m south west. Due to the distance between the caves and the location for the proposed caravan sites it is assumed that the caves will not impact upon the structural design.

8. Foundation loads

Loads are likely to be low as the scheme is for the siting of individual static units with associated parking and access road.

The ground conditions are unknown at the present time although information gathered suggests the presence of shallow bedrock. It is assumed that the structural slab/foundation will be founded upon the bedrock. Due to the site topography the caravans will have to be upon stilts or cut into the rock.

9. The presence of utility services.

The site is known to be served by mains water (DCWW) and electric, both entering the site along the access road from Llwynceilyn. Information gathered indicates that the site is not served with a mains gas supply (Wales and West) or sewers (DCWW). No investigation has been carried out with BT. The existing topographical survey highlights numerous foul chambers within the site but does not highlight a means of discharge. The site may be served by a septic tank, treatment plant and drainage field or possibly discharging into the nearby watercourse/sea. All drainage within the site are deemed private. A CAT scanner should be used prior to any excavation to verify potential services on site.

10. Porosity

The underlying bedrock (limestone) is permeable and is classified as a Principal Aquifer and thus has a high intergranular and/or fracture permeability. The bedrock is overlain with low permeability superficial deposits (Till) which are classified as an unproductive aquifer. As the permeability of the superficial deposit is low it is assumed that soakaways will not be feasible for this site. Porosity tests will be required to determine the infiltration rate.

11. Radon affected area.

The site is within a radon affected area as defined by the Health Protection Agency (HPA). The site is within an area that has between 1% - 3% of properties that are above the action level. Therefore no radon protection methods are required by building control for the proposed site.

3. WALKOVER REPORT

A walkover survey of the site was undertaken in November 2017. The purpose was to gather information on the site and the surrounding area in order to determine any possible risks that may affect the proposed holiday village design. The walkover survey provided an opportunity to address the issues raised by this desk study and to uncover any other issues that may prove to have a bearing upon the redevelopment of the holiday village.

The walkover survey was completed and highlighted the following:

1. Site topography

The site walkover confirmed that the proposed development will be affected by the steep gradient of the proposed development location. The development will require the structural slabs to be cut into the hill side or constructed on stilts (or similar). There are numerous steep embankments and existing walls that may require a retaining structure/replacement in order to omit any risk of due to the proposed development.

2. Adjacent land and boundaries

The adjacent land is utilised as grazing lands primarily for the horses kept by the client and thus not considered to be at impact by the development. The proposed site is surrounded on two sides by fields with a hedge/fence boundary, however the north and north east boundary are steep embankments or walls that are assumed to be likely affected by the proposals.

3. Utilities

The site is served by a main water pipe (within the main road), an electrical cable (overhead and underground) and telecom. The site utilises its own gas storage tank and thus not connected to the mains. The site manager confirmed that there are no existing sewers within/near the site.

4. Highway

The proposed site will utilise the existing main road to the stables at which point the private road will be amended to allow for all vehicles to access the proposed carpark. The existing track towards the proposed carpark will require its gradient and width adjusted in addition to passing bays having to be incorporated into the design. Due to the existing road layout the visibility splay must be considered when placing the passing bays to ensure that cars can pull in if any obstruction/traffic is within site. Passing bays located on corners would be beneficial as it will reduce the needs for traffic to reverse from this location to allow for a vehicle to pass. The existing road is a public right of way (discussions underway regarding its repositioning) and thus the road should allow for use by the public.

5. Drainage

Foul

The site has been confirmed that there are no sewers within the vicinity of the site. The existing foul drainage discharges into a septic tank located between the existing holiday homes and cliff edge. Due to the proximity to the cliff this septic tank is at risk from erosion. The septic tank discharges the effluent water to the sea with the point of discharge located within the field west of the existing holiday homes. The site has a permit from Natural Resources Wales that allows for the discharge but is currently on a rolling permit (holiday season). Natural Resources Wales have attended site but have not formally stated if the current discharge location could be utilised by the proposed treatment plant. A CCTV survey will be required to ascertain the existing point of discharge and whether this can be utilised should Natural Resources Wales give approval.

Surface Water

The site managers informed Datrys during our attendance that the site surface water discharges into the sea/river at numerous locations. Although this could be heard over the cliff face these locations could not be seen to confirm the discharge locations. A CCTV sewer survey will be required to provide information on the existing systems and the location of the discharge locations that may be reused in the coming development. The site contains a number of land drains which need further investigation.

4. CONCEPTUAL MODEL

In accordance with current guidance the information collated during the preliminary site assessment has been reviewed to establish the conceptual model for the site. The conceptual model is based upon the identification and assessment of potential 'hazards', identified or suspected from the results of the preliminary assessment; the potential 'receptors' that may be affected; and the anticipated 'pathways' to those receptors.

The 'Conceptual Model' takes into consideration the proposed redevelopment of the site with a residential development and the sites environmental setting.

Potential On-Site Contamination Sources and Hazards

The main data source for the hazard identification is the fill material associated with the historic development (raising and levelling areas for the existing units and access road) and existing utilities within the site and, information on the historical activities off site. From the assessment of this data, information on the potential source, type and location of contamination hazard has been identified.

There are potential sources of contamination within the site which are associated with the infilling of land which is assumed to be relating to the cliff erosion and/or the construction of the existing units foundations/slabs and installation of the existing utilities. The site is anticipated to have an area of made ground located by the existing units any may be contaminated dependent on the material used, no fill is anticipated at the location of the proposed new units.

Based on the interpretation of the desk based study and the historical maps of the site there is also evidence of potential sources of contamination located in the surrounding area (historic lime kiln 72m NE) but due to the distance from source to receptor they are deemed to be a low contamination risk.

Potential Pathways

There are a number of potential pathways by which contamination may migrate and impact a particular receptor. The following pathways have been identified for the study area:

- *Migration through semi-permeable soils / Made Ground* – The superficial deposits at the site is likely to be of low permeability, however the made ground could have a higher permeability. Due to this the material may have the potential to allow migration of contaminants in gaseous or aqueous form. The Groundsure data indicates that there are 15 potential sources of contamination within 500m of the site, the closest being the infilled land within the site between 1904 and 1948.
- *Groundwater within Aquifer* – The superficial deposits are classified as unproductive aquifers and thus limits the risk of contamination to the Secondary A Aquifer below however the site may be at risk from leaching within flat areas.
- *Direct contact with contaminants* – Ingestion or dermal contact of contaminants that may be at or near the surface or which become exposed through excavation.
- *Direct and indirect inhalation of contaminants* – From airborne particles, ground gases and vapours, which might be present on site or migrate through services.
- *Direct and indirect Ingestion of contaminants* – From consuming affected ground material, soil, dust or water.
- *Migration through underground service trenches & drains* – Contaminants may migrate off site to local receptors through permeable service trenches or through the site drainage system. This is particularly the case for more mobile contaminants such as oils and solvents.

Potential Receptors

The following potential receptors have been identified and considered as relevant for the whole site. The receptors that may be significantly harmed or polluted by potential contaminative materials (if present) are considered to be:

- *Human health (site workers)* – are considered to be a sensitive receptor due to the close proximity in which they are required to work, during the construction process, with contaminated ground/soils and/or contaminated surfaces (if present)
- *Humans (future site users)* – are considered to be a high sensitive receptor as it is proposed to develop the site to accommodate residential units. Future users are potentially at risk via direct contact (dermal), ingestion or inhalation of contaminants (if present) in shallow surface/soil, water or vapours.
- *Groundwater within Aquifer* – is considered to be a low sensitive (unlikely) receptor. The groundwater within 1000m of the site is not used for abstraction and the site does not lie within a Groundwater Protection Zone.
- *Neighbouring properties & land use* – the site is located south of Aberaeron on the coast line. As such, neighbouring land users are considered to be of low sensitivity.
- *Ecological receptors (i.e. fauna and flora)* – considered to be medium sensitive receptor during and post construction as the site is in a rural area.
- *Building and structures* – considered to be of high sensitivity should chemically aggressive ground conditions or soil gas pose a risk to the future development.

Conceptual model conclusion

The desk study indicates that there is a low risk of contamination at the proposed development from onsite sources. Offsite sources of contamination are deemed to be a low risk due to the distance between source and receptor. Therefore the site investigation will not require contamination tests for the new development, however possible WAC test may be required for the existing development due to the assumed made ground.

5. DISCUSSION

The output from the desk study and walkover survey indicates that the existing site exhibits a low probability of contamination, thus the risk of contamination on the continuation of the development is low.

It is assumed that the discussed fill (as indicated within the conceptual model) consist of excavated ground from site due to the historic cut and fill, the fill material is assumed to be inert. Therefore the likelihood of contamination within the fill is assumed to be low.

Due to the low probability of contamination at the proposals location, Datrys will not be carrying out contamination tests as the risk of contamination at this location is minimal. However, as the area of hardstanding is to be replaced it would be beneficial to carry out a WAC test on the material. If the contamination results come back clear then there are no significant hazards which are likely to affect continuation of the works or the design of the structures and their foundations.

The information gathered from the British Geological Survey indicate that the site will comprise of Till (superficial deposits) underlain by shallow bedrock (sandstone or mudstone). The Bedrock has been classified as a Secondary (A) Aquifer and thus is assumed to have a low permeability. Due to the low permeability of the bedrock and the steep gradient of the site it's assumed that the surface water runoff will discharge downhill and into the sea. Intrusive tests will be required to determine the ground conditions.

The natural progression from this desk study is to design and carry out an intrusive site investigation. This will provide greater detail on the ground type and groundwater level. Contamination testing will not be required however WAC test would be beneficial for the hardstanding that is to be replaced. Depending on the results, further tests may be required.

6. RECOMMENDATIONS

The ground investigation is to concentrate on ground conditions utilising the following tests in two phases:

- Trial pit tests to determine the ground conditions e.g. rock level
- Geotechnical testing to determine the effect of a drainage field etc. surcharging the nearby ground
- WAC testing within made ground that is to be reused or removed (after demolition of the existing development).
- Porosity tests to determine the ground suitability for a drainage field or similar.

Bulk disturbed samples will be taken at shallow depths (max 0.5m) via the trial pits and will be used for geotechnical testing. The testing will be required to determine the geotechnical properties of the present strata such as plasticity index.

Testing will be required if the bedrock is not present at shallow depths and will be required to determine the geotechnical properties of the present strata such as plasticity index.

The foul and surface water drainage within the site requires further investigation to determine if it could be utilised for the proposed development.

APPENDICES

APPENDIX A



Scale	1 : 4000@A4
User ID	g.prebble@dwys.co.uk
Date	22/11/2017
Grid Ref.	Easting: 243646 Northing: 261276

<p>Some exceptions of Plant Items:</p>	

TITLE:

The plan shows those pipes owned by Wales & West Utilities (WU) in its role as a Licensed Gas Transporter (GT). The information shown on this plan is derived from historic information and may have involved re-scaling plans, and the accuracy of it cannot be guaranteed. Service pipes, valves, syphons, stub connections, etc. may not be shown but their presence should be anticipated. No warranties are therefore given in respect of it. WU its employees and contractors do not accept any liability for any inaccuracy or incompleteness in it.

You must use safe digging practices, in accordance with HS(G)47, to establish the actual position of mains, pipes, services and other apparatus on site before any mechanical plant is used. It is your responsibility to ensure that this information is provided to all persons (either direct labour or contractors) working for you or near gas apparatus. The information shown on this plan should not be used beyond 28 days from the date of issue of this plan as it is subject to updating.

The plan also provides indications of gas pipes owned by other GTs, or otherwise privately owned, which may be present in this area. This information is not information of WU and WU is unable to verify this information or to confirm whether it is accurate or complete. It is supplied voluntarily to assist the user in determining whether to make contact with other GTs or others. The user must obtain such information from the other GT or person concerned. WU, its employees and contractors do not accept any liability for this information or any inaccuracy or incompleteness in it.

Wales and West Utilities Ltd., Wales and West House, Spooner Close, Celtic Springs, Coedkernew, Newport, NP10 8FZ

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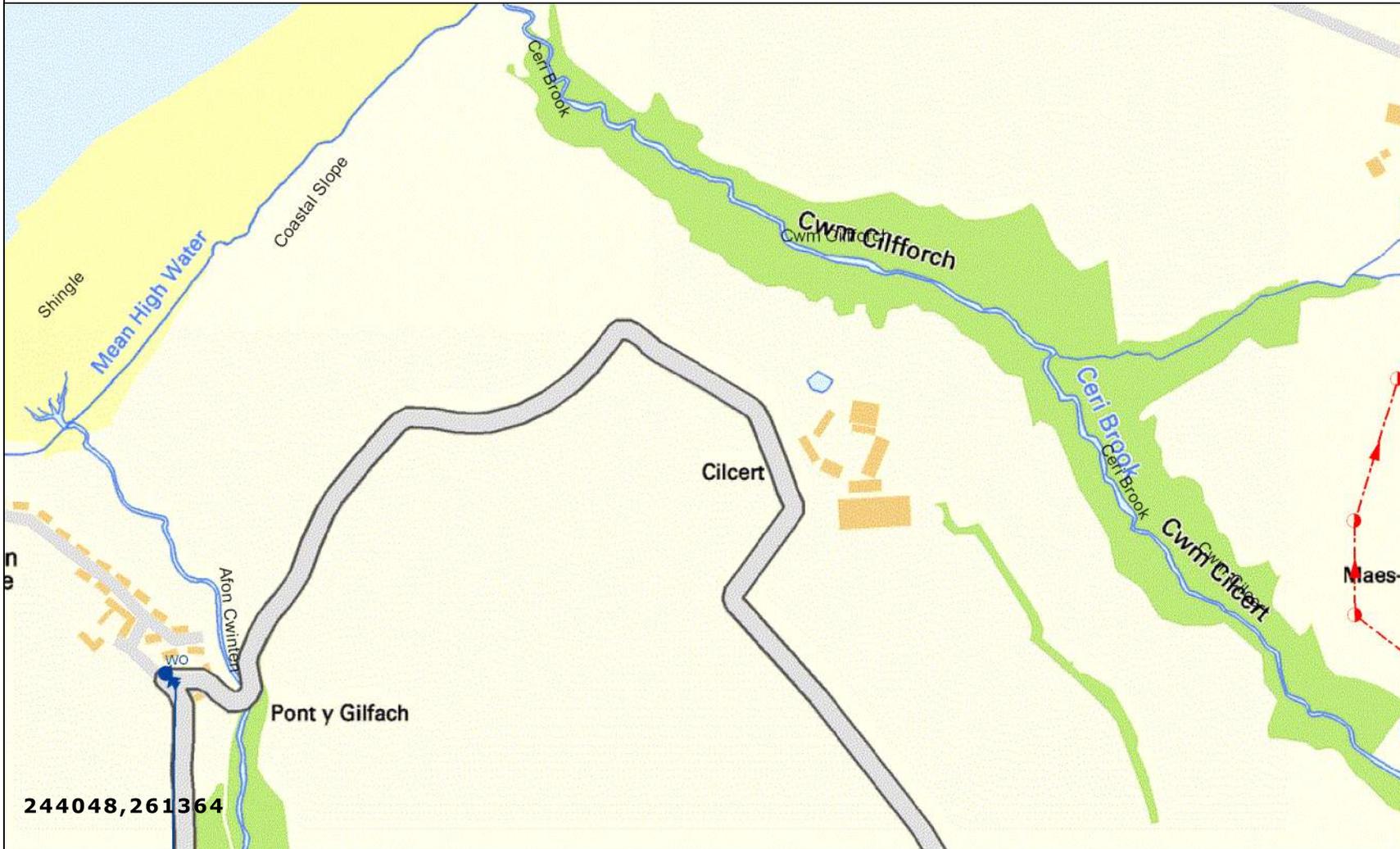
Dŵr Cymru
Welsh Water

22/11/2017

Gilfach Holiday Village



Scale: 1:5000



LEGEND

Clean Water

- Sluice Val
- Air Val, SINGLE
- Tap
- Pressure Reducing Valve
- Meter
- BULK Meter
- FH
- Cap
- Existing Main
- NON COMPANY

Sewerage External

- Foul
- Surface Water
- Combined
- Rising Main
- Private
- Treatment Works
- Pumping Station
- Special Purpose
- Unknown End
- Change, Combined Overflow
- Outfall, FOUL
- Lamp Hole, Foul
- Private Sewer Transfer
- Lateral Drain
- Inspection Chamber

244048,261364

Dŵr Cymru Cyfyngedig ('the Company') gives this information as to the position of its underground apparatus by way of general guidance only and on the strict understanding that it is based on the best information available and no warranty as to its correctness is relied upon in the event of excavations or other works made in the vicinity of the Company's apparatus and any onus of locating the apparatus before carrying out any excavations rests entirely on you. The information which is supplied hereby by the Company, is done so in accordance with statutory requirements of sections 198 and 199 of the Water Industry Act 1991 based upon the best information available and in particular, but without prejudice to the generality of the foregoing, it should be noted that the records that are available to the Company may not disclose the existence of a drain sewer or disposal main laid before 1 September 1989, or if they do, the particulars thereof including their position underground may not be accurate. It must be understood that the furnishing of this information is entirely without prejudice to the provision of the New Roads and Street Works Act 1991 and the Company's right to be compensated for any damage to its apparatus.

EXACT LOCATION OF ALL APPARATUS TO BE DETERMINED ON SITE

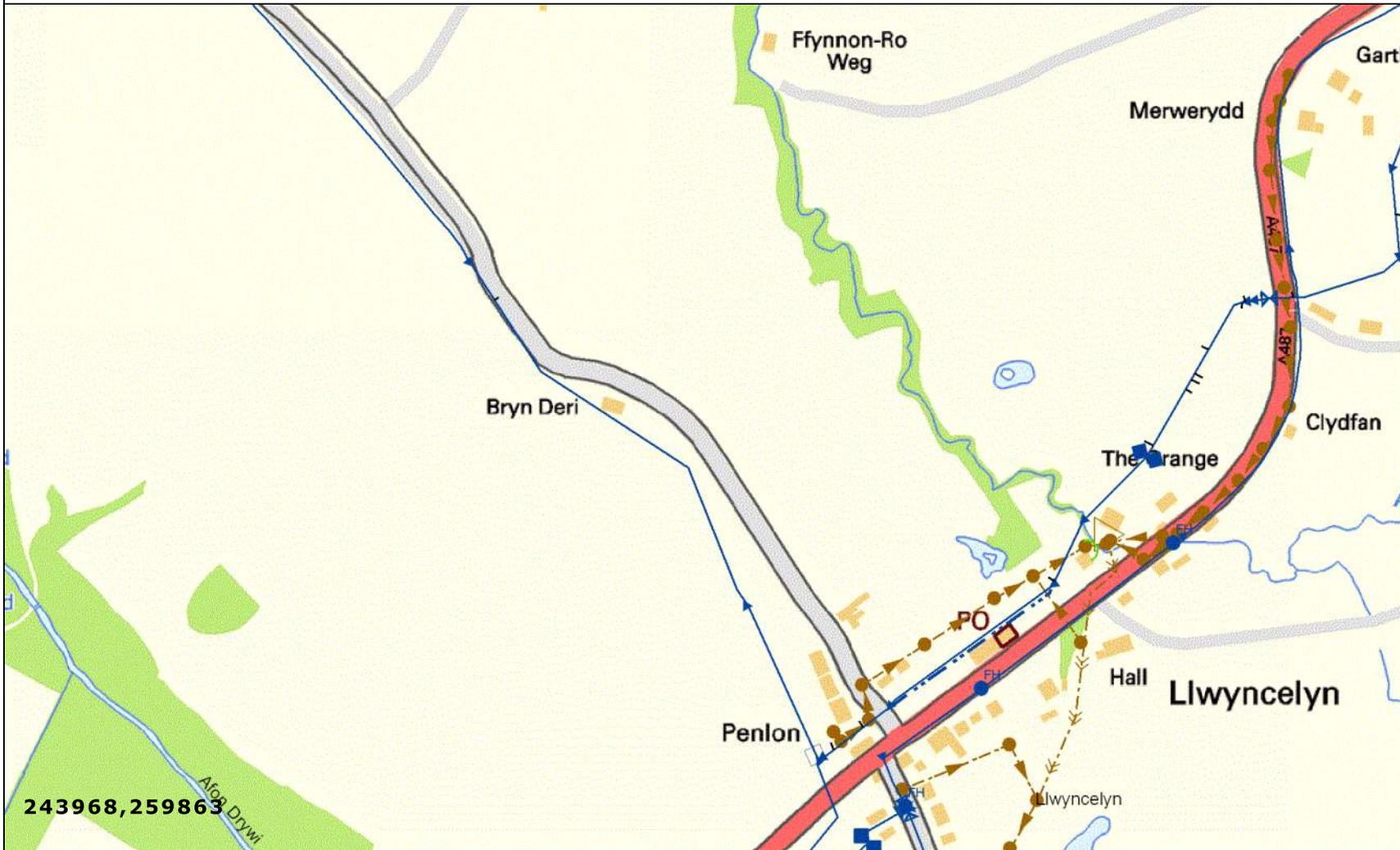
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Whilst every reasonable effort has been taken to correctly record the pipe material of DCWW assets, there is a possibility that in some cases pipe material (other than Asbestos Cement or Pitch Fibre) may be found to be asbestos cement (AC) or Pitch Fibre (PF). It is therefore advisable that the possible presence of AC or PF pipes be anticipated and considered as part of any risk assessment prior to excavation

Gilfach Holliday Village



Scale: 1:5000



- LEGEND**
- Clean Water**
- Sluice Val
 - Air Val, SINGLE
 - Tap
 - Pressure Reducing Valve
 - Meter
 - BULK Meter
 - FH
 - Cap
 - Existing Main
 - NON COMPANY
- Sewerage External**
- Foul
 - Surface Water
 - Combined
 - Rising Main
 - Private
 - Treatment Works
 - Pumping Station
 - Special Purpose
 - Unknown End
 - Change, Combined Overflow
 - Outfall, FOUL
 - Lamp Hole, Foul
 - Private Sewer Transfer
 - Lateral Drain
 - Inspection Chamber

Dŵr Cymru Cyfyngedig ('the Company') gives this information as to the position of its underground apparatus by way of general guidance only and on the strict understanding that it is based on the best information available and no warranty as to its correctness is relied upon in the event of excavations or other works made in the vicinity of the Company's apparatus and any onus of locating the apparatus before carrying out any excavations rests entirely on you. The information which is supplied hereby by the Company, is done so in accordance with statutory requirements of sections 198 and 199 of the Water Industry Act 1991 based upon the best information available and in particular, but without prejudice to the generality of the foregoing, it should be noted that the records that are available to the Company may not disclose the existence of a drain sewer or disposal main laid before 1 September 1989, or if they do, the particulars thereof including their position underground may not be accurate. It must be understood that the furnishing of this information is entirely without prejudice to the provision of the New Roads and Street Works Act 1991 and the Company's right to be compensated for any damage to its apparatus.

EXACT LOCATION OF ALL APPARATUS TO BE DETERMINED ON SITE

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Whilst every reasonable effort has been taken to correctly record the pipe material of DCWW assets, there is a possibility that in some cases pipe material (other than Asbestos Cement or Pitch Fibre) may be found to be asbestos cement (AC) or Pitch Fibre (PF). It is therefore advisable that the possible presence of AC or PF pipes be anticipated and considered as part of any risk assessment prior to excavation

APPENDIX B



Groundsure

LOCATION INTELLIGENCE

Datrys Consulting Engineers

3-5 DATRYS CONSULTING ENGINEERS, STRYD
YR EGLWYS,
CAERNARFON, LL55 1SW

Groundsure
Reference:

GS-4481298

Your Reference: 17248-JA

Report Date 20 Nov 2017

Report Delivery Method: Email - pdf

Address: AVON ESTATES LTD, GILFACH HOLIDAY VILLAGE, GILFACH YR HALEN, C1017 FROM PONT Y
GILFACH TO THE JUNCTION OF THE U5175, LLWYNCELYN, SA46 0HN

Dear Sir/ Madam,

Thank you for placing your order with Groundsure. Please find enclosed the
requested.

as

If you need any further assistance, please do not hesitate to contact our helpline on 08444 159000
quoting the above Groundsure reference number.

Yours faithfully,

Managing Director
Groundsure Limited

Enc.
Groundsure Enviroinsight

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Aerial Photograph Capture date: 15-Apr-2014
 Grid Reference: 243196,261170
 Site Size: 8.77ha
 Report Reference: GS-4481298
 Client Reference: 17248-JA



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4 -

For further details on each dataset, please refer to each individual section in the main report as listed. Where the database has been searched a numerical result will be recorded. Where the database has not been searched '-' will be recorded.

Historical Industrial Sites	On-site	0-50	51-250	251-500
Potentially Contaminative Uses identified from 1:10,000 scale mapping	0	0	1	0
Additional Information – Historical Tank Database	0	0	0	0
Additional Information – Historical Energy Features Database	0	0	0	0
Additional Information – Historical Petrol and Fuel Site Database	0	0	0	0
Additional Information – Historical Garage and Motor Vehicle Repair Database	0	0	0	0
Potentially Infilled Land	7	1	2	4

Environmental Permits, Incidents and Registers	On-site	0-50m	51-250	251-500
Industrial Sites Holding Environmental Permits and/or Authorisations				
Records of historic IPC Authorisations	0	0	0	0
Records of Part A(1) and IPPC Authorised Activities	0	0	0	0
Records of Red List Discharge Consents	0	0	0	0
Records of List 1 Dangerous Substances Inventory sites	0	0	0	0
Records of List 2 Dangerous Substances Inventory sites	0	0	0	0
Records of Part A(2) and Part B Activities and Enforcements	0	0	0	0
Records of Category 3 or 4 Radioactive Substances Authorisations	0	0	0	0
Records of Licensed Discharge Consents	0	1	0	0
Records of Water Industry Referrals	0	0	0	0
Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site	0	0	0	0
Records of COMAH and NIHHS sites	0	0	0	0
Environment Agency/Natural Resources Wales Recorded Pollution Incidents				
National Incidents Recording System, List 2	0	0	0	0
National Incidents Recording System, List 1	0	0	0	0
Sites Determined as Contaminated Land under Part 2A EPA 1990	0	0	0	0

Landfill and Other Waste Sites	On-site	0-50m	51-250	251-500	501-1000	1000-1500
Landfill Sites						
Environment Agency/Natural Resources Wales Registered Landfill Sites	0	0	0	0	0	Not searched
Environment Agency/Natural Resources Wales Historic Landfill Sites	0	0	0	0	0	0
BGS/DoE Landfill Site Survey	0	0	0	0	0	0
Records of Landfills in Local Authority and Historical Mapping Records	0	0	0	0	0	0
Landfill and Other Waste Sites Findings						
Operational and Non-Operational Waste Treatment, Transfer and Disposal Sites	0	0	0	0	Not searched	Not searched
Environment Agency/Natural Resources Wales Licensed Waste Sites	0	0	0	0	0	0

Current Land Use	On-site	0-50m	51-250	251-500
Current Industrial Sites Data	0	0	0	Not searched
Records of Petrol and Fuel Sites	0	0	0	0
National Grid Underground Electricity Cables	0	0	0	0
National Grid Gas Transmission Pipelines	0	0	0	0

Geology	
Are there any records of Artificial Ground and Made Ground present beneath the study site?	No
Are there any records of Superficial Ground and Drift Geology present beneath the study site?	Yes
For records of Bedrock and Solid Geology beneath the study site see the detailed findings section.	

Hydrogeology and Hydrology		0-500m
Are there any records of Strata Classification in the Superficial Geology within 500m of the study site?		Yes
Are there any records of Strata Classification in the Bedrock Geology within 500m of the study site?		Yes

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
Groundwater Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	0
Surface Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	2
Potable Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	0
Source Protection Zones (within 500m of the study site)	0	0	0	0	Not searched	Not searched
Source Protection Zones within Confined Aquifer	0	0	0	0	Not searched	Not searched
Groundwater Vulnerability and Soil Leaching Potential (within 500m of the study site)	2	0	1	0	Not searched	Not searched

Hydrogeology and Hydrology	0-500m					
	On-site	0-50m	51-250	251-500	501-1000	1000-1500
Is there any Environment Agency/Natural Resources Wales information on river quality within 1500m of the study site?	No	No	No	No	No	No
Detailed River Network entries within 500m of the site	0	1	2	3	Not searched	Not searched
Surface water features within 250m of the study site	No	Yes	No	Not searched	Not searched	Not searched

Flooding	
Are there any Environment Agency Zone 2 floodplains within 250m of the study site?	Yes
Are there any Environment Agency/Natural Resources Wales Zone 3 floodplains within 250m of the study site?	Yes
What is the Risk of flooding from Rivers and the Sea (RoFRaS) rating for the study site?	Medium
Are there any Flood Defences within 250m of the study site?	No
Are there any areas benefiting from Flood Defences within 250m of the study site?	No
Are there any areas used for Flood Storage within 250m of the study site?	No
What is the maximum BGS Groundwater Flooding susceptibility within 50m of the study site?	Potential at Surface
What is the BGS confidence rating for the Groundwater Flooding susceptibility areas?	High

Sites	Designated Environmentally Sensitive					
	On-site	0-50m	51-250	251-500	501-1000	1000-2000
Records of Sites of Special Scientific Interest (SSSI)	1	0	0	0	4	3
Records of National Nature Reserves (NNR)	0	0	0	0	0	0
Records of Special Areas of Conservation (SAC)	1	0	1	0	0	1
Records of Special Protection Areas (SPA)	0	0	0	0	0	0
Records of Ramsar sites	0	0	0	0	0	0
Records of Ancient Woodlands	0	2	2	5	25	13
Records of Local Nature Reserves (LNR)	0	0	0	0	0	0
Records of World Heritage Sites	0	0	0	0	0	0
Records of Environmentally Sensitive Areas	0	0	0	0	0	0

Sites	Designated Environmentally Sensitive	On-site	0-50m	51-250	251-500	501-1000	1000-2000
Records of Areas of Outstanding Natural Beauty (AONB)		0	0	0	0	0	0
Records of National Parks		0	0	0	0	0	0
Records of Nitrate Sensitive Areas		0	0	0	0	0	0
Records of Nitrate Vulnerable Zones		0	0	0	0	0	0
Records of Green Belt land		0	0	0	0	0	0

Natural Hazards

What is the maximum risk of natural ground subsidence?	Moderate
What is the maximum Shrink-Swell hazard rating identified on the study site?	Very Low
What is the maximum Landslides hazard rating identified on the study site?	Very Low
What is the maximum Soluble Rocks hazard rating identified on the study site?	Negligible
What is the maximum Compressible Ground hazard rating identified on the study site?	Negligible
What is the maximum Collapsible Rocks hazard rating identified on the study site?	Very Low
What is the maximum Running Sand hazard rating identified on the study site?	Moderate
Radon	
Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?	The property is in a Radon Affected Area, as between 1 and 3% of properties are above the Action Level.
Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment?	No radon protective measures are necessary.

Mining

Are there any coal mining areas within 75m of the study site?	No
Are there any Non-Coal Mining areas within 50m of the study site boundary?	Yes
Are there any brine affected areas within 75m of the study site?	No

& 5

The following report is designed by Environmental Consultants for Environmental Professionals bringing together the most up-to-date market leading environmental data. This report is provided under and subject to the Terms & Conditions agreed between Groundsure and the Client. The document contains the following sections:

6 .+2 +2

Provides information on past land uses that may pose a risk to the study site in terms of potential contamination from activities or processes. Potentially Infilled Land features are also included. This search is conducted using radii of up to 500m.

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Provides information on Regulated Industrial Activities and Pollution Incidents as recorded by Regulatory Authorities, and sites determined as Contaminated Land. This search is conducted using radii up to 500m.

86 + - 22 + (+

Provides information on landfills and other waste sites that may pose a risk to the study site. This search is conducted using radii up to 1500m.

)6 + &

Provides information on current land uses that may pose a risk to the study site in terms of potential contamination from activities or processes. These searches are conducted using radii of up to 500m. This includes information on potentially contaminative industrial sites, petrol stations and fuel sites as well as high pressure gas pipelines and underground electricity transmission lines.

'6 2 3

Provides information on artificial and superficial deposits and bedrock beneath the study site.

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Provides information on productive strata within the bedrock and superficial geological layers, abstraction licenses, Source Protection Zones (SPZs) and river quality. These searches are conducted using radii of up to 2000m.

"6 2

Provides information on river and coastal flooding, flood defences, flood storage areas and groundwater flood areas. This search is conducted using radii of up to 250m.

06 + 7 +223

Provides information on the Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar sites, Local Nature Reserves (LNR), Areas of Outstanding Natural Beauty (AONB), National Parks (NP), Environmentally Sensitive Areas, Nitrate Sensitive Areas, Nitrate Vulnerable Zones and World Heritage Sites and Scheduled Ancient Woodland. These searches are conducted using radii of up to 2000m.

16 + +2 +9+

Provides information on a range of natural hazards that may pose a risk to the study site. These factors include natural ground subsidence and radon..

!6

Provides information on areas of coal and non-coal mining and brine affected areas.

6 +.

This section of the report provides contact points for statutory bodies and data providers that may be able to provide further information on issues raised within this report. Alternatively, Groundsure provide a free Technical Helpline (08444 159000) for further information and guidance.

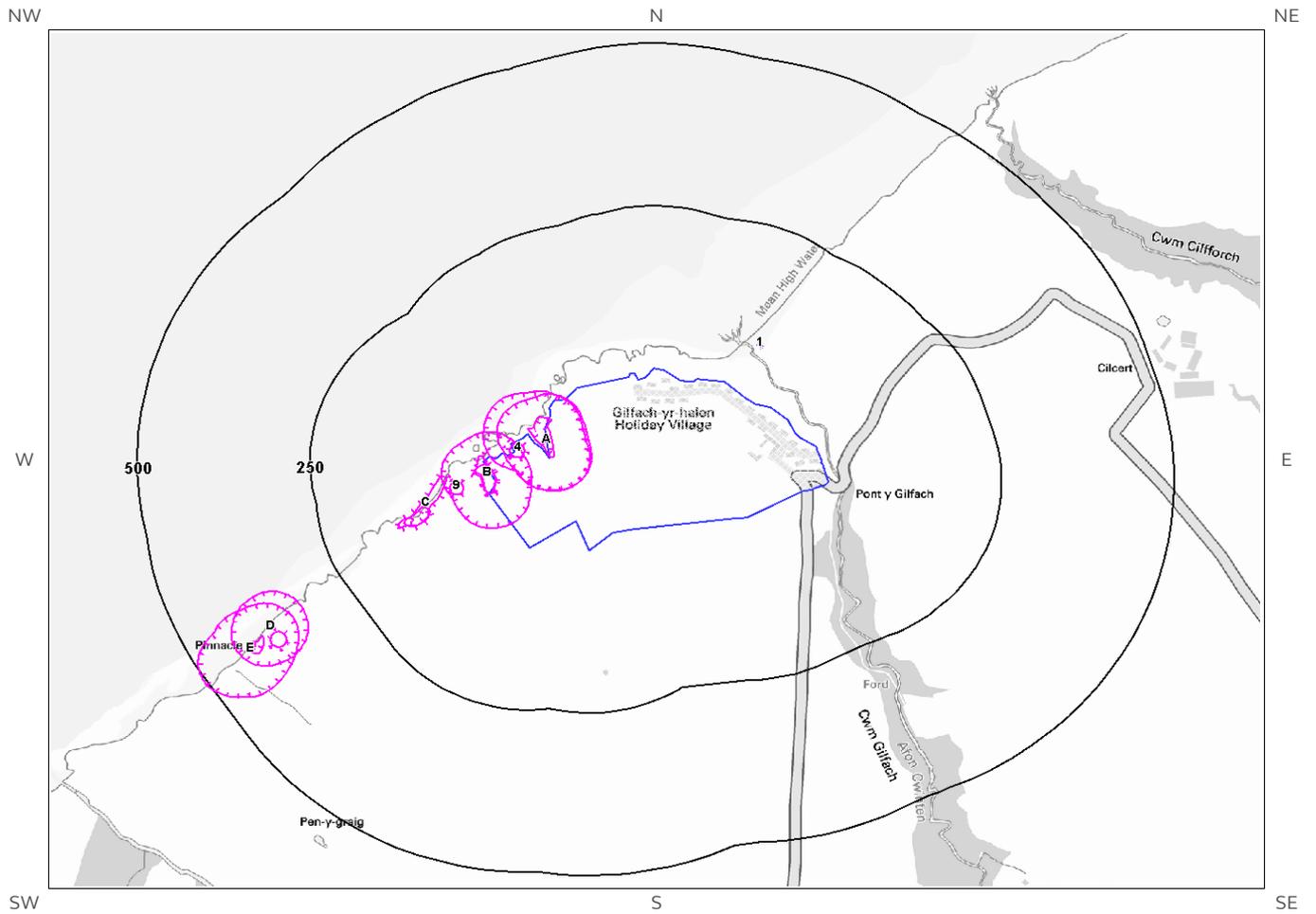
#+5

Only certain features are placed on the maps within the report. All features represented on maps found within this search are given an identification number. This number identifies the feature on the mapping and correlates it to the additional information provided below. This identification number precedes all other information and takes the following format -Id: 1, Id: 2, etc. Where numerous features on the same map are in such close proximity that the numbers would obscure each other a letter identifier is used instead to represent the features. (e.g. Three features which overlap may be given the identifier "A" on the map and would be identified separately as features 1A, 3A, 10A on the data tables provided).

Where a feature is reported in the data tables to a distance greater than the map area, it is noted in the data table as "Not Shown".

All distances given in this report are in Metres (m). Directions are given as compass headings such as N: North, E: East, NE: North East from the nearest point of the study site boundary.

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The systematic analysis of data extracted from standard 1:10,560 and 1:10,000 scale historical maps provides the following information:

Records of sites with a potentially contaminative past land use within 500m of the search boundary: 1

	+. :7;	.	&	+
1	72	NE	Lime Kiln	1887

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The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical tanks within 500m of the search boundary: 0

Database searched and no data found.

68 +2 - 7+ < .+2 3 + ++>+

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical energy features within 500m of the search boundary: 0

Database searched and no data found.

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The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical petrol stations and fuel sites within 500m of the search boundary: 0

Database searched and no data found.

6' +2 - 7+ < .+2 ++ + # .2 5+ ++>+

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical garage and motor vehicle repair sites within 500m of the search boundary: 0

Database searched and no data found.

6* \$ +223 - 22 +

Records of Potentially Infilled Features from 1:10,000 scale mapping within 500m of the study site: 14

The following Historical Potentially Infilled Features derived from the Historical Mapping information is provided by Groundsure:

	+ . ?7@	.	&	+
2A	0	On Site	Cave	1948
3A	0	On Site	Cave	1948
4	0	On Site	Cave	1904
5A	0	On Site	Cave	1938
6B	0	On Site	Caves	1938
7B	0	On Site	Caves	1948
8B	0	On Site	Caves	1948
9	38	W	Caves	1904
10C	59	SW	Caves	1948
11C	90	W	Caves	1938
12D	322	SW	Cave	1948
13E	342	SW	Cave	1948
14D	367	SW	Cave	1904
15E	395	SW	Cave	1938

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- | | | | | | |
|--|-------------------------------|--|---|--|--|
| | Site Outline | | Recorded Pollution Incident | | RAS 3 & 4 Authorisations |
| | Dangerous Substances (List 1) | | Dangerous Substances (List 2) | | Part A(1) Authorised Processes and Historic IPC Authorisations |
| | Water Industry Referrals | | Part A(2) and Part B Authorised Processes | | COMAH / NIHHS Sites |
| | Licensed Discharge Consents | | Sites Determined as Contaminated Land | | Hazardous Substance Consents and Enforcements |
| | Red List Discharge Consents | | | | |

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 . +

,6 +2 2 . . + A +

Searches of information provided by the Environment Agency/Natural Resources Wales and Local Authorities reveal the following information:

2.1.1 Records of historic IPC Authorisations within 500m of the study site:

0

Database searched and no data found.

2.1.2 Records of Part A(1) and IPPC Authorised Activities within 500m of the study site:

0

Database searched and no data found.

2.1.3 Records of Red List Discharge Consents (potentially harmful discharges to controlled waters) within 500m of the study site:

0

Database searched and no data found.

2.1.4 Records of List 1 Dangerous Substances Inventory Sites within 500m of the study site:

0

Database searched and no data found.

2.1.5 Records of List 2 Dangerous Substance Inventory Sites within 500m of the study site:

0

Database searched and no data found.

2.1.6 Records of Part A(2) and Part B Activities and Enforcements within 500m of the study site:

0

Database searched and no data found.

2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations:

0

Database searched and no data found.

2.1.8 Records of Licensed Discharge Consents within 500m of the study site:

1

The following Licensed Discharge Consents records are represented as points on the Environmental Permits, Incidents and Registers Map:

+ . ?7@				+ 2	
1	1	W	243250 261250	Address: GILFACH YR HALEN HOLIDAY VILLAGE, LLWYNCELYN, ABERAERON, SA46 OHN Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: BP027220101 Permit Version: 1	Receiving Water: CARDIGAN BAY Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 11/12/1998 Effective Date: 11-Dec-1998 Revocation Date: -

2.1.9 Records of Water Industry Referrals (potentially harmful discharges to the public sewer) within 500m of the study site:

0

Database searched and no data found.

2.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site:

0

Database searched and no data found.

,6, + +9+

Records of COMAH & NIHHS sites within 500m of the study site: 0

Database searched and no data found.

,68 7 .3A + +2 . (+2 . \$ 22 .

2.3.1 Records of National Incidents Recording System, List 2 within 500m of the study site:

0

Database searched and no data found.

2.3.2 Records of National Incidents Recording System, List 1 within 500m of the study site:

0

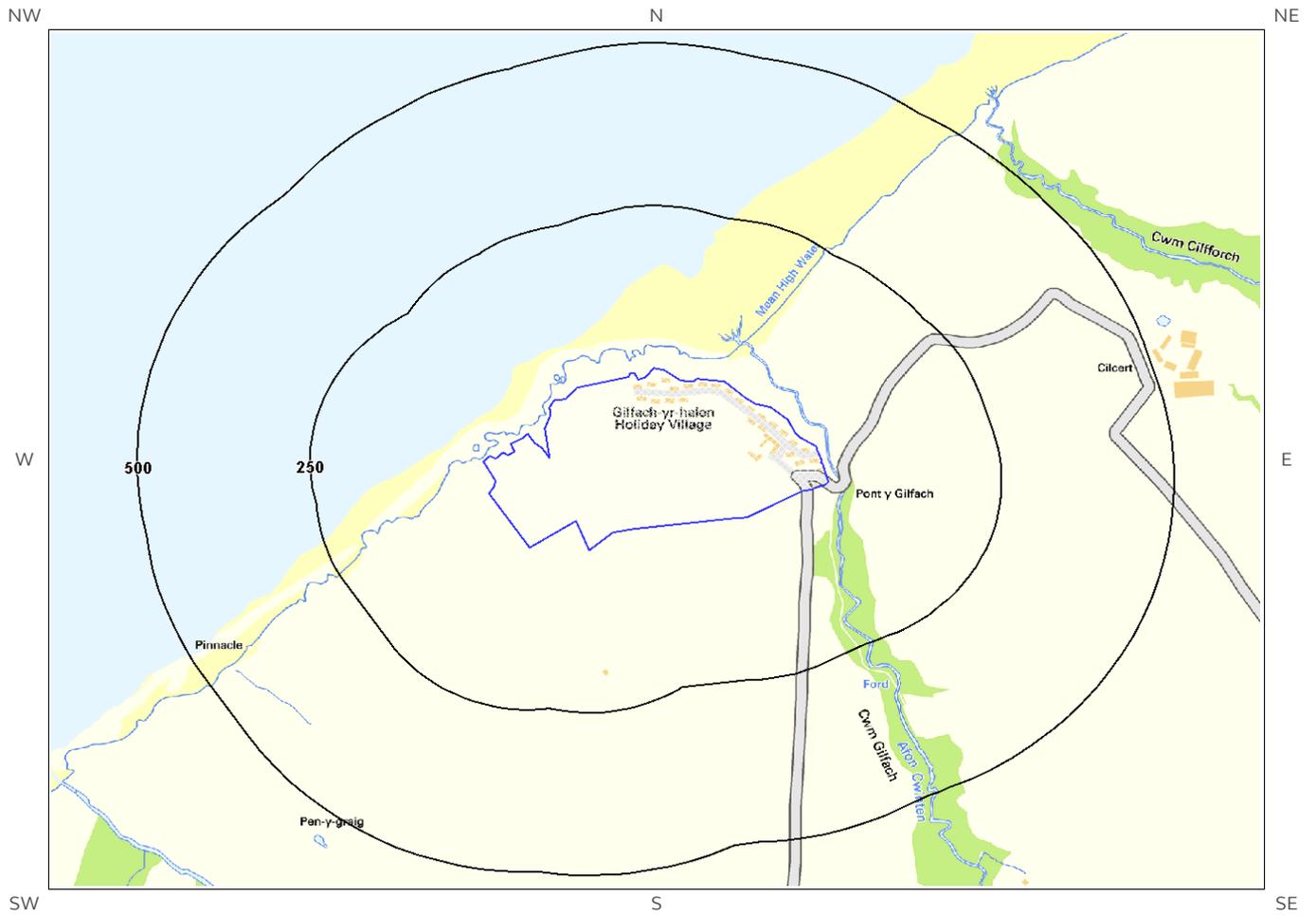
Database searched and no data found.

,6) 7 + +7 + + \$+ , \$ 11!

How many records of sites determined as contaminated land under Section 78R of the Environmental Protection Act 1990 are there within 500m of the study site? 0

Database searched and no data found.

86 + - 22 + (+
 #+5



86 + - 22 + (+

86 + - 22

3.1.1 Records from Environment Agency/Natural Resources Wales landfill data within 1000m of the study site:

0

Database searched and no data found.

3.1.2 Records of Environment Agency/Natural Resources Wales historic landfill sites within 1500m of the study site:

0

Database searched and no data found.

3.1.3 Records of BGS/DoE non-operational landfill sites within 1500m of the study site:

0

Database searched and no data found.

3.1.4 Records of Landfills from Local Authority and Historical Mapping Records within 1500m of the study site:

0

Database searched and no data found.

86, (+

3.2.1 Records of waste treatment, transfer or disposal sites within 500m of the study site:

0

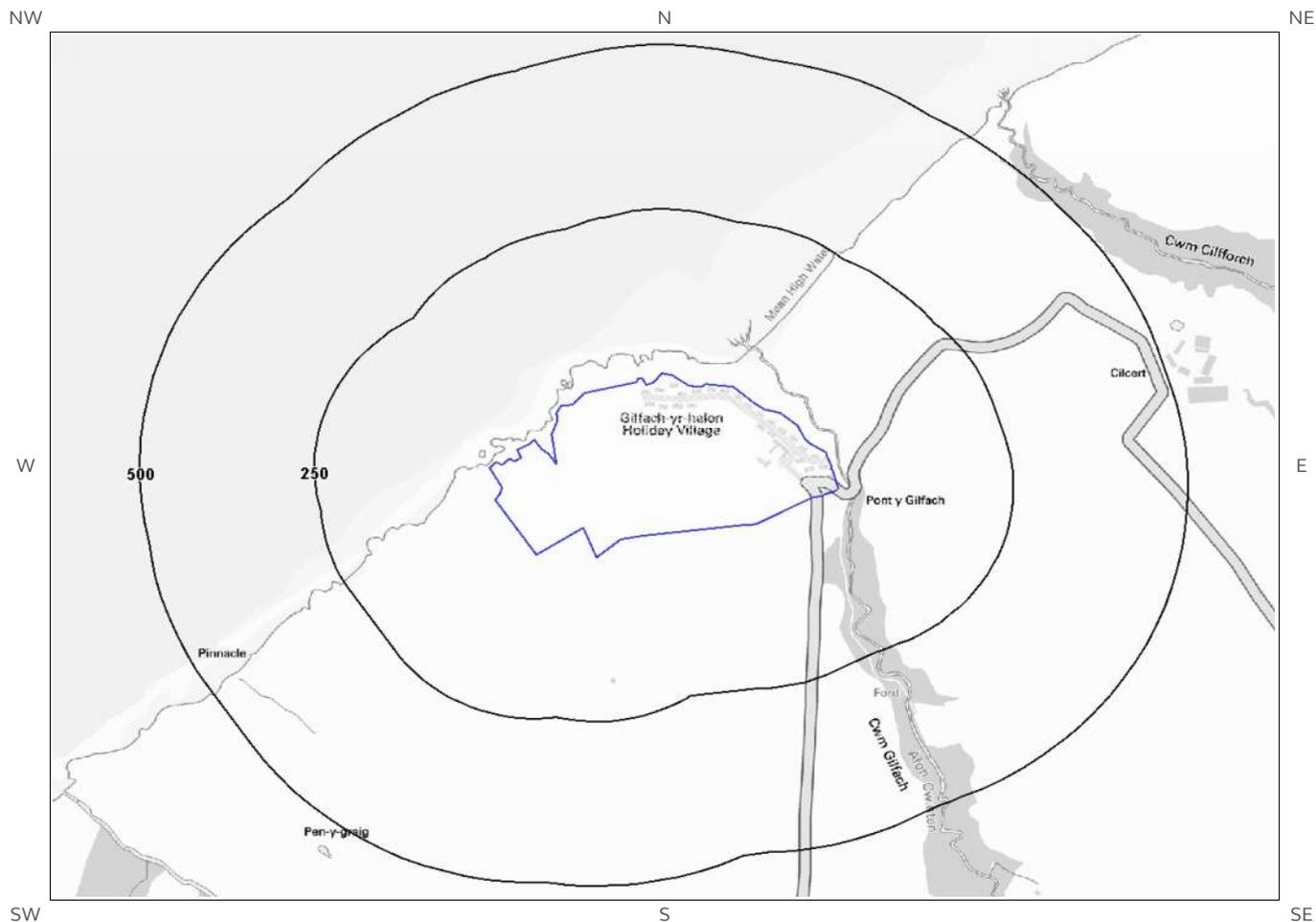
Database searched and no data found.

3.2.2 Records of Environment Agency/Natural Resources Wales licensed waste sites within 1500m of the study site:

0

Database searched and no data found.

)6 + & #+5



)6 + &

)6 +2 ++

Records of potentially contaminative industrial sites within 250m of the study site: 0

Database searched and no data found.

)6, \$ 2 + 2

Records of petrol or fuel sites within 500m of the study site: 0

Database searched and no data found.

)68 + +2 2+ & 2 . . 3 + 7 +>2

This dataset identifies the high voltage electricity transmission lines running between generating power plants and electricity substations. The dataset does not include the electricity distribution network (smaller, lower voltage cables distributing power from substations to the local user network). This information has been extracted from databases held by National Grid and is provided for information only with no guarantee as to its completeness or accuracy. National Grid do not offer any warranty as to the accuracy of the available data and are excluded from any liability for any such inaccuracies or errors.

Records of National Grid high voltage underground electricity transmission cables within 500m of the study site: 0

Database searched and no data found.

)6) + +2 \$ + + 7 \$ 5 2

This dataset identifies high-pressure, large diameter pipelines which carry gas between gas terminals, power stations, compressors and storage facilities. The dataset does not include the Local Transmission System (LTS) which supplies gas directly into homes and businesses. This information has been extracted from databases held by National Grid and is provided for information only with no guarantee as to its completeness or accuracy. National Grid do not offer any warranty as to the accuracy of the available data and are excluded from any liability for any such inaccuracies or errors.

Records of National Grid high pressure gas transmission pipelines within 500m of the study site: 0

Database searched and no data found.

'6 2 3

'6 - . +2 + #+

Database searched and no data found.

The database has been searched on site, including a 50m buffer.

'6, 5 - . +2 + - 2 3

The database has been searched on site, including a 50m buffer.

B	. 5	.= 35
TILLD-DMTN	TILL, DEVENSIAN	DIAMICTON
MBD-XSV	MARINE BEACH DEPOSITS	SAND AND GRAVEL

'68 C . = + 2 2 3

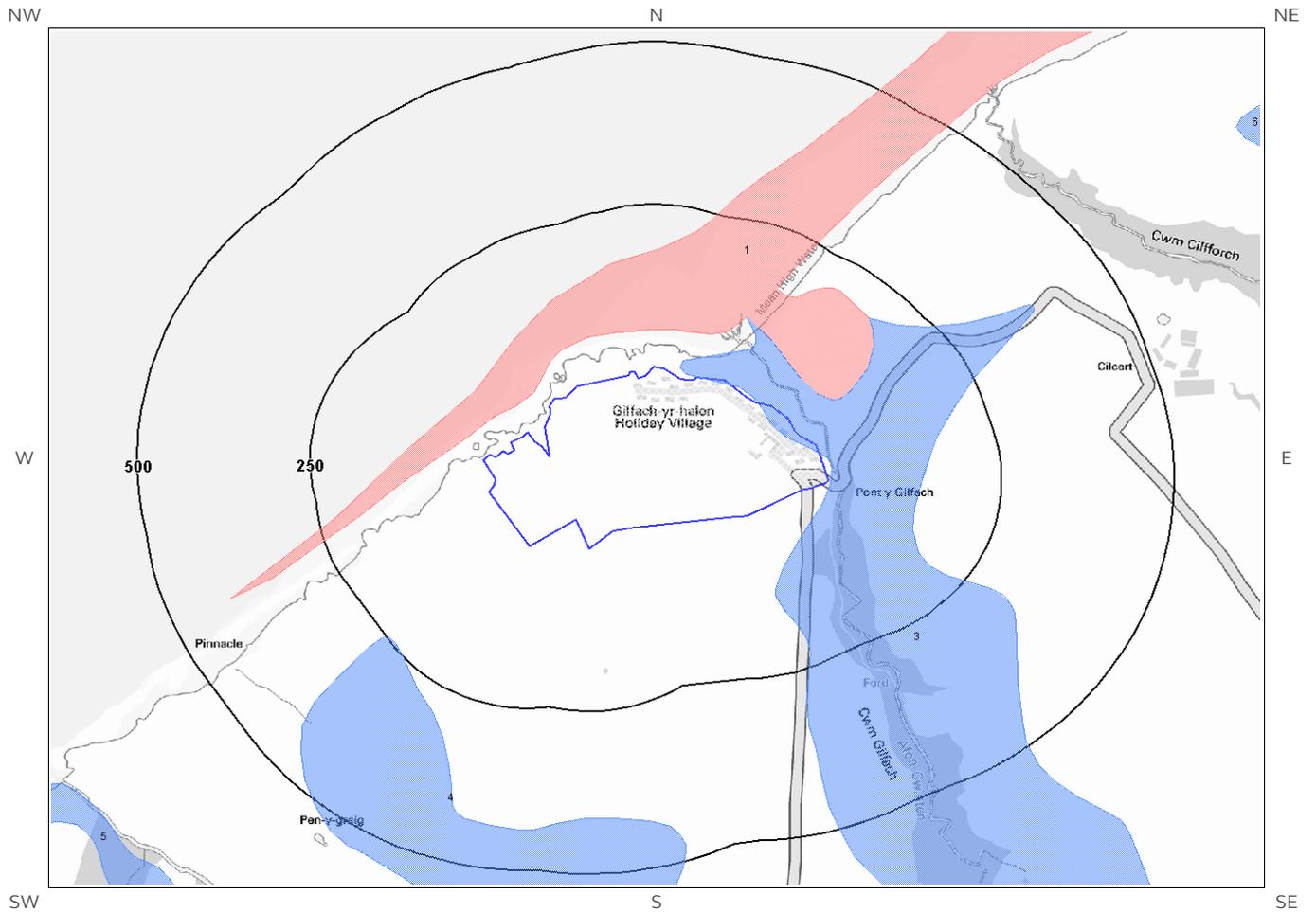
The database has been searched on site, including a 50m buffer.

B	. 5	.= 35
MYBA-STMD	Mynydd Bach Formation	SANDSTONE AND MUDSTONE

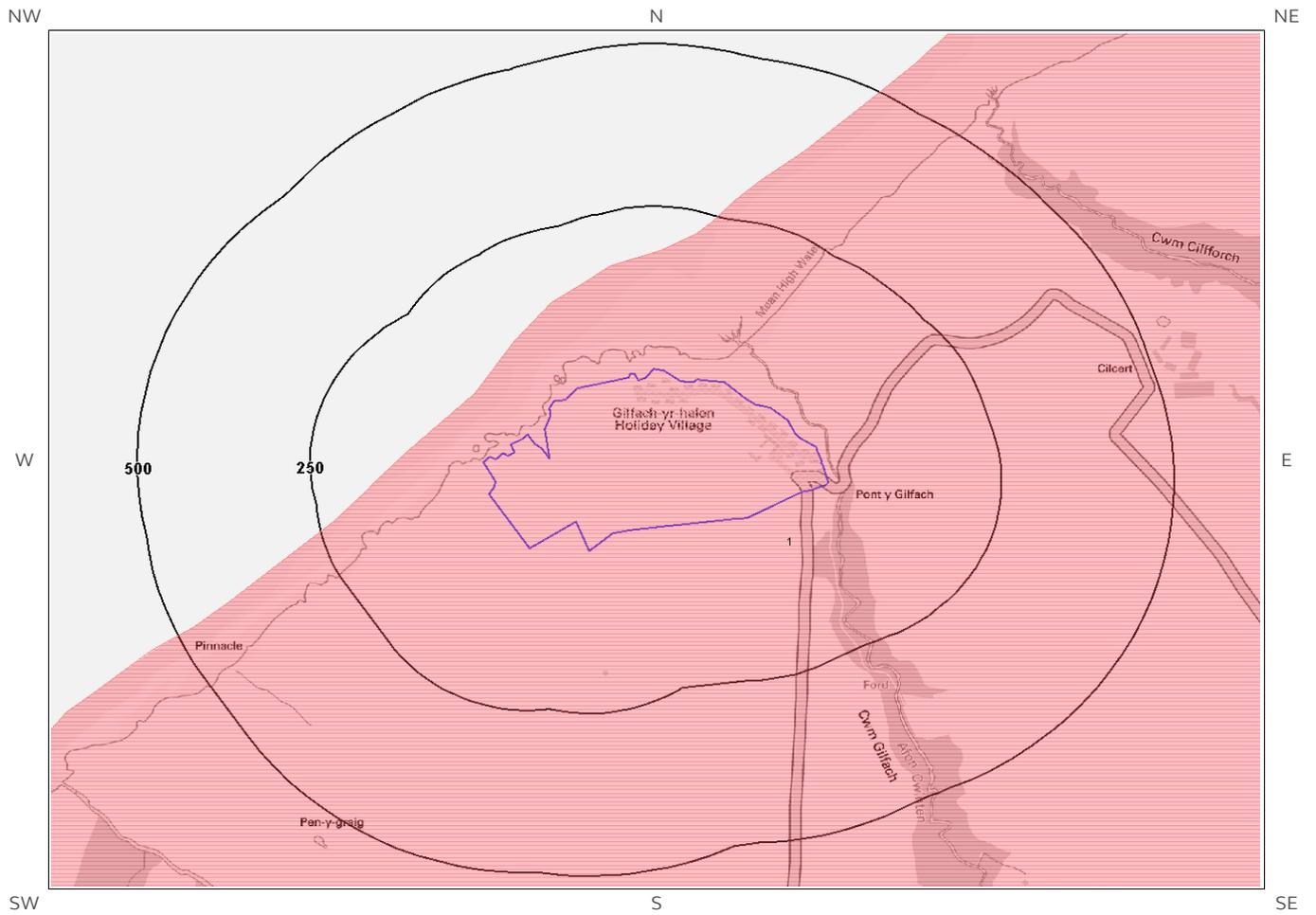
(Derived from the BGS 1:50,000 Digital Geological Map of Great Britain)

* 3 2 3 + 3 2 3

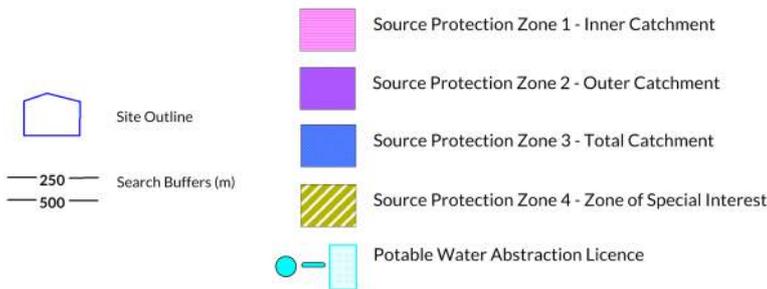
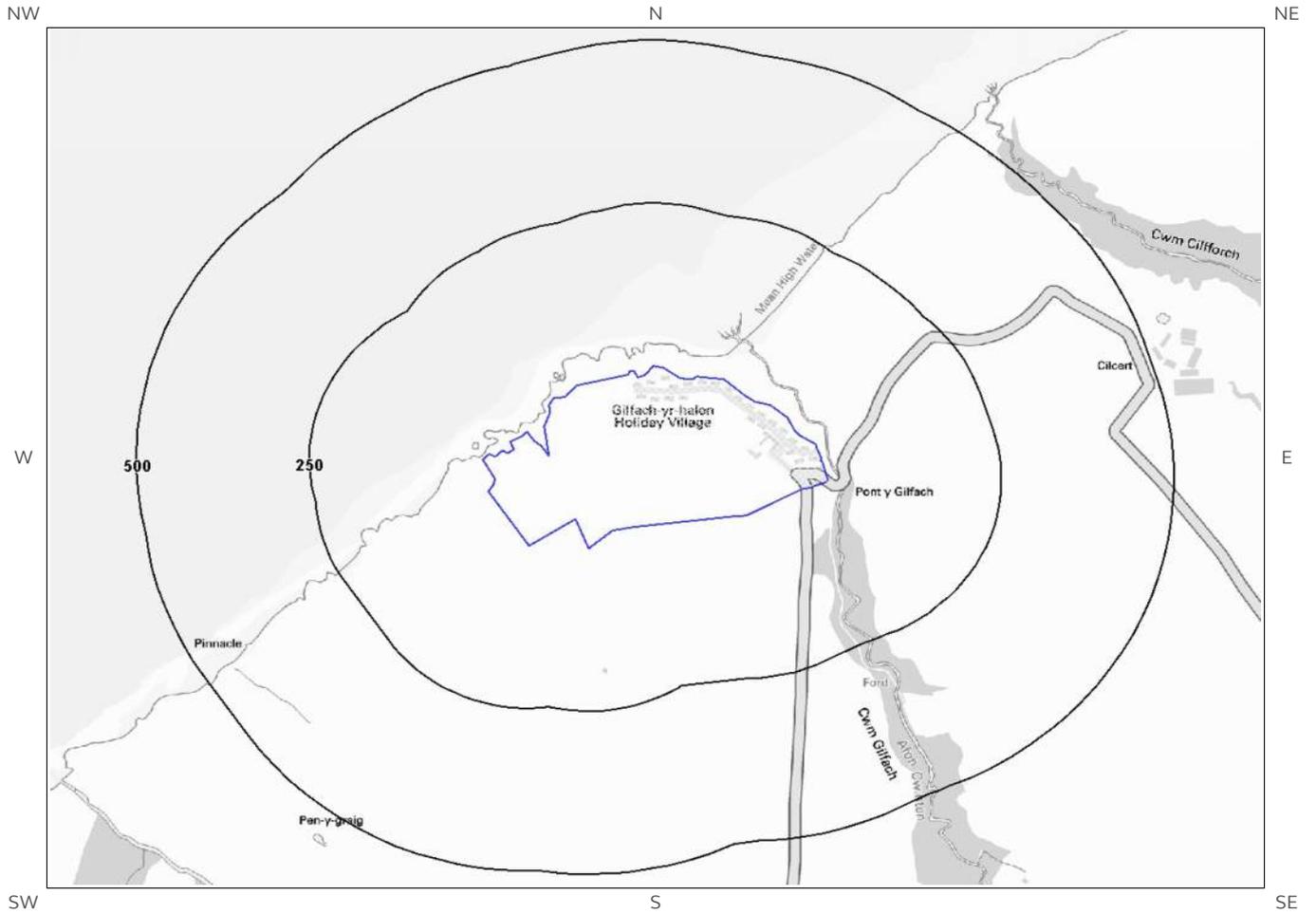
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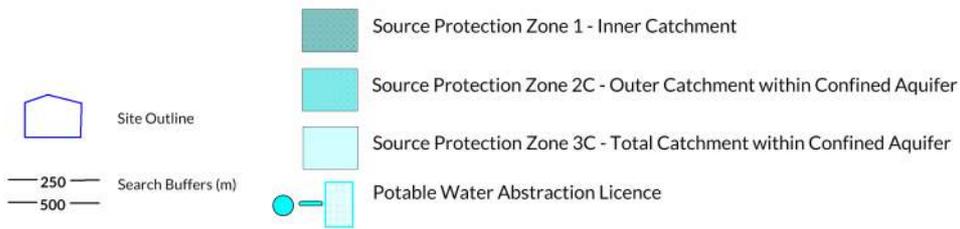
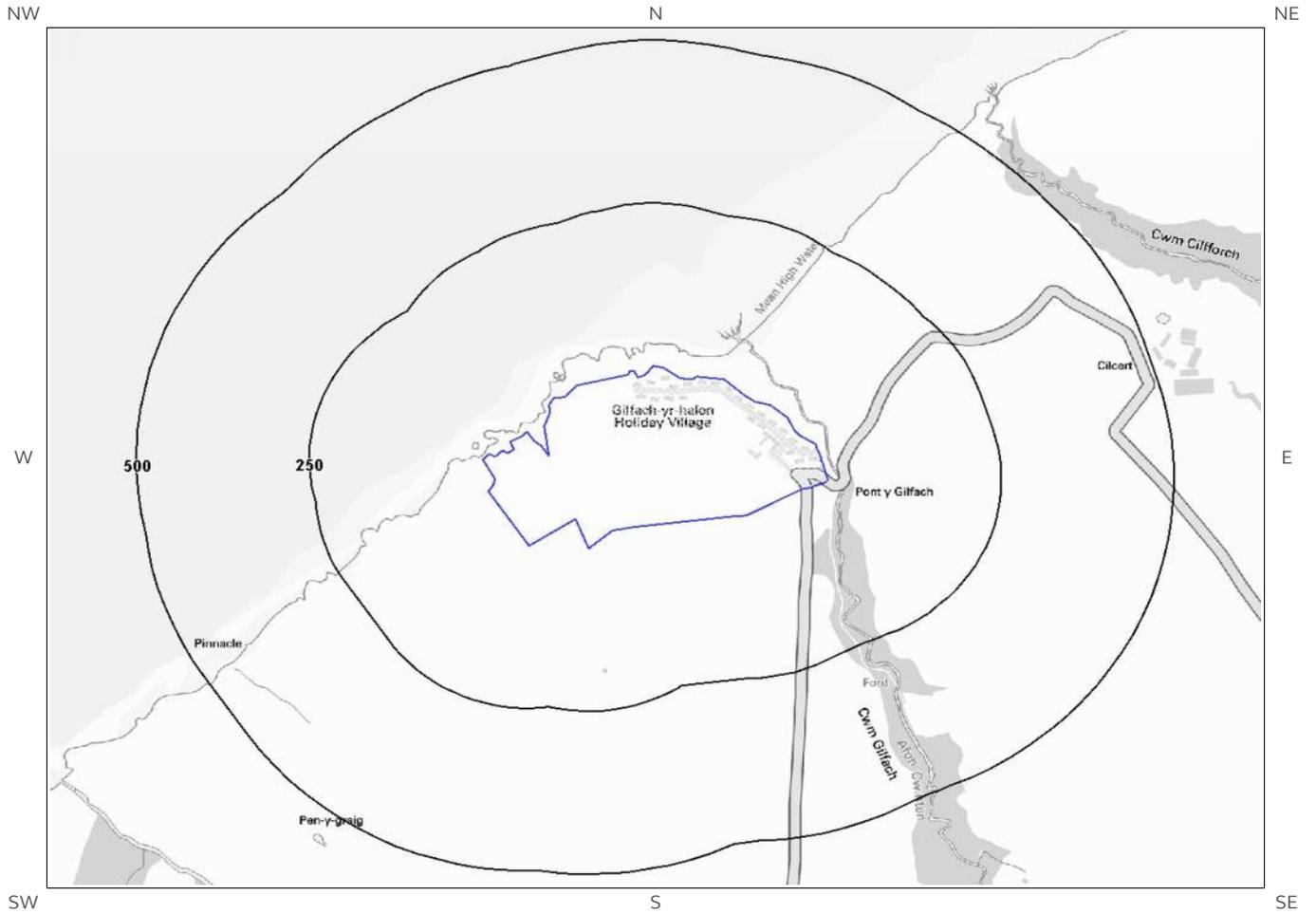
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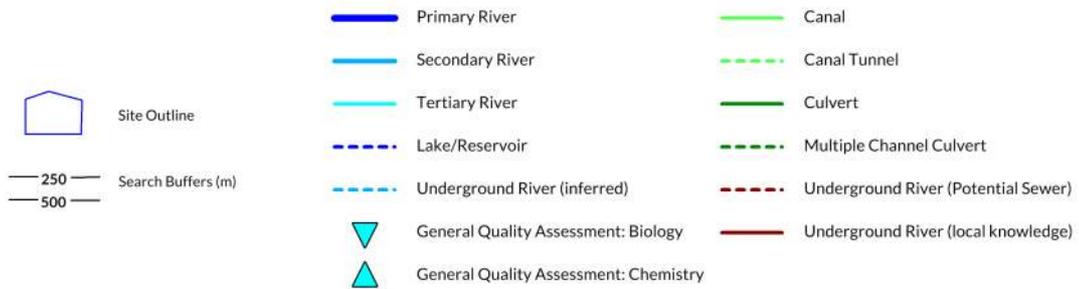
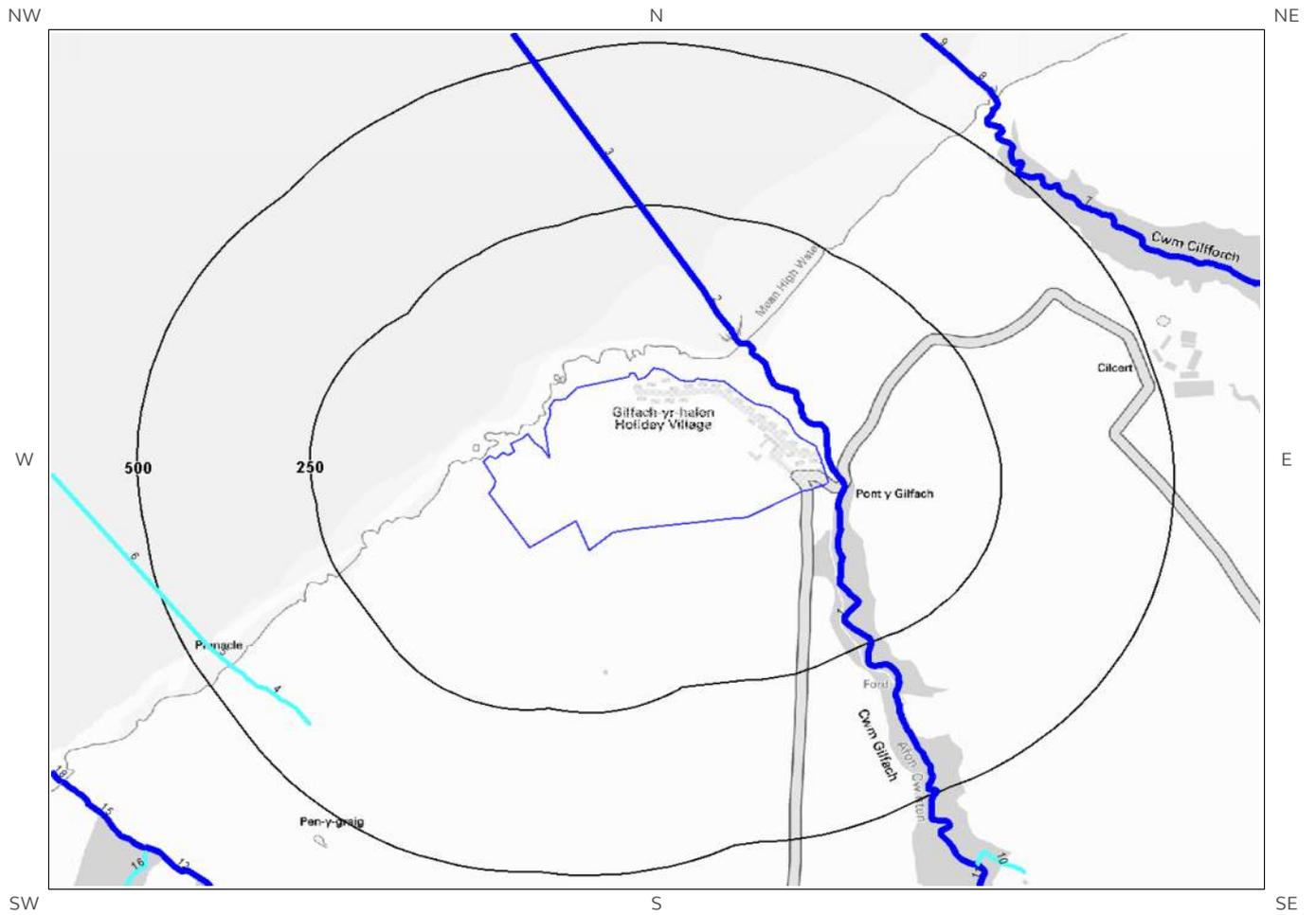
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\$. E + \$ +>2
(+ > +. .



* 6 3 2 3 < .
 \$. E 4 . -
 +D -



* 6 3 2 3 < + 2
 4 = + F + 2 3



*6 3 2 3 + 3 2 3

*6 D - 4 5 -. +2 5

Are there records of strata classification within the superficial geology at or in proximity to the property? Yes

From 1 April 2010, the Environment Agency/Natural Resources Wales's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the Groundsure Enviro Insight User Guide.

The following aquifer records are shown on the Aquifer within Superficial Geology Map (6a):

	+	.	?	@	.	+	.	5
3	0	On Site	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow				
1	30	NW	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers				
4	245	SW	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow				

*6, D - 4 C . = 5

Are there records of strata classification within the bedrock geology at or in proximity to the property? Yes

From 1 April 2010, the Environment Agency/Natural Resources Wales's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the Groundsure Enviro Insight User Guide.

The following aquifer records are shown on the Aquifer within Bedrock Geology Map (6b):

	+	.	?	@	.	+	.	5
1	0	On Site	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers				

*68 4+ > +. . .

Are there any Groundwater Abstraction Licences within 2000m of the study site? No

Database searched and no data found.

***6) -+. (+ > +. . .**

Are there any Surface Water Abstraction Licences within 2000m of the study site?

Yes

The following Surface Water Abstraction Licences records are represented as points, lines and regions on the Aquifer within Bedrock Geology Map (6b):

<p>! " # "\$ % & \$ " " ' "() " * ("+ #", * "+"- & ." #"\$ /+0 * \$ 1 -</p>	<p>2 \$ 3\$45 6 7 + 2 \$ 3\$45 00)8 ."% " '70 "+ 9 : 2" " 2" ' -</p>
<p>;" + 8 \$ " " ' "() " * ("+ #", * "+"- & ." #"\$ /+0 * \$ 1 -</p>	<p>2 \$ 3\$45 6 7 + 2 \$ 3\$45 00)8 ."% " '70 "+ 9 : 2" " 2" ' -</p>

***6' \$ +>2 (+ > +. . .**

Are there any Potable Water Abstraction Licences within 2000m of the study site?

No

Database searched and no data found.

***6* . \$. E**

Are there any Source Protection Zones within 500m of the study site?

No

Database searched and no data found.

*6" . \$. E 4 - D -

Are there any Source Protection Zones within the Confined Aquifer within 500m of the study site? No

Historically, Source Protection Zone maps have been focused on regulation of activities which occur at or near the ground surface, such as prevention of point source pollution and bacterial contamination of water supplies. Sources in confined aquifers were often considered to be protected from these surface pressures due to the presence of a low permeability confining layer (e.g. glacial till, clay). The increased interest in subsurface activities such as onshore oil and gas exploration, ground source heating and cooling requires protection zones for confined sources to be marked on SPZ maps where this has not already been done.

Database searched and no data found.

*60 4+ 2 +> 2 3+ 2 +. \$ +2

Is there any Environment Agency/Natural Resources Wales information on groundwater vulnerability and soil leaching potential within 500m of the study site? Yes

+	.	?	@	.	2+	-.+	2	2	+>	2	3	+	3	.	5
0	On Site	Minor Aquifer/Low Leaching Potential										L			Soils in which pollutants are unlikely to penetrate the soil layer because either water movement is largely horizontal, or they have the ability to attenuate diffuse pollutants.
0	On Site	Minor Aquifer/Intermediate Leaching Potential										I1			Soils which can possibly transmit a wide range of pollutants.
189	E	Minor Aquifer/Intermediate Leaching Potential										I1			Soils which can possibly transmit a wide range of pollutants.

*61 F +2 3

Is there any Environment Agency/Natural Resources Wales information on river quality within 1500m of the study site? No

6.9.1 Biological Quality:

Database searched and no data found.

6.9.2 Chemical Quality:

Database searched and no data found.

*6! + 2 4 =

Are there any Detailed River Network entries within 500m of the study site?

Yes

The following Detailed River Network records are represented on the Hydrology Map (6e):

	+. ?7@	.	+ 2
1	11	E	River Name: Afon Cwinten Welsh River Name: - Alternative Name: - River Type: Primary River Main River Status: Currently Undefined
2	64	N	River Name: - Welsh River Name: - Alternative Name: - River Type: Primary River Main River Status: Currently Undefined
3	150	N	River Name: - Welsh River Name: - Alternative Name: - River Type: Primary River Main River Status: Currently Undefined
4	416	SW	River Name: - Welsh River Name: - Alternative Name: - River Type: Tertiary River Main River Status: Currently Undefined
5	459	SW	River Name: - Welsh River Name: - Alternative Name: - River Type: Tertiary River Main River Status: Currently Undefined
6	470	SW	River Name: - Welsh River Name: - Alternative Name: - River Type: Tertiary River Main River Status: Currently Undefined

*6 -. (+ +

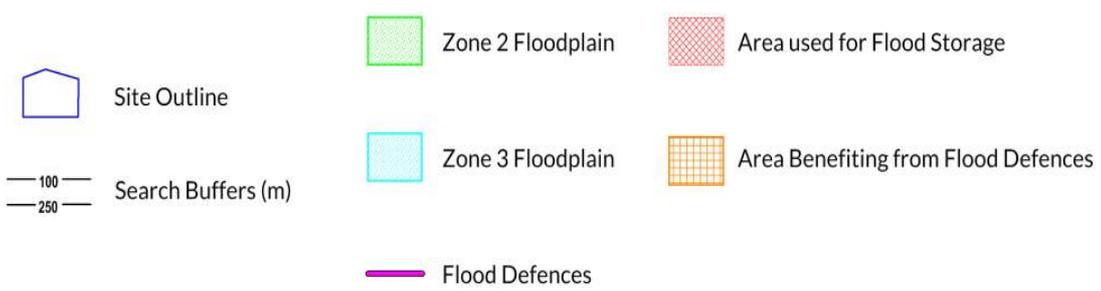
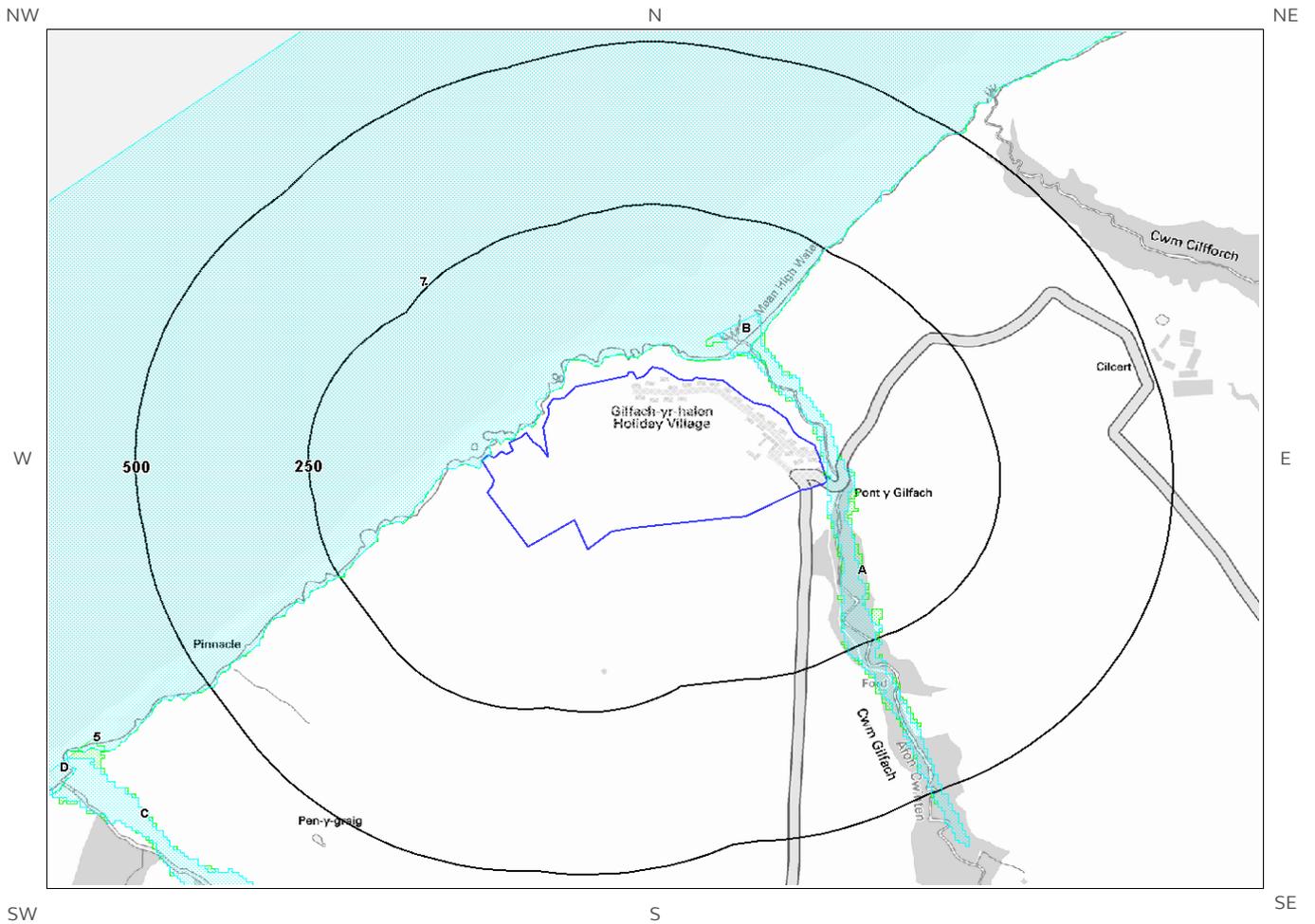
Are there any surface water features within 250m of the study site?

Yes

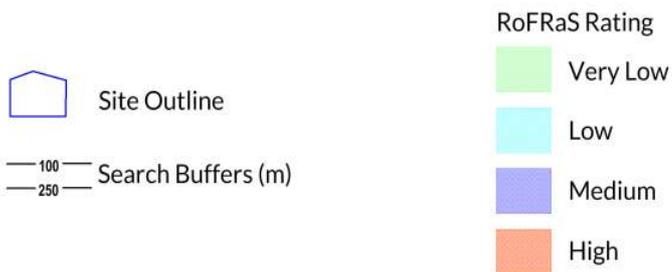
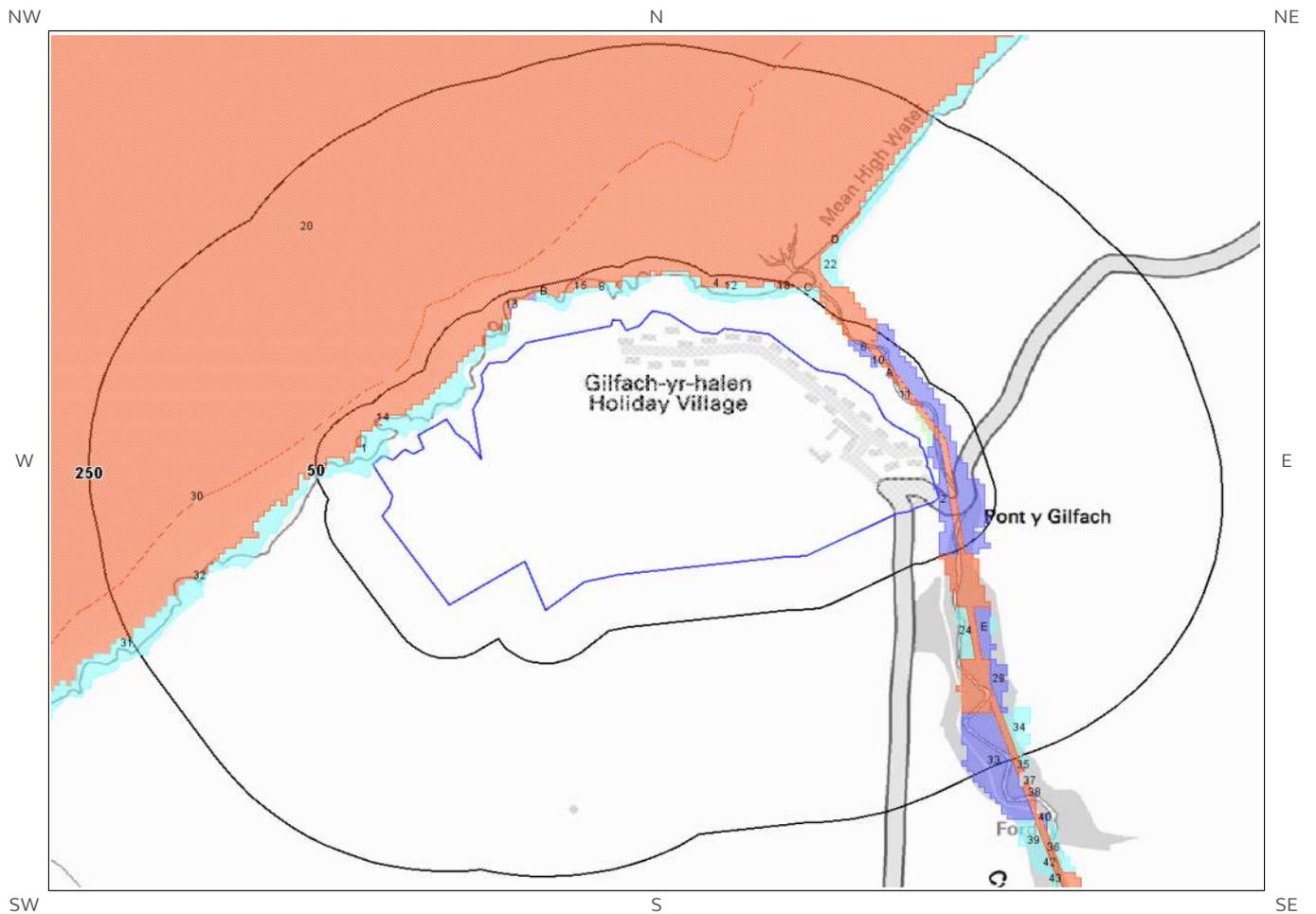
The following surface water records are not represented on mapping:

+. ?7@	.
8	W
10	E
20	E

"+6 7 .3A + +2
 . (+2 2 #+5 -
 \$2+ ?- 7 + +@



">6 7 .3A + +2
 . (+2 = - 2
 - 7 + + ? + @
 #+5



" 2

"6 + + +2 E , 2

Is the site within 250m of an Environment Agency/Natural Resources Wales Zone 2 floodplain? Yes

Environment Agency/Natural Resources Wales Zone 2 floodplains estimate the annual probability of flooding as between 1 in 1000 (0.1%) and 1 in 100 (1%) from rivers and between 1 in 1000 (0.1%) and 1 in 200 (0.5%) from the sea. Any relevant data is represented on Map 7a – Flood Map for Planning:

	+ . ?7@	.	&5 +	35
1A	0	On Site	17-Aug-2017	Zone 2 - (Fluvial /Tidal Models)
2	0	On Site	17-Aug-2017	Zone 2 - (Fluvial /Tidal Models)
3B	40	N	17-Aug-2017	Zone 2 - (Fluvial /Tidal Models)

"6, + + +2 E 8 2

Is the site within 250m of an Environment Agency/Natural Resources Wales Zone 3 floodplain? Yes

Zone 3 shows the extent of a river flood with a 1 in 100 (1%) or greater chance of occurring in any year or a sea flood with a 1 in 200 (0.5%) or greater chance of occurring in any year. Any relevant data is represented on Map 7a – Flood Map for Planning.

	+ . ?7@	.	&5 +	35
1A	0	On Site	22-Aug-2017	Zone 3 - (Fluvial Models)
2	0	On Site	22-Aug-2017	Zone 3 - (Fluvial Models)
3B	40	N	22-Aug-2017	Zone 3 - (Fluvial Models)

"68 = - 2 - 7 + +? + @ 2 +

What is the highest risk of flooding onsite? Medium

The Environment Agency/Natural Resources Wales RoFRaS database provides an indication of river and coastal flood risk at a national level on a 50m grid with the flood rating at the centre of the grid calculated and given above. The data considers the probability that the flood defences will overtop or breach by considering their location, type, condition and standard of protection.

RoFRaS data for the study site indicates the property is in an area with a Medium (greater than 1 in 100 but less than 1 in 30) chance of flooding in any given year.

Any relevant data within 250m is represented on the RoFRaS Flood map. Data to 50m is reported in the table below.

	+ . ??@	.	+ -2 =
1	0.0	On Site	Low
2	0.0	On Site	Medium
3	5.0	NE	Very Low
4	8.0	E	High
5	14.0	E	Medium
6	20.0	NE	Medium
7A	22.0	NE	Medium
8	22.0	N	Low
9A	22.0	NE	Medium
10	23.0	NE	Low
11	24.0	NE	Medium
12	24.0	N	Low
13	27.0	NW	Medium
14	28.0	N	Low
15	35.0	NW	Low
16B	36.0	N	Low
17B	37.0	N	Medium
18	40.0	N	Low
19C	44.0	NE	Low

"6) 2 - .

Are there any Flood Defences within 250m of the study site? No
Database searched and no data found.

"6' + > - - 7 2 - .

Are there any areas benefiting from Flood Defences within 250m of the study site? No

"6* + > - - 7 2 +

Are there any areas used for Flood Storage within 250m of the study site?

No

"6" 4+ 2 . 5 > 2 3 +

7.7.1 Are there any British Geological Survey groundwater flooding susceptibility areas within 50m of the boundary of the study site? Yes

Does this relate to Clearwater Flooding or Superficial Deposits Flooding? Superficial Deposits Flooding

Notes: Groundwater flooding may either be associated with shallow unconsolidated sedimentary aquifers which overlie unproductive aquifers (Superficial Deposits Flooding), or with unconfined aquifers (Clearwater Flooding).

7.7.2 What is the highest susceptibility to groundwater flooding in the search area based on the underlying geological conditions?

Potential at Surface

Where potential for groundwater flooding to occur at surface is indicated, this means that given the geological conditions in the area groundwater flooding hazard should be considered in all land-use planning decisions. It is recommended that other relevant information e.g. records of previous incidence of groundwater flooding, rainfall, property type, and land drainage information be investigated in order to establish relative, but not absolute, risk of groundwater flooding.

"60 4+ 2 - . +

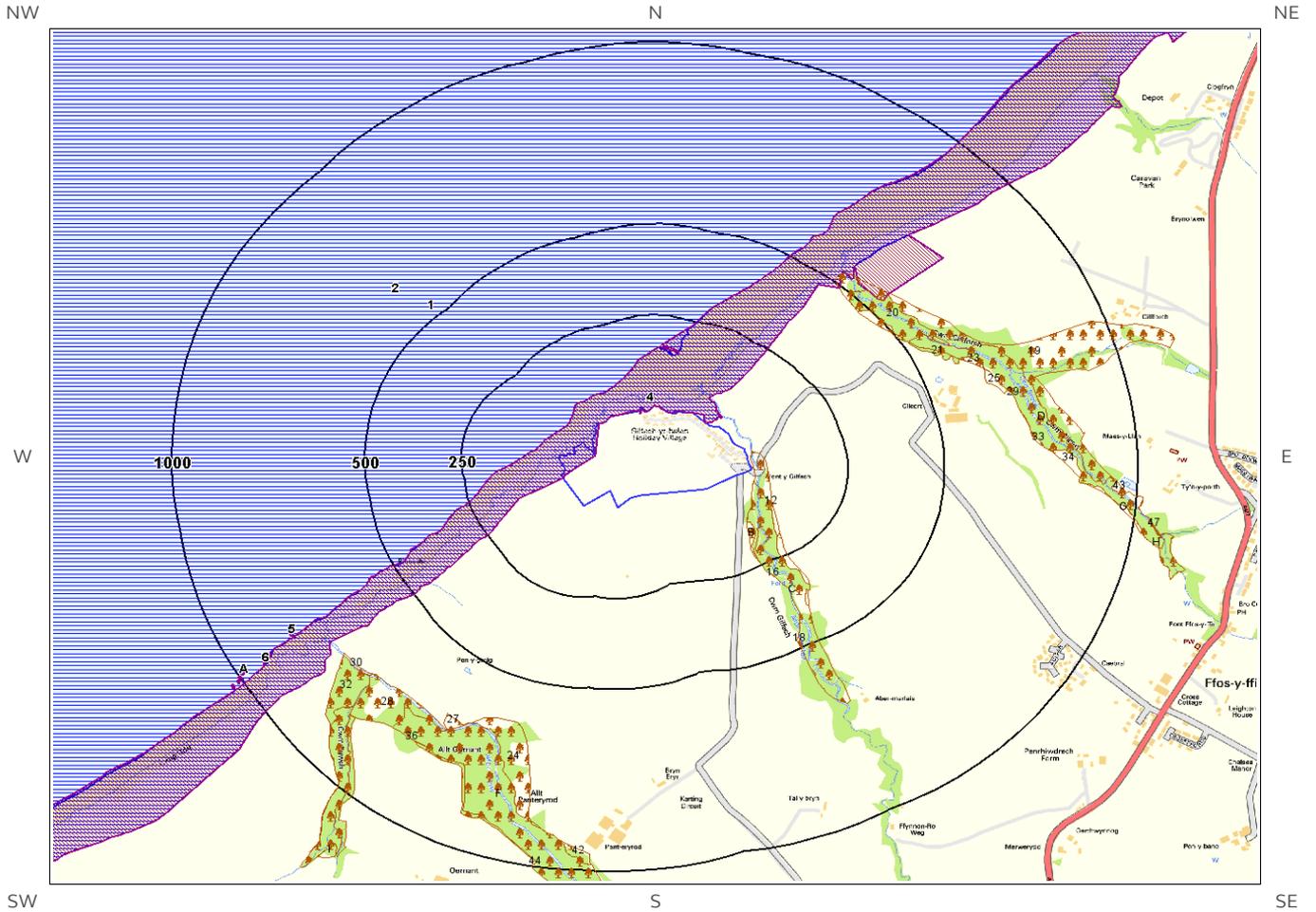
What is the British Geological Survey confidence rating in this result?

High

Notes: Groundwater flooding is defined as the emergence of groundwater at the ground surface or the rising of groundwater into man-made ground under conditions where the normal range of groundwater levels is exceeded.

The confidence rating is on a threefold scale - Low, Moderate and High. This provides a relative indication of the BGS confidence in the accuracy of the susceptibility result for groundwater flooding. This is based on the amount and precision of the information used in the assessment. In areas with a relatively lower level of confidence the susceptibility result should be treated with more caution. In other areas with higher levels of confidence the susceptibility result can be used with more confidence.

06 + 7 +223 #+5



06 + 7 +223

Presence of Designated Environmentally Sensitive Sites within 2000m of the study site? Yes

06 . - - 5 . +2 . - . ? @ 4 ,!!!7 - 3

8

The following Site of Special Scientific Interest (SSSI) records provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

	+	.	?	@	7	!!!	+	.
4	0	On Site			ABERARTH - CARREG WYLAN			Natural Resources Wales
5	814	SW			ABERARTH - CARREG WYLAN			Natural Resources Wales
6	918	SW			ABERARTH - CARREG WYLAN			Natural Resources Wales
7A	982	SW			ABERARTH - CARREG WYLAN			Natural Resources Wales
8A	997	SW			ABERARTH - CARREG WYLAN			Natural Resources Wales
9A	1008	SW			ABERARTH - CARREG WYLAN			Natural Resources Wales
10A	1025	SW			ABERARTH - CARREG WYLAN			Natural Resources Wales
Not shown	1819	SW			ABERARTH - CARREG WYLAN			Natural Resources Wales

06, . - + +2 + ? @ 4 ,!!!7 - 3

0

Database searched and no data found.

068 . - 5 . +2 + - + ? @ 4 ,!!!7 - 3

3

The following Special Area of Conservation (SAC) records provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

	+	.	?	@	7	!!!	+	.
1	0	On Site			Cardigan Bay / Bae Ceredigion			Natural Resources Wales
2	57	NW			West Wales Marine / Gorllewin Cymru Forol			Natural Resources Wales

	+ . ?7@	.	+7	++ .
Not shown	1819	SW	Cardigan Bay / Bae Ceredigion	Natural Resources Wales

06) . - 5 . +2 \$. + ? \$ @ 4 ,!!!7 - 3

0

Database searched and no data found.

06' . - +7 + 4 ,!!!7 - 3

0

Database searched and no data found.

06* . - . (2+ 4 ,!!!7 - 3

47

The following records of Designated Ancient Woodland provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

	+	.		(2+ +7	++ .
	?7@	.			
12	6	E		Unknown	Ancient and Semi-Natural Woodland
13C	30	S		Unknown	Ancient and Semi-Natural Woodland
14B	106	SE		Unknown	Ancient and Semi-Natural Woodland
15B	154	S		Unknown	Ancient and Semi-Natural Woodland
16	276	SE		Unknown	Ancient and Semi-Natural Woodland
17C	357	SE		Unknown	Ancient and Semi-Natural Woodland
18	458	SE		Unknown	Ancient and Semi-Natural Woodland
19	474	NE		Unknown	Ancient and Semi-Natural Woodland
20	477	NE		Unknown	Ancient and Semi-Natural Woodland
21	516	NE		Unknown	Ancient and Semi-Natural Woodland
22D	519	NE		Unknown	Ancient and Semi-Natural Woodland
23	610	NE		Unknown	Ancient and Semi-Natural Woodland
24	617	S		Unknown	Ancient and Semi-Natural Woodland
25	651	E		Unknown	Ancient and Semi-Natural Woodland
26F	658	SW		Unknown	Ancient and Semi-Natural Woodland
27	666	SW		Unknown	Ancient and Semi-Natural Woodland
28	691	SW		Unknown	Ancient and Semi-Natural Woodland
29	705	E		Unknown	Ancient and Semi-Natural Woodland
30	711	SW		Unknown	Ancient and Semi-Natural Woodland
31D	712	E		Unknown	Ancient and Semi-Natural Woodland
32	726	SW		Unknown	Ancient Replanted Woodland
33	731	E		Unknown	Ancient and Semi-Natural Woodland
34	769	E		Unknown	Ancient and Semi-Natural Woodland
35	774	SW		Unknown	Ancient and Semi-Natural Woodland
36	781	SW		Unknown	Ancient and Semi-Natural Woodland
37E	808	SW		Unknown	Restored Ancient Woodland Site
38E	831	SW		Unknown	Restored Ancient Woodland Site

	+	?	@		(2+	+7		++	
39G	868	E					Unknown			Ancient and Semi-Natural Woodland
40F	875	S					Unknown			Ancient and Semi-Natural Woodland
41	885	SW					Unknown			Ancient and Semi-Natural Woodland
42	918	S					Unknown			Ancient and Semi-Natural Woodland
43	931	E					Unknown			Ancient and Semi-Natural Woodland
44	988	S					Unknown			Ancient and Semi-Natural Woodland
45E	999	SW					Unknown			Ancient and Semi-Natural Woodland
46G	1005	E					Unknown			Ancient and Semi-Natural Woodland
47	1015	E					Unknown			Ancient and Semi-Natural Woodland
48	1054	SW					Unknown			Ancient and Semi-Natural Woodland
49H	1057	E					Unknown			Ancient and Semi-Natural Woodland
Not shown	1057	S					Unknown			Ancient and Semi-Natural Woodland
51H	1072	E					Unknown			Ancient and Semi-Natural Woodland
Not shown	1076	S					Unknown			Ancient and Semi-Natural Woodland
Not shown	1095	S					Unknown			Ancient and Semi-Natural Woodland
54I	1131	SW					Unknown			Ancient and Semi-Natural Woodland
55I	1141	SW					Unknown			Ancient and Semi-Natural Woodland
Not shown	1292	S					Unknown			Ancient and Semi-Natural Woodland
Not shown	1296	S					Unknown			Ancient and Semi-Natural Woodland
Not shown	1683	S					Unknown			Ancient and Semi-Natural Woodland

06" . - .+2 + ? @ 4 ,!!!7 - 3

0

Database searched and no data found.

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0

Database searched and no data found.

061 . - 7 +223 + 4 ,!!!7 - 3

0

Database searched and no data found.

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3

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Database searched and no data found.

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Database searched and no data found.

06) . - C 2 2+ 4 ,!!!7 - 3

0

Database searched and no data found.

16 + +2 +9+

16 +2 C ++

BGS GeoSure Data has been searched to 50m. The data is included in tabular format. If you require further information on geology and ground stability, please obtain a **Groundsure Geo Insight**, available from our [website](#). The following information has been found:

9.1.1 Shrink Swell

What is the maximum Shrink-Swell* hazard rating identified on the study site? Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

+9+

Ground conditions predominantly low plasticity. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with shrink-swell clays.

9.1.2 Landslides

What is the maximum Landslide* hazard rating identified on the study site? Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

+9+

Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.

9.1.3 Soluble Rocks

What is the maximum Soluble Rocks* hazard rating identified on the study site? Negligible

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

+9+

Soluble rocks are present, but unlikely to cause problems except under exceptional conditions. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.

* This indicates an automatically generated 50m buffer and site.

9.1.4 Compressible Ground

What is the maximum Compressible Ground* hazard rating identified on the study site? Negligible

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

+9+

No indicators for compressible deposits identified. No special actions required to avoid problems due to compressible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible deposits.

9.1.5 Collapsible Rocks

What is the maximum Collapsible Rocks* hazard rating identified on the study site? Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

+9+

Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.

9.1.6 Running Sand

What is the maximum Running Sand** hazard rating identified on the study site? Moderate

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

+9+

Significant potential for running sand problems with relatively small changes in ground conditions. Avoid large amounts of water entering the ground (for example through pipe leakage or soak-aways). Do not dig (deep) holes into saturated ground near the property without technical advice. For new build consider the consequences of soil and groundwater conditions during and after construction. For existing property possible increase in insurance risk from running sand, for example, due to water leakage, high rainfall events or flooding.

* This indicates an automatically generated 50m buffer and site.

16, +

9.2.1 Radon Affected Areas

Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level? The property is in a Radon Affected Area, as between 1 and 3% of properties are above the Action Level.

The radon data in this report is supplied by the BGS/Public Health England and is the definitive map of Radon Affected Areas in Great Britain and Northern Ireland. The dataset was created using long-term radon measurements in over 479,000 homes across Great Britain and 23,000 homes across Northern Ireland, combined with geological data. The dataset is considered accurate to 50m to allow for the margin of error in geological lines, and the findings of this report supercede any answer given in the less accurate Indicative Atlas of Radon in Great Britain, which simplifies the data to give the highest risk within any given 1km grid square. As such, the radon atlas is considered indicative, whereas the data given in this report is considered definitive.

9.2.2 Radon Protection

Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment? No radon protective measures are necessary.

!6

!6 +2 #

Are there any coal mining areas within 75m of the study site? No

Database searched and no data found.

!6, / +2 #

Are there any Non-Coal Mining areas within 50m of the study site boundary? Yes

The following non-coal mining information is provided by the BGS:

+ . ?7@	.	+7	77 3	7 -2 = 2
0.0	On Site	Berwyn Hills	Vein Mineral	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered

Past underground mine workings may occur. The rock types present in these areas are such that small mineral veins may be present on which it is possible that small scale mining has been undertaken and/or it is possible that limited underground extraction of other materials may have occurred. All such occurrences are likely to be of minor localised extent and infrequent. It should be noted, however, that there is always the possibility of the existence of other sub-surface excavations, such as wells, cess pits, follies, air raid shelters/bunkers and other military structures etc. that could affect surface ground stability but which are outside the scope of this dataset. However, if in a coalfield area you should still consider a Coal Authority mining search for the area of interest.

!68 C -- . +

Are there any brine affected areas within 75m of the study site? No

Guidance: No Guidance Required.

+ . + 2

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Telephone: 08444 159 000
info@groundsure.com

C 2 .+2 3 D
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Tel: 0115 936 3143.
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Email:
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BGS Geological Hazards Reports and general geological enquiries:
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+ +2 . (+2
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Email: enquiries@naturalresourceswales.gov.uk

\$ >2 . +2 2+
Public information access office
Public Health England, Wellington House
133-155 Waterloo Road, London, SE1 8UG
% < 0
Email: D G5 6 6 =
Main switchboard !, !**) 0!!!

+2 3
200 Lichfield Lane
Mansfield
Notts NG18 4RG
Tel: 0345 7626 848
DX 716176 Mansfield 5
4446. +26 6 =

+ . 3
Adanac Drive, Southampton
SO16 0AS
Tel: 08456 050505

.+2 3
Authority: Sir Ceredigion - Ceredigion County Council
Phone: 01545 570 881
Web: <http://www.ceredigion.gov.uk>
Address: Neuadd Cyngor Ceredigion, Penmorfa, Aberaeron,



Public Health
England



The Coal
Authority



7+55 \$
Virginia Villas, High Street, Hartley Witney,
Hampshire RG27 8NW
Tel: 01252 845444



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Groundsure

LOCATION INTELLIGENCE

Datrys Consulting Engineers

3-5 DATRYS CONSULTING ENGINEERS, STRYD
YR EGLWYS,
CAERNARFON, LL55 1SW

Groundsure
Reference:

GS-4481299

Your Reference:

17248-JA

Report Date

20 Nov 2017

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Method:

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GILFACH TO THE JUNCTION OF THE U5175, LLWYNCELYN, SA46 0HN

Dear Sir/ Madam,

Thank you for placing your order with Groundsure. Please find enclosed the
requested.

as

If you need any further assistance, please do not hesitate to contact our helpline on 08444 159000
quoting the above Groundsure reference number.

Yours faithfully,

Managing Director
Groundsure Limited

Enc.
Groundsure Geo Insight

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NW N NE

W E



SW S SE

Aerial Photograph Capture date: 15-Apr-2014
 Grid Reference: 243196,261170

Site Size: 8.77ha

#*

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The Groundsure Geo Insight provides high quality geo-environmental information that allows geo-environmental professionals and their clients to make informed decisions and be forewarned of potential ground instability problems that may affect the ground investigation, foundation design and possibly remediation options that could lead to possible additional costs.

The report is based on the BGS 1:50,000 and 1:10,000 Digital Geological Map of Great Britain, BGS Geosure data; BRITPITS database; Non-coal mining data and Borehole Records, Coal Authority data including brine extraction areas, PBA non-coal mining and natural cavities database, Johnson Poole and Bloomer mining data and Groundsure's unique database including historical surface ground and underground workings.

For further details on each dataset, please refer to each individual section in the report as listed. Where the database has been searched a numerical result will be recorded. Where the database has not been searched '-' will be recorded.

Section 1: Geology 1:10,000 Scale		
1.1 Artificial Ground	1.1 Is there any Artificial Ground/ Made Ground present beneath the study site at 1:10,000 scale?	No
1.2 Superficial Geology and Landslips	1.2.1 Is there any Superficial Ground/Drift Geology present beneath the study site at 1:10,000 scale?*	No
	1.2.2 Are there any records of landslip within 500m of the study site boundary at 1:10,000 scale?	No
1.3 Bedrock, Solid Geology and linear features	1.3.1 For records of Bedrock and Solid Geology beneath the study site* see the detailed findings section.	
	1.3.2 Are there any records of linear features within 500m of the study site boundary at 1:10,000 scale?	No
Section 2: Geology 1:50,000 Scale		
2.1 Artificial Ground	2.1.1 Is there any Artificial Ground/ Made Ground present beneath the study site?	No
	2.1.2 Are there any records relating to permeability of artificial ground within the study site*boundary?	No
2.2 Superficial Geology and Landslips	2.2.1 Is there any Superficial Ground/Drift Geology present beneath the study site?*	Yes
	2.2.2 Are there any records of permeability of superficial ground within 500m of the study site?	Yes
	2.2.3 Are there any records of landslip within 500m of the study site boundary?	No
	2.2.4 Are there any records relating to permeability of landslips within the study site* boundary?	No

Section 2: Geology 1:50,000 Scale

2.3 Bedrock, Solid Geology and linear features

2.3.1 For records of Bedrock and Solid Geology beneath the study site* see the detailed findings section.

2.3.2 Are there any records relating to permeability of bedrock ground within the study site boundary?

Yes

2.3.3 Are there any records of linear features within 500m of the study site boundary?

Yes

Section 3: Radon

3. Radon

3.1 Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?

The property is in a Radon Affected Area, as between 1 and 3% of properties are above the Action Level.

3.2 Radon Protection

No radon protective measures are necessary.

Section 4: Ground Workings

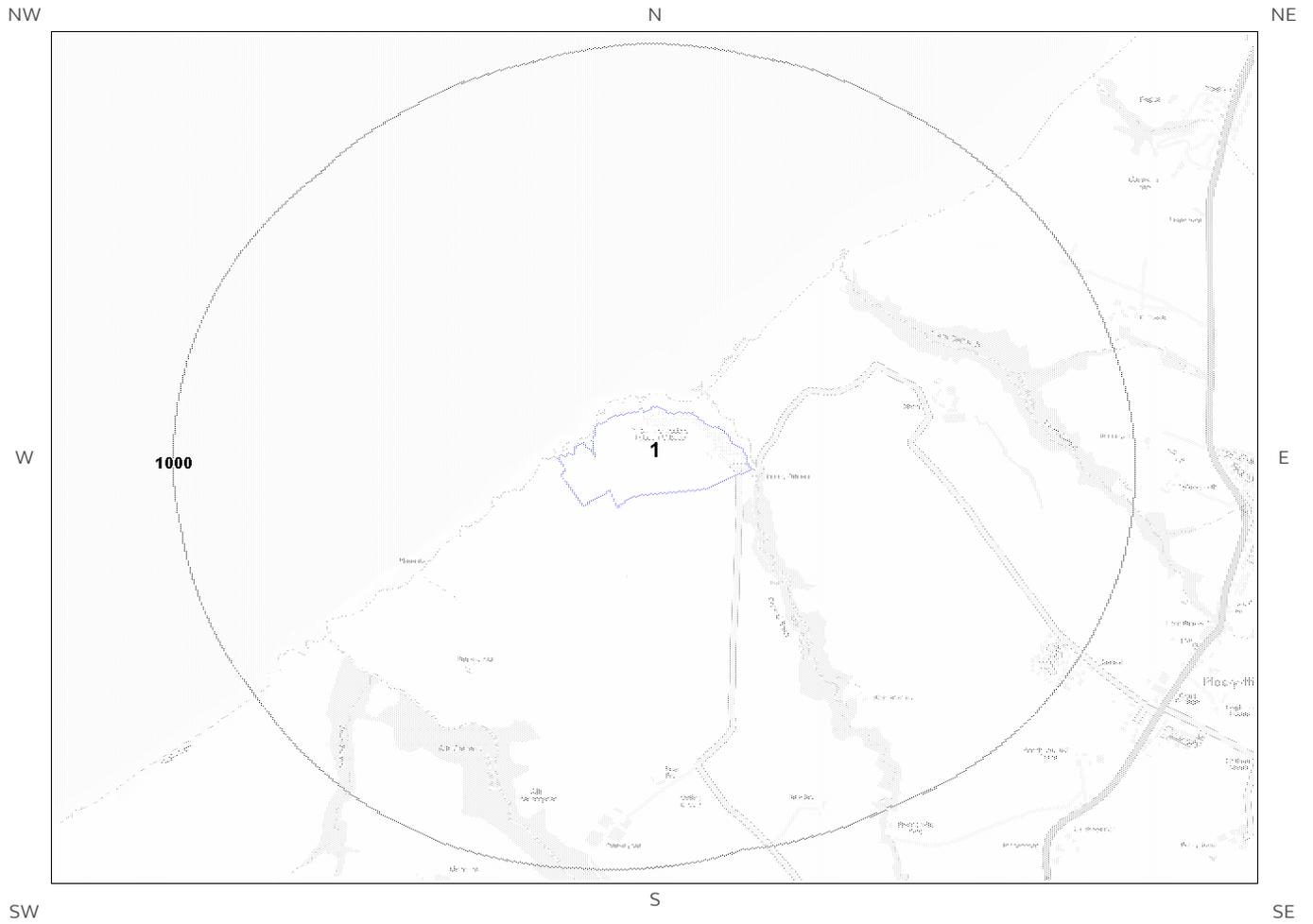
	On-site	0-50m	51-250	251-500	501-1000
4.1 Historical Surface Ground Working Features from Small Scale Mapping	1	0	1	Not Searched	Not Searched
4.2 Historical Underground Workings from Small Scale Mapping	0	0	0	0	0
4.3 Current Ground Workings	0	0	0	0	0

Section 5: Mining, Extraction & Natural Cavities

	On-site	0-50m	51-250	251-500	501-1000
5.1 Historical Mining	0	0	0	0	0
5.2 Coal Mining	0	0	0	0	0
5.3 Johnson Poole and Bloomer Mining Area	0	0	0	0	0
5.4 Non-Coal Mining*	1	0	0	0	0
5.5 Non-Coal Mining Cavities	0	0	0	0	0
5.5 Natural Cavities	0	0	0	0	0

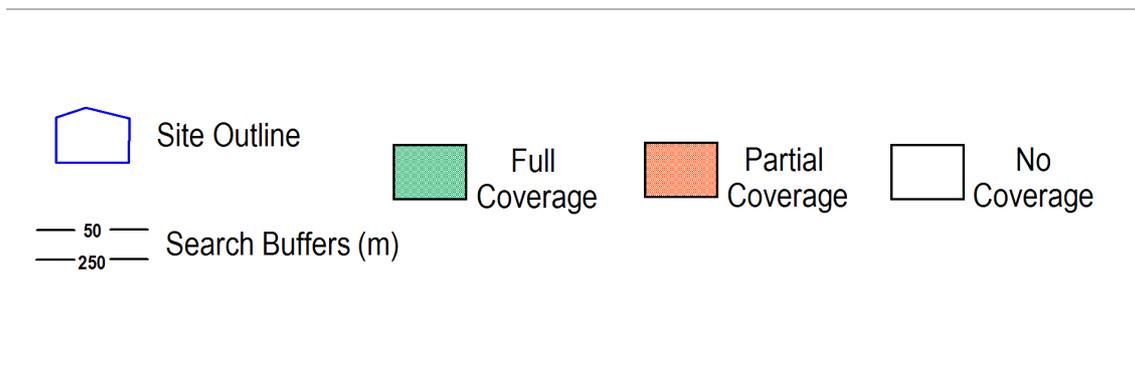
Section 5: Mining, Extraction & Natural Cavities	On-site	0-50m	51-250	251-500	501-1000
5.6 Brine Extraction	0	0	0	0	0
5.7 Gypsum Extraction	0	0	0	0	0
5.8 Tin Mining	0	0	0	0	0
5.9 Clay Mining	0	0	0	0	0
Section 6: Natural Ground Subsidence	On-site				
6.1 Shrink-Swell Clay	Very Low				
6.2 Landslides	Very Low				
6.3 Ground Dissolution of Soluble Rocks	Negligible				
6.4 Compressible Deposits	Negligible				
6.5 Collapsible Deposits	Very Low				
6.5 Running Sand	Moderate				
Section 7: Borehole Records	On-site	0-50m	51-250		
7 BGS Recorded Boreholes	0	0	0		
Section 8: Estimated Background Soil Chemistry	On-site	0-50m	51-250		
8 Records of Background Soil Chemistry	4	4	0		
Section 9: Railways and Tunnels	On-site	0-50m	51-250	250-500	
9.1 Tunnels	0	0	0	Not Searched	
9.2 Historical Railway and Tunnel Features	0	0	0	Not Searched	
9.3 Historical Railways	0	0	0	Not Searched	
9.4 Active Railways	0	0	0	Not Searched	
9.5 Railway Projects	0	0	0	0	

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Geological Data Availability

The following information represents the availability of the key components of the 1:10,000 scale geological data.

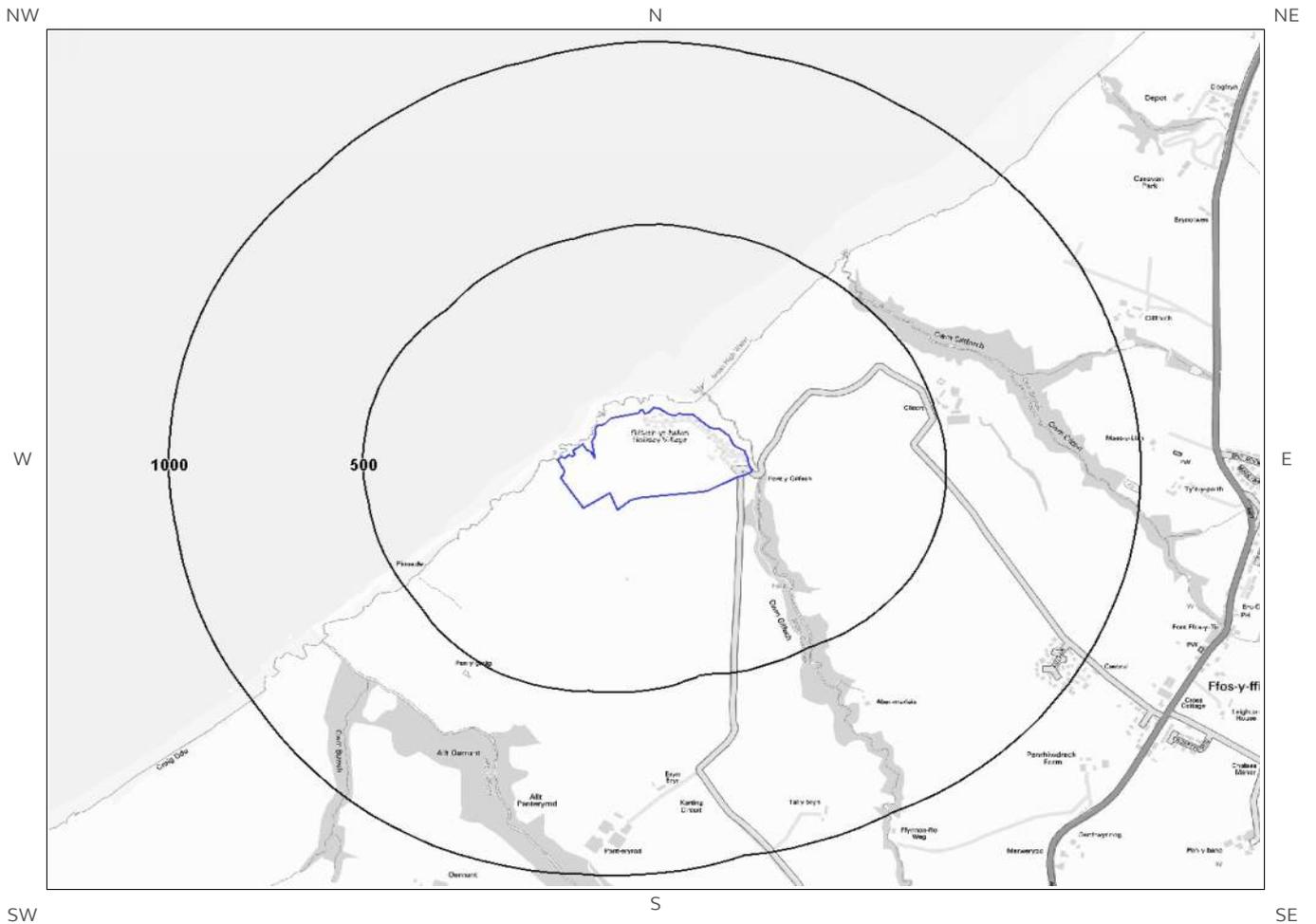
Tile ID	Bedrock	Superficial	Artificial	Mass Movement
1	No deposits are mapped	No coverage	No coverage	No coverage

Guidance: The 1:10,000 scale geological interpretation is the most detailed generally available from BGS and is the scale at which most geological surveying is carried out in the field. The database is presented as four types of geology (artificial, mass movement, superficial and bedrock), although not all themes are mapped or available on every map sheet. Therefore a coverage layer showing the availability of the four themes is presented above.

The definitions of coverage are as follows:

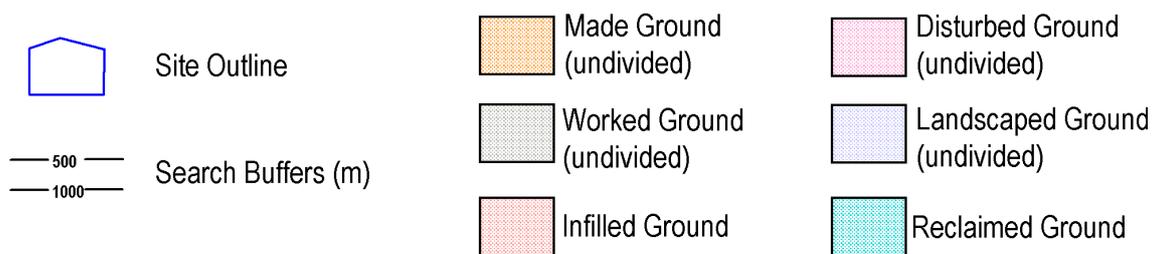
Geology Type	Full Coverage	Partial Coverage	No Coverage
Bedrock	The whole tile has been mapped	Some but not all the tile has been mapped	No coverage
Superficial	The whole tile has been mapped	Some but not all of the tile has been mapped	No coverage
Artificial	Some deposits are mapped on this tile	-	No deposits are mapped
Mass Movement	Some deposits are mapped on this tile	-	No coverage

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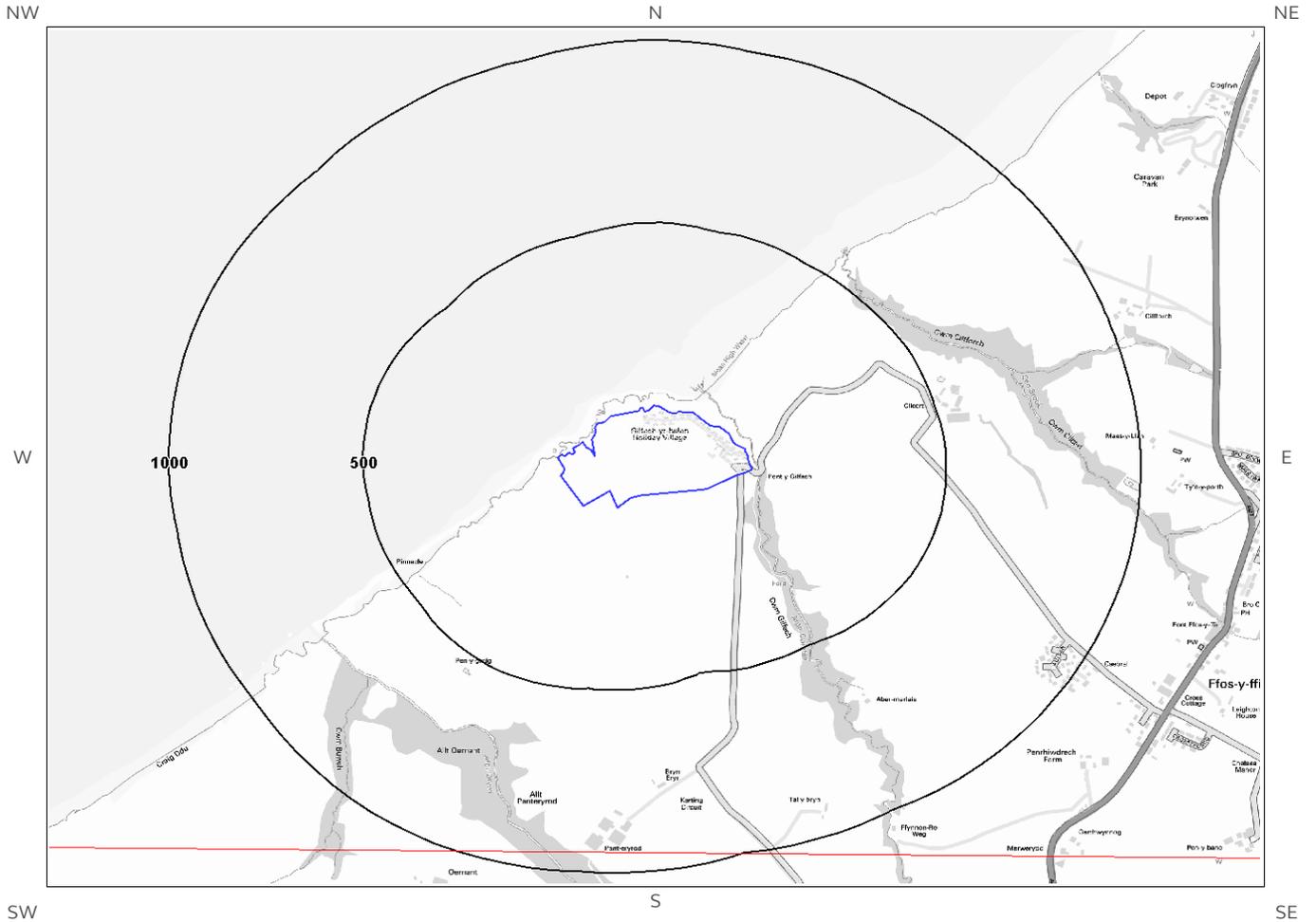
= - . *2

The following geological information represented on the mapping is derived from 1:10,000 scale BGS Geological mapping.

Are there any records of Artificial/ Made Ground within 500m of the study site boundary at 1:10,000 scale? No

Database searched and no data found.

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 Site Outline

 500
 1000
 Search Buffers (m)

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* 27

The following geological information represented on the mapping is derived from 1:10,000 scale BGS Geological mapping

1.2.1 Superficial Deposits/ Drift Geology

Are there any records of Superficial Deposits/ Drift Geology within 500m of the study site boundary at 1:10,000 scale? No

Database searched and no data found.

1.2.2 Landslip

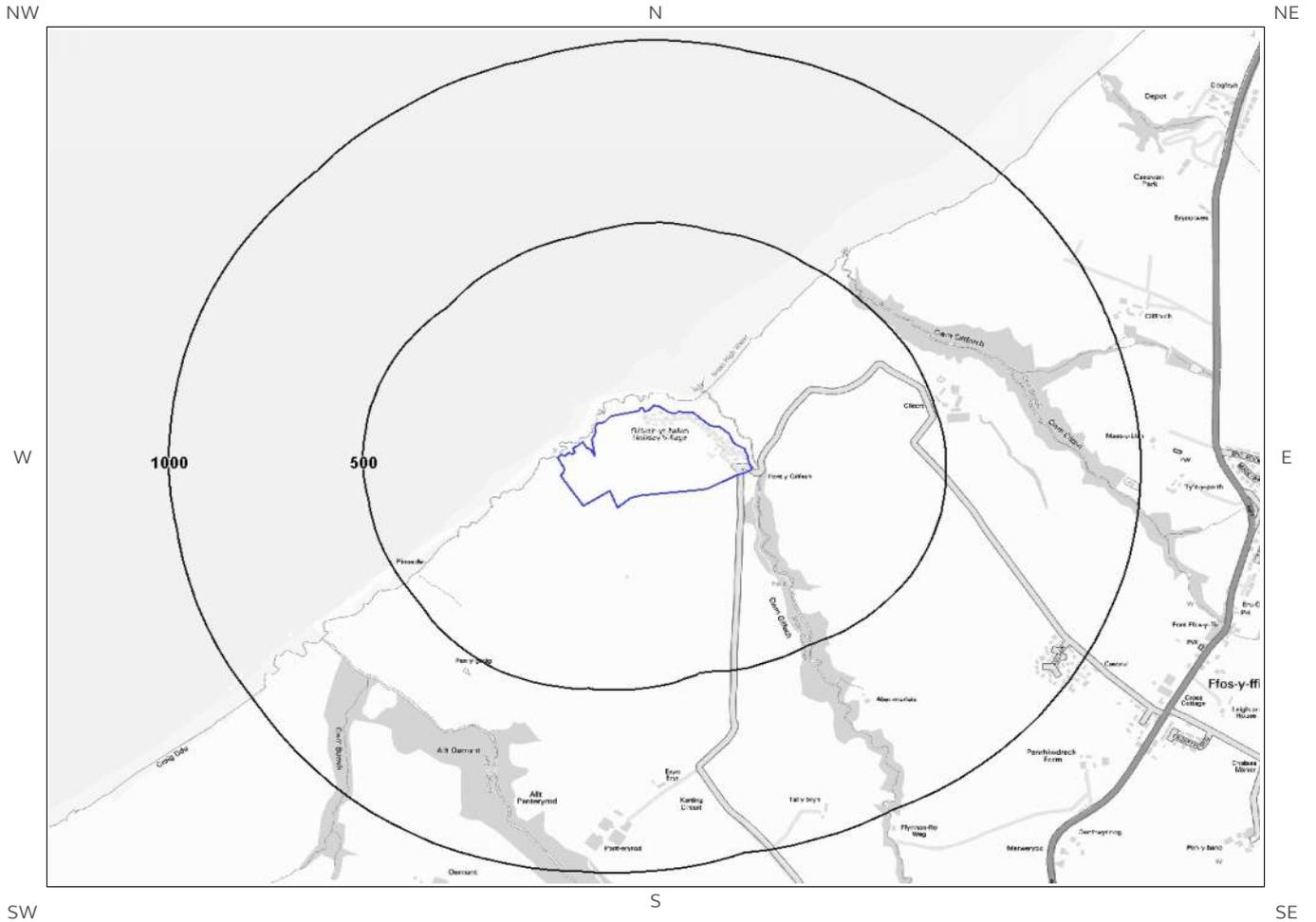
Are there any records of Landslip within 500m of the study site boundary at 1:10,000 scale? No

Database searched and no data found.

The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of Great Britain at 1:10,000 scale

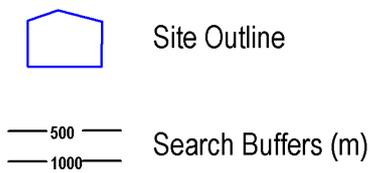
This Geology shows the main components as discrete layers, these are: Artificial / Made Ground, Superficial / Drift Geology and Landslips. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

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The following geological information represented on the mapping is derived from 1:10,000 scale BGS Geological mapping.

1.3.1 Bedrock/ Solid Geology

Records of Bedrock/Solid Geology within 500m of the study site boundary at 1:10,000 scale.

Database searched and no data found at this scale.

1.3.2 Linear features

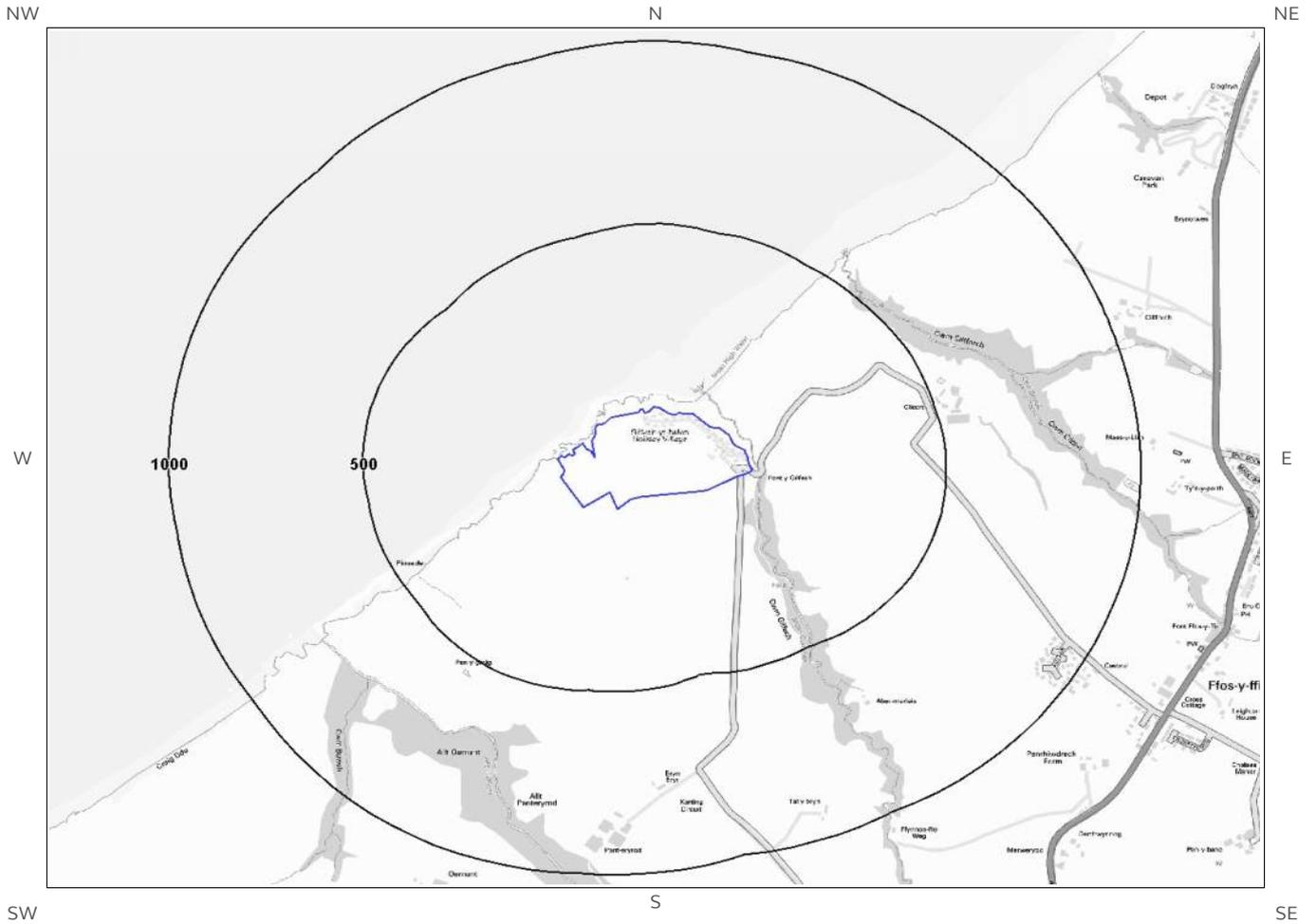
Are there any records of linear features within 500m of the study site boundary at 1:10,000 scale? No

Database searched and no data found at this scale.

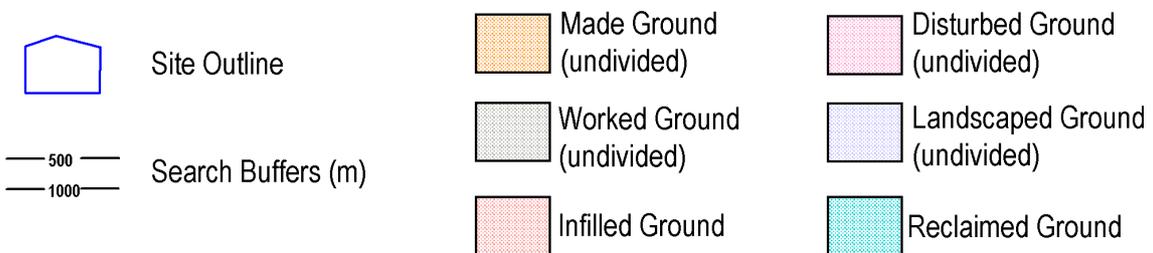
The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of great Britain at 1:10,000 scale.

This Geology shows the main components as discrete layers, these are: Bedrock/ Solid Geology and linear features such as faults. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

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The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No: 177

2.1.1 Artificial/ Made Ground

Are there any records of Artificial/ Made Ground within 500m of the study site boundary? No

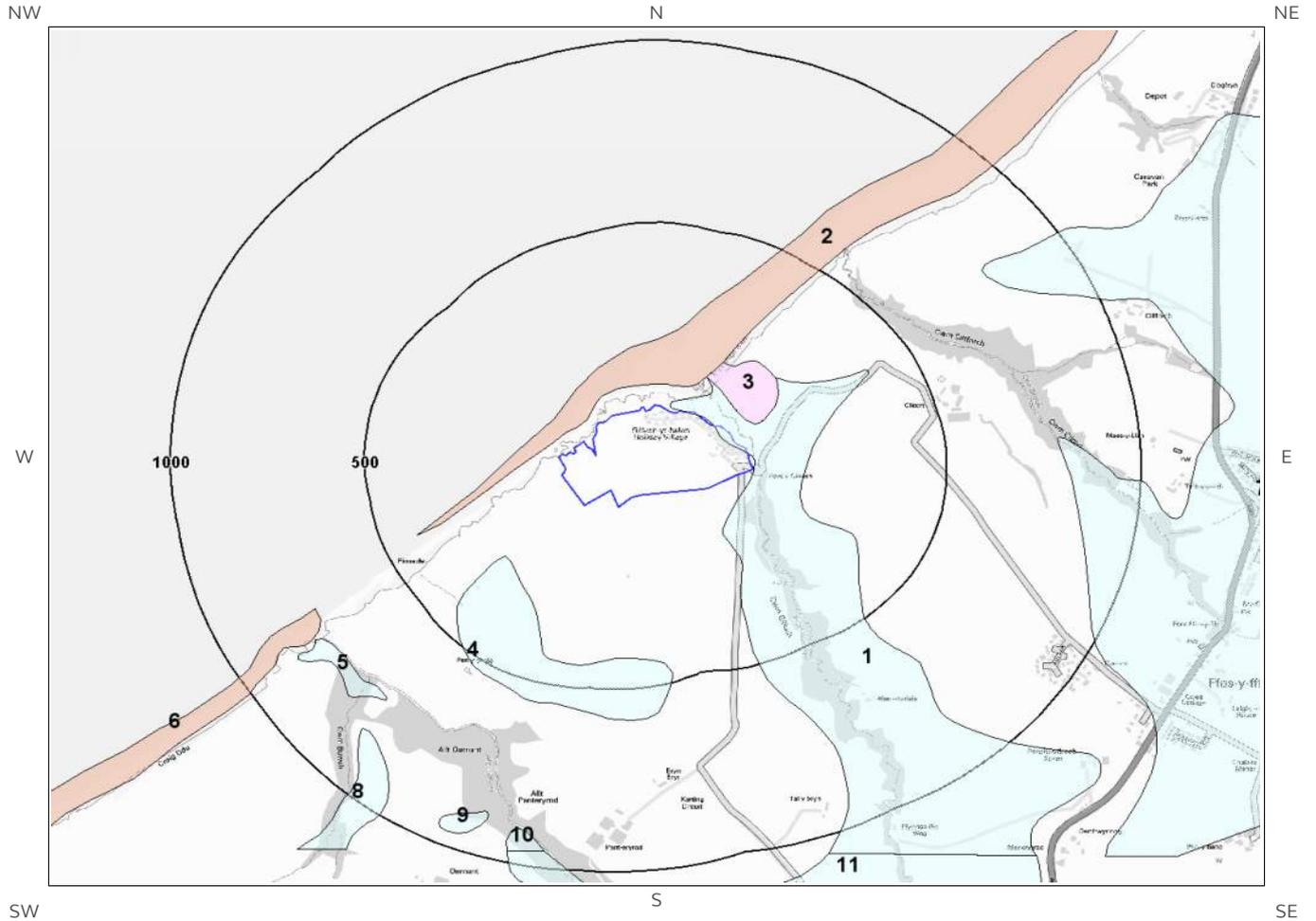
Database searched and no data found.

2.1.2 Permeability of Artificial Ground

Are there any records relating to permeability of artificial ground within the study site boundary? No

Database searched and no data found.

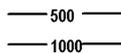
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Site Outline



Search Buffers (m)

+ = + 7 - . * 2 7 *
* 2 7

2.2.1 Superficial Deposits/ Drift Geology

Are there any records of Superficial Deposits/ Drift Geology within 500m of the study site boundary? Yes

	*	.	?	. 7	.9 . 7
1	0.0	On Site	TILLD-DMTN	TILL, DEVENSIAN	DIAMICTON
2	30.0	NW	MBD-XSV	MARINE BEACH DEPOSITS	SAND AND GRAVEL
3	56.0	NE	GFDUD-XSV	GLACIOFLUVIAL DEPOSITS, DEVENSIAN	SAND AND GRAVEL
4	245.0	SW	TILLD-DMTN	TILL, DEVENSIAN	DIAMICTON

2.2.2 Permeability of Superficial Ground

Are there any records relating to permeability of superficial ground within the study site boundary? Yes

* . ; <	.	2 4 37	**@ : : # : * 5 2 3	" : : # : * 5 2 3
0.0	On Site	Mixed	High	Low
30.0	NW	Intergranular	Very High	High

2.2.3 Landslip

Are there any records of Landslip within 500m of the study site boundary? No

Database searched and no data found.

The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of Great Britain at 1:50,000 scale.

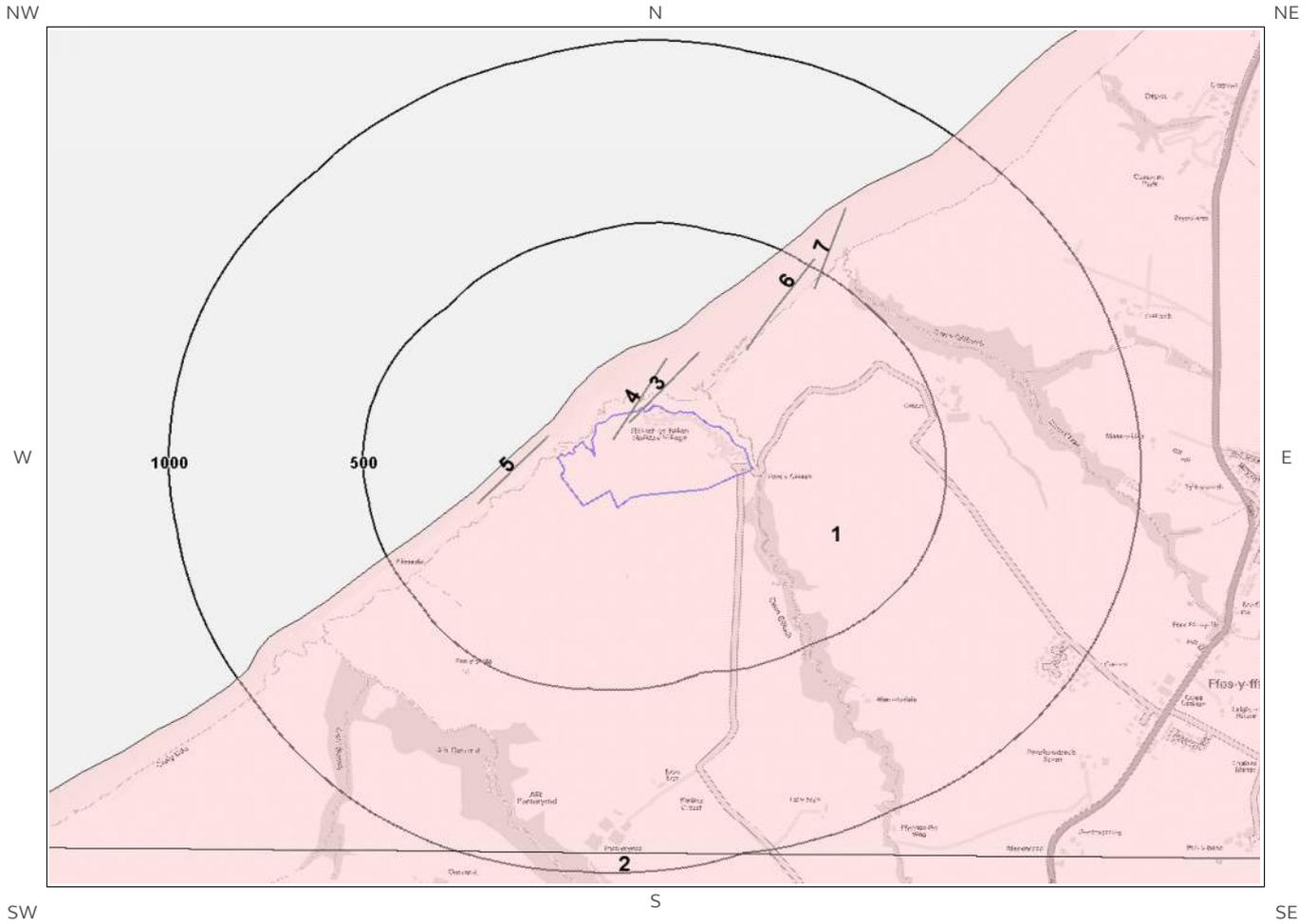
This Geology shows the main components as discrete layers, there are: Artificial/ Made Ground, Superficial/ Drift Geology and Landslips. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

2.2.4 Landslip Permeability

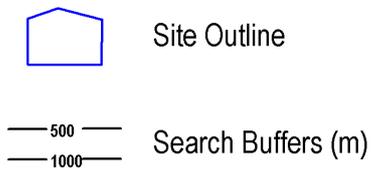
Are there any records relating to permeability of landslips within the study site boundary? No

Database searched and no data found.

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The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No: 177

2.3.1 Bedrock/Solid Geology

Records of Bedrock/Solid Geology within 500m of the study site boundary:

	*	.	?	.9 . 7	.9
1	0.0	On Site	MYBA-STMD	MYNYDD BACH FORMATION - SANDSTONE AND MUDSTONE	-

2.3.2 Permeability of Bedrock Ground

Are there any records relating to permeability of bedrock ground within the study site boundary? Yes

*	.	2 4 37	**@ :: # : *5 2 3	" :: # : *5 2 3
0.0	On Site	Fracture	Moderate	Low

2.3.3 Linear features

Are there any records of linear features within 500m of the study site boundary? Yes

	*	.	* 3 . 7	* . 7
3	0.0	On Site	FOLD_AXIS	Axial plane trace of major anticline
4	0.0	On Site	FOLD_AXIS	Axial plane trace of major syncline
5	60.0	NW	FOLD_AXIS	Axial plane trace of major anticline
6	218.0	NE	FOLD_AXIS	Axial plane trace of major anticline
7	450.0	NE	FOLD_AXIS	Axial plane trace of major anticline

The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of Great Britain at 1:50,000 scale.

This Geology shows the main components as discrete layers, these are: Bedrock/Solid Geology and linear features such as faults. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nation wide coverage.

> * * *

3.1 Radon Affected Areas

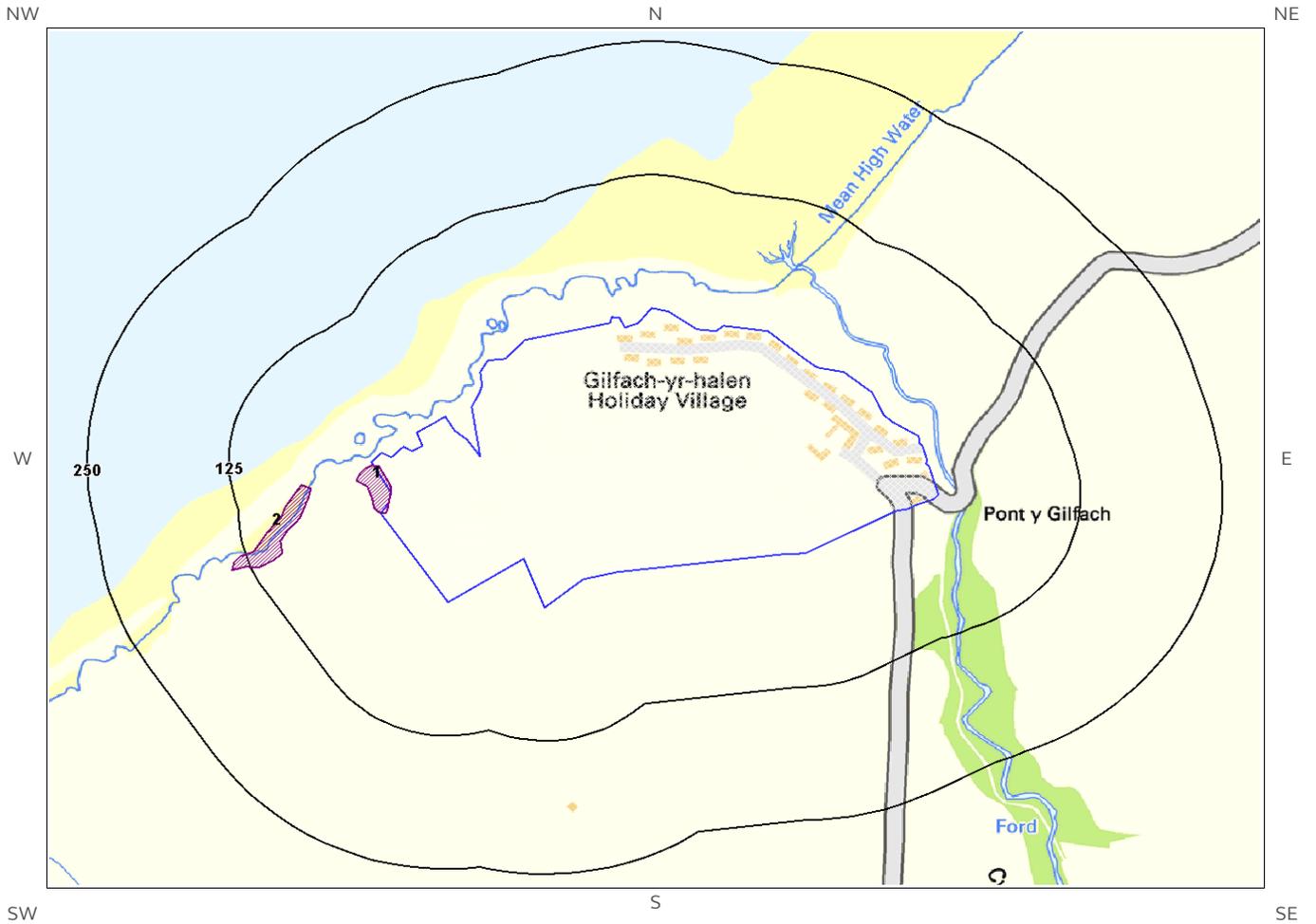
Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level? The property is in a Radon Affected Area, as between 1 and 3% of properties are above the Action Level.

The radon data in this report is supplied by the BGS/Public Health England and is the definitive map of Radon Affected Areas in Great Britain and Northern Ireland. The dataset was created using long-term radon measurements in over 479,000 homes across Great Britain and 23,000 homes across Northern Ireland, combined with geological data. The dataset is considered accurate to 50m to allow for the margin of error in geological lines, and the findings of this report supercede any answer given in the less accurate Indicative Atlas of Radon in Great Britain, which simplifies the data to give the highest risk within any given 1km grid square. As such, the radon atlas is considered indicative, whereas the data given in this report is considered definitive.

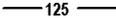
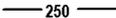
3.2 Radon Protection

Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment? No radon protective measures are necessary.

(' 9 : * 7



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-  Site Outline
-  Historic Surface Ground Workings
-  125
-  250 Search Buffers (m)
-  Historic Underground Workings
-  Current Ground Workings

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This dataset is based on Groundsure's unique Historical Land Use Database derived from 1:10,560 and 1:10,000 scale historical mapping

Are there any Historical Surface Ground Working Features within 250m of the study site boundary? Yes

	* ;<	.	' 9 *	%	*
1	0.0	On Site	243158 261157	Caves	1948
2	59.0	SW	243077 261121	Caves	1948

(=+ .2 % ' 9 * , - : .2 "77

This data is derived from the Groundsure unique Historical Land Use Database. It contains data derived from 1:10,000 and 1:10,560 historical Ordnance Survey Mapping and includes some natural topographical features (Shake Holes for example) as well as manmade features that may have implications for ground stability. Underground and mining features have been identified from surface features such as shafts. The distance that these extend underground is not shown.

Are there any Historical Underground Working Features within 1000m of the study site boundary? No

Database searched and no data found.

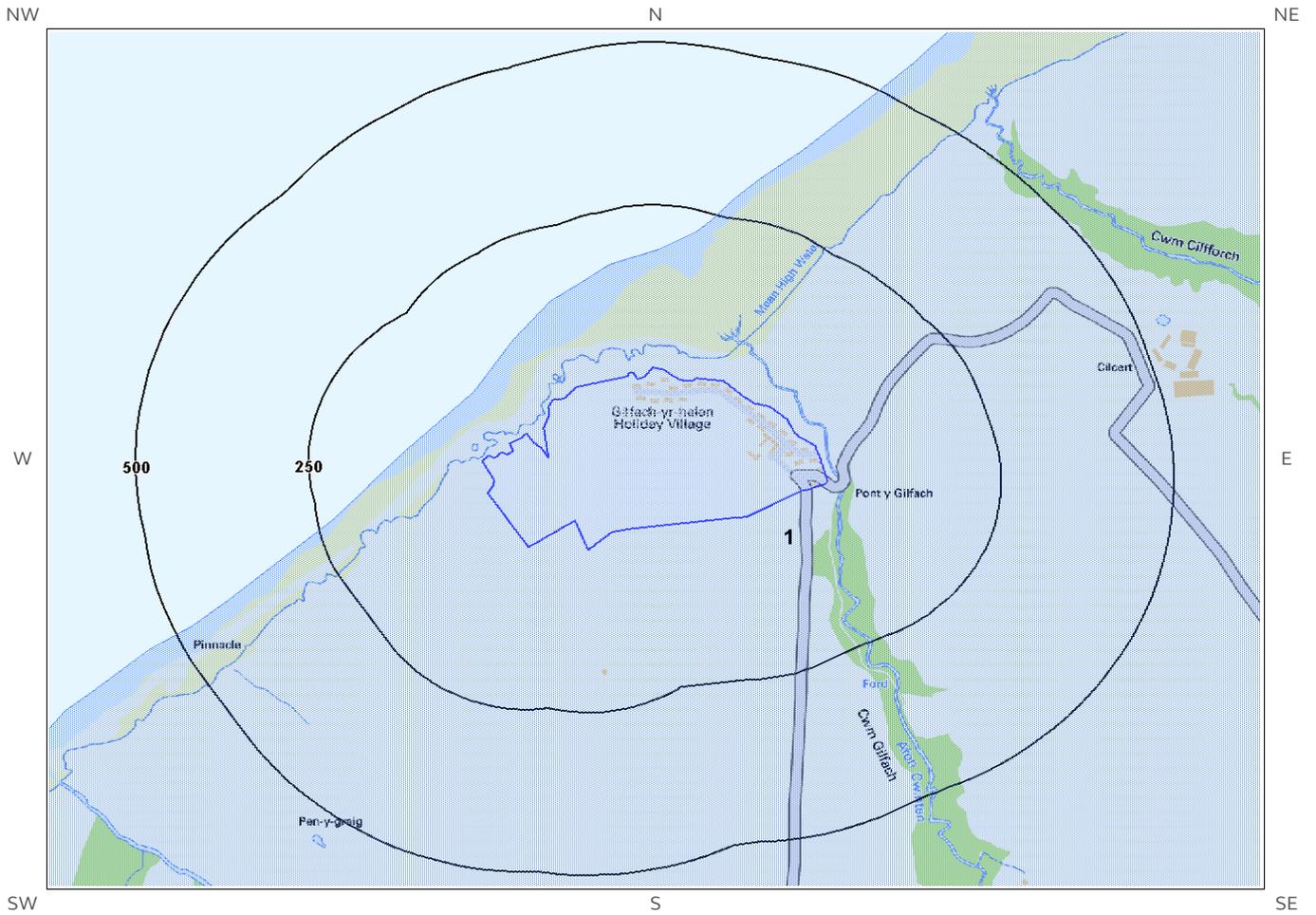
(=> ' 9

This dataset is derived from the BGS BRITPITS database covering active; inactive mines; quarries; oil wells; gas wells and mineral wharves; and rail deposits throughout the British Isles.

Are there any BGS Current Ground Workings within 1000m of the study site boundary? No

Database searched and no data found.

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* , : *7



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Historical Mining Areas

Historical Mining Areas

This dataset is derived from Groundsure unique Historical Land-use Database that are indicative of mining or extraction activities.

Are there any Historical Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

Coal Mining Areas

This dataset provides information as to whether the study site lies within a known coal mining affected area as defined by the coal authority.

Are there any Coal Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

JPB Mining Areas

This dataset provides information as to whether the study site lies within an area where JPB hold information relating to mining.

Are there any JPB Mining areas within 1000m of the study site boundary? No

The following information provided by JPB is not represented on mapping: Database searched and no data found.

Non-Coal Mining Areas

This dataset provides information as to whether the study site lies within an area which may have been subject to non-coal historic mining.

Are there any Non-Coal Mining areas within 1000m of the study site boundary? Yes

The following non-coal mining information is provided by the BGS:

ID	Distance (m)	Location	Mineral	Description
1	0.0	On Site	Berwyn Hills	Vein Mineral
Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered				

Non-Coal Mining Cavities

This dataset provides information from the Peter Brett Associates (PBA) mining cavities database (compiled for the national study entitled "Review of mining instability in Great Britain, 1990" PBA has also continued adding to this database) on mineral extraction by mining.

Are there any Non-Coal Mining cavities within 1000m of the study site boundary? No

Database searched and no data found.

Natural Cavities

This dataset provides information based on Peter Brett Associates natural cavities database.

Are there any Natural Cavities within 1000m of the study site boundary? No

Database searched and no data found.

Brine Extraction Areas

This data provides information from the Coal Authority issued on behalf of the Cheshire Brine Subsidence Compensation Board.

Are there any Brine Extraction areas within 1000m of the study site boundary? No

Database searched and no data found.

Gypsum Extraction Areas

This dataset provides information on Gypsum extraction from British Gypsum records.

Are there any Gypsum Extraction areas within 1000m of the study site boundary? No

Database searched and no data found.

Tin Mining Areas

This dataset provides information on tin mining areas and is derived from tin mining records. This search is based upon postcode information to a sector level..

Are there any Tin Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

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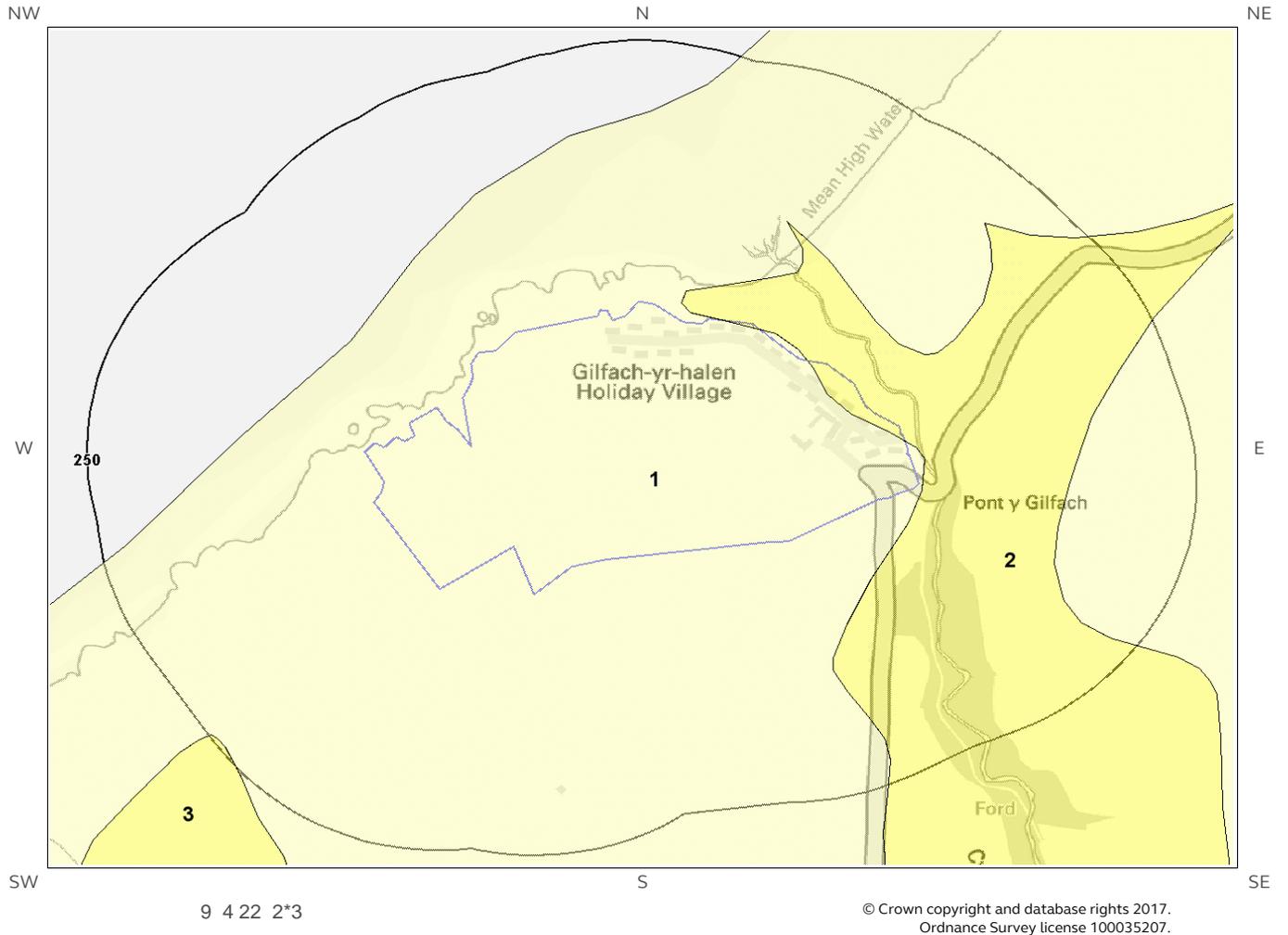
This dataset provides information on Kaolin and Ball Clay mining from relevant mining records.

Are there any Clay Mining areas within 1000m of the study site boundary?

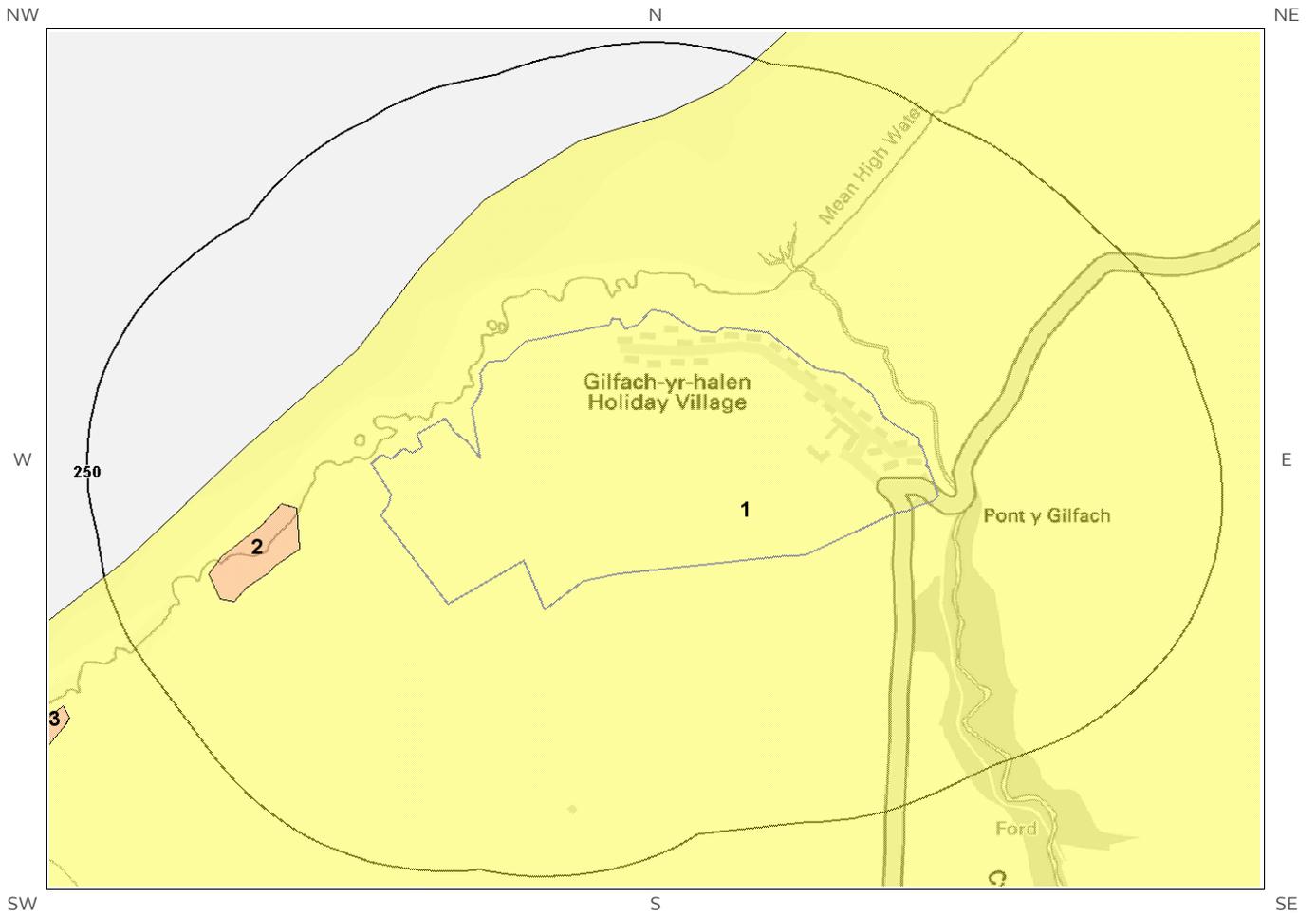
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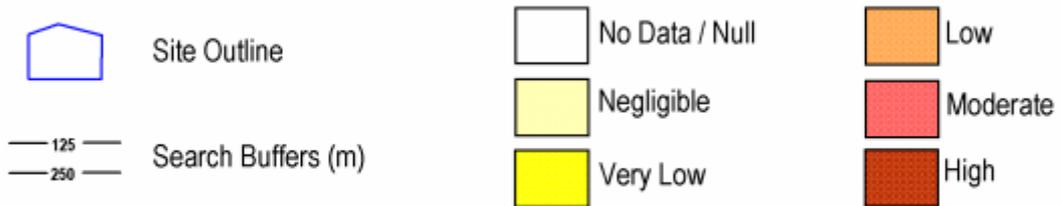
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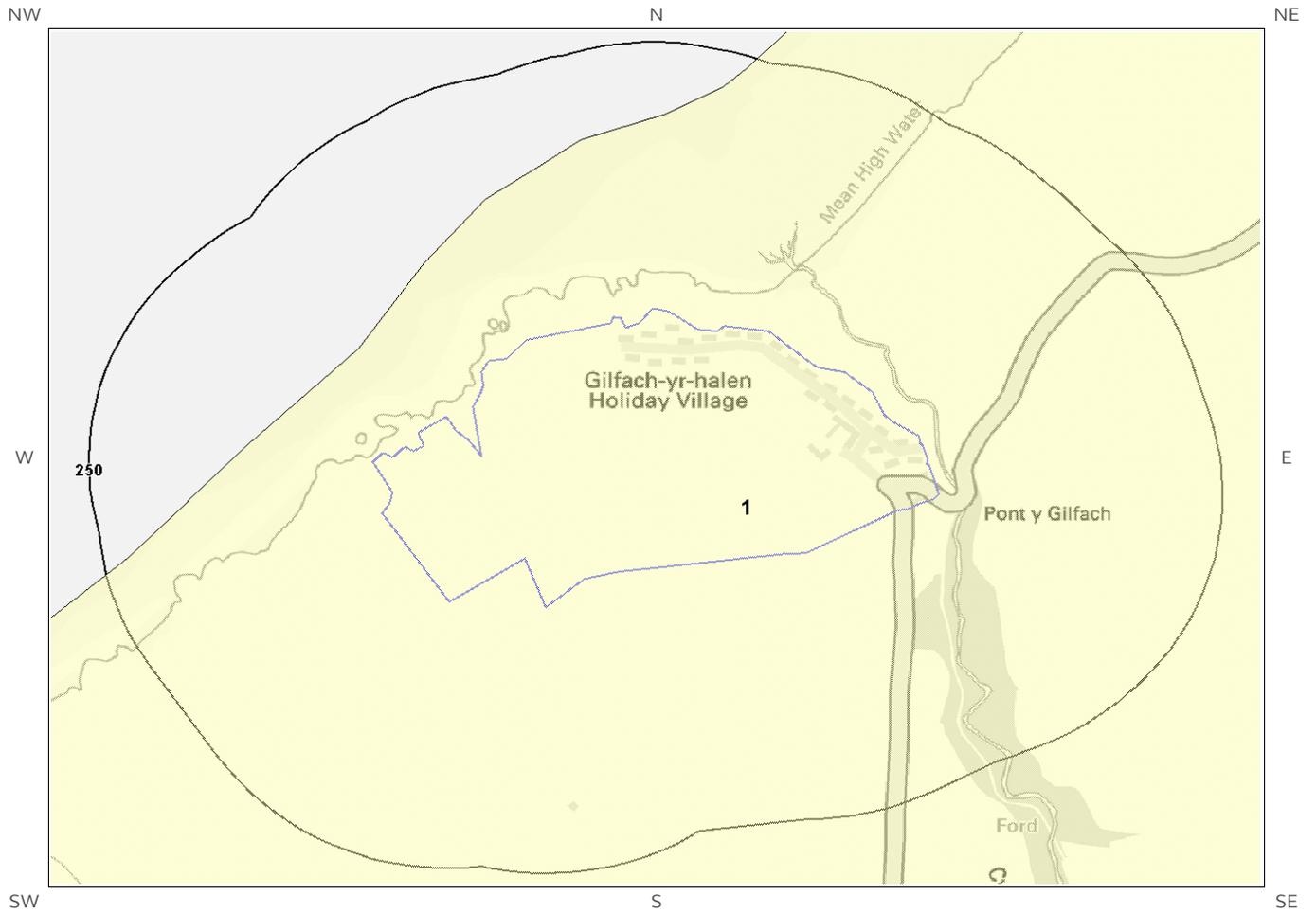
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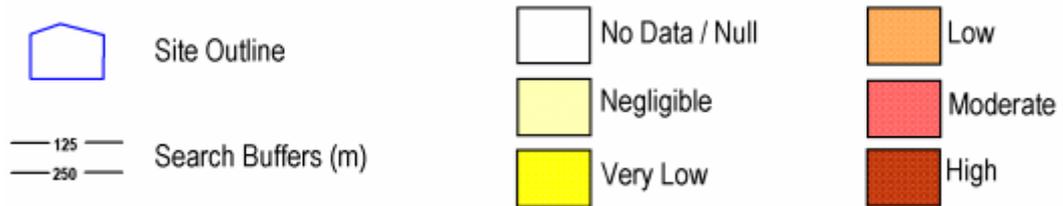


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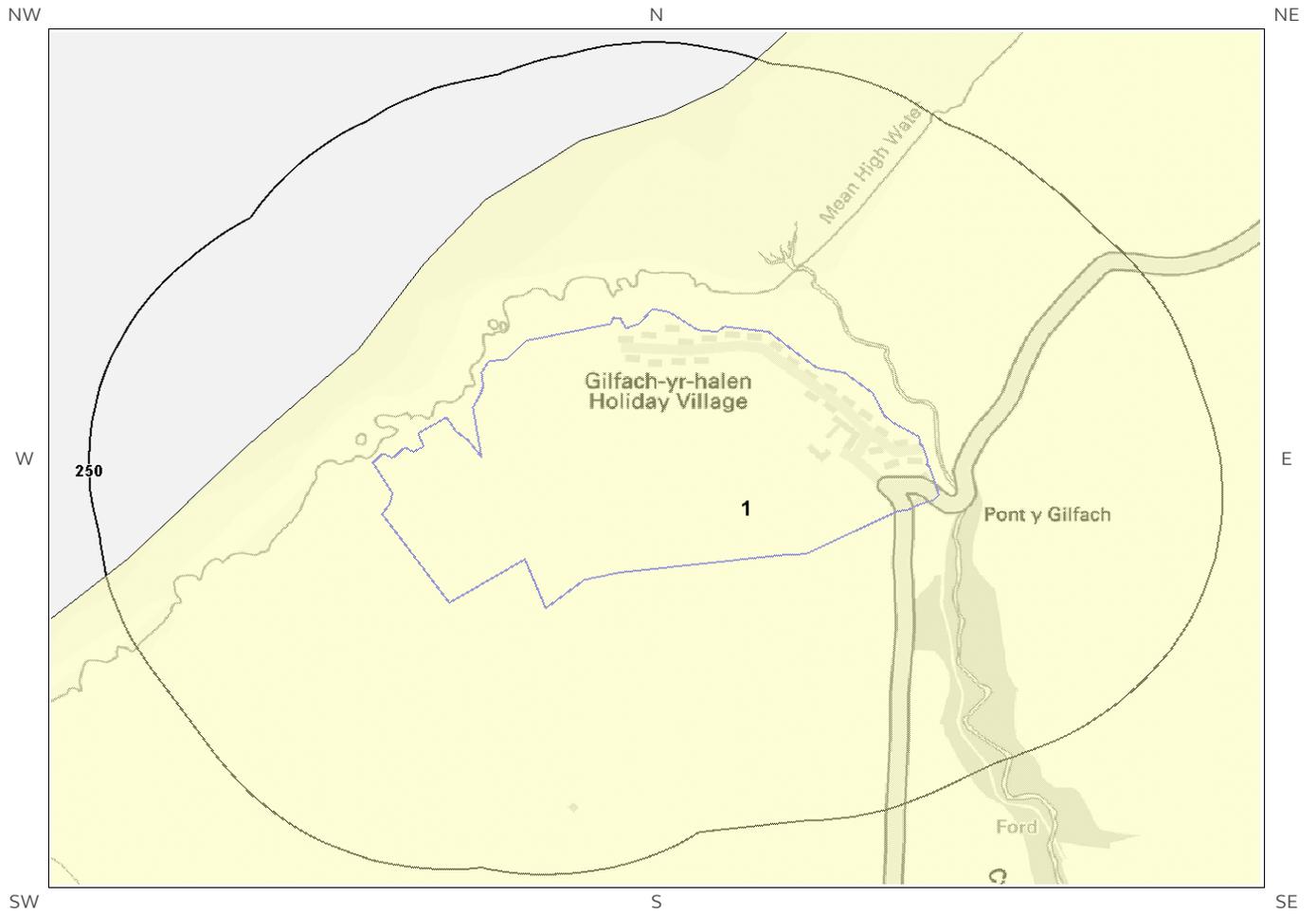


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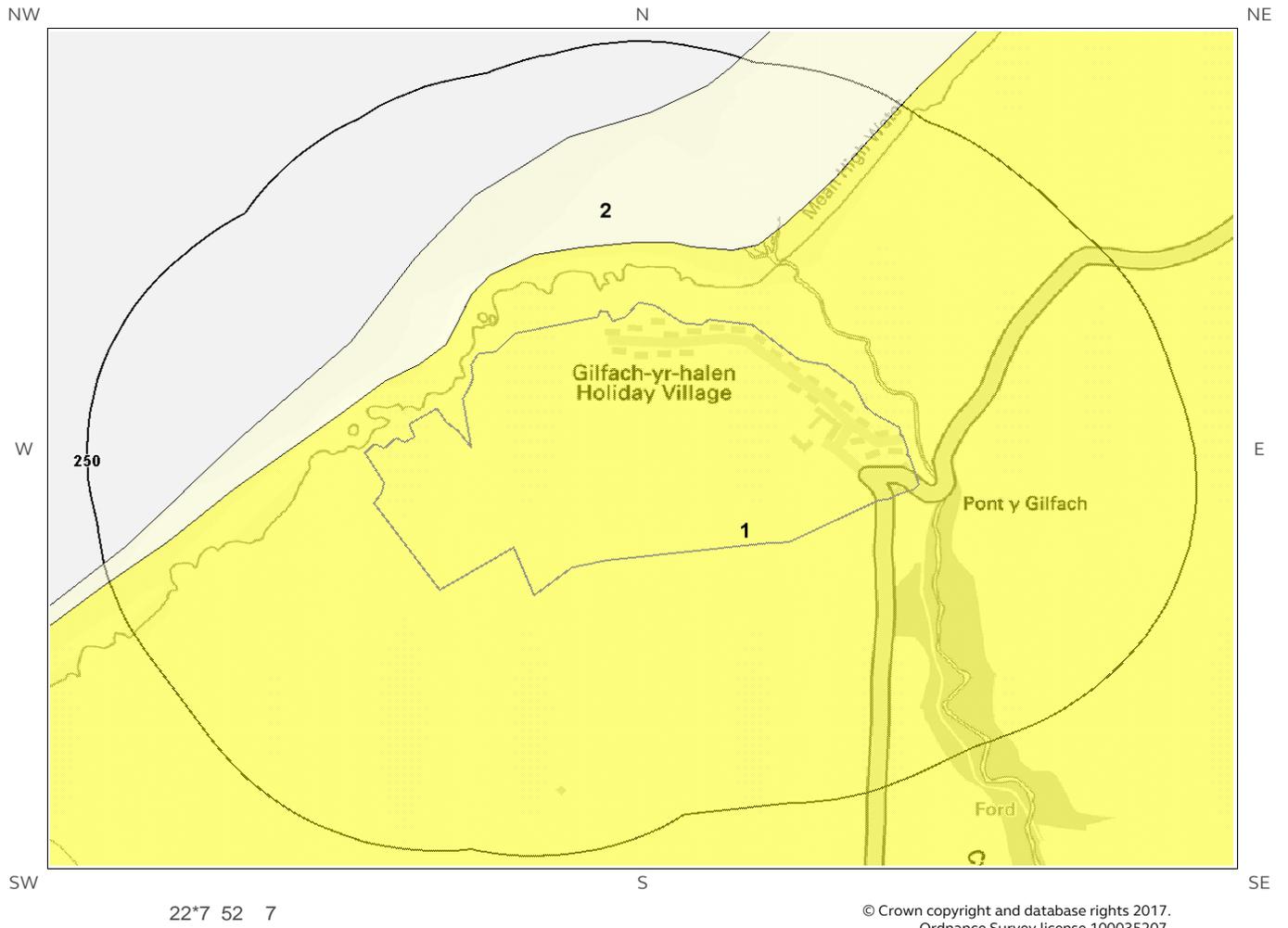
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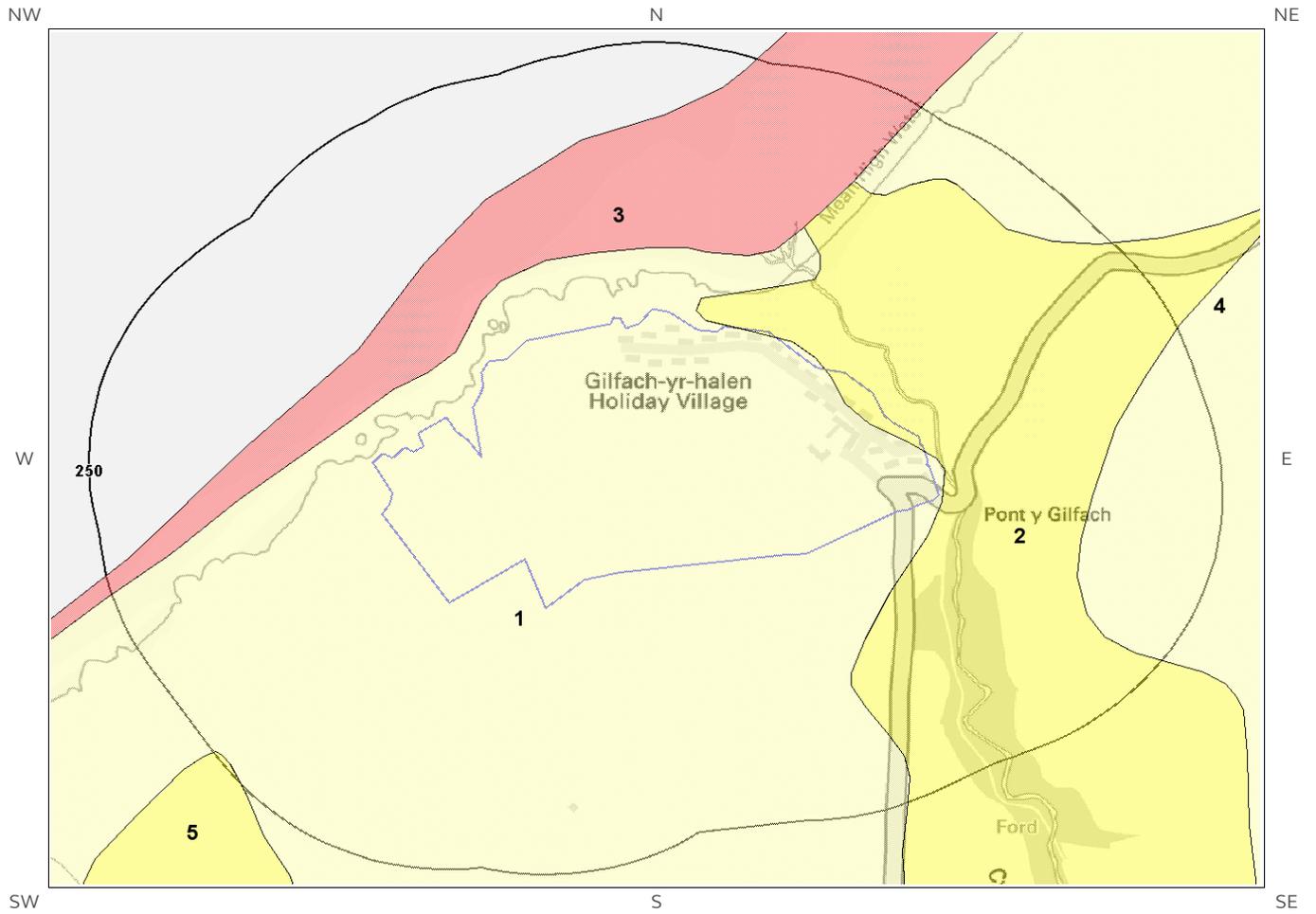
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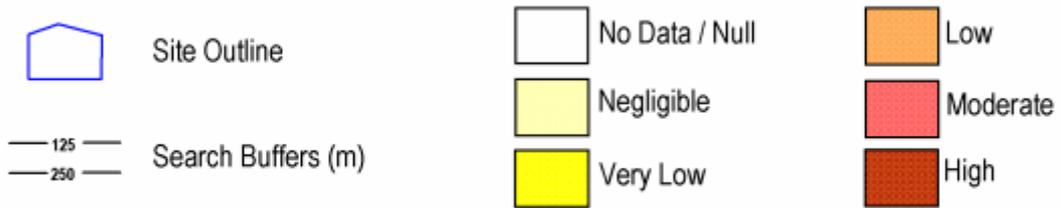
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The National Ground Subsidence rating is obtained through the 6 natural ground stability hazard datasets, which are supplied by the British Geological Survey (BGS).

The following GeoSure data represented on the mapping is derived from the BGS Digital Geological map of Great Britain at 1:50,000 scale.

What is the maximum hazard rating of natural subsidence within the study site* boundary? Moderate

)= 9/ 4 22 2*3

The following Shrink Swell information provided by the British Geological Survey:

	* ::<	.	*B* *	* 2
1	0.0	On Site	Negligible	Ground conditions predominantly non-plastic. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely likely due to potential problems with shrink-swell clays.
2	0.0	On Site	Very Low	Ground conditions predominantly low plasticity. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with shrink-swell clays.

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The following Landslides information provided by the British Geological Survey:

	* ::<	.	*B* *	* 2
1	0.0	On Site	Very Low	Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.

* This includes an automatically generated 50m buffer zone around the site

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The following Ground Dissolution information provided by the British Geological Survey:

	*	.	.	*B*	*	* 2
	::<
1	0.0	On Site	Negligible	Soluble rocks are present, but unlikely to cause problems except under exceptional conditions. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.		

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The following Compressible Deposits information provided by the British Geological Survey:

	*	.	.	*B*	*	* 2
	::<
1	0.0	On Site	Negligible	No indicators for compressible deposits identified. No special actions required to avoid problems due to compressible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible deposits.		

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The following Collapsible Rocks information provided by the British Geological Survey:

	*	.	.	*B*	*	* 2
	::<
1	0.0	On Site	Very Low	Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.		
2	30.0	NW	Negligible	No indicators for collapsible deposits identified. No actions required to avoid problems due to collapsible deposits. No special ground investigation required, or increased construction costs or increased financial risk due to potential problems with collapsible deposits.		

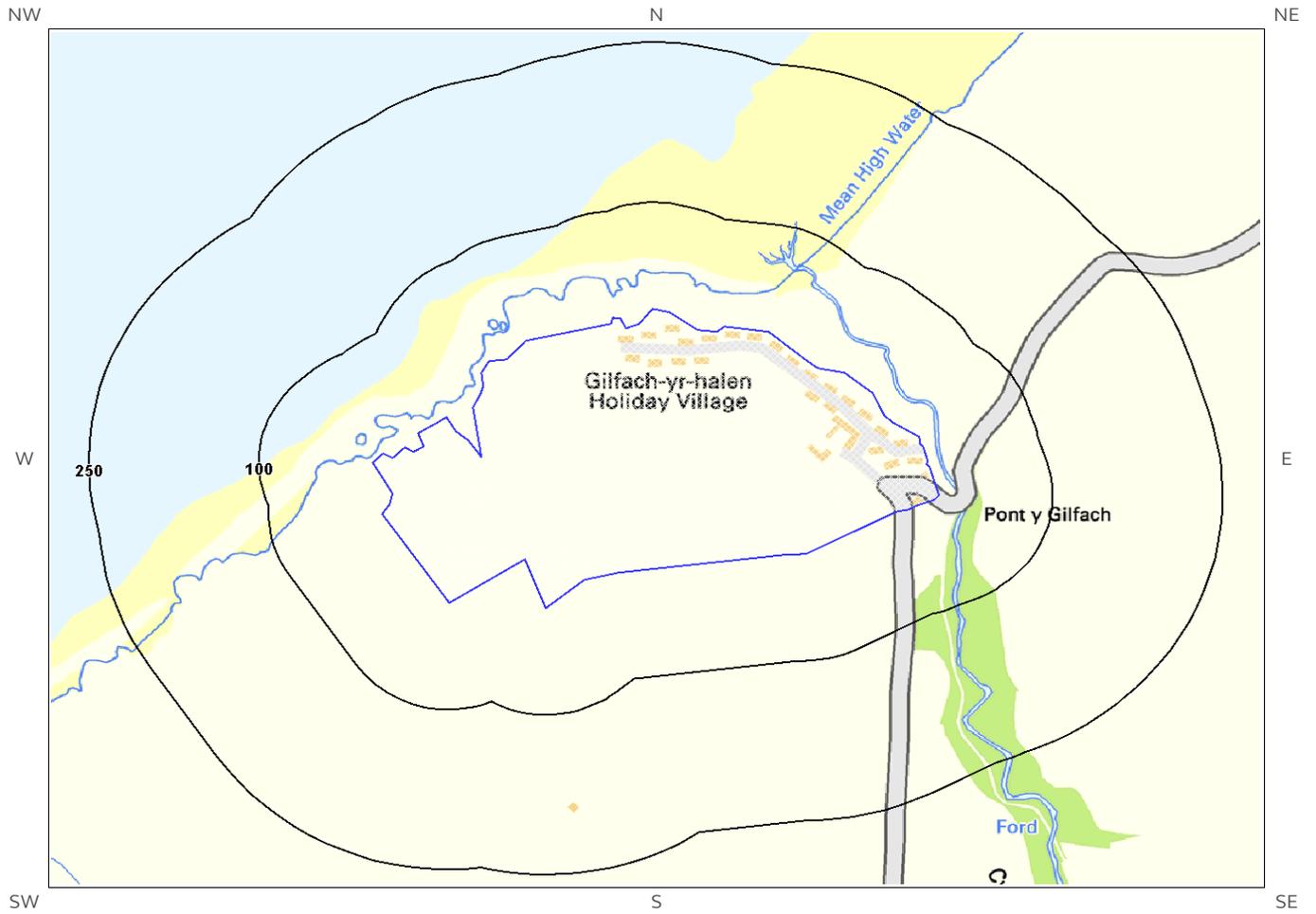
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The following Running Sands information provided by the British Geological Survey:

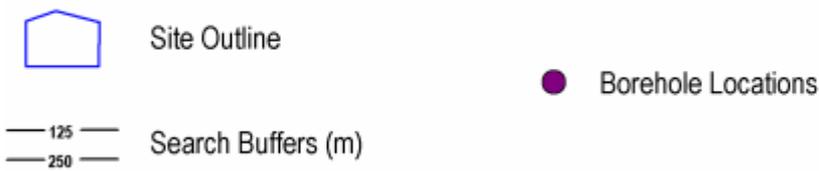
	*	.	.	*B*	*	* 2
	::<
1	0.0	On Site	Negligible	No indicators for running sand identified. No special actions required to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.		
2	0.0	On Site	Very Low	Very low potential for running sand problems if water table rises or if sandy strata are exposed to water. No special actions required, to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.		

	* ;<	.	*B* *	* 2
3	30.0	NW	Moderate	Significant potential for running sand problems with relatively small changes in ground conditions. Avoid large amounts of water entering the ground (for example through pipe leakage or soak-aways). Do not dig (deep) holes into saturated ground near the property without technical advice. For new build - consider the consequences of soil and groundwater conditions during and after construction. For existing property - possible increase in insurance risk from running sand, for example, due to water leakage, high rainfall events or flooding.

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The systematic analysis of data extracted from the BGS Borehole Records database provides the following information.

Records of boreholes within 250m of the study site boundary: 0

Database searched and no data found.

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Records of background estimated soil chemistry within 250m of the study site boundary:

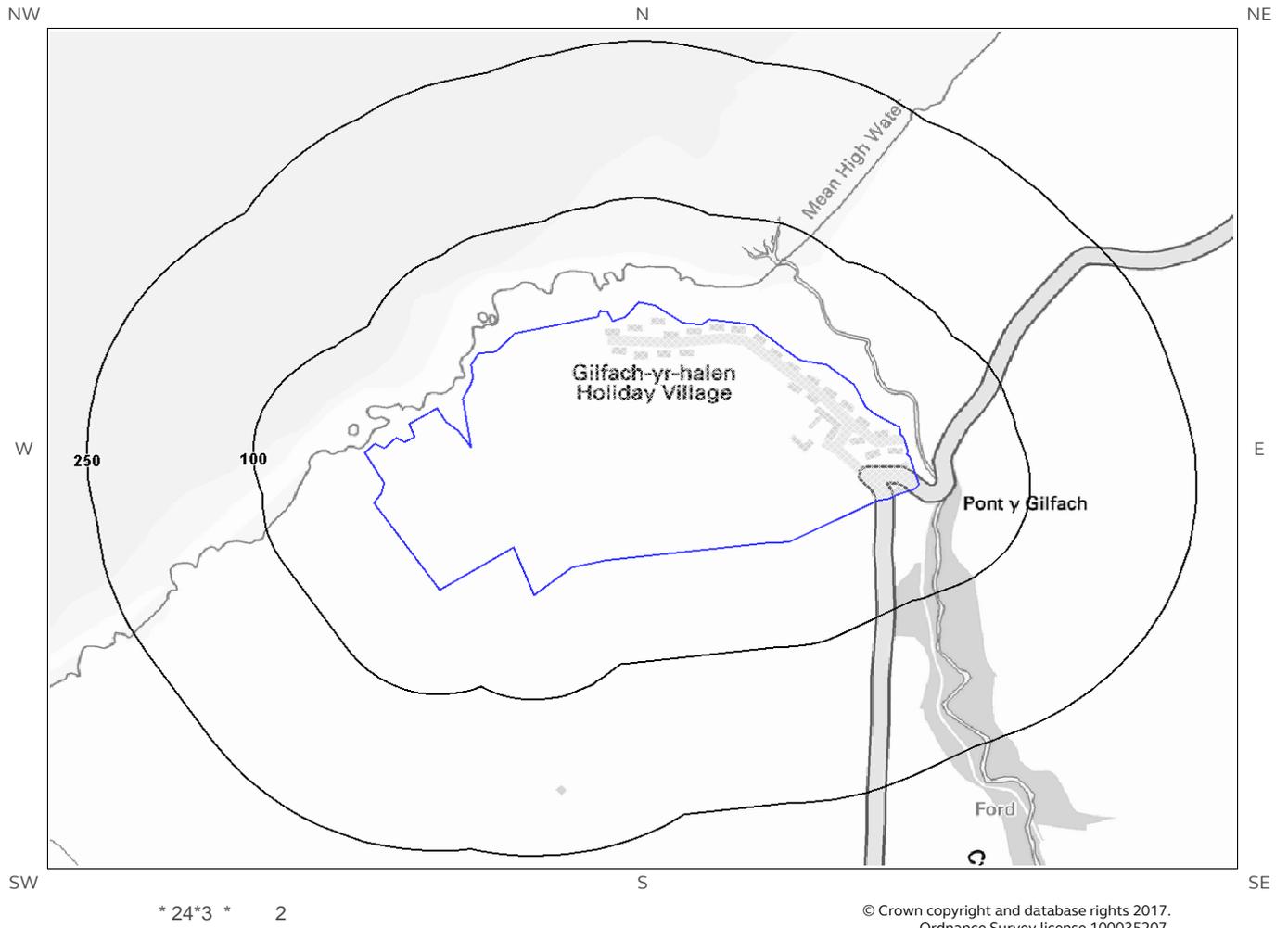
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For further information on how this data is calculated and limitations upon its use, please see the Groundsure Geo Insight User Guide, available on request.

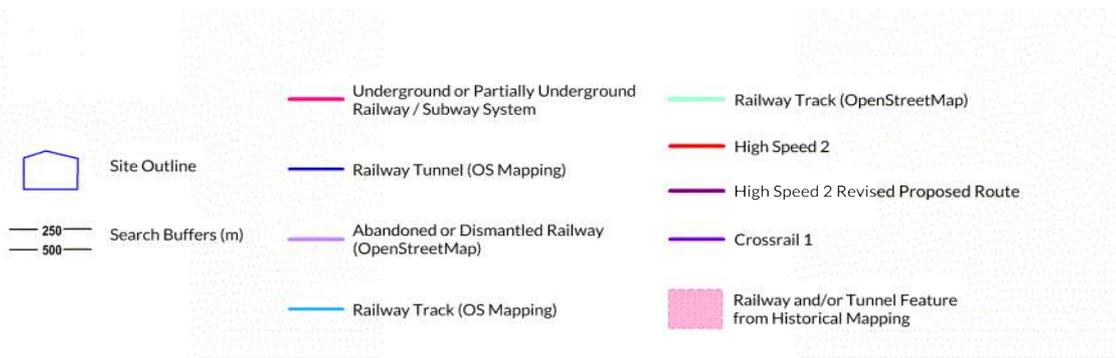
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0.0	On Site	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
30.0	NW	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
40.0	N	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
46.0	S	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
46.0	S	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg

*As this data is based upon underlying 1:50,000 scale geological information, a 50m buffer has been added to the search radius.

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This data is derived from OpenStreetMap and provides information on the possible locations of underground railway systems in the UK - the London Underground, the Tyne & Wear Metro and the Glasgow Subway.

Have any underground railway lines been identified within the study site boundary? No

Have any underground railway lines been identified within 250m of the study site boundary? No

Database searched and no data found.

This data is derived from Ordnance Survey mapping and provides information on the possible locations of railway tunnels forming part of the UK overground railway network.

Have any other railway tunnels been identified within the site boundary? No

Have any other railway tunnels been identified within 250m of the site boundary? No

Database searched and no data found.

1=+ .*2 * 24*3 * 2 *

This data is derived from Groundsure's unique Historical Land-use Database and contains features relating to tunnels, railway tracks or associated works that have been identified from historical Ordnance Survey mapping.

Have any historical railway or tunnel features been identified within the study site boundary? No

Have any historical railway or tunnel features been identified within 250m of the study site boundary? No

Database searched and no data found.

1=> . * 24*3

This data is derived from OpenStreetMap and provides information on the possible alignments of abandoned or dismantled railway lines in proximity to the study site.

Have any historical railway lines been identified within the study site boundary? No

Have any historical railway lines been identified within 250m of the study site boundary? No

Database searched and no data found.

Multiple sections of the same track may be listed in the detail above

1=(. , * 24*3

These datasets are derived from Ordnance Survey mapping and OpenStreetMap and provide information on the possible locations of active railway lines in proximity to the study site.

Have any active railway lines been identified within the study site boundary? No

Have any active railway lines been identified within 250m of the study site boundary? No

Database searched and no data found.

Multiple sections of the same track may be listed in the detail above

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These datasets provide information on the location of large scale railway projects High Speed 2 and Crossrail 1 .

Is the study site within 5km of the route of the High Speed 2 rail project? No

Is the study site within 500m of the route of the Crossrail 1 rail project? No

!"# \$ %

The route data has been digitised from publicly available maps by Groundsure. The route as provided relates to the Crossrail 1 project only, and does not include any details of the Crossrail 2 project, as final details of the route for Crossrail 2 are still under consultation.

Please note that this assessment takes account of both the original Phase 2b proposed route and the amended route proposed in 2016. As the Phase 2b route is still under consultation, Groundsure are providing information on both options until the final route is formally confirmed. Practitioners should take account of this uncertainty when advising clients.

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BGS Geological Hazards Reports and general geological enquiries



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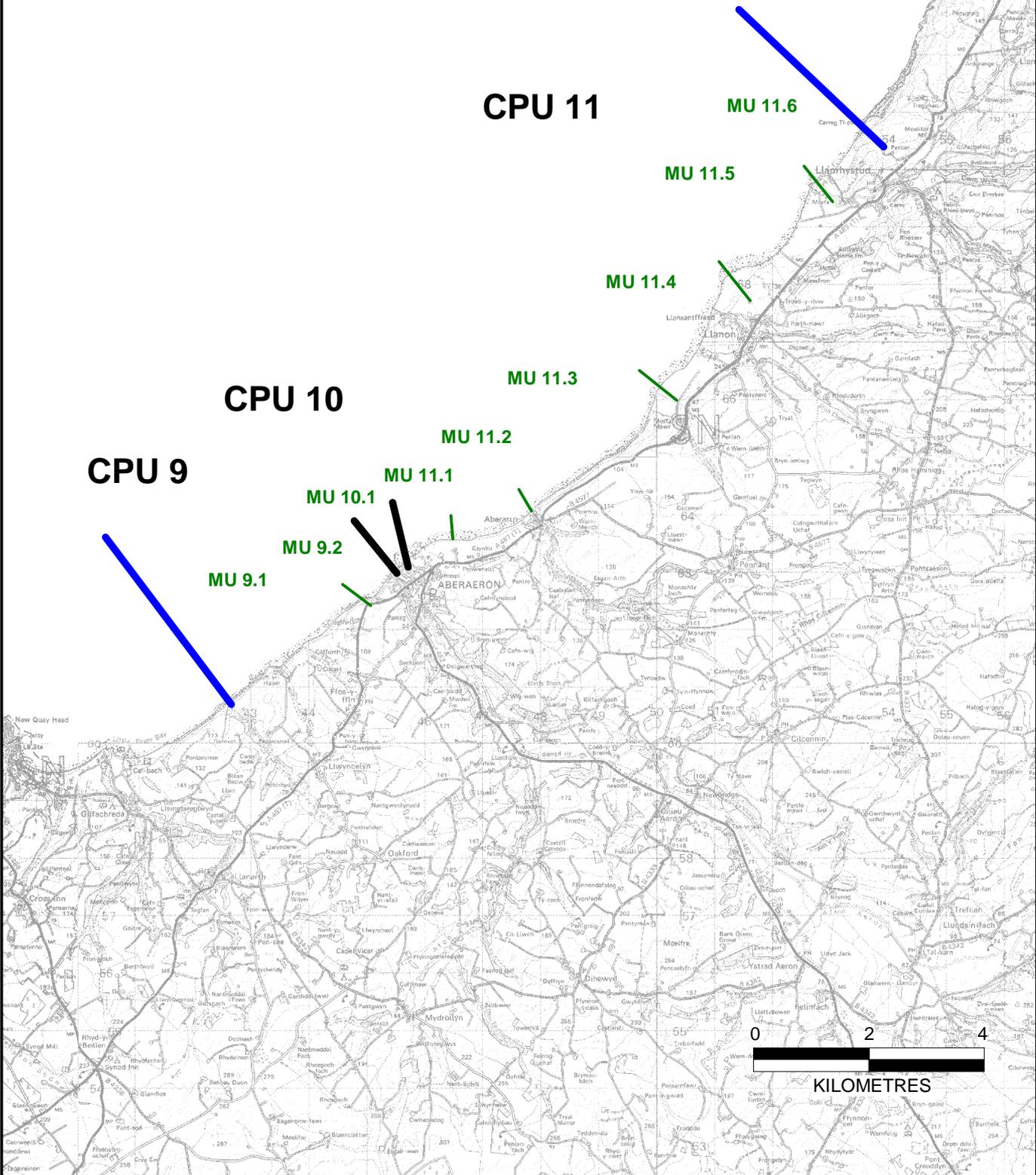
Groundsure's Terms and Conditions can be viewed online at this link:

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APPENDIX C



ZONE D



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	PROJECT CARDIGAN BAY SHORELINE MANAGEMENT PLAN	TITLE ZONE D		DATE MAR '04 SCALE 1:100,000
				DRAWN MJM CHKD LC
				FIGURE 5.4b

5.4.1 CPU 9 Gilfach yr Halen Cliffs (Aberaeron South Beach)**Coastal Processes:**

Exposure:	Tidal range (springs):	4.3m
	Dominant Process:	Waves, high exposure. Dominant directions W with significant energy from WNW.
Geomorphology:		General SW/NE orientation. Hard rock cliffs overlain over the central section, between the watercourses of Afon Cwinten and Ceri Brook, by thick boulder clay deposits. This leading down to the shingle bank fronting the southern section of Aberaeron.
Longshore drift potential:		Predominantly net drift from the SW to NE, locally reduced at the northern end of the boulder clay frontage and at South Pier.
Trends:	Erosion:	Very slow erosion of cliffs immediately S of Aberaeron with more rapid erosion of the clay cliffs. Potential erosion of the land behind south beach and periodic erosion of areas of the shingle beach.
	Accretion:	Material partially entrapped within the valley at Gilfach yr Halen and held up at Aberaeron South Pier.
Long-term Evolution:		Local erosion likely to continue but constrained eventually as hard rock cliffs become more prominent, resulting in a reduction of drift. In the absence of defences or control, erosion of south beach and breaching into harbour area would occur.

Management Units: MU 9.1 Cliffs, MU 9.2 South Beach

Appraisal Format:	There is some drift of material from the south to South Beach Aberaeron. This would in time be reduced naturally. Units are therefore considered in numerical sequence up the coast.
-------------------	--

CPU issues: Erosion of the clay cliffs will result in a decreasing drift into the South Beach management unit. The Harbour South Pier artificially holds South Beach.

Local Appraisal of MU 9.1**i) Initial Screening**

Do Nothing	Current policy, appropriate to natural hard frontage. Erosion of the clay cliffs will continue with loss of economic assets. Will maintain drift in the short term. Possible loss of existing environment interest.	Potentially Viable
Hold the Line	Low value of assets compared with defence costs. Would curtail drift to the north. This option is inappropriate to the nature of the frontage.	Not Considered Further
Retreat	Possibility of local action to stabilise cliffs.	Potentially Viable
Advance	No value nor strategic need to advance the line of protection	Not Considered Further

ii) Appraisal of Potentially Viable Options

Do Nothing and Retreat the Line are potentially viable options and are considered further.

Do Nothing

This is the existing policy. The soft clay cliffs would continue to erode, supplying some sediment along the coast to the north, but also providing fine sediment input to the nearshore waters. The cliff-top assets at Gilfach yr Halen would be lost.

This option, despite the possible loss of assets and tourism facilities, which could be relocated, generally assists in meeting the aims of shoreline management and while not necessarily protecting the specific existing environmental interest in the long term, it does address local issues overall. Moving assets from the cliff top might potentially allow room for more natural development of habitats.

The indicative economic damages are shown in the table below.

Retreat

Although it may be appropriate to allow the shore to evolve naturally, the option exists to stabilise the cliff in the immediate area of the holiday chalets, at the edge of the Cwinten Valley. This action would still allow general natural erosion of the frontage, and effectively would extend the section of hard exposed cliff further north.

Such action would be consistent with the general aims of shoreline management. It would not significantly affect sediment transport but could impact upon the environmental interests of the coast. An indicative cost of the works is set out in the table below. This suggests the justification of this option would be marginal. It is unlikely that it would warrant public investment but equally this option should not be ruled out, subject to more detailed investigation, specifically in relation to environmental interests.

iii) Indicative Economic Assessment

Item	Do Nothing	Retreat
Costs £ x 1,000 (Pvc)	0	112
Damage £ x 1,000 (PVb)	95	0
Benefits £ x 1,000 (PVb)	0	95
NPV	0	-17
B/C ratio	-	0.85

iv) Preferred Policy Option

Do Nothing meets the shoreline management aims and is therefore the preferred option.

v) Management Implications and Issues

Under a Do Nothing policy, there will be continued erosion of areas of glacial drift and this potentially would threaten certain assets. Where it is technically feasible and desirable to do so, the SMP policy of Do Nothing would not necessarily preclude protecting local areas. Such local protection would have neither a significant impact upon coastal processes nor would it affect sediment supply in any substantial way. Indeed if there were local intervention, one constraint would be that it should not interfere with these processes; any works would need to be set back from the main line of the cliffs.

In the long term, as the soft frontage retreats, the hard rock to the north will become more prominent and will eventually restrict drift to the north. An appreciation of this impact must be taken forward in considering policies for adjacent units.

Any proposed development or investment in the cliff-top frontage needs to recognise the policy of allowing continued erosion.

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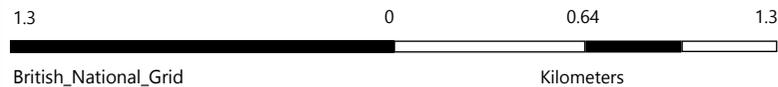
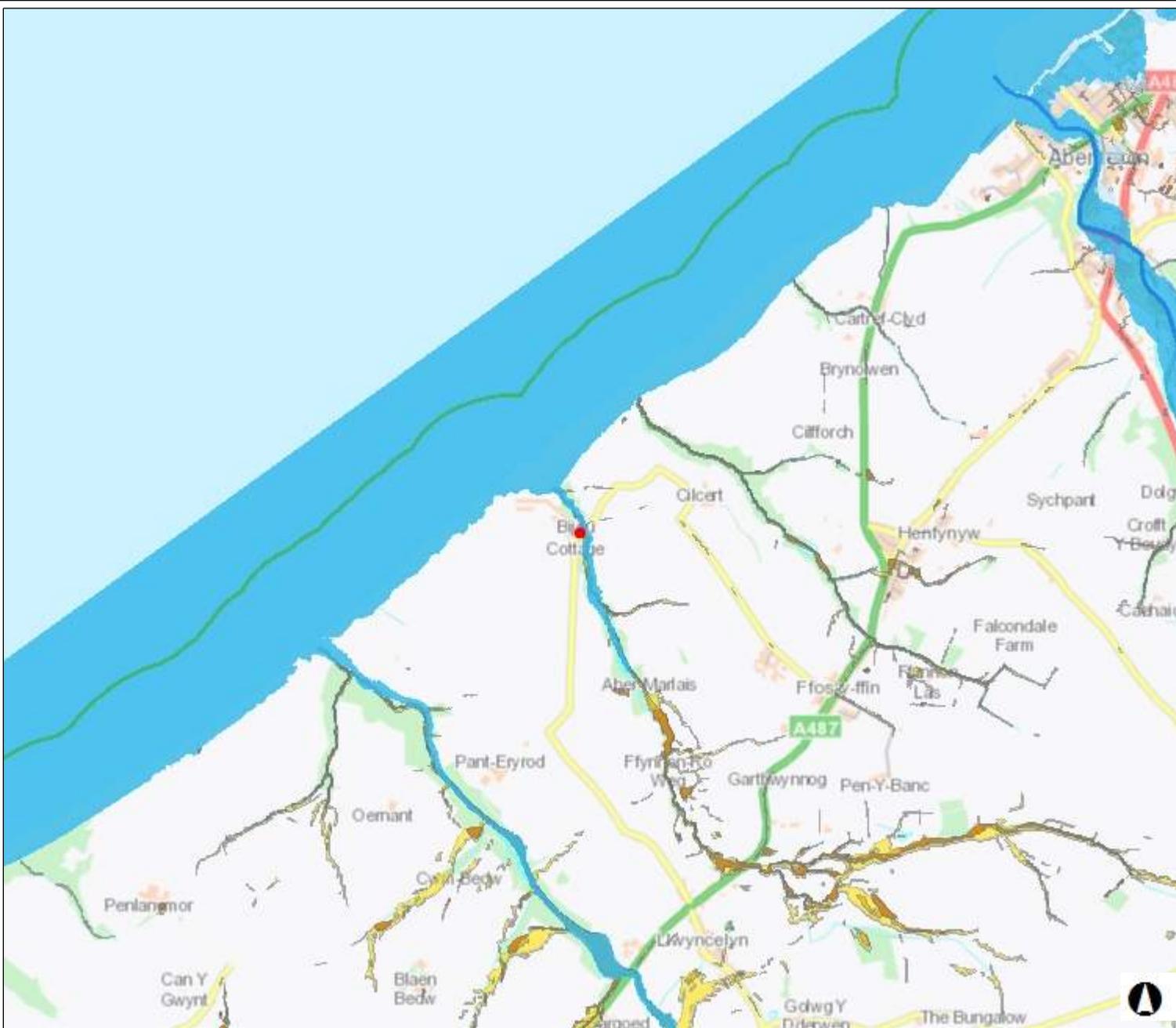
Map Perygl Llifogydd / Flood Risk Map

Allwedd / Map Key

-  Main Rivers
-  Flood Defences
-  Areas Benefiting from Flood Defences
-  Shoreline Management Plan & Coastal Erosion
-  Flood Storage Areas
-  Floodmap Flood Zone 3
-  Floodmap Flood Zone 2
- Reservoir Depths**
-  0 - 0.3m
-  0.3 - 2.0m
-  Greater than 2.0m
-  High Surface Water Flood Risk - Extent
-  Medium Surface Water Flood Risk - Extent
-  Low Surface Water Flood Risk - Extent

Graddfa / Scale 1: 25,000

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22/11/2017

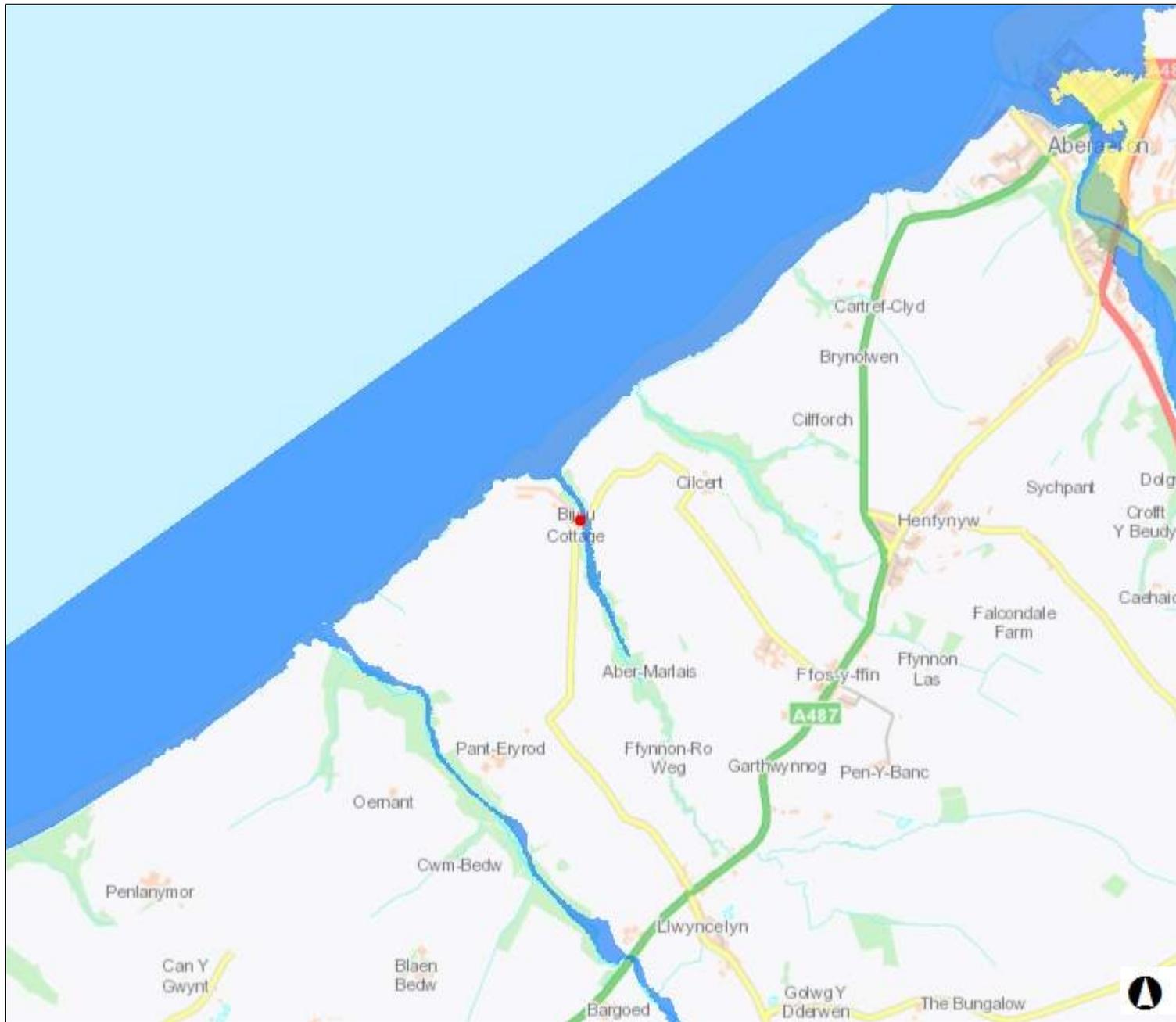


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Map Perygl Llifogydd / Flood Risk Map

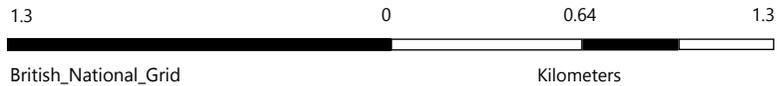
Allwedd / Map Key

- Zone C1
- Zone C2
- Zone B
- Zone A



Graddfa / Scale 1: 25,000

Dyddiad / Date
22/11/2017



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