GEO Environmental Engineering

PHASE 1: DESK TOP STUDY REPORT

PROPOSED RESIDENTIAL DEVELOPMENT OF LAND AT:

SUMMERGROVE, WHITEHAVEN, CUMBRIA

FOR

JOHN SWIFT HOMES LTD

GEO Environmental Engineering

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Client:	John Swift Homes Ltd
Consultant:	Alpha Design Ltd

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1.0 Introduction

1.1 Instruction

Geo Environmental Engineering Ltd (GEO) has been commissioned by John Swift Homes Ltd, herein referred to as the Client to undertake a Phase 1: Desk Top Study Report for land at Summergrove near Whitehaven, Cumbria as indicated on the site location plan included in Appendix I.

It is understood that the Client is considering the site for residential development. Further details relating to the full scope of development should be obtained from the Consultant, Alpha Design Ltd.

This Phase 1: Desk Top Study Report is suitable for submission to the Local Authority as part of a planning application.

1.2 Aims and Objectives

The main objective of this Phase 1: Desk Top Study (DTS) Report is to assess the geological and environmental sensitivity of the development area and the surrounding environs, with particular attention made to any potentially contaminative industries or processes that may have taken place on the site or on adjacent sites, which may be considered as potentially posing a risk of ground/groundwater contamination and ground gas generation that could negatively affect the proposed end users, adjacent land and controlled waters. This Phase 1: Desk Top Study Report has been completed in accordance with the following documents:

- Land Contamination Risk Management Stages 1 to 4 (LCRM – www.gov.uk).
- CLR11: Model Procedures for the Management of Land Contamination. DEFRA/EA, 2004.
- BS10175:2011: Code of Practice for the Investigation of Potentially Contaminated Sites.
- BS5930:2015: Code of Practice for Site Investigations.
- UK Specification for Ground Investigation, 2nd Edition. Site Investigation Steering Group, 2011.
- Effective Site Investigation. Site Investigation Steering Group, 2013.

During the completion of this DTS, information has been obtained and reviewed from the following sources:

- British Geological Survey (BGS) Geological Mapping Data
- Environment Agency (EA).
- Ground Sure Report (Geoinsight and Enviroinsight – GSR – Appendix II)
- Ordnance Survey Historical Map Data (Appendix III)
- The Coal Authority Online Database.

1.3 Limitations of Use

The information, assessments, conclusions and recommendations presented within this Phase 1: Desk Top Study (DTS) Report are solely based on, and are limited to, the boundaries of the site, the immediate area around the site, and the historical use(s) as described, with the approximate extent of the site marked on the Site Location Plan in Appendix I.

This DTS has been completed utilising information relating to the physical and environmental setting of the development area, highlighting, where possible, any potential geohazards that might be encountered with respect to the proposed Residential end use (i.e. “Best Fit” CLEA classification of *Residential*).

Therefore, if a change in the proposed end use is envisaged, then a reassessment of the development area should be carried out.

Consequently, any comments, opinions, diagrams, cross sections and/or sketches contained within the DTS, and/or any configuration of the findings is purely conjectural and given for guidance only as no intrusive investigation works have been completed by Geo Environmental Engineering Ltd and it is recommended that confirmation of the anticipated ground conditions should be considered before development proceeds.

The conclusions and recommendations presented within this report are considered reasonable based on the available information. However, these cannot be guaranteed to gain regulatory approval. Therefore, the report should be passed to the appropriate regulatory authorities and/ or other key stakeholders in order to seek their approval of the findings prior to undertaking any works on site.

Reliance on the report is for the named Client only. Agreement for the use or copying of this report by any Third Party must be obtained in writing from Geo Environmental Engineering Ltd. Reliance on the report is strictly in accordance with the Geo Environmental Engineering Ltd Standard Terms and Conditions, copies of which are available on request.

2.0 Site Location and Development Proposals

2.1 Development Proposal

It is understood that the Client plans to develop the site for residential end use. A proposed site layout plan has not been provided, however, it is likely that the development will include private housing with gardens, areas of soft landscaping, roads, car parking and other associated infrastructure.

It is understood that the client plans to include a sustainable urban drainage system (SUDS) to accommodate surface water run-off where feasible and suitable to do so.

2.2 Site Location and Description

The site, occupying an area of c.8.21ha is irregular in shape and located in a rural setting, c.3.5km south east of Whitehaven town centre and c.2.5km north west of Cleator Moor in Cumbria.

- National Grid Reference: 299998, 515394
- Post Code: CA28 8XZ (approximate only)

The site comprises two agricultural fields, separated by a post and wire fence. Access between the two fields was not possible during the site walkover. Access to the site is made from Dalzell Street to the south east or Summergrove Park (residential estate) to the north.

An elongated mound of material is present on the site boundary, adjacent to the former quarry (possibly overburden from the quarry). The mound rises c.2 to 3m above the level of the site.

A location plan and photographs of the site that were taken during the walkover survey in December 2018 are included in Appendix I.

2.3 Existing Site Levels

The central part of the site undulates, but is generally level, however, the ground level falls to the north and south. Topographical survey data was not available during the investigation; however, Ordnance Survey data indicates that the highest part of the site in the centre is at an elevation of c.96m AOD. The southern part of the site is at an elevation of c.87m AOD and the northern part of the site is at an elevation of c.90m AOD.

Given the changes in elevation across the site, it is recommended that a topographical survey is completed to aid site layout design.

2.4 Existing Site Surfacing and Buildings

The site is surfaced with grass. There are no buildings present on site.

2.5 Surrounding Land Uses

The site is delineated by post and wire/timber fencing. Summergrove Park (residential housing estate) is present immediately north east of the site and Westlakes Science and Technology Park is present to the south beyond a strip of dense woodland. A former quarry (Galmire Quarry) is present to the east of the site and agricultural fields are present to the north west and east. The quarry has previously been used as an inert landfill, however, it is understood that the site has been closed for several years and no longer accepts any waste.

2.6 Existing Infrastructure and Utilities

A review of statutory utility supplier records lies outside the scope of this report.

However, an inspection of the utility plans obtained in preparation for the ground investigation works indicates that there are no mains utilities on site. No evidence of buried utilities was noted during the site walkover.

2.7 Previous Reports

GEO are not aware of any previous reports or studies for the site.

3.0 Geo-Environmental Setting

This section is based principally upon a search of information available on public registers and obtained through the Ground Sure Report (GSR) to determine any environmental or geological constraints to the proposed development.

- Section 3.1 refers to the Geoinsight Ground Sure Report contained in Appendix II.
- Sections 3.2 to 3.4 refer to the Enviroinsight Ground Sure Report contained in Appendix II.
- Section 3.5 refers to the Historical Map Extracts contained in Appendix III.

3.1 Development Area Geology

A geological review of the site has been undertaken using information provided in the GSR and on published geological maps as indicated below:

- BGS Sheet 28 Whitehaven, 1:50,000 scale, Solid and Drift Editions (see Figures 1 and 2).

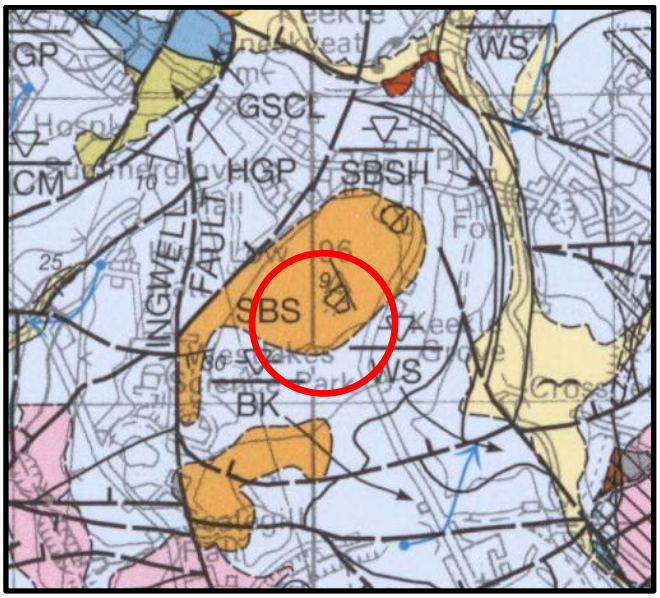


Figure 1. 1,50,000 Geological Map (Solid & Drift)

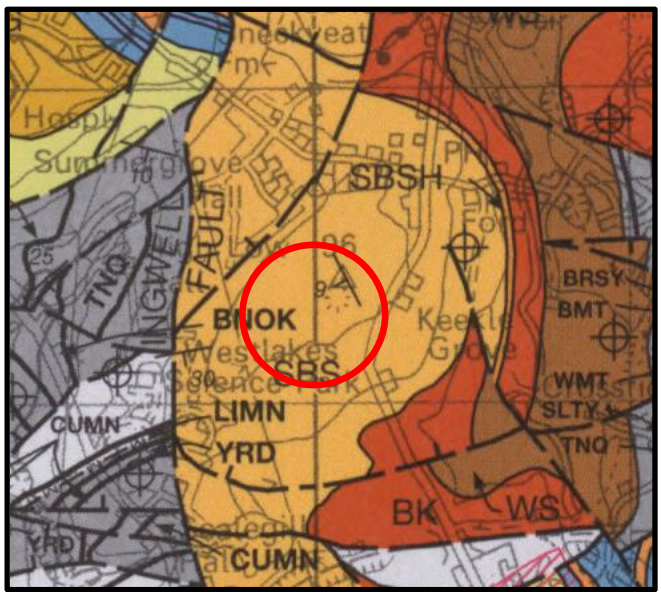


Figure 2. 1,50,000 Geological Map (Solid)

3.1.1 Made Ground

A review of the published geological map and the GSR indicates that there are no areas of recorded made ground on the site, however, both sources, indicate a former quarry (worked ground) immediately adjacent to the east of the site (Galmire Quarry). It is understood that the quarry was used until recently as a landfill for inert waste. The landfill has now closed. There is no evidence of any landfill type materials at the surface of the former quarry which suggests that the landfill has been covered.

It is common for agricultural land to be disturbed/re-worked during agricultural processes (i.e. ploughing) and some undulations may have been infilled. Topsoil materials on agricultural land can frequently include coarse granular anthropogenic debris (i.e. fragments of ash, clinker, brick, etc.) that may have been added to the shallow soils to aid drainage.

3.1.2 Drift Geological Deposits

A review of published geological map indicates that the majority of the site is devoid of drift deposits, except for the most southerly part of the site which is underlain by glacial till deposits. These deposits typically comprise sandy, gravelly, firm and stiff clay with occasional layers of sand and gravel. Sporadic boulders may also be present.

The GSR (Geoinsight Section 6.0) within Appendix II identifies the following geohazards and indicates a preliminary level of risk:

- Shrink-swell clays — Negligible to very low risk.
- Landslides — Very low risk.
- Compressible deposits — Negligible risk.
- Collapsible deposits — Very low risk.
- Running sands — Very low risk.

Glacial till deposits may be geotechnically variable and can be affected by shrinking and swelling, especially in the vicinity of mature vegetation such as hedgerows and trees. It would be prudent to carry out geotechnical testing on clay samples to determine minimum foundation depths. Consequently, Phase 2: Ground Investigation works would be prudent to aid the design of foundations, roads and any retaining structures, should they be deemed necessary by the Design Team.

It is recommended that reference be made to Section 6.0 of the Geoinsight GSR (Appendix II).

3.1.3 Bedrock Deposits

Reference to the published geological map and the GSR indicates the site is underlain by St Bees Sandstone Member. This is recorded as bed-brown, very fine to medium grained, commonly micaceous sandstones.

The GSR indicates that there is a negligible risk from the dissolution of rock or natural cavities beneath the site.

The St Bees Sandstone Member is devoid of productive coal seams.

3.1.4 Historical Borehole Records

The GSR indicates several historical boreholes within the vicinity of the site, however, an inspection of the records indicates that they do not contain any information.

3.1.5 Geological Features

An inspection of the geological map indicates that a fault is present immediately north of the site. Structurally, the fault poses a very low risk as any ground movement will have ceased by now, however, there is a potential for fractured strata in the vicinity of the fault.

3.1.6 Mining and Quarrying Assessment

The site is underlain by the by St Bees Sandstone Member which is devoid of productive coal seams. Strata of the Middle Coal Measures (MCM) strata is present c.174 west of the site. Several coal seams are present within the MCM strata that are known to have been worked in this area including the Ten Quarters Coal seam, Main Band Coal seam, Yard Coal seam, etc… However, the seams dip to the north west, away from the site. Therefore, the risk of shallow unrecorded coal seams beneath the site is currently considered to be negligible.

An inspection of the Coal Authority (CA) online database indicates that the site is located within a coal mining reporting area due to its proximity to the MCM strata. However, the CA do not indicate any coal mining related features in the vicinity of the site. As such, the risk of coal mine related geohazards is currently considered to be negligible.

Information presented within the GSR suggests that there is no risk to the development from natural cavities, brine extraction, tin mining, clay mining and gypsum extraction. The GSR also notes that the risk from ground dissolution of soluble rocks is negligible.

The GSR indicates several areas of iron ore mining in the vicinity of the site. The mining areas are suggested c.39m south west, 134m south and 174m west. The GSR also indicates an area of mining within the site boundary and refers to the feature as “Whangs, Cumbria”. However, published geological plans (which normally indicate the presence of iron ore mine workings) indicate none at the site location. Likewise, the Northern Cavern & Mine Research Society do not record underground workings at this location. As a result, a significant risk is not considered to be present associated with iron ore mining.

GEO is not responsible for third party information and records may be inaccurate or incomplete. Consequently, GEO recommends that care and consideration of potential mining features should be made by the developer during construction.

3.1.7 Radon Gas Assessment

The GSR indicates that the development area is not located within a Radon Affected Area as defined by the Health Protection Agency (HPA), as less than 1% of properties are above the action level and in accordance with BR211 radon protection measures are not necessary.

3.2 Development Area Hydrogeology (Groundwater)

3.2.1 Made Ground/Soils

Any made ground/topsoil materials on site are likely to be classified as high permeability (i.e. worst-case scenario assumed until proven otherwise).

3.2.2 Drift Geology

The GSR indicates that the natural drift deposits are predominantly devoid on the site except for the most southerly part which is underlain by glacial till deposits. These deposits are recorded by the BGS as a Secondary Aquifer (undifferentiated layers). However, as the drift deposits are recorded as glacial till, it is likely that they will have a low permeability and a negligible significance for water supply or river base flow.

3.2.3 Solid Geology

The underlying bedrock (St Bees Sandstone Member) is designated Principal Aquifer status. This is geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale.

3.3 Development Area Hydrology

3.3.1 Groundwater

Given the topography and anticipated ground conditions, shallow groundwater is considered unlikely, however, localised perched (trapped) water may be encountered within any made ground and cohesive soils.

A review of the Hydrology information in the GSR indicates the following:

- There are no groundwater abstractions recorded within c.1km of the site.
- The nearest surface water abstraction is recorded c.472m south west for Westlakes Properties Ltd, however, the license is recorded as historical and is unlikely to be active.
- No potable water abstraction licences are held within c.2km of the site.
- The site is not recorded as being within or within c.500m of a Source Protection Zone.

3.3.2 Surface Water Features

The nearest surface water feature is an unnamed stream or drain c.28m south east.

3.3.3 Current Surface Water Run-off

As the site is currently an open undeveloped field, surface water is anticipated to permeate into the underlying ground with some run-off onto surrounding land during periods of heavy rain fall.

3.4 Development Area Environmental Sensitivity

3.4.1 Site Ecology

- No Sites of Special Scientific Interest (SSSI) are recorded within 250m.
- No Special Areas of Conservation (SAC) are recorded within 250m.
- No National Nature Reserves (NNR) are present within c.250m.
- No Special Protection Areas (SPA) are present within c.250m.
- No World Heritage Sites are recorded within c.250m.
- No RAMSAR Sites are noted within c.250m.
- No Records of Ancient Woodland are recorded within c.250m.
- No Environmentally Sensitive Areas are recorded within c.250m.
- No Areas of Outstanding Natural Beauty (AONB) are recorded within c.250m.
- No National Parks are recorded within c.250m.
- No Nitrate Vulnerable Zones (NVZ) are within c.250m.
- No Nitrate Sensitive Areas are within c.250m.

The Design Team should refer to Section 8.0 of the GSR (Enviroinsight – Appendix II) for further information on the above-mentioned records.

3.4.2 Authorisations, Incidents and Registers

- No records of IPC Authorisations are held within c.250m.
- No records of IPPC Authorisations are held within c.250m.
- No records of Water Industry Referrals are held within c.250m.
- No records of Red List Discharge Consents are held within c.250m.
- No records of List 1 Dangerous Substances Inventory sites are held within c.250m.
- No records of List 2 Dangerous Substances Inventory sites are held within c.250m.
- No records of Category 3 or 4 Radioactive Substances Authorisations are held within c.250m.
- There are two Discharge Consents held within c.250m. These are located c.186m south east and 241m north east. Neither are considered as posing a risk to the site.
- No records of Planning Hazardous Substance Consents or Enforcements are within c.250m.
- No records of COMAH and NIHHS sites are held within c.250m.
- No Environment Agency Recorded Pollution Incidents (List 2) are noted within c.250m.

The Design Team should refer to Section 2.0 of the GSR (Enviroinsight – Appendix II).

3.4.3 Determination of Contaminated Land (Part IIA)

A review of the GSR Enviroinsight has indicated that the site is not currently recorded as being determined as Contaminated Land under Part IIA EPA 1990. In addition, no sites are determined as Contaminated Land under Part IIA EPA 1990 within c.500m of the development area.

3.4.4 Historical Industrial Land Uses

A review of Section 1.0 in the GSR (EnviroInsight) identifies the following:

- Potentially Contaminative Uses (PCU) - The GSR indicates two main PCUs within 250m. This includes the former quarry immediately adjacent to the eastern boundary and an infectious diseases hospital c.135m north east. The risk to the site from the hospital is negligible.
- Potentially Infilled Land – The GSR indicates a former pond and quarry on the site, however, both of these features were located immediately east of the site (the pond is indicated within the quarry). Other areas of potential infilled land within c.250m include unspecified ground workings, quarry and ponds.
- Historical Tank Database – The nearest historical tank is recorded as a possible tank or trough c.98m south.
- Historical Energy Features – None recorded with c.250m.
- Historical Petrol and Fuel Site Database – None noted within c.250m.
- Historical Garage and Motor Vehicle Repair Database – None noted within c.250m.

It is recommended that reference be made to Section 1.0 of the GSR for further information (Enviroinsight – Appendix II).

3.4.5 Current Industrial Land Uses

The Enviroinsight GSR does not indicate any current industrial land uses on the site. Within 20m industrial land uses include a refuse disposal facility, electrical pylon and sub-station and general industrial engineering within Westlakes Park c164m south west. The refuse disposal facility is recorded 25m north east, however, it is understood that the former quarry immediately east was used as the refuse disposal facility (landfill).

3.4.6 Fuel Station Entries

No fuel filling stations are currently active within c.500m of the site.

3.4.7 Landfill and Waste Regulation/Management – Landfill Sites

The Environment Agency and BGS/DoE indicate that former quarry (Galemire Quarry) present immediately east of the site is recorded as a landfill. The landfill was registered to accept non-biodegradable waste. A planning application was made in 2015 (Reference: PL\1479\05 (4/15/9009)) for the importation of material to improve the restoration of the former inert landfill site.

It is recommended that reference be made to Section 3.0 of the GSR Enviroinsight (Appendix II) for further information.

3.5 Development Area Historical Plan Appraisal

This section is based on historical Ordnance Survey map data that was obtained as part of the GSR and provides a summary of the site history and highlights any industries, processes or activities that may be considered as Geohazards. Copies of historical maps are provided in Appendix III. Copies of historical Ordnance Survey maps covering the site and adjacent areas have been reviewed with extracts provided within Appendix III.

3.5.1 On Site

The site has remained undeveloped agricultural land since the first historical map extract dated 1865.

3.5.2 Off Site

The first historical map extract dated 1865 indicates that the site was surrounded by agricultural land with occasional woodland and some residential properties to the north. Galemire Quarry was present immediately east and by 1899, the quarry had been enlarged and was recorded as an “Old Quarry”. The quarry appears to be disused after 1925 as the northern part comprises a pond. By 1987 the quarry is recorded as a tip. Between 1994 and 2017 further house building has occurred to the north.

The historical maps do not indicate any significant industrial land uses on or in the vicinity of the site, except for the quarry.

4.0 Conceptual Site Model

A Conceptual Site Model (CSM) has been designed using the information presented within this DTS to provide a model of the anticipated ground, groundwater and ground gas conditions below the development area (Existing Site CSM).

The CSM utilises the established *Source – Pathway – Receptor* pollutant linkage model and is designed to provide an improved understanding of the site characteristics. This ensures adequate and appropriate Phase 2: Ground Investigation (P2 GI) Works are designed and undertaken for wide spread and targeted investigations, should they be deemed necessary.

Depending on the results of the ground investigation, the CSM can be refined based upon the outcomes of the intrusive works to ensure that appropriate remediation (if required) is completed to ensure the development area is “fit for purpose” in relation to the proposed residential end use.

The preliminary CSM is presented in the matrix on the following page and considers the anticipated *Source – Pathway – Receptor* pollutant linkage model derived for this site.

Sources:
S1 = Possible Made Ground – No specific sources identified. Historical information suggests that the site has remained undeveloped and no industries, processes or potential sources of significant contamination present on site. Historical records indicate a former quarry immediately east of the site that has been used as an inert landfill. Some made ground may be encountered in the vicinity of the former quarry, however, significant contamination is not anticipated. It is likely that any topsoil on the site will be reused for the proposed residential development, therefore, it is recommended that chemical screening is completed to confirm that it is suitable for re-use in a residential context in accordance with British Standards. It is recommended that excavations be completed on site to confirm the shallow ground conditions. At this stage, with no specific contamination sources identified, it is recommended that the soils are screened for a generic suite of contaminants that should include: Metals (Arsenic, Cadmium, Chromium (III and VI), Copper, Lead, Mercury, Nickel, Selenium, Zinc, Cyanide), pH, Water Soluble Sulphate, Total Organic Carbon, Asbestos and PAH. The developer should also implement a watching brief during the development works to ensure that if made ground and or visual/olfactory evidence of contamination is identified then works should be stopped, the Local Authority notified and advice should be sought from an appropriately qualified and experienced Geo-Environmental Engineer.
S2 = Ground Gas (Carbon Dioxide and Methane) – Potential Sources Identified. The site is located adjacent to a former quarry that has been used as an inert landfill. The landfill is a potential source of ground gas. Therefore, gas monitoring for carbon dioxide, methane and oxygen is recommended to determine the risk to the end user.
S3 = Radon Gas – No Potential Sources Identified The GSR indicates that the development area is not located within a Radon Affected Area as defined by the Health Protection Agency (HPA), as less than 1% of properties are above the action level and in accordance with BR211 radon protection measures are not necessary.
Pathways:
P1 = Inhalation of air (wind-blown particles, vapours, gasses)
P2 = Dermal/direct contact (limited risk through areas of private gardens and soft landscaping)
P3 = Ingestion (limited risk through areas of private gardens and soft landscaping)
P4 = Migration through services (potable water supply)
P5 = Direct contact with building materials (aggressive ground conditions for buried concrete)
P6 = Surface Run-off
P7 = Leaching from Soils (to underlying Aquifer)
Receptors:
R1 = Human Health (End users - Residents)
R2 = Human Health (Construction Workforce)
R3 = Controlled Waters (Principal Aquifer, nearby surface waters)
R4 = Building Materials and Buried Utilities
R5 = Flora and Fauna (future private gardens and soft landscaping)

5.0 Preliminary Qualitative Risk Assessment

5.1 Qualitative Geotechnical Risk Assessment – Risk Meter

The following preliminary Geotechnical Risk Meter determines the potential level of risk associated with the geotechnical properties of the site, considering any potential geohazards identified by the information presented within the DTS.

Geotechnical:	⇩					
RISK =	NEGLIGIBLE	VERY LOW	LOW	MODERATE	HIGH	VERY HIGH

A risk level of VERY LOW to LOW is determined appropriate for this development area for the following reasons:

- Historical records indicate that the site has not been previously developed.
- Geological records indicate that the southern part of the site is underlain by glacial till at shallow depth. Glacial till deposits can be geotechnically variable with the potential for bands of sand and gravel. Where clay soils are present, their soil shrinkability could be affected by mature vegetation such as trees.
- The majority of the site is devoid of drift deposits as these have probably been eroded. Depending on the depth of the residual soils and the strength of the bedrock, difficulties may be encountered when excavating utility and foundation trenches.
- Shallow trapped "perched" groundwater may be present within the glacial drift deposits, especially during wetter periods of the year, however, a shallow groundwater table is not anticipated.
- Information provided by the CA, BGS and GSR suggests that the development site is not considered to be at potential risk of mining related geohazards (i.e. ground disturbance/movement/mine entries etc.). However, GEO is not responsible for third party information and records may be inaccurate or incomplete. Consequently, GEO recommends that care and consideration of potential mining features should be made by the developer during construction
- The GSR indicates that the risk from the dissolution of rock beneath the site is negligible.

Consequently, Phase 2: Ground Investigation works would be prudent to determine ground conditions with respect to made ground, natural drift deposits/bedrock and groundwater to aid the design of foundations and highways, should they be deemed necessary by the Design Team.

5.2 Qualitative Contamination Risk Assessment – Risk Meter

The following Risk Meter determines the potential level of risk associated with the development with respect to ground contamination, groundwater contamination and ground gas. The risk meter takes into account the anticipated *Sources – Pathways – Receptors* within the pollutant linkage model and CSM.

Ground Contamination:		⇩				
RISK =	NEGLIGIBLE	VERY LOW	LOW	MODERATE	HIGH	VERY HIGH
Groundwater Contamination:	⇩					
RISK =	NEGLIGIBLE	VERY LOW	LOW	MODERATE	HIGH	VERY HIGH
Ground Gas:			⇩			
RISK =	NEGLIGIBLE	VERY LOW	LOW	MODERATE	HIGH	VERY HIGH

A risk level of VERY LOW is currently determined appropriate for this development with respect to ground contamination. In summary, the site has not been developed, however, the site is located adjacent to a former quarry which was later used as a landfill. There is a potential for some contamination associated with the former quarry/landfill, however, this is unlikely to be significant and will probably be limited in area.

It is recommended, however that intrusive investigations be completed to confirm the shallow ground conditions, with samples recovered to allow for chemical laboratory analysis to facilitate a Human Health Risk Assessment and to determine if the soils (topsoil and sub-soils) are suitable for reuse in a residential context in accordance with British Standards.

At this stage, with no specific contamination sources identified, it is recommended that the soils are screened for a generic suite of contaminants that should include: Arsenic, Cadmium, Chromium (III and VI), Copper, Lead, Mercury, Nickel, Selenium, Zinc, Cyanide (free), pH, Water Soluble Sulphate, Total Organic Carbon, Asbestos and PAH. If, during the ground investigation, areas of made ground or evidence of contamination are identified, it may be necessary to increase the range of contaminant screening depending on the nature and type of possible contaminants encountered.

A watching brief should be implemented during the development works to ensure that if additional areas of made ground (that includes anthropogenic debris, i.e. ash, clinker etc.) and/or visual/olfactory (malodorous) evidence of potential contamination (i.e. fuel/oil) are identified then works should be stopped, the Local Authority notified and advice should be sought from an appropriately qualified and experienced Geo-Environmental Engineer.

A risk level of NEGLIGIBLE is currently considered appropriate for the site with respect to potential risks to controlled waters (groundwater, nearby surface water features) and adjacent sites, as any contamination associated with the quarry/landfill is unlikely to be mobile.

A risk level of LOW is currently considered appropriate for the site with respect to potential harmful ground gas (Carbon Dioxide and Methane). A former quarry/landfill is located immediately east of the site which is a potential source of ground gas.

The GSR indicates that the development area is not located within a Radon Affected Area as defined by the Health Protection Agency (HPA), as less than 1% of properties are above the action level and in accordance with BR211 radon protection measures are not necessary

6.0 Conclusions

When considering the results of this DTS report, the following can be seen:

- The development site is currently considered to represent a very low to low geotechnical risk.
- The site is currently considered to pose a very low risk to the proposed end users from ground contamination.
- The site is currently considered to negligible risk to adjacent sites (the surrounding environment) and controlled waters with respect to potential ground/groundwater contamination.
- The site is currently considered to pose a low risk to the proposed end users from ground gas (Carbon Dioxide and Methane).
- The site does not require Radon protection measures.

Consequently, Phase 2 Ground Investigation works are recommended to fully characterise the ground/groundwater conditions and ground gas regime below the development site with the resulting information suitable for submission to the Local Authority for planning purposes and for the appointed design team.

In summary, the site works could include (as a minimum):

- Mini percussion boreholes and mechanically excavated trial pits to determine the nature and in-situ strength of the underlying ground conditions across the development site.
- Soil logging by a suitably qualified and experienced Geo-Environmental Engineer.
- In-situ strength and density testing to aid foundation design.
- Laboratory based geotechnical and chemical testing.
- Gas and groundwater monitoring
- Interpretive Phase 2: Ground Investigation Report.

It is recommended that excavations be completed on site to confirm the shallow ground conditions and if made ground is identified (with anthropogenic debris) then contamination screening and a human health risk assessment will be required.

In addition, a watching brief is recommended during the redevelopment works to ensure that if made ground (that includes anthropogenic debris, i.e. ash, clinker etc.) and/or visual/olfactory evidence of potential contamination are identified then works should be stopped, the Local Authority notified and advice should be sought from an appropriately qualified and experienced Geo-Environmental Engineer.

The conclusions and recommendations presented within this report are considered reasonable based on the available information. However, these cannot be guaranteed to gain regulatory approval. Therefore, the report should be passed to the appropriate regulatory Authorities and/or other key stakeholders in order to seek their approval of the findings prior to finalising any land values as part of a site acquisition or prior to undertaking any construction or redevelopment works on site.

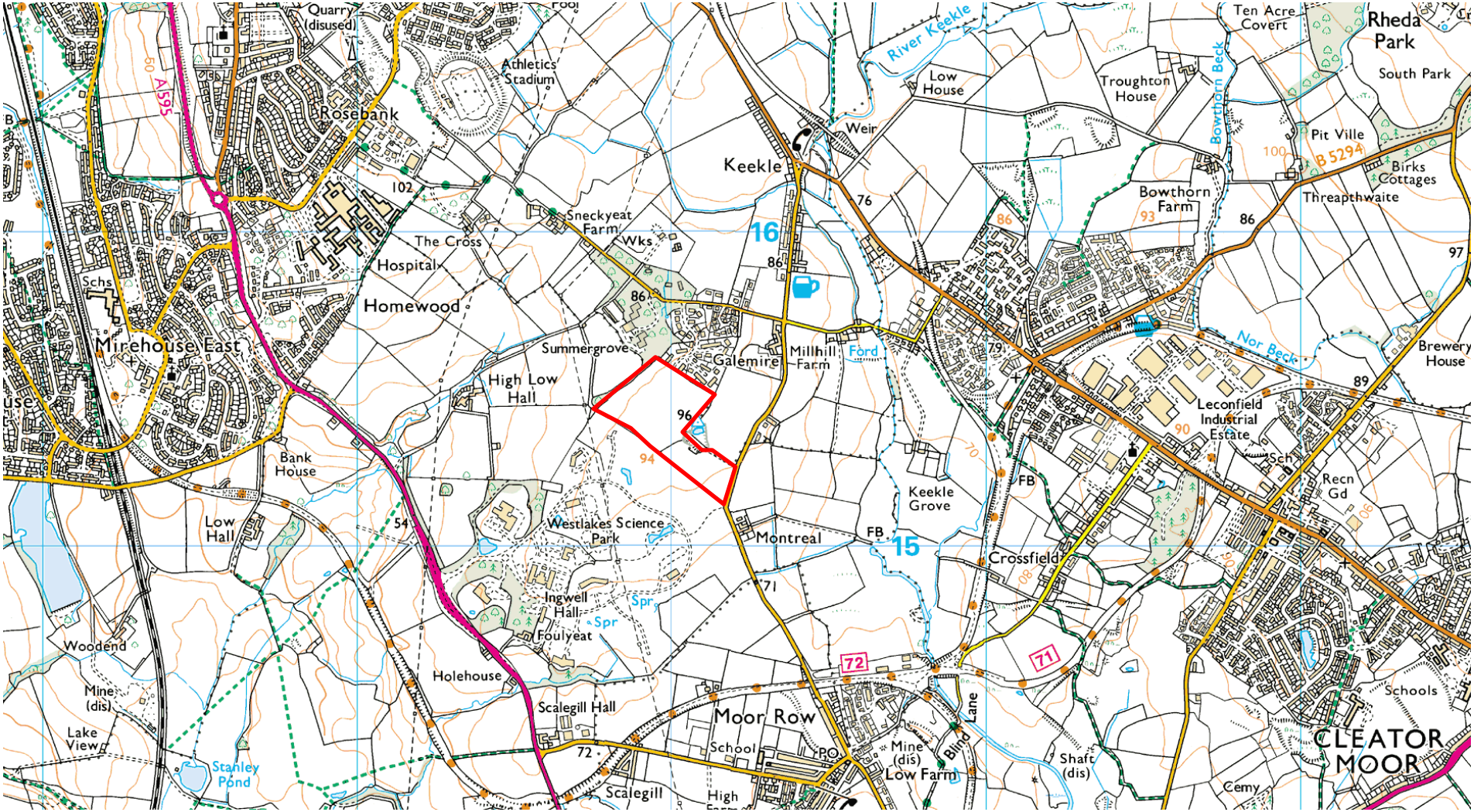
End of Report

Appendix I

- Site Location Plan
- Aerial Photograph Extract
- Site Photographs (November 2018)

GEO Environmental Engineering

GEO2018-3441: Summergrove, Whitehaven – Site Location



Website: www.geoenvironmentalengineering.com
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Telephone: 08456 768 895 / 07883 440 186

GEO Environmental Engineering

GEO2018-3441: Summergrove, Whitehaven – Aerial Photograph

Website: www.geoenvironmentalengineering.com
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GEO Environmental Engineering

GEO2018-3441: Summergrove, Whitehaven – Site Photographs (November 2018)

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Appendix II

- Groundsure Reports (Geoinsight and Enviroinsight Reports)

EmapSite

Masdar House, 1 Reading Road,
Eversley, RG27 0RP

Report Reference: EMS-517324_696160

Your Reference: EMS_517324_696160

Report Date 13 Dec 2018

Report Delivery Method: Email - pdf

Geo Insight

Address:

Dear Sir/ Madam,

Thank you for placing your order with Groundsure. Please find enclosed the **Groundsure Geo Insight** as requested.

If you would like further assistance regarding this report then please contact the emapsite customer services team on 0118 9736883 quoting the above report reference number.

Yours faithfully,

emapsite customer services team

Enc.
Groundsure Geo Insight

Geo Insight

Address:

Date: 13 Dec 2018

Reference: EMS-517324_696160

Client: EmapSite

NW N NE

W E

SW S SE

Aerial Photograph Capture date: 16-Aug-2016

Grid Reference: 299998,515394

Site Size: 8.21ha

Groundsure
LOCATION INTELLIGENCE

emapsite™

Contents Page

Overview of Findings

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?	Yes
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?	Yes
	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	3.1Is 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 not in a Radon Affected Area, as less than 1% of properties are above the Action Level.
	3.2Radon 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	8	1	4	Not Searched	Not Searched
4.2 Historical Underground Workings from Small Scale Mapping	0	0	0	0	14
4.3 Current Ground Workings	0	1	1	3	26

Section 5: Mining, Extraction & Natural Cavities	On-site	0-50m	51-250	251-500	501-1000
5.1 Historical Mining	0	0	0	0	14
5.2 Coal Mining	1	0	0	0	0
5.3 Johnson Poole and Bloomer Mining Area	0	0	0	0	0
5.4 Non-Coal Mining*	0	1	2	4	14
5.5 Non–Coal Mining Cavities	1	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

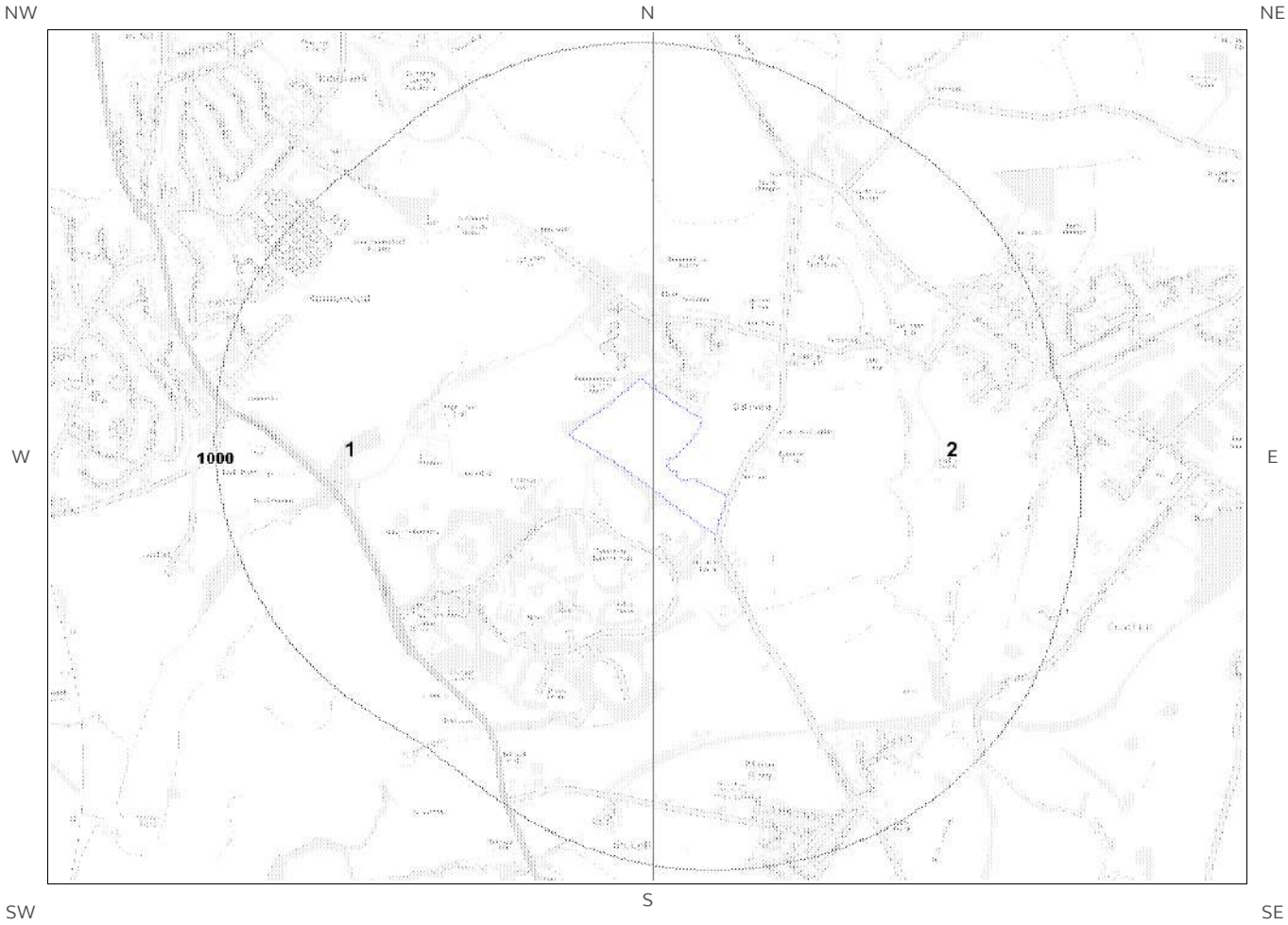
Section 6: Natural Ground Subsidence	On-site
6.1 Shrink-Swell Clay	Very Low
6.2 Landslides	Very Low
6.3 Ground Dissolution of Soluble Rocks	Negligible
6.4 Compressible Deposits	Negligible
6.5 Collapsible Deposits	Very Low
6.5 Running Sand	Very Low

Section 7: Borehole Records	On-site	0-50m	51-250
7 BGS Recorded Boreholes	0	4	16

Section 8: Estimated Background Soil Chemistry	On-site	0-50m	51-250
8 Records of Background Soil Chemistry	9	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

1:10,000 Scale Availability



1_10,000 Availability Legend

Site Outline

Full Coverage

Partial Coverage

No Coverage

50
250
Search Buffers (m)

Availability of 1:10,000 Scale Geology Mapping

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

ID	Distance	Artificial Coverage	Superficial Coverage	Bedrock Coverage	Mass Movement Coverage
1	0.0	No deposits are mapped	No coverage	No coverage	No coverage
2	0.0	No deposits are mapped	No coverage	No coverage	No coverage

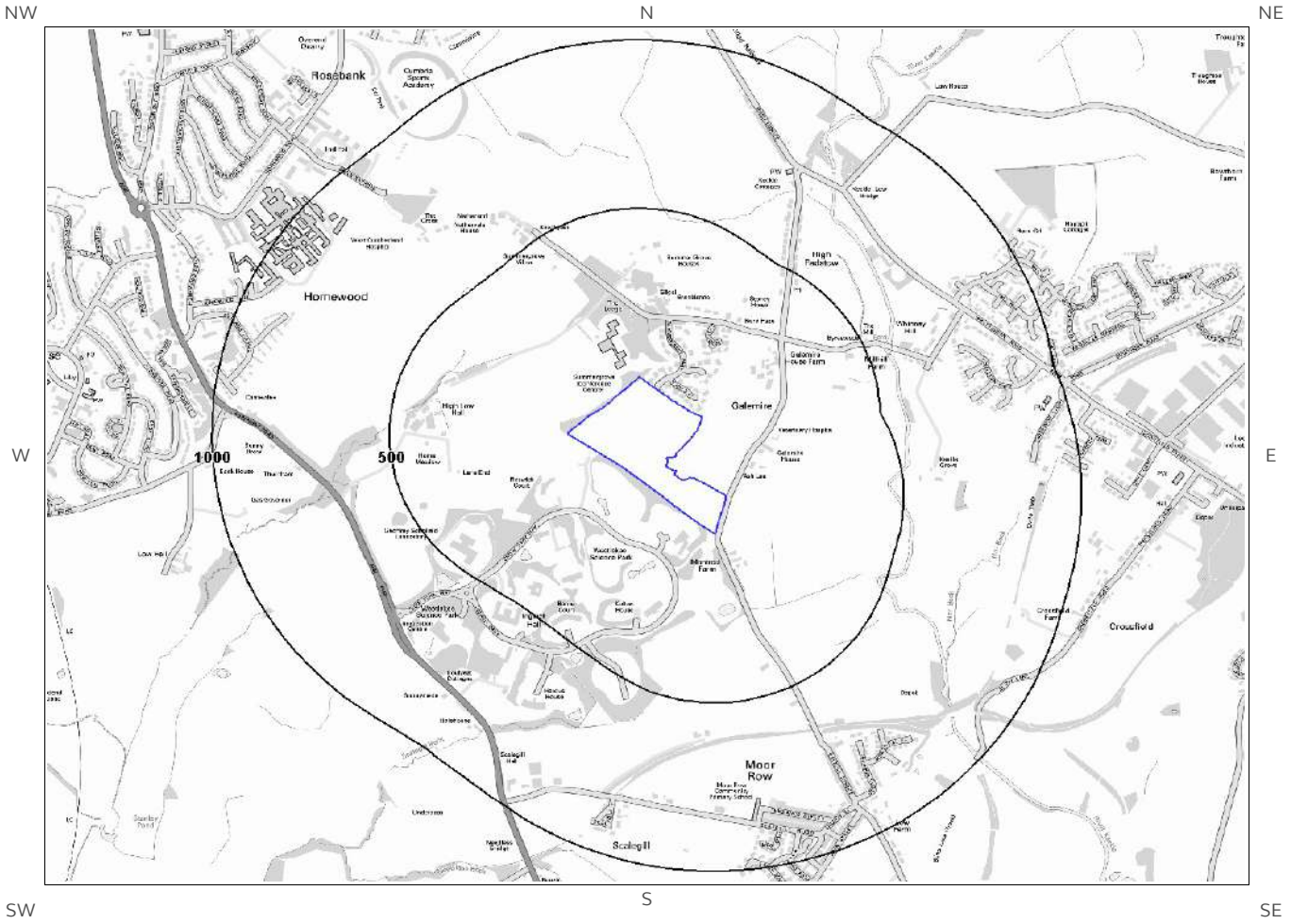
Guidance: The 1:10,000 scale geological interpretation is the most detailed generally available from BGS and is the scale at which most geological surveying is carried out in the field. The database is presented as four types of geology (artificial, mass movement, superficial and bedrock), although not 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	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

1 Geology (1:10,000 scale).

1.1 Artificial Ground map (1:10,000 scale)



Artificial Ground Legend

Site Outline

500
1000
Search Buffers (m)

Made Ground (undivided)

Disturbed Ground (undivided)

Worked Ground (undivided)

Landscaped Ground (undivided)

Infilled Ground

Reclaimed Ground

1. Geology 1:10,000 scale

1.1 Artificial Ground

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

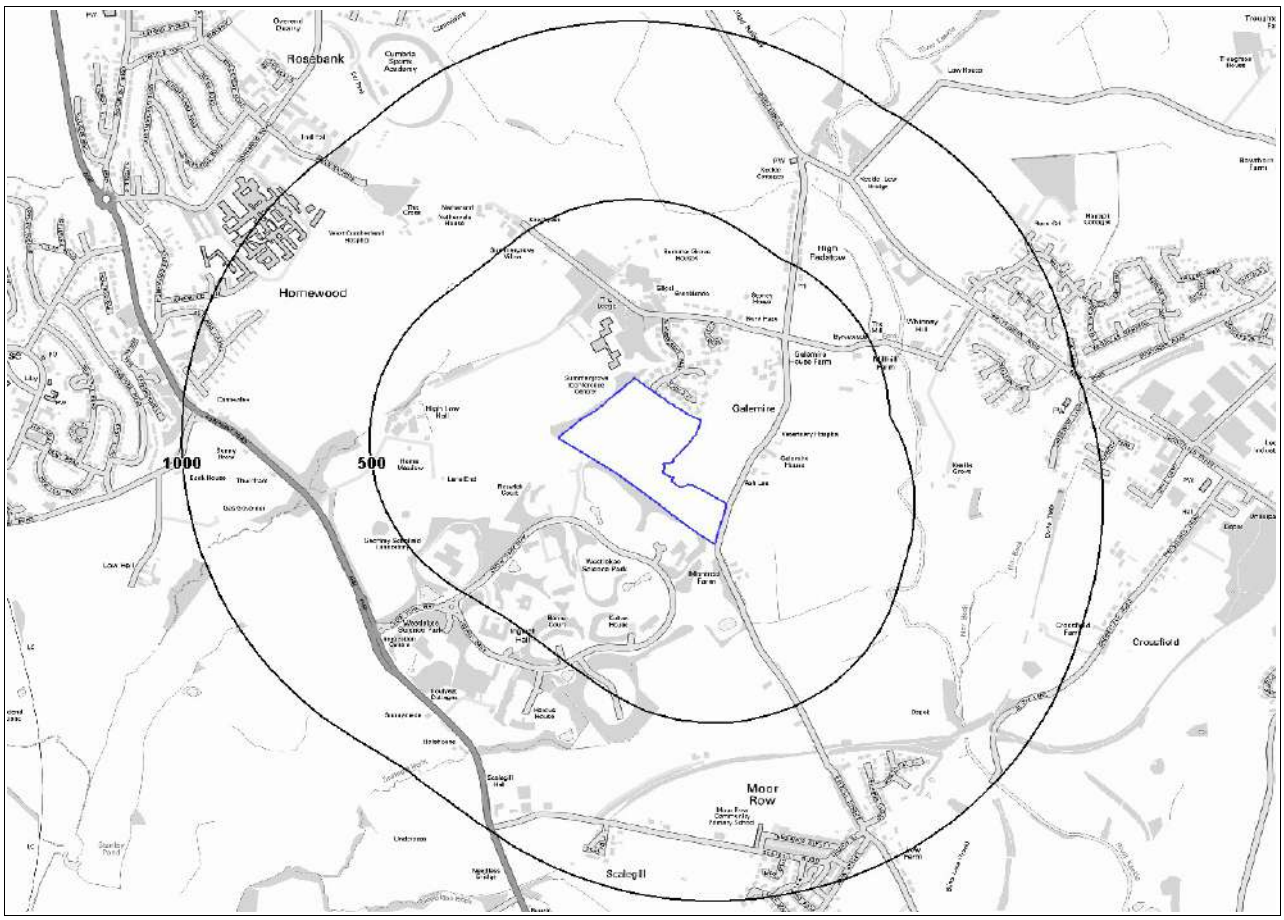
Database searched and no data found.

1.2 Superficial Deposits and Landslips map (1:10,000 scale)

NW N NE

W E

SW S SE



Artificial Ground Legend

Site Outline

500
1000
Search Buffers (m)

1.2 Superficial Deposits and Landslips

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?

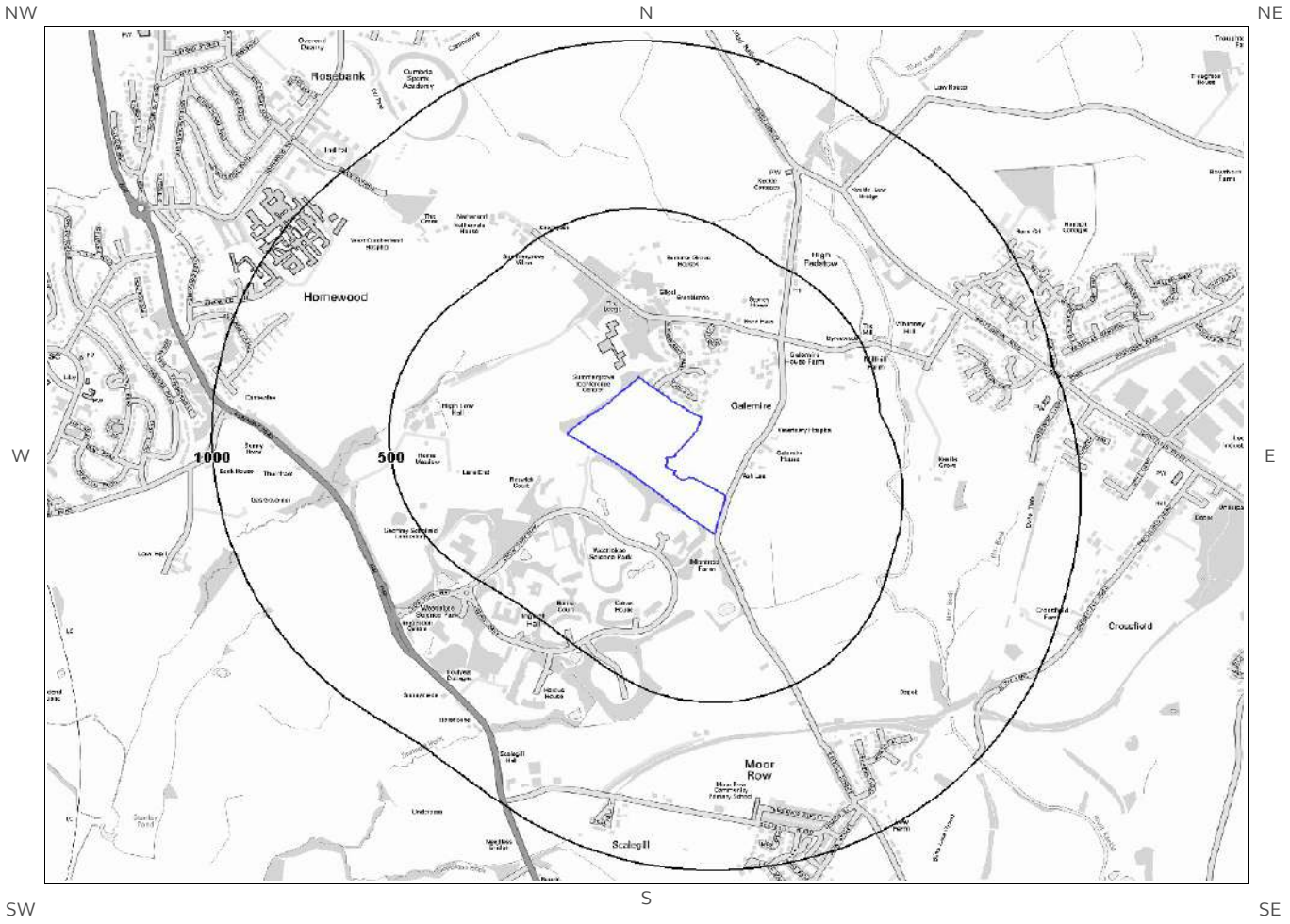
No

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.

1.3 Bedrock and linear features map (1:10,000 scale)



Bedrock and linear features Legend

Site Outline

500
1000
Search Buffers (m)

1.3 Bedrock and linear features

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.

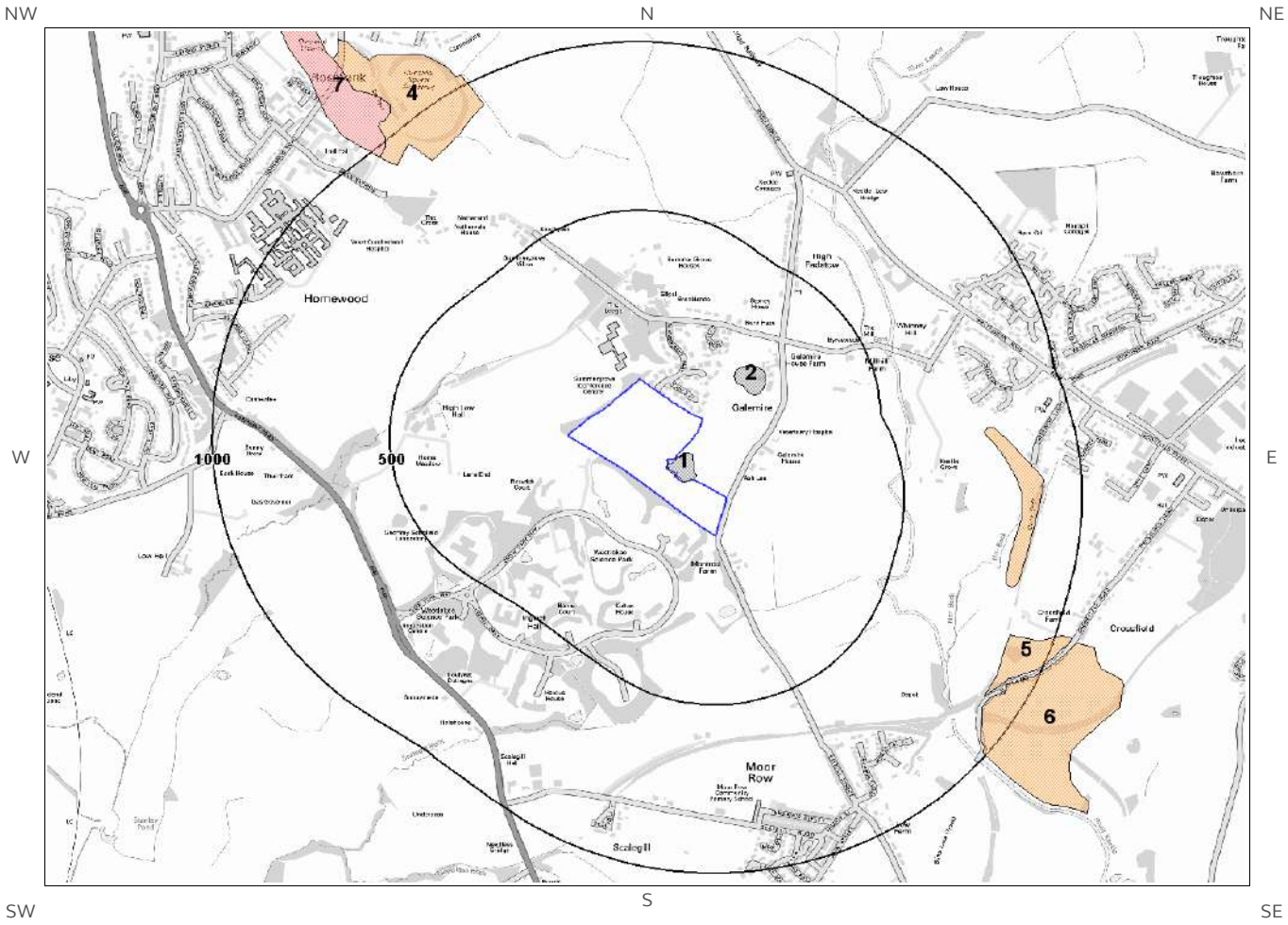
The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of great Britain at 1:10,000 scale.

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.

---

2 Geology 1:50,000 Scale

2.1 Artificial Ground map



Site Outline

500
1000
Search Buffers (m)

Made Ground (undivided)

Disturbed Ground (undivided)

Worked Ground (undivided)

Landscaped Ground (undivided)

Infilled Ground

Reclaimed Ground

2. Geology 1:50,000 scale

2.1 Artificial Ground

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No: 028

2.1.1 Artificial/ Made Ground

Are there any records of Artificial/ Made Ground within 500m of the study site boundary? Yes

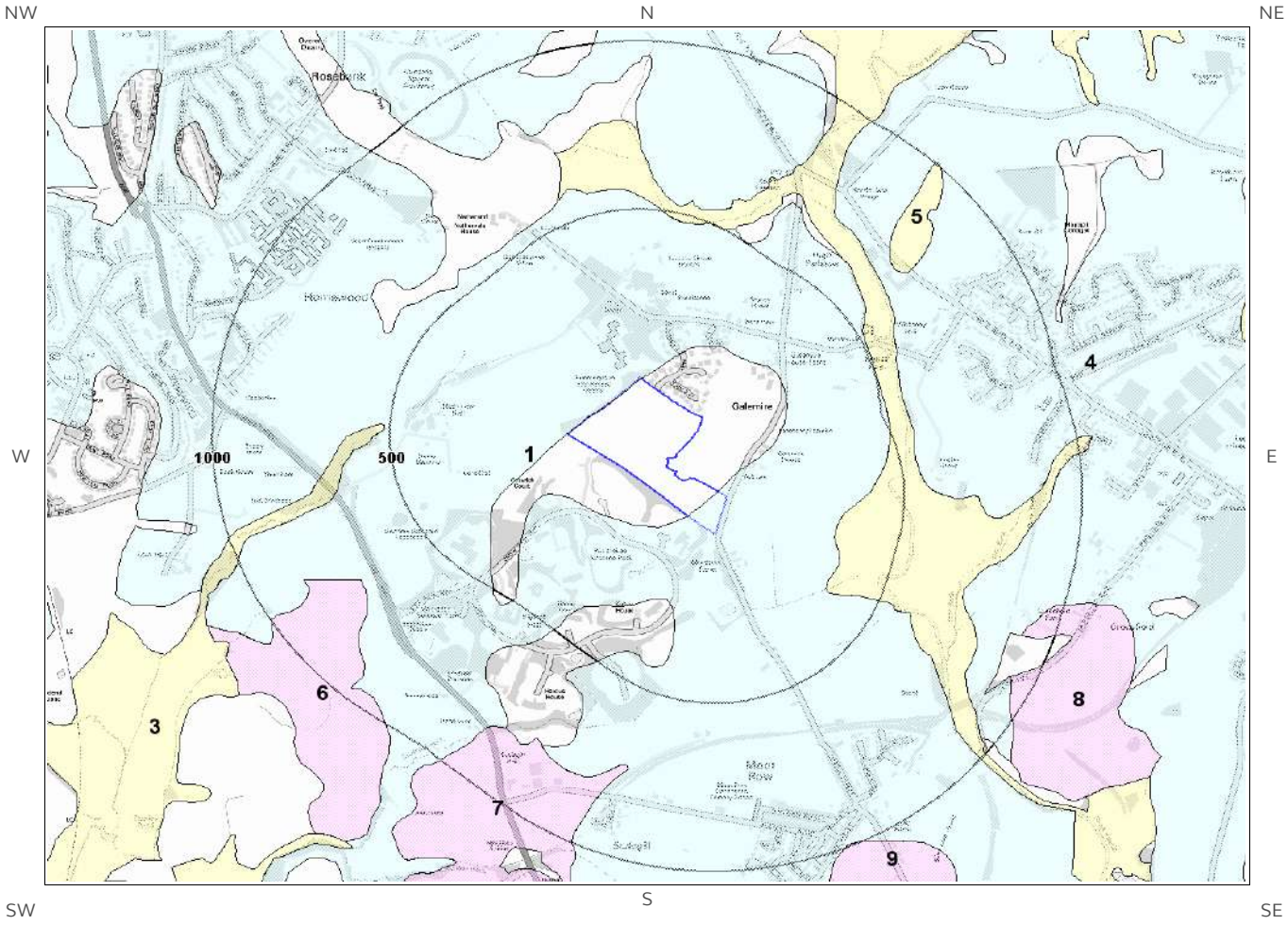
ID	Distance (m)	Direction	LEX Code	Description	Rock Description
1	0.0	On Site	WGR-VOID	WORKED GROUND (UNDIVIDED)	VOID
2	144.0	NE	WGR-VOID	WORKED GROUND (UNDIVIDED)	VOID

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.

2.2 Superficial Deposits and Landslips map (1:50,000 scale)



Site Outline

500
1000
Search Buffers (m)

2.2 Superficial Deposits and Landslips

2.2.1 Superficial Deposits/ Drift Geology

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

ID	Distance	Direction	LEX Code	Description	Rock Description
1	0.0	On Site	TILLD-DMTN	TILL, DEVENSIAN	DIAMICTON
2	321.0	E	ALV-XCZSV	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL

2.2.2 Permeability of Superficial Ground

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

Distance (m)	Direction	Flow Type	Maximum Permeability	Minimum Permeability
0.0	On Site	Mixed	High	Low
0.0	On Site	Mixed	High	Low

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

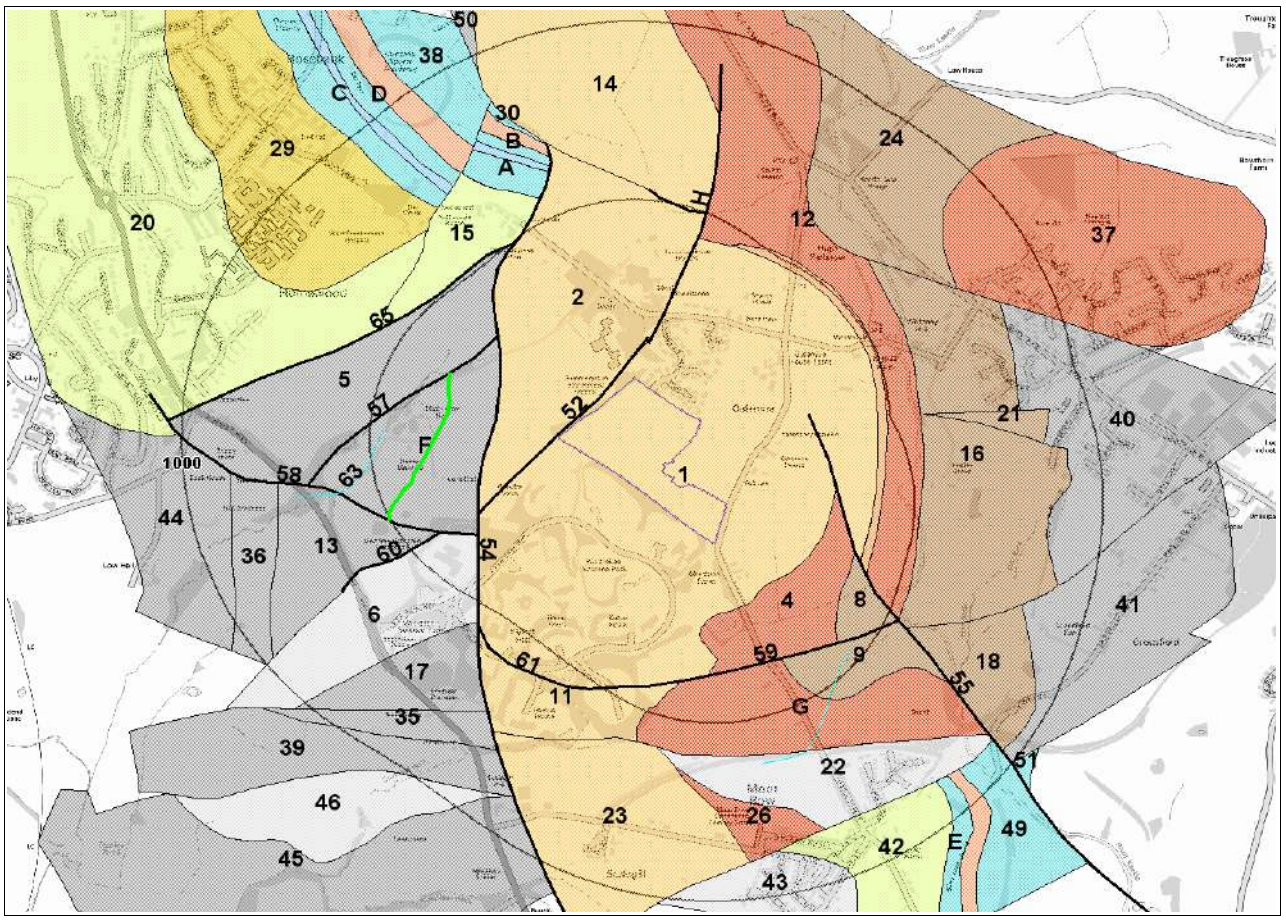
Database searched and no data found.

2.3 Bedrock and linear features map (1:50,000 scale)

NW N NE

W E

SW S SE



Site Outline

500
1000
Search Buffers (m)

2.3 Bedrock, Solid Geology & linear features

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No: 028

2.3.1 Bedrock/Solid Geology

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

ID	Distance	Direction	LEX Code	Rock Description	Rock Age
1	0.0	On Site	SBS-SDST	ST BEES SANDSTONE MEMBER - SANDSTONE	-
2	4.0	NW	SBS-SDST	ST BEES SANDSTONE MEMBER - SANDSTONE	-
3F	174.0	W	PMCM-MDSS	PENNINE MIDDLE COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
4	176.0	SE	BK-BREC	BROCKRAM - BRECCIA	-
5	314.0	NW	PMCM-MDSS	PENNINE MIDDLE COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
6	343.0	SW	PLCM-MDSS	PENNINE LOWER COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
7G	353.0	S	BK-BREC	BROCKRAM - BRECCIA	-
8	360.0	E	WS-SDST	WHITEHAVEN SANDSTONE FORMATION - SANDSTONE	WESTPHALIAN
9	364.0	SE	WS-SDST	WHITEHAVEN SANDSTONE FORMATION - SANDSTONE	WESTPHALIAN
10	383.0	E	SBSH-SIMD	ST BEES SHALE FORMATION - SILTSTONE AND MUDSTONE, INTERBEDDED	-
11	393.0	S	SBS-SDST	ST BEES SANDSTONE MEMBER - SANDSTONE	-
12	407.0	E	BK-BREC	BROCKRAM - BRECCIA	-
13	407.0	SW	PMCM-MDSS	PENNINE MIDDLE COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
14	489.0	N	SBS-SDST	ST BEES SANDSTONE MEMBER - SANDSTONE	-
15	493.0	NW	SMGP-MDSS	STAINMORE FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	NAMURIAN

2.3.2 Permeability of Bedrock Ground

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

Distance	Direction	Flow Type	Maximum Permeability	Minimum Permeability
0.0	On Site	Mixed	High	Moderate

Distance	Direction	Flow Type	Maximum Permeability	Minimum Permeability
0.0	On Site	Mixed	High	Moderate

2.3.3 Linear features

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

ID	Distance	Direction	Category Description	Feature Description
52	4.0	NW	FAULT	Fault, inferred, displacement unknown
53H	103.0	N	FAULT	Fault, inferred, displacement unknown
54	174.0	W	FAULT	Fault, inferred, displacement unknown
55	284.0	E	FAULT	Fault, inferred, displacement unknown
56F	302.0	W	ROCK	Coal seam, inferred
57	314.0	NW	FAULT	Fault, inferred, displacement unknown
58	343.0	SW	FAULT	Fault, inferred, displacement unknown
59	353.0	S	FAULT	Fault, inferred, displacement unknown
60	407.0	SW	FAULT	Fault, inferred, displacement unknown
61	434.0	SW	FAULT	Fault, inferred, displacement unknown
62G	465.0	SE	LANDFORM	Glacial meltwater channel centre line, undifferentiated
63	466.0	W	LANDFORM	Glacial meltwater channel centre line, undifferentiated
64H	489.0	N	FAULT	Fault, inferred, displacement unknown
65	493.0	NW	FAULT	Fault, inferred, displacement unknown

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 Radon Data

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 not in a Radon Affected Area, as less than 1% 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.

---

4 Ground Workings map

Ground Workings Legend

Site Outline

125
250
Search Buffers (m)

Historic Surface Ground Workings

Historic Underground Workings

Current Ground Workings

4 Ground Workings

4.1 Historical Surface Ground Working Features derived from Historical Mapping

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

ID	Distance (m)	Direction	NGR	Use	Date
1A	0.0	On Site	300078 515347	Unspecified Quarry	1938
2A	0.0	On Site	300078 515347	Unspecified Old Quarry	1898
3A	0.0	On Site	300080 515343	Unspecified Quarry	1951
4A	0.0	On Site	300080 515343	Unspecified Quarry	1969
5A	0.0	On Site	300083 515347	Unspecified Quarry	1993
6	0.0	On Site	300096 515321	Unspecified Quarry	1863
7B	0.0	On Site	300085 515371	Pond	1898
8B	0.0	On Site	300085 515371	Pond	1938
9B	1.0	SE	300086 515367	Pond	1951
10C	142.0	NE	300267 515600	Unspecified Ground Workings	1951
11C	145.0	NE	300267 515603	Unspecified Ground Workings	1938
12C	158.0	NE	300272 515620	Unspecified Quarry	1863
13	191.0	NE	300280 515621	Unspecified Old Quarry	1898

4.2 Historical Underground Working Features derived from Historical Mapping

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? Yes

The following Historical Underground Working Features are provided by Groundsure:

ID	Distance (m)	Direction	NGR	Use	Date
Not shown	578.0	E	300733 515630	Collieries	1863
Not shown	738.0	E	301009 515554	Collieries	1863
Not shown	825.0	SE	300666 514464	Unspecified Old Shaft	1898
Not shown	825.0	SE	300666 514464	Unspecified Old Shaft	1938
Not shown	828.0	SE	300664 514457	Unspecified Old Shaft	1948
Not shown	880.0	NE	300920 515896	Unspecified Old Shaft	1951
Not shown	882.0	NE	300922 515897	Unspecified Old Shaft	1898
Not shown	882.0	NE	300922 515897	Unspecified Old Shaft	1938
Not shown	889.0	NE	300930 515898	Old Coal Shaft	1863
Not shown	924.0	SE	301155 514643	Iron Ore Mine	1938
Not shown	952.0	SE	301167 514676	Disused Iron Ore Mine	1948
Not shown	967.0	SE	300711 514167	Iron Ore Mines	1938
Not shown	967.0	SE	300711 514167	Iron Ore Mine	1898
Not shown	982.0	SE	301186 514709	Iron Ore Mine	1898

4.3 Current Ground Workings

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? Yes

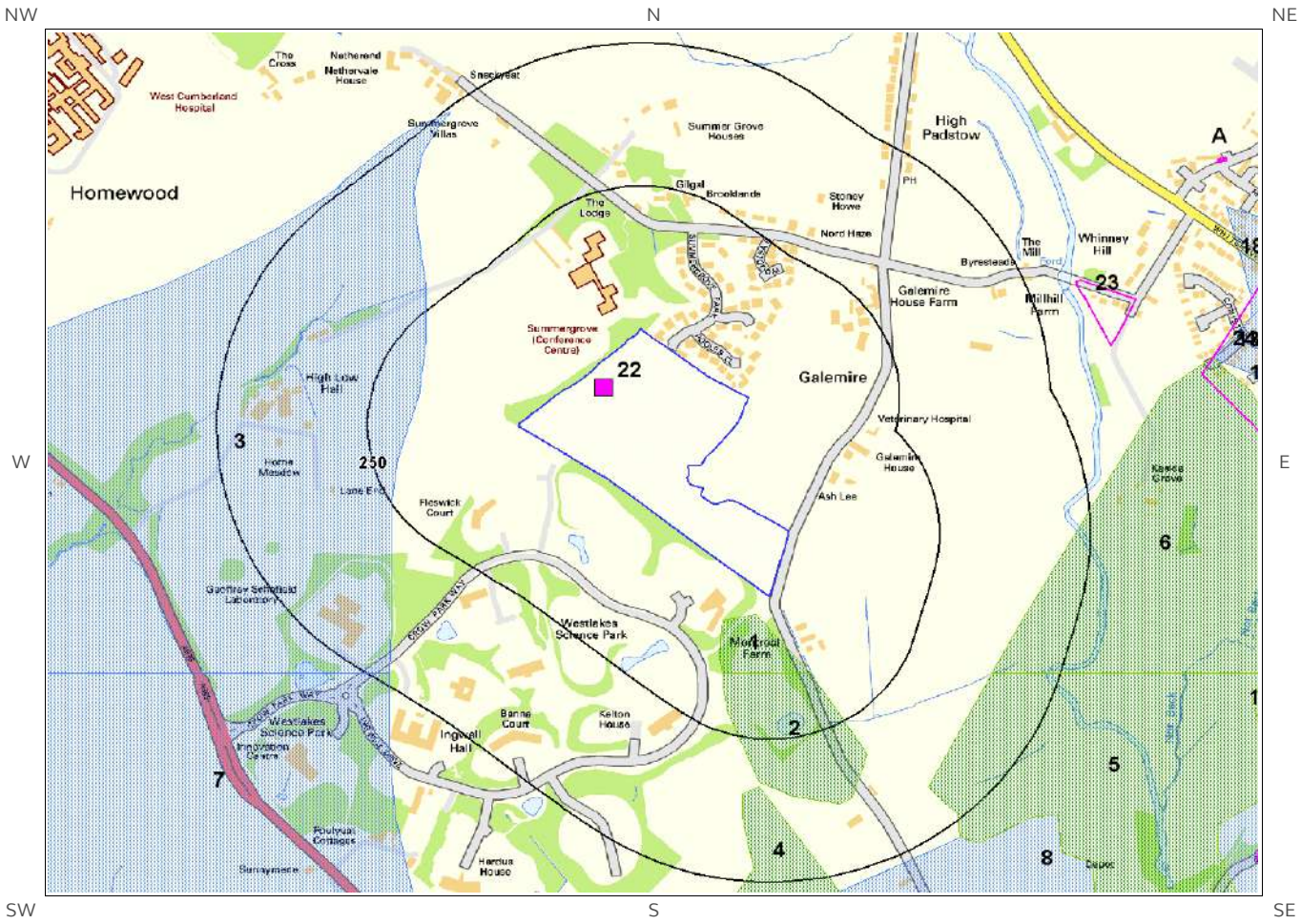
The following Current Ground Workings information is provided by British Geological Survey:

ID	Distance (m)	Direction	NGR	Commodity Produced	Pit Name	Type of working	Status
28A	23.0	SE	300080 515350	Sandstone	Galemire	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
29C	185.0	NE	300269 515615	Sandstone	Galemire	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
30	321.0	SW	299587 515162	Sandstone	Crowpark Quarry	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
31	350.0	E	300490 515496	Coal, Deep	Mill Hill PIt	Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots)	Ceased
32	459.0	SW	299350 515225	Coal, Deep	Low Hall Colliery Pit	Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots)	Ceased
33	517.0	SW	299366 515098	Coal, Deep	Ingwell Pit	Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots)	Ceased
Not shown	538.0	SW	299282 515185	Coal, Deep	Low Hall Colliery Pit	Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots)	Ceased
Not shown	538.0	SW	299282 515185	Coal, Deep	Ingwell Pit	Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots)	Ceased
Not shown	540.0	W	299220 515415	Coal, Deep	Low Hall Colliery	Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots)	Ceased
37	543.0	SW	299403 515023	Coal, Deep	Ingwell Pit	Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots)	Ceased
Not shown	603.0	E	300721 515644	Coal, Deep	Whinny Hill Colliery	Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots)	Ceased
Not shown	711.0	NW	299555 516185	Limestone	Netherend	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased

ID	Distance (m)	Direction	NGR	Commodity Produced	Pit Name	Type of working	Status
Not shown	713.0	E	300920 515270	Coal, Deep	Whinny Hill Colliery, Dean's Pit	Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots)	Ceased
Not shown	721.0	SW	299437 514784	Coal, Deep	Henry Pit	Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots)	Ceased
Not shown	722.0	SW	299093 515155	Coal, Deep	Thurnham Pits	Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots)	Ceased
Not shown	734.0	E	300940 515210	Coal, Deep	Whinny Hill Colliery, No 1 Pit	Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots)	Ceased
Not shown	764.0	SW	299068 515109	Coal, Deep	Thurnham Pits	Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots)	Ceased
Not shown	793.0	W	298982 515278	Coal, Deep	Thurnham Pits	Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots)	Ceased
Not shown	821.0	E	301005 515440	Coal, Deep	Whinny Hill Colliery, Staple Pit	Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots)	Ceased
Not shown	822.0	NW	299425 516225	Limestone	Litt's Pond	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	845.0	E	301020 515477	Coal, Deep	Whinny Hill Colliery, No 2 Pit	Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots)	Ceased
Not shown	850.0	SW	299015 515022	Coal, Deep	Thurnham Pits	Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots)	Ceased
Not shown	856.0	NW	299345 516200	Limestone	Overend	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	889.0	NE	300930 515890	Coal, Deep	Henry Pit	Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots)	Ceased
Not shown	895.0	E	301090 515100	Coal, Deep	Hope Pit	Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots)	Ceased

ID	Distance (m)	Direction	NGR	Commodity Produced	Pit Name	Type of working	Status
Not shown	897.0	SE	300648 514372	Iron ore	Moor Row Iron Ore Mine	Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots)	Ceased
Not shown	913.0	SE	301013 514770	Iron ore	Montreal Iron Ore Mine	Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots)	Ceased
Not shown	925.0	SW	299000 514905	Coal, Deep	Railway Pit	Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots)	Ceased
Not shown	935.0	NW	299475 516400	Limestone	Overend	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	946.0	SW	299353 514570	Coal, Deep	Elizabeth Pit	Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots)	Ceased
Not shown	950.0	SE	300943 514575	Iron ore	Montreal Iron Ore Mine	Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots)	Ceased

5 Mining, Extraction & Natural Cavities map



Mining, Extraction and Natural Cavities Legend

Site Outline

250
500
Search Buffers (m)

Historical Mining

Non-Coal Mining Cavities

Natural Cavities (point data)

Natural Cavities (polygon data)

Non-Coal Mining

Highly likely

Likely

Unlikely

Highly unlikely

Rare

5 Mining, Extraction & Natural Cavities

5.1 Historical Mining

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? Yes

The following Historical Mining information is provided by Groundsure:

ID	Distance (m)	Direction	NGR	Details	Date
23	578.0	E	300733 515630	Collieries	1863
24	738.0	E	301009 515554	Collieries	1863
Not shown	825.0	SE	300666 514464	Unspecified Old Shaft	1898
Not shown	825.0	SE	300666 514464	Unspecified Old Shaft	1938
Not shown	828.0	SE	300664 514457	Unspecified Old Shaft	1948
28A	880.0	NE	300920 515896	Unspecified Old Shaft	1951
29A	882.0	NE	300922 515897	Unspecified Old Shaft	1938
30A	882.0	NE	300922 515897	Unspecified Old Shaft	1898
31A	889.0	NE	300930 515898	Old Coal Shaft	1863
32	924.0	SE	301155 514643	Iron Ore Mine	1938
Not shown	952.0	SE	301167 514676	Disused Iron Ore Mine	1948
Not shown	967.0	SE	300711 514167	Iron Ore Mine	1898
Not shown	967.0	SE	300711 514167	Iron Ore Mines	1938
Not shown	982.0	SE	301186 514709	Iron Ore Mine	1898

5.2 Coal Mining

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? Yes

The following Coal Mining information provided by the Coal Authority is not represented on Mapping:

Distance (m)	Direction	Details
0.0	On Site	The study site is located within the specified search distance of an identified mining area. Further details concerning this can be obtained from the Coal Authority Helpline on 0845 762 6848.

5.3 Johnson Poole and Bloomer

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.

5.4 Non-Coal Mining

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)	Direction	Name	Commodity	Assessment of likelihood
1	39.0	SW	Not available	Iron Ore (Non Vein)	Underground mining is known to have occurred within or very close to the area. Potential for difficult ground conditions should be investigated. Potential for localised subsidence is at a level where it should be considered
2	134.0	S	Not available	Iron Ore (Non Vein)	Underground mining is known to have occurred within or very close to the area. Potential for difficult ground conditions should be investigated. Potential for localised subsidence is at a level where it should be considered
3	174.0	W	Not available	Iron Ore (Bedded)	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
4	334.0	S	Not available	Iron Ore (Non Vein)	Underground mining is known to have occurred within or very close to the area. Potential for difficult ground conditions should be investigated. Potential for localised subsidence is at a level where it should be considered
5	388.0	SE	Not available	Iron Ore (Non Vein)	Underground mining is known to have occurred within or very close to the area. Potential for difficult ground conditions should be investigated. Potential for localised subsidence is at a level where it should be considered

ID	Distance (m)	Direction	Name	Commodity	Assessment of likelihood
6	391.0	E	Not available	Iron Ore (Non Vein)	Underground mining is known to have occurred within or very close to the area. Potential for difficult ground conditions should be investigated. Potential for localised subsidence is at a level where it should be considered
7	480.0	SW	Not available	Iron Ore (Bedded)	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
8	516.0	SE	Not available	Iron Ore (Non Vein)	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
Not shown	588.0	S	Not available	Iron Ore (Bedded)	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
10	620.0	N	Not available	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
Not shown	641.0	S	Not available	Iron Ore (Non Vein)	Underground mining is known to have occurred within or very close to the area. Potential for difficult ground conditions should be investigated. Potential for localised subsidence is at a level where it should be considered
Not shown	716.0	SE	Not available	Iron Ore (Non Vein)	Underground mining is known to have occurred within or very close to the area. Potential for difficult ground conditions should be investigated. Potential for localised subsidence is at a level where it should be considered
13	766.0	NE	Not available	Iron Ore (Non Vein)	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
14	818.0	E	Not available	Haematite	Underground mining is known to have occurred within or very close to the area. Potential for difficult ground conditions should be investigated. Potential for localised subsidence is at a level where it should be considered
15	822.0	E	Not available	Iron Ore (Bedded)	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
Not shown	829.0	E	Not available	Haematite	Underground mining is known to have occurred within or very close to the area. Potential for difficult ground conditions should be investigated. Potential for localised subsidence is at a level where it should be considered
Not shown	829.0	E	Not available	Iron Ore (Bedded)	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
18	845.0	E	Not available	Iron Ore (Bedded)	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
Not shown	858.0	E	Not available	Iron Ore (Bedded)	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
Not shown	871.0	E	Not available	Iron Ore (Non Vein)	Underground mining is known to have occurred within or very close to the area. Potential for difficult ground conditions should be investigated. Potential for localised subsidence is at a level where it should be considered
Not shown	887.0	E	Not available	Haematite	Underground mining is known to have occurred within or very close to the area. Potential for difficult ground conditions should be investigated. Potential for localised subsidence is at a level where it should be considered

5.5 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? Yes

The following Non-Coal Mining Cavities information provided by Peter Brett Associates:

ID	Distance (m)	Direction	NGR	Address	Superficial Deposits	Bedrock Deposits	Extracted Mineral
22	0.0	On Site	299900 515500	WHANGS, Cumbria	-	-	Hematite

5.6 Natural Cavities

This dataset provides information based on the Peter Brett Associates natural cavities database. The dataset is made up of points and polygons. Where polygons are used these represent an area in which it is expected the cavities could be found. It does not indicate that cavities are present everywhere within the polygon, and caution should be used in the interpretation of this data.

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

Database searched and no data found.

5.7 Brine Extraction

This data provides information from 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.

5.8 Gypsum Extraction

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.

5.9 Tin Mining

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.

5.10 Clay Mining

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? No

Database searched and no data found.

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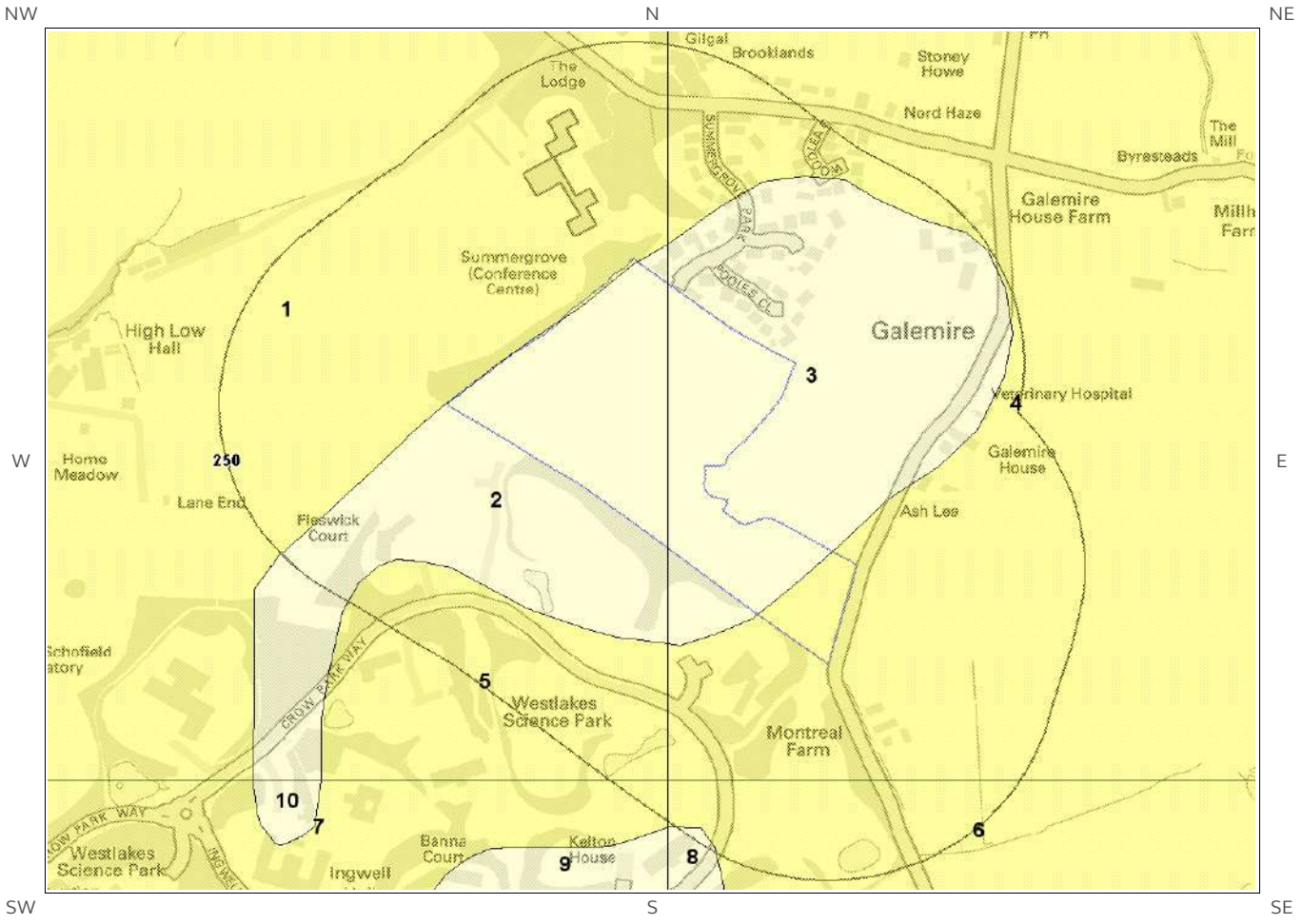
6 Natural Ground Subsidence

6.1 Shrink-Swell Clay map



Shrink Swell Clay Legend

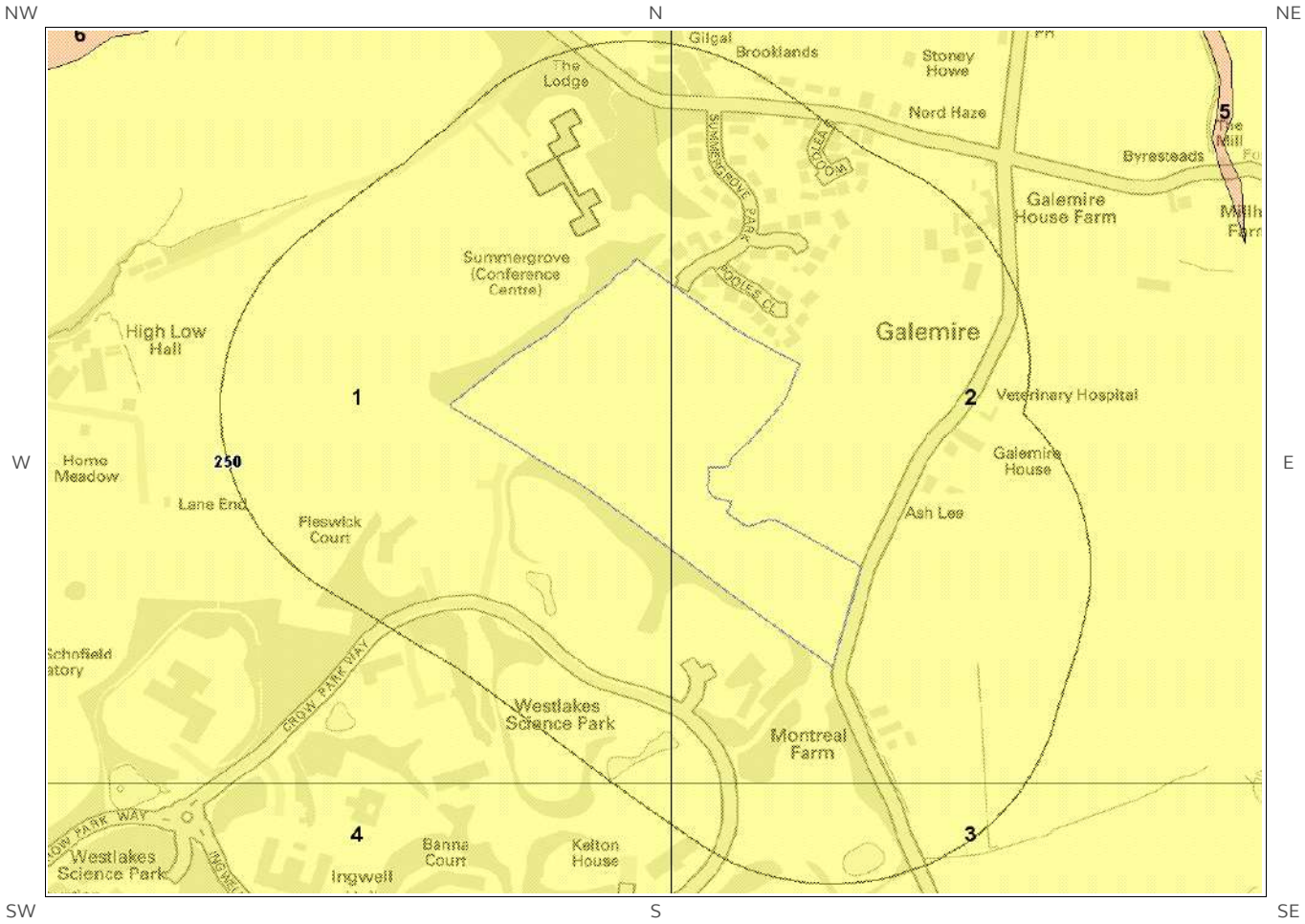
Site Outline

125
250
Search Buffers (m)

No Data / Null
Negligible
Very Low

Low
Moderate
High

6.2 Landslides map



Landslides Legend

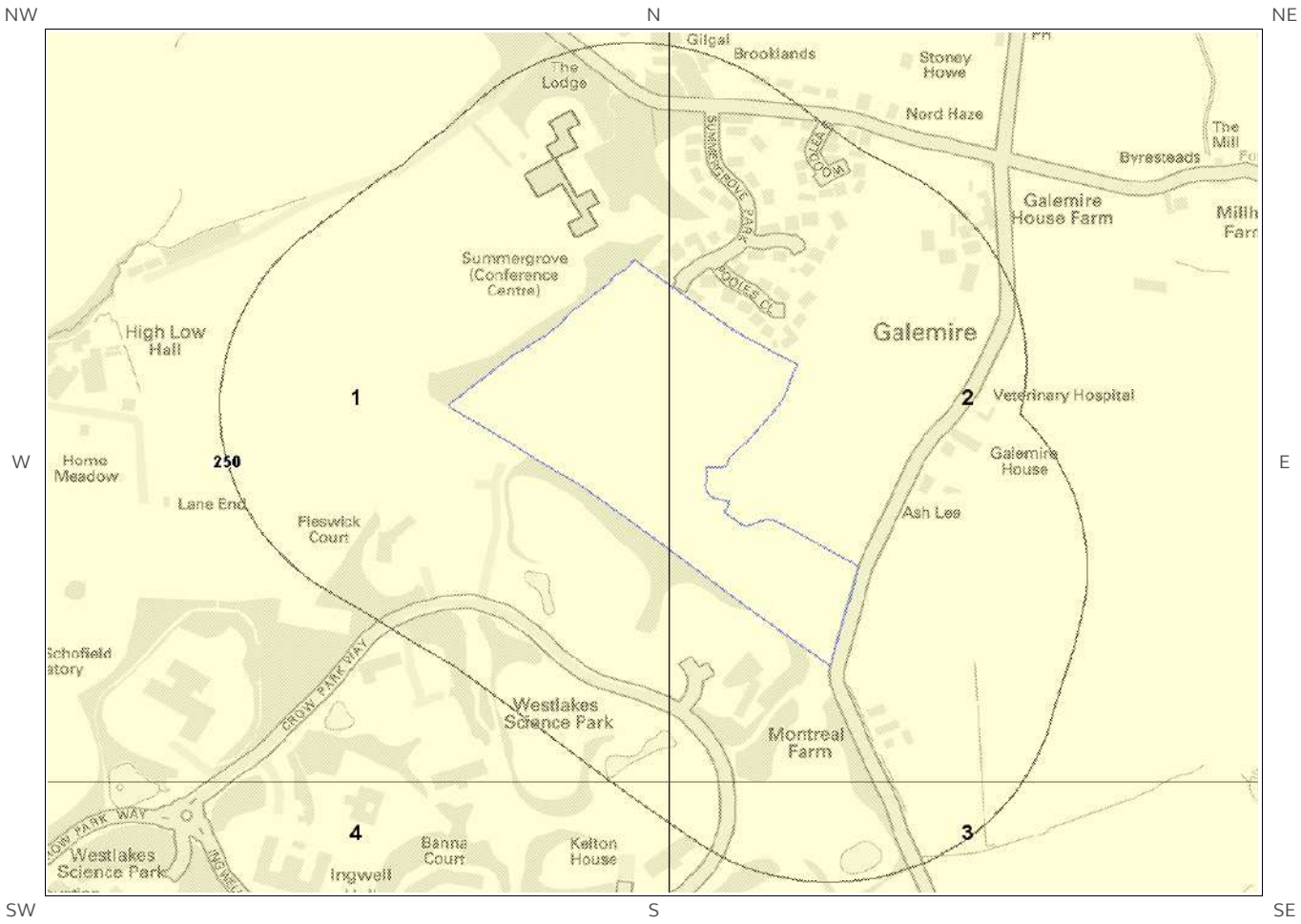
Site Outline

125
250
Search Buffers (m)

No Data / Null
Negligible
Very Low

Low
Moderate
High

6.3 Ground Dissolution of Soluble Rocks map



Ground Dissolution Soluble Rocks Legend

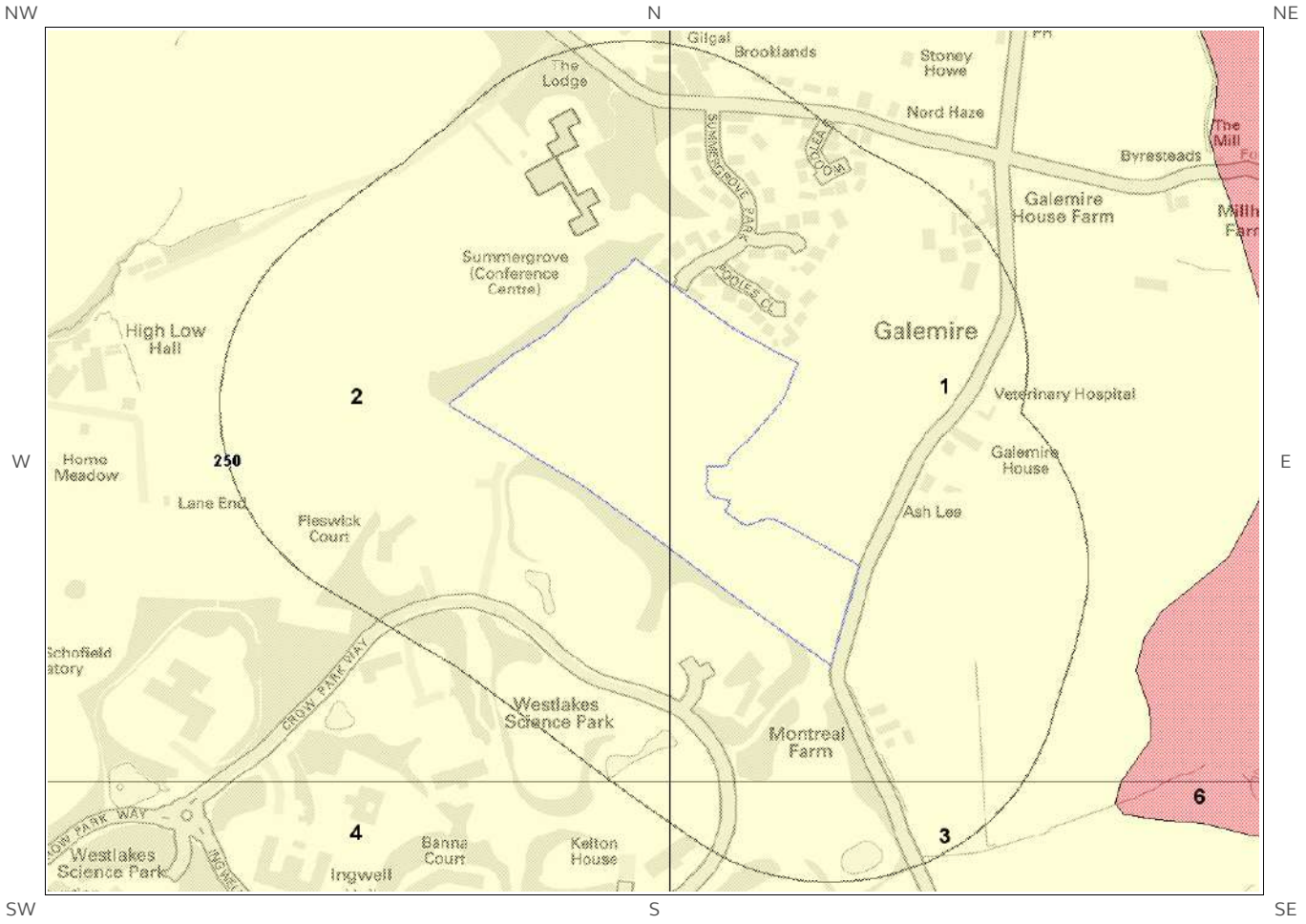
Site Outline

125
250
Search Buffers (m)

No Data / Null
Negligible
Very Low

Low
Moderate
High

6.4 Compressible Deposits map



Compressible Deposits Legend

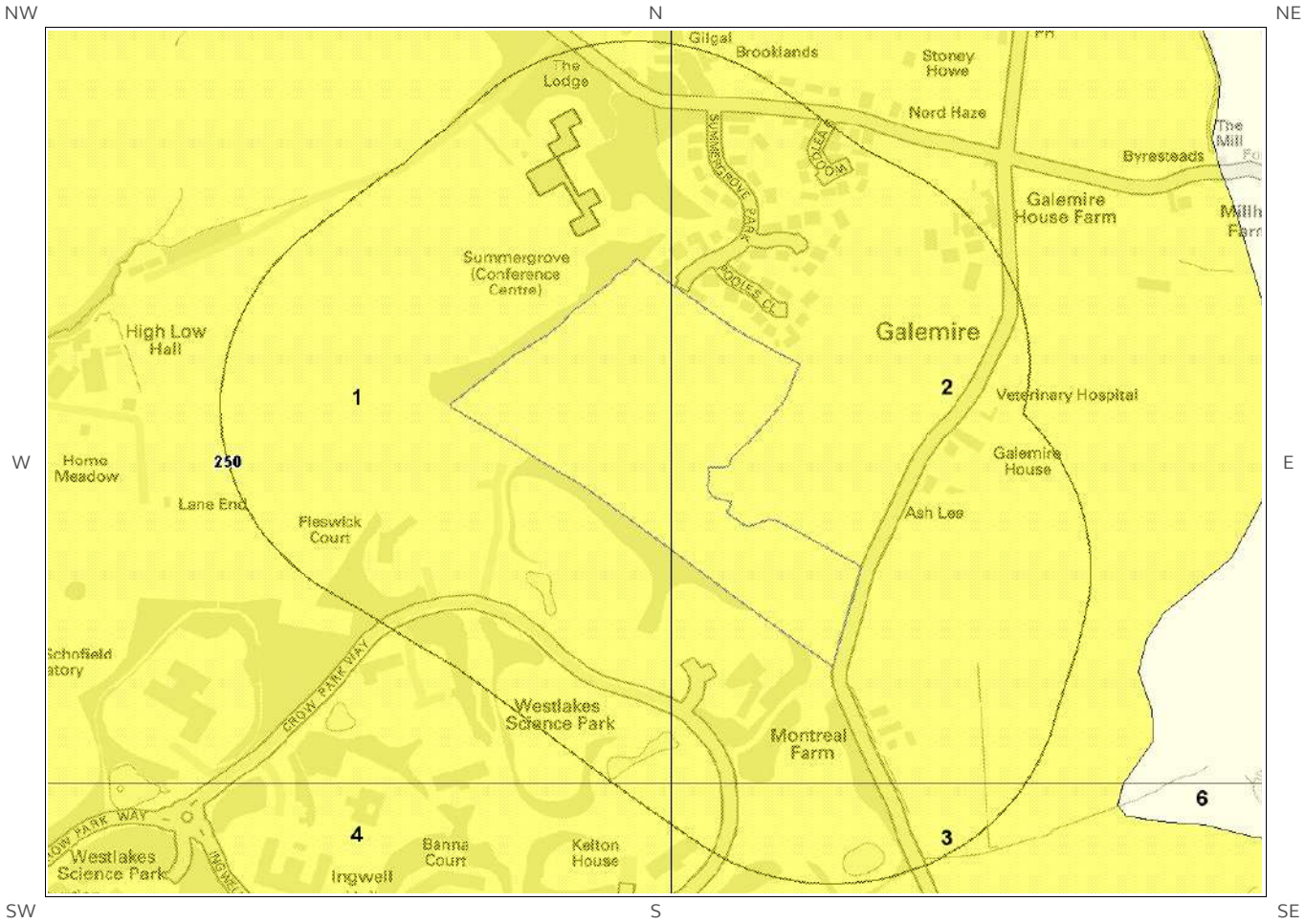
Site Outline

125
250
Search Buffers (m)

No Data / Null
Negligible
Very Low

Low
Moderate
High

6.5 Collapsible Deposits map



Collapsible Deposits Legend

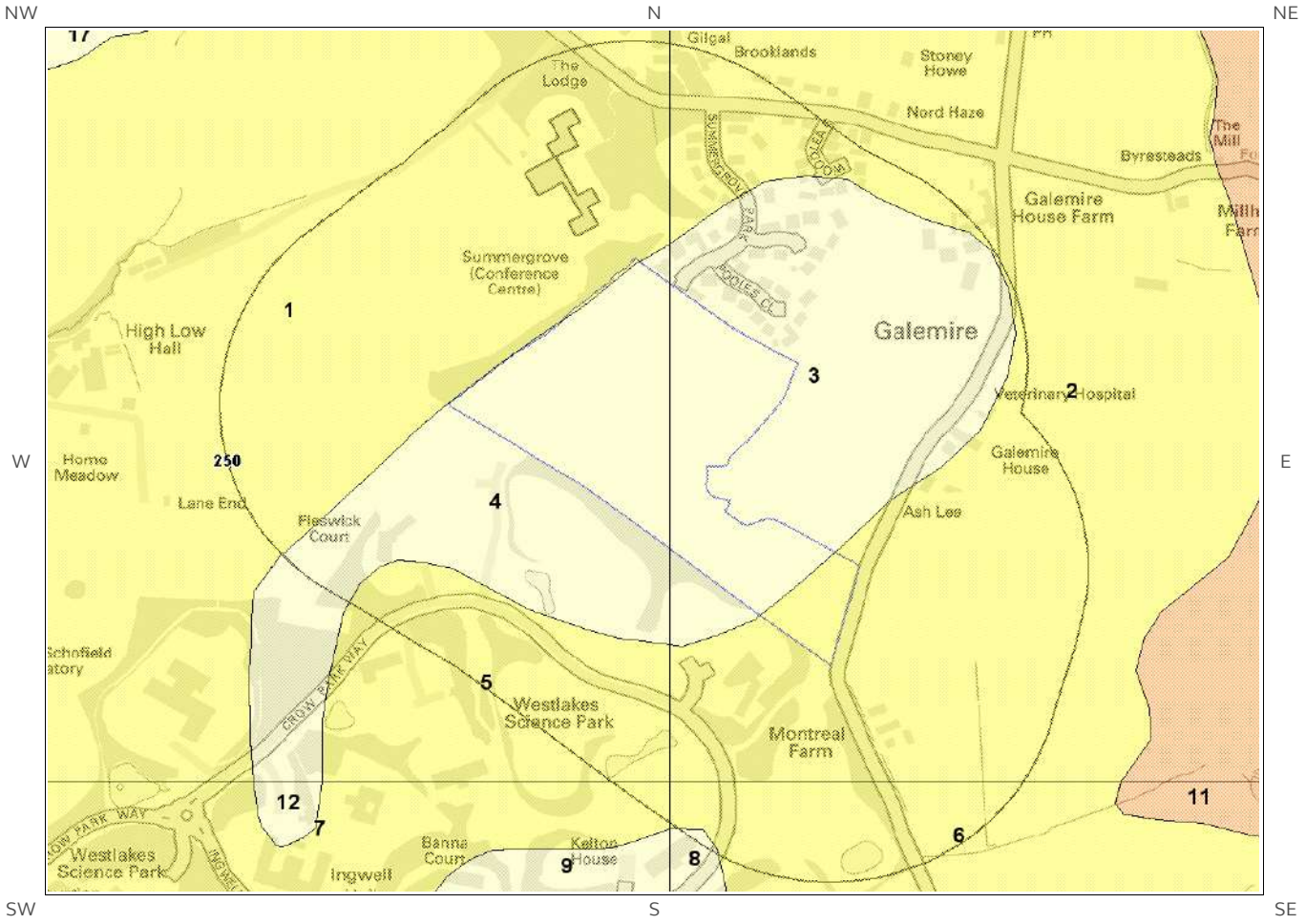
Site Outline

125
250
Search Buffers (m)

No Data / Null
Negligible
Very Low

Low
Moderate
High

6.6 Running Sand map



Running Sand Legend

Site Outline

125
250
Search Buffers (m)

No Data / Null
Negligible
Very Low

Low
Moderate
High

6 Natural Ground Subsidence

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? Very Low

6.1 Shrink-Swell Clays

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

ID	Distance (m)	Direction	Hazard Rating	Details
1	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.
2	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.
3	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.
4	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.

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

6.2 Landslides

The following Landslides information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
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.
2	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.

6.3 Ground Dissolution of Soluble Rocks

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

ID	Distance (m)	Direction	Hazard Rating	Details
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.
2	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.

6.4 Compressible Deposits

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

ID	Distance (m)	Direction	Hazard Rating	Details
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.
2	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.

6.5 Collapsible Deposits

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

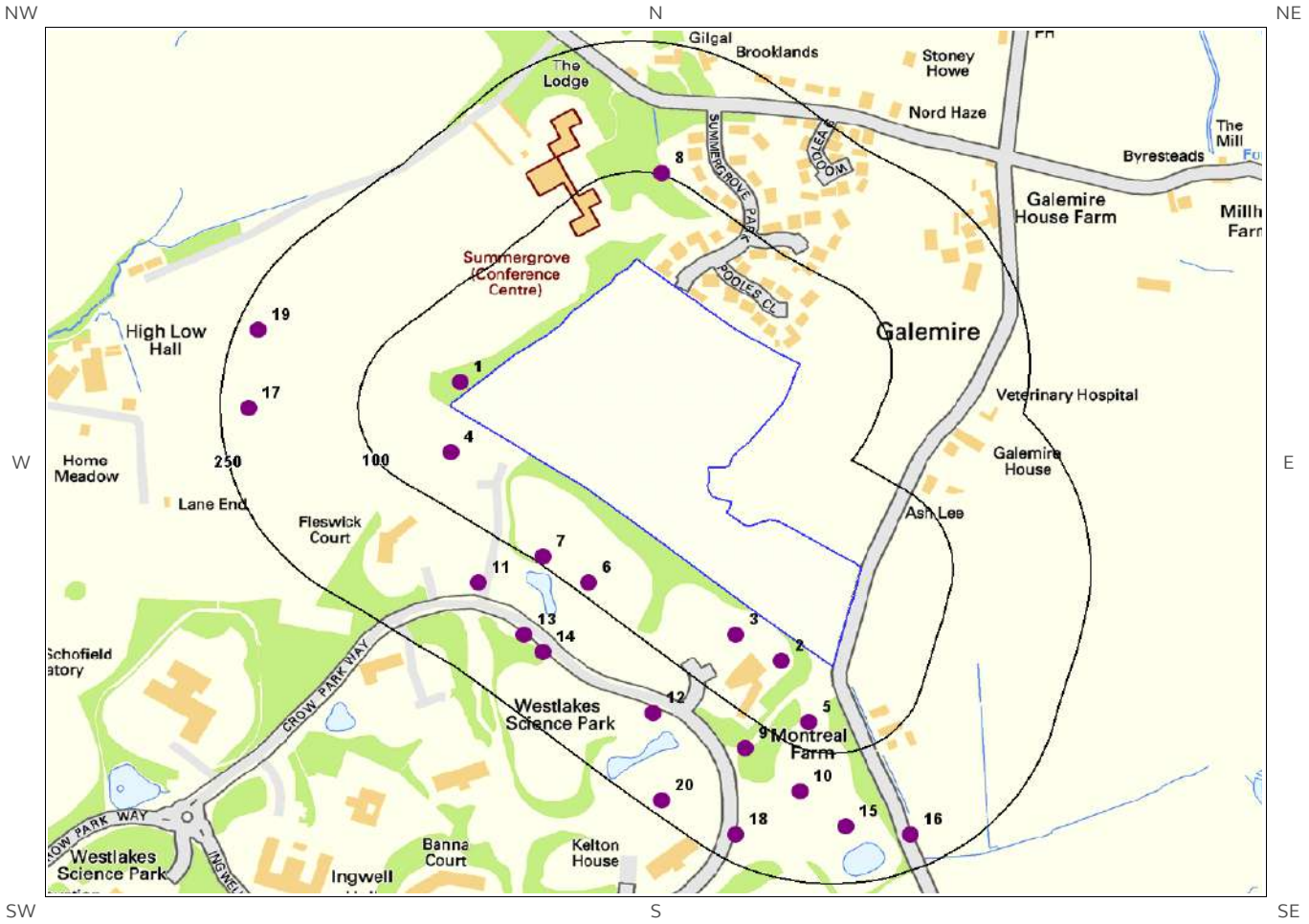
ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.
2	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.

6.6 Running Sands

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

ID	Distance (m)	Direction	Hazard Rating	Details
1	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.
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.
3	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.
4	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.

7 Borehole Records map



Borehole Records Legend

Site Outline

Borehole Locations

125
250
Search Buffers (m)

7 Borehole Records

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: 20

ID	Distance (m)	Direction	NGR	BGS Reference	Drilled Length	Borehole Name
1	13.0	NW	299770 515460	NX91NE185	-1.0	SUMMERGROVE SPRING 2
2	28.0	SW	300120 515140	NY01NW451	-1.0	WESTLAKES SCIENCE & TECHNOLOGY PARK PHASE II EXT. 203
3	34.0	SW	300070 515170	NY01NW453	-1.0	WESTLAKES SCIENCE & TECHNOLOGY PARK PHASE II EXT. TP303
4	44.0	SW	299760 515380	NX91NE365	-1.0	WESTLAKES SCIENCE & TECHNOLOGY PARK PHASE II EXT. TP301
5	69.0	S	300150 515070	NY01NW454	-1.0	WESTLAKES SCIENCE & TECHNOLOGY PARK PHASE II EXT. TP307
6	86.0	SW	299910 515230	NX91NE366	-1.0	WESTLAKES SCIENCE & TECHNOLOGY PARK PHASE II EXT. TP302
7	92.0	SW	299860 515260	NX91NE363	-1.0	WESTLAKES SCIENCE & TECHNOLOGY PARK PHASE II EXT. 201
8	102.0	N	299990 515700	NX91NE176	-1.0	SUMMERGROVE SPRING 1
9	133.0	SW	300080 515040	NY01NW452	-1.0	WESTLAKES SCIENCE & TECHNOLOGY PARK PHASE II EXT. 204/204A
10	149.0	S	300140 514990	NY01SW855	-1.0	WESTLAKES SCIENCE & TECHNOLOGY PARK PHASE II EXT. 205
11	155.0	SW	299790 515230	NX91NE367	-1.0	WESTLAKES SCIENCE & TECHNOLOGY PARK PHASE II EXT. TP304
12	160.0	SW	299980 515080	NX91NE369	-1.0	WESTLAKES SCIENCE & TECHNOLOGY PARK PHASE II EXT. TP306
13	176.0	SW	299840 515170	NX91NE368	-1.0	WESTLAKES SCIENCE & TECHNOLOGY PARK PHASE II EXT. TP305
14	180.0	SW	299860 515150	NX91NE364	-1.0	WESTLAKES SCIENCE & TECHNOLOGY PARK PHASE II EXT. 202
15	185.0	S	300190 514950	NY01SW857	-1.0	WESTLAKES SCIENCE & TECHNOLOGY PARK PHASE II EXT. TP312
16	212.0	SE	300260 514940	NY01SW660	-1.0	MONTREAL (STREAM)
17	220.0	W	299540 515430	NX91NE172	-1.0	HIGH LOW HALL FARM SPRING 'A'

ID	Distance (m)	Direction	NGR	BGS Reference	Drilled Length	Borehole Name
18	221.0	SW	300070 514940	NY01SW856	-1.0	WESTLAKES SCIENCE & TECHNOLOGY PARK PHASE II EXT. 207
19	227.0	NW	299550 515520	NX91NE173	-1.0	HIGH LOW HALL FARM SPRING 'B'
20	234.0	SW	299990 514980	NX91SE305	-1.0	WESTLAKES SCIENCE & TECHNOLOGY PARK PHASE II EXT. TP309

The borehole records are available using the hyperlinks below: Please note that if the donor of the borehole record has requested the information be held as commercial-in-confidence, the additional data will be held separately by the BGS and a formal request must be made for its release.

#1: scans.bgs.ac.uk/sobi_scans/boreholes/819968
#8: scans.bgs.ac.uk/sobi_scans/boreholes/819959
#16: scans.bgs.ac.uk/sobi_scans/boreholes/897037
#17: scans.bgs.ac.uk/sobi_scans/boreholes/819955
#19: scans.bgs.ac.uk/sobi_scans/boreholes/819956

8 Estimated Background Soil Chemistry

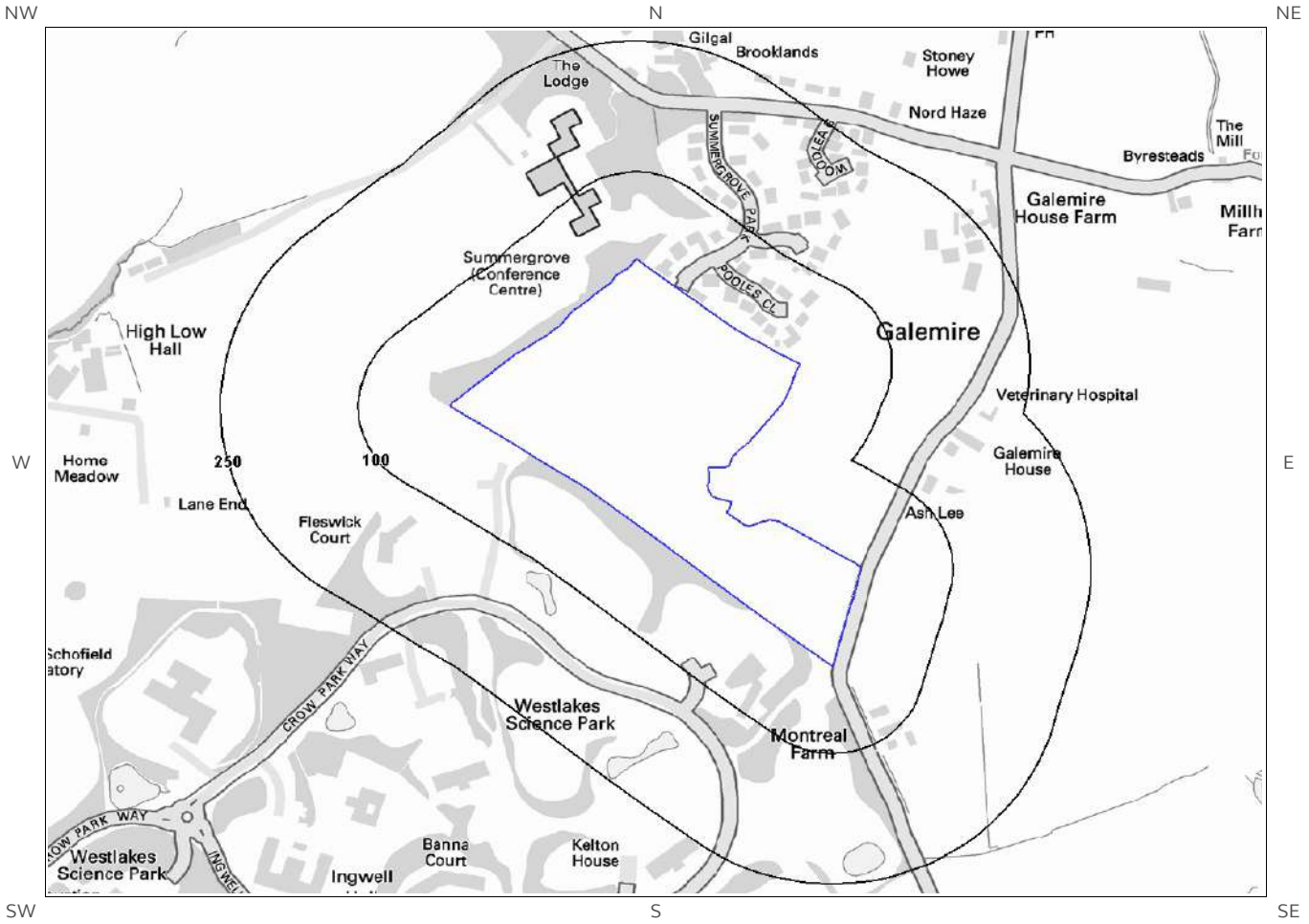
Records of background estimated soil chemistry within 250m of the study site boundary: 13

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.

Distance (m)	Direction	Sample Type	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Nickel (Ni)	Lead (Pb)
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 mg/kg	<100 mg/kg
0.0	On Site	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	<15 mg/kg	<100 mg/kg
0.0	On Site	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	<15 mg/kg	<100 mg/kg
0.0	On Site	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	<15 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 mg/kg	<100 mg/kg
0.0	On Site	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	<15 mg/kg	<100 mg/kg
4.0	NW	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
12.0	NW	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
36.0	NE	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
36.0	NE	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.

9 Railways and Tunnels map



Railways and Tunnels Legend

- Site Outline
- Search Buffers (m): 250, 500
- Underground or Partially Underground Railway / Subway System
- Railway Tunnel (OS Mapping)
- Abandoned or Dismantled Railway (OpenStreetMap)
- Railway Track (OS Mapping)
- Railway Track (OpenStreetMap)
- High Speed 2
- High Speed 2 Revised Proposed Route
- Crossrail 1
- Railway and/or Tunnel Feature from Historical Mapping

9 Railways and Tunnels

9.1 Tunnels

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.

Any records that have been identified are represented on the Railways and Tunnels map.

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.

Any records that have been identified are represented on the Railways and Tunnels map.

9.2 Historical Railway and Tunnel Features

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.

Any records that have been identified are represented on the Railways and Tunnels map.

9.3 Historical Railways

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
Any records that have been identified are represented on the Railways and Tunnels map.

9.4 Active Railways

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
Any records that have been identified are represented on the Railways and Tunnels map.

9.5 Railway Projects

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

Further information on proximity to these routes, the project construction status and associated works can be obtained through the purchase of a Groundsure HS2 and Crossrail 1 Report.

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.

Contact Details

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British Geological Survey Enquiries

Kingsley Dunham Centre
Keyworth, Nottingham NG12 5GG
Tel: 0115 936 3143.
Fax: 0115 936 3276.
Email:**enquiries@bgs.ac.uk**
Web:**www.bgs.ac.uk**
BGS Geological Hazards Reports and general geological enquiries

British Gypsum

British Gypsum Ltd
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Leicestershire
LE12 6HX

The Coal Authority

200 Lichfield Lane
Mansfield
Notts NG18 4RG
Tel: 0345 7626 848
DX 716176 Mansfield 5
www.coal.gov.uk

Public Health England

Public information access office
Public Health England, Wellington House
133-155 Waterloo Road, London, SE1 8UG
https://www.gov.uk/government/organisations/public-health-england
Email: **enquiries@phe.gov.uk**
Main switchboard: 020 7654 8000

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Website:**http://www.peterbrett.com/home**

Standard Terms and Conditions

Groundsure's Terms and Conditions can be viewed online at this link:
https://www.groundsure.com/terms-and-conditions-may25-2018

EmapSite

Masdar House, 1 Reading Road,
Eversley, RG27 0RP

Groundsure Reference:	EMS-517324_696161
Your Reference:	EMS_517324_696161
Report Date	13 Dec 2018
Report Delivery Method:	Email - pdf

Enviro Insight

Address:

Dear Sir/ Madam,

Thank you for placing your order with Groundsure. Please find enclosed the **Groundsure Enviro Insight** as requested.

If you would like further assistance regarding this report then please contact the emapsite customer services team on 0118 9736883 quoting the above report reference number.

Yours faithfully,

emapsite customer services team

Enc.
Groundsure Enviroinsight

Enviro Insight

Address:

Date: 13 Dec 2018

Reference: EMS-517324_696161

Client: EmapSite

NW N NE

W E

SW S SE

Aerial Photograph Capture date: 16-Aug-2016
Grid Reference: 299998,515394
Site Size: 8.21ha

Report Reference: EMS-517324_696161
Client Reference: EMS_517324_696161

Contents Page

Overview of Findings

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.

Section 1: Historical Industrial Sites	On-site	0-50	51-250	251-500
1.1 Potentially Contaminative Uses identified from 1:10,000 scale mapping	7	0	9	12
1.2 Additional Information – Historical Tank Database	0	0	1	1
1.3 Additional Information – Historical Energy Features Database	0	0	0	4
1.4 Additional Information – Historical Petrol and Fuel Site Database	0	0	0	0
1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database	0	0	0	0
1.6 Historical military sites	0	0	0	0
1.7 Potentially Infilled Land	9	1	5	9

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

Section 3: Landfill and Other Waste Sites	On-site	0-50m	51-250	251-500	501-1000	1000-1500
3.1 Landfill Sites						
3.1.1 Environment Agency/Natural Resources Wales Registered Landfill Sites	1	0	0	0	0	Not searched
3.1.2 Environment Agency/Natural Resources Wales Historic Landfill Sites	0	0	1	0	7	1
3.1.3 BGS/DoE Landfill Site Survey	0	0	0	0	0	2
3.1.4 Records of Landfills in Local Authority and Historical Mapping Records	0	0	0	0	0	8
3.2 Landfill and Other Waste Sites Findings						
3.2.1 Operational and Non-Operational Waste Treatment, Transfer and Disposal Sites	1	0	0	0	Not searched	Not searched
3.2.2 Environment Agency/Natural Resources Wales Licensed Waste Sites	2	0	0	0	0	0

Section 4: Current Land Use	On-site	0-50m	51-250	251-500
4.1 Current Industrial Sites Data	0	2	6	Not searched
4.2 Records of Petrol and Fuel Sites	0	0	0	0
4.3 National Grid Underground Electricity Cables	0	0	0	0
4.4 National Grid Gas Transmission Pipelines	0	0	0	0

Section 5: Geology	
5.1 Records of Artificial Ground and Made Ground present beneath the study site	Identified
5.2 Records of Superficial Ground and Drift Geology present beneath the study site	Identified
5.3 For records of Bedrock and Solid Geology beneath the study site see the detailed findings section.	

Section 6: Hydrogeology and Hydrology	0-500m
6.1 Records of Strata Classification in the Superficial Geology within 500m of the study site	Identified
6.2 Records of Strata Classification in the Bedrock Geology within 500m of the study site	Identified

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

Section 6: Hydrogeology and Hydrology

	0-500m					
	On-site	0-50m	51-250	251-500	501-1000	1000-1500
6.9 Environment Agency/Natural Resources Wales information on river quality within 1500m of the study site	No	No	No	No	No	Yes
6.10 Ordnance Survey MasterMap Water Network entries within 500m of the site	0	2	4	38	Not searched	Not searched
6.11 Surface water features within 250m of the study site	No	Yes	Yes	Not searched	Not searched	Not searched

Section 7: Flooding

7.1 Enviroment Agency Zone 2 floodplains within 250m of the study site	None identified
7.2 Environment Agency/Natural Resources Wales Zone 3 floodplains within 250m of the study site	None identified
7.3 Risk of flooding from Rivers and the Sea (RoFRaS) rating for the study site	Very Low
7.4 Flood Defences within 250m of the study site	None identified
7.5 Areas benefiting from Flood Defences within 250m of the study site	None identified
7.6 Areas used for Flood Storage within 250m of the study site	None identified
7.7 Maximum BGS Groundwater Flooding susceptibility within 50m of the study site	Limited potential
7.8 BGS confidence rating for the Groundwater Flooding susceptibility areas	Low

Section 8: Designated Environmentally Sensitive Sites

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
8.1 Records of Sites of Special Scientific Interest (SSSI)	0	0	0	0	0	0
8.2 Records of National Nature Reserves (NNR)	0	0	0	0	0	0
8.3 Records of Special Areas of Conservation (SAC)	0	0	0	0	0	0
8.4 Records of Special Protection Areas (SPA)	0	0	0	0	0	0
8.5 Records of Ramsar sites	0	0	0	0	0	0
8.6 Records of Ancient Woodlands	0	0	0	0	0	4
8.7 Records of Local Nature Reserves (LNR)	0	0	0	0	0	0
8.8 Records of World Heritage Sites	0	0	0	0	0	0
8.9 Records of Environmentally Sensitive Areas	0	0	0	0	0	0

Section 8: Designated Environmentally Sensitive Sites

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
8.10 Records of Areas of Outstanding Natural Beauty (AONB)	0	0	0	0	0	0
8.11 Records of National Parks	0	0	0	0	0	0
8.12 Records of Nitrate Sensitive Areas	0	0	0	0	0	0
8.13 Records of Nitrate Vulnerable Zones	0	0	0	0	0	1
8.14 Records of Green Belt land	0	0	0	0	0	0

Section 9: Natural Hazards

9.1 Maximum risk of natural ground subsidence	Very Low
9.1.1 Maximum Shrink-Swell hazard rating identified on the study site	Very Low
9.1.2 Maximum Landslides hazard rating identified on the study site	Very Low
9.1.3 Maximum Soluble Rocks hazard rating identified on the study site	Negligible
9.1.4 Maximum Compressible Ground hazard rating identified on the study site	Negligible
9.1.5 Maximum Collapsible Rocks hazard rating identified on the study site	Very Low
9.1.6 Maximum Running Sand hazard rating identified on the study site	Very Low
9.2 Radon	
9.2.1 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 site is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.
9.2.2 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.

Section 10: Mining

10.1 Coal mining areas within 75m of the study site	Identified
10.2 Non-Coal Mining areas within 50m of the study site boundary	Identified
10.3 Brine affected areas within 75m of the study site	None identified

Using this report

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:

1. Historical Industrial Sites

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.

2. Environmental Permits, Incidents and Registers

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.

3. Landfills and Other Waste Sites

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.

4. Current Land Uses

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.

5. Geology

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

6. Hydrogeology and Hydrology

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

7. Flooding

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.

8. Designated Environmentally Sensitive Sites

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.

9. Natural Hazards

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..

10. Mining

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

11. Contacts

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.

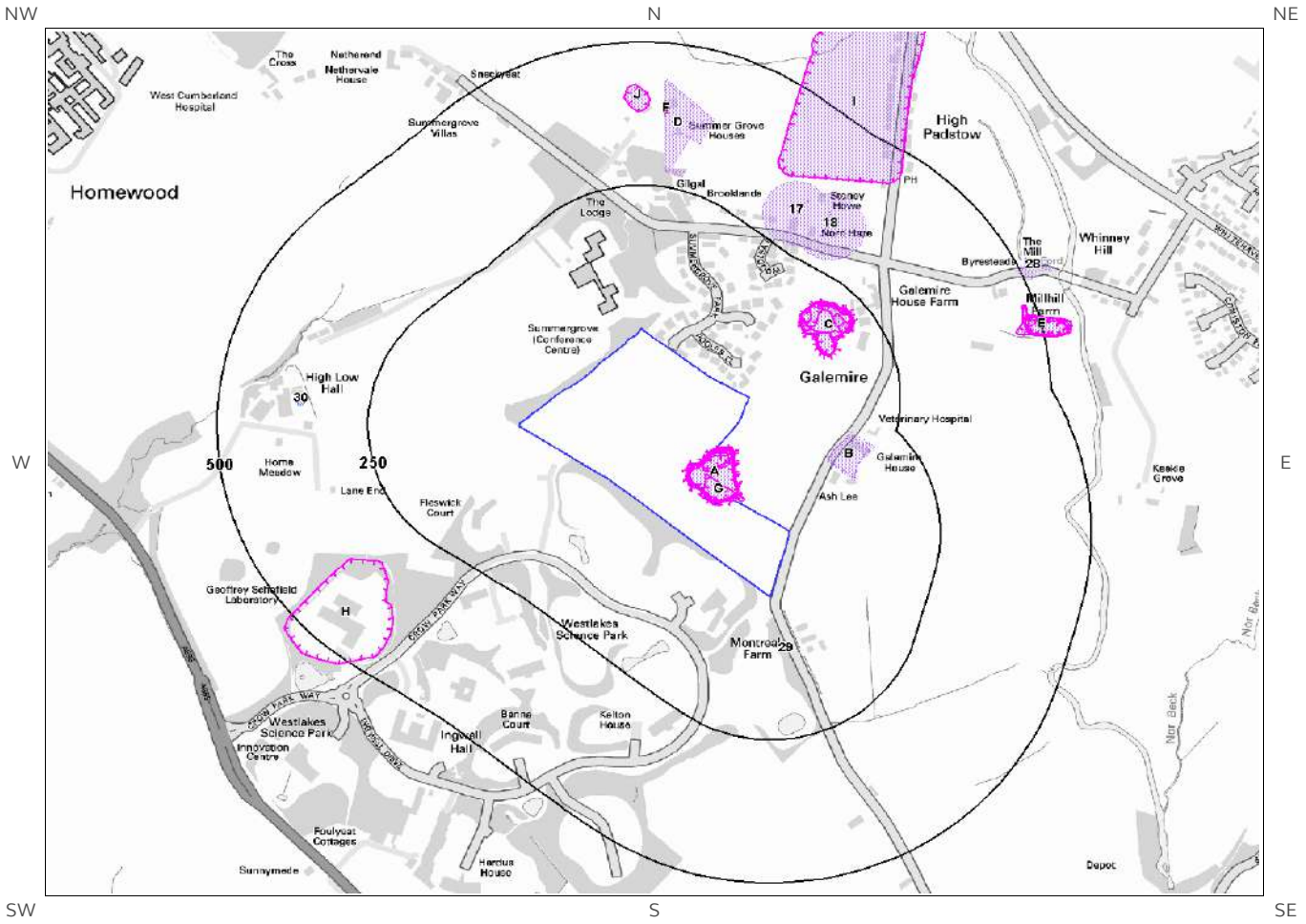
Note: Maps

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.

1. Historical Land Use



Historical 1:10,000 and 1:10,560 scale mapping

Site Outline

Industrial Land Use

Potentially Infilled Land

250
500
Search Buffers (m)

Historical 1:2,500, 1:1,250 and 1:500 scale mapping

Energy Features

Petrol Stations

Historical military sites

Tanks

Garages

1. Historical Industrial Sites

1.1 Potentially Contaminative Uses identified from 1:10,000 scale Mapping

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: 28

ID	Distance [m]	Direction	Use	Date
1A	0	On Site	Unspecified Old Quarry	1898
2A	0	On Site	Unspecified Quarry	1938
3A	0	On Site	Unspecified Quarry	1926
4A	0	On Site	Unspecified Quarry	1993
5A	0	On Site	Unspecified Quarry	1969
6A	0	On Site	Unspecified Quarry	1951
7G	0	On Site	Unspecified Quarry	1863
8B	135	NE	Infectious Diseases Hospital	1951
9B	138	NE	Infectious Diseases Hospital	1926
10B	138	NE	Infectious Diseases Hospital	1898
11B	138	NE	Infectious Diseases Hospital	1938
12C	142	NE	Unspecified Ground Workings	1951
13C	143	NE	Unspecified Quarry	1926
14C	145	NE	Unspecified Ground Workings	1938
15C	158	NE	Unspecified Quarry	1863
16C	191	NE	Unspecified Old Quarry	1898
17	259	NE	Butts	1969
18	268	NE	Butts	1951
19D	274	N	Water Works	1969
20D	335	N	Pumping Station	1993
21I	359	NE	Sewage Works	1951
22J	378	N	Unspecified Heap	1977
23E	456	E	Unspecified Ground Workings	1969
24E	472	E	Refuse Heap	1951
25E	475	E	Refuse Heap	1938
26E	478	E	Refuse Heap	1926
27E	478	E	Refuse Heap	1926
28	494	NE	Corn Mill	1863

1.2 Additional Information – Historical Tank Database

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: 2

ID	Distance (m)	Direction	Use	Date
29	98	S	Tank or Trough	1865
30	357	W	Unspecified Tank	1993

1.3 Additional Information – Historical Energy Features Database

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: 4

ID	Distance (m)	Direction	Use	Date
31D	363	N	Electricity Substation	1987
32D	375	N	Electricity Substation	1969
33F	377	N	Electricity Substation	1985
34F	377	N	Electricity Substation	1992

1.4 Additional Information – Historical Petrol and Fuel Site Database

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.

1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database

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.

1.6 Historical military sites

Certain military installations were not noted on historic mapping for security reasons. Whilst not all military land is necessarily of concern, Groundsure has researched and digitised a number of Ordnance Factories and other military industrial features (e.g. Ordnance Depots, Munitions Testing Grounds) which may be of contaminative concern. This research was drawn from a number of different sources, and should not be regarded as a definitive or exhaustive database of potentially contaminative military installations. The boundaries of sites within this database have been estimated from the best evidence available to Groundsure at the time of compilation.

Records of historical military sites within 500m of the search boundary: 0

Database searched and no data found.

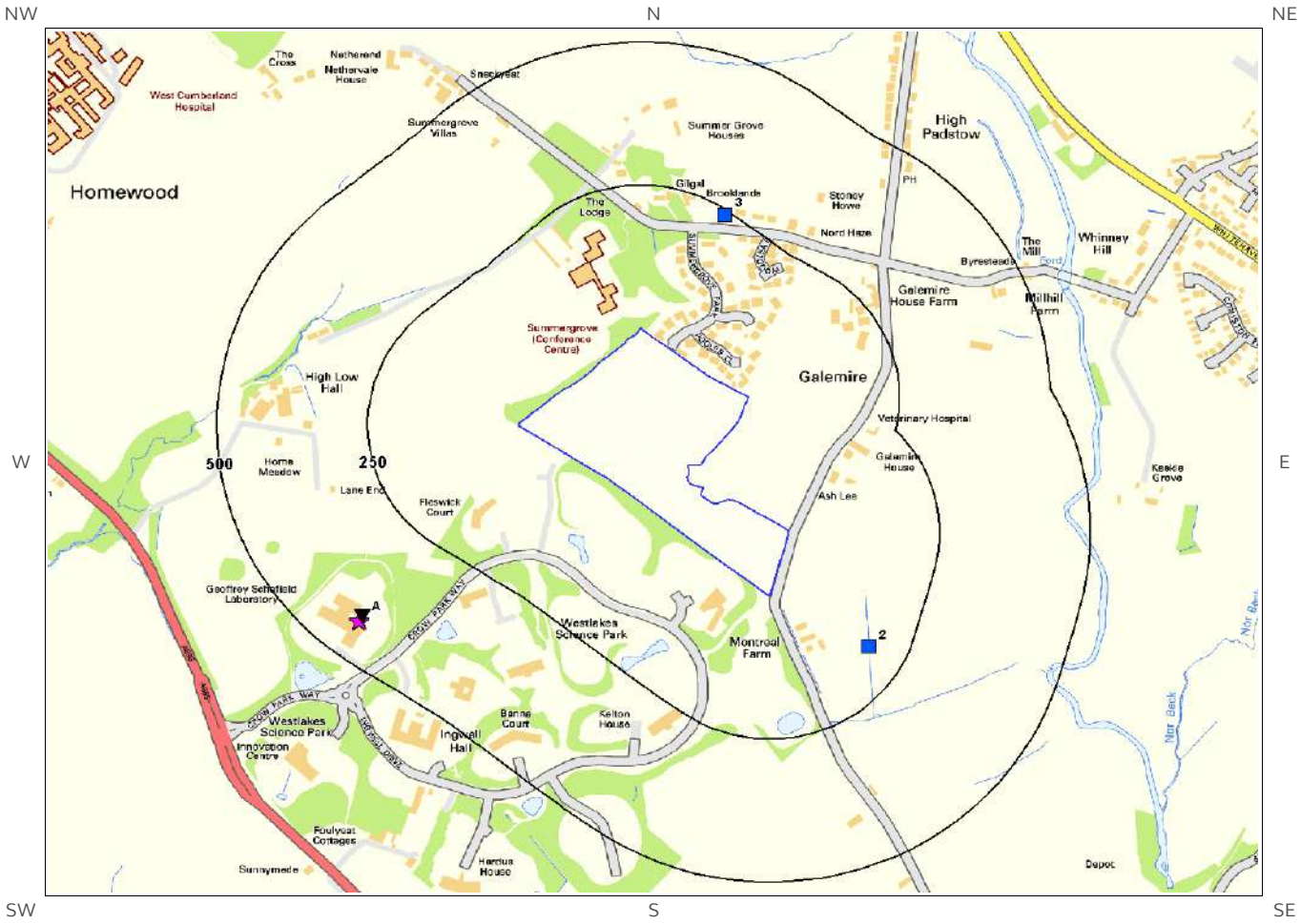
1.7 Potentially Infilled Land

Records of Potentially Infilled Features from 1:10,000 scale mapping within 500m of the study site: 24

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

ID	Distance(m)	Direction	Use	Date
35A	0	On Site	Pond	1938
36A	0	On Site	Pond	1898
37A	0	On Site	Unspecified Quarry	1993
38A	0	On Site	Unspecified Quarry	1938
39A	0	On Site	Unspecified Old Quarry	1898
40A	0	On Site	Unspecified Quarry	1969
41A	0	On Site	Unspecified Quarry	1951
42G	0	On Site	Unspecified Quarry	1863
43A	0	On Site	Unspecified Quarry	1926
44A	1	SE	Pond	1951
45C	142	NE	Unspecified Ground Workings	1951
46C	143	NE	Unspecified Quarry	1926
47C	145	NE	Unspecified Ground Workings	1938
48C	158	NE	Unspecified Quarry	1863
49C	191	NE	Unspecified Old Quarry	1898
50H	330	SW	Pond	1898
51H	330	SW	Pond	1938
52I	359	NE	Sewage Works	1951
53J	378	N	Unspecified Heap	1977
54E	456	E	Unspecified Ground Workings	1969
55E	472	E	Refuse Heap	1951
56E	475	E	Refuse Heap	1938
57E	478	E	Refuse Heap	1926
58E	478	E	Refuse Heap	1926

2. Environmental Permits, Incidents and Registers Map



- Site Outline
- Search Buffers (m) 250 / 500
- Recorded Pollution Incident
- Dangerous Substances (List 1)
- Dangerous Substances (List 2)
- Water Industry Referrals
- Licenced Discharge Consents
- Red List Discharge Consents
- RAS 3 & 4 Authorisations
- Part A(1) Authorised Processes and Historic IPC Authorisations
- Part A(2) and Part B Authorised Processes
- COMAH / NIHHS Sites
- Sites Determined as Contaminated Land
- Hazardous Substance Consents and Enforcements

2. Environmental Permits, Incidents and Registers

2.1 Industrial Sites Holding Licences and/or Authorisations

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:

1

The following RAS Licence (3 or 4) records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Address	Operator	Type	Permission Number	Dates	Status
5A	422	SW	299500 515100	Sellafield Ltd, Science Building, Westlakes Science + Technology Park, Moor Road, Egremont, Cumbria, CA24 3JZ	Sellafield Ltd	Disposal Of Radioactive Waste (was Rsa60 Section 6).	BZ2273	Date of Approval:1/7/2005 Effective from:8/7/2005 Last date of update:2015-01-01	Revoked/cancelled

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

2

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

ID	Distance (m)	Direction	NGR	Details	
2	186	SE	300339 515046	Address: MONTREAL FARM, MOOR ROW, WHITEHAVEN, CUMBRIA, CA24 3LE Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: EPRAB3093VZ Permit Version: 1	Receiving Water: UN-NAMED TRIB OF RIVER KEEKLE Status: NEW ISSUED UNDER EPR 2010 Issue date: 07/01/2014 Effective Date: 07-Jan-2014 Revocation Date:
3	241	NE	300100 515800	Address: NETHEREND FARM STP, HENSINGHAM, WHITEHAVEN, CUMBRIA Effluent Type: MISCELLANEOUS DISCHARGES - SURFACE WATER Permit Number: 017490148 Permit Version: 1	Receiving Water: TRIB DRAIN AREA 74 Status: REVOKED - UNSPECIFIED Issue date: Effective Date: 02-Sep-1988 Revocation Date: 01/11/1994

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.

2.2 Dangerous or Hazardous Sites

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

Database searched and no data found.

2.3 Environment Agency/Natural Resources Wales Recorded Pollution Incidents

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

1

The following NIRS List 2 records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details	
1A	432	SW	299495 515091	Incident Date: 21-Jan-2004 Incident Identification: 211993 Pollutant: Inorganic Chemicals/Products Pollutant Description: Alkalis	Water Impact: Category 1 (Major) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)

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

0

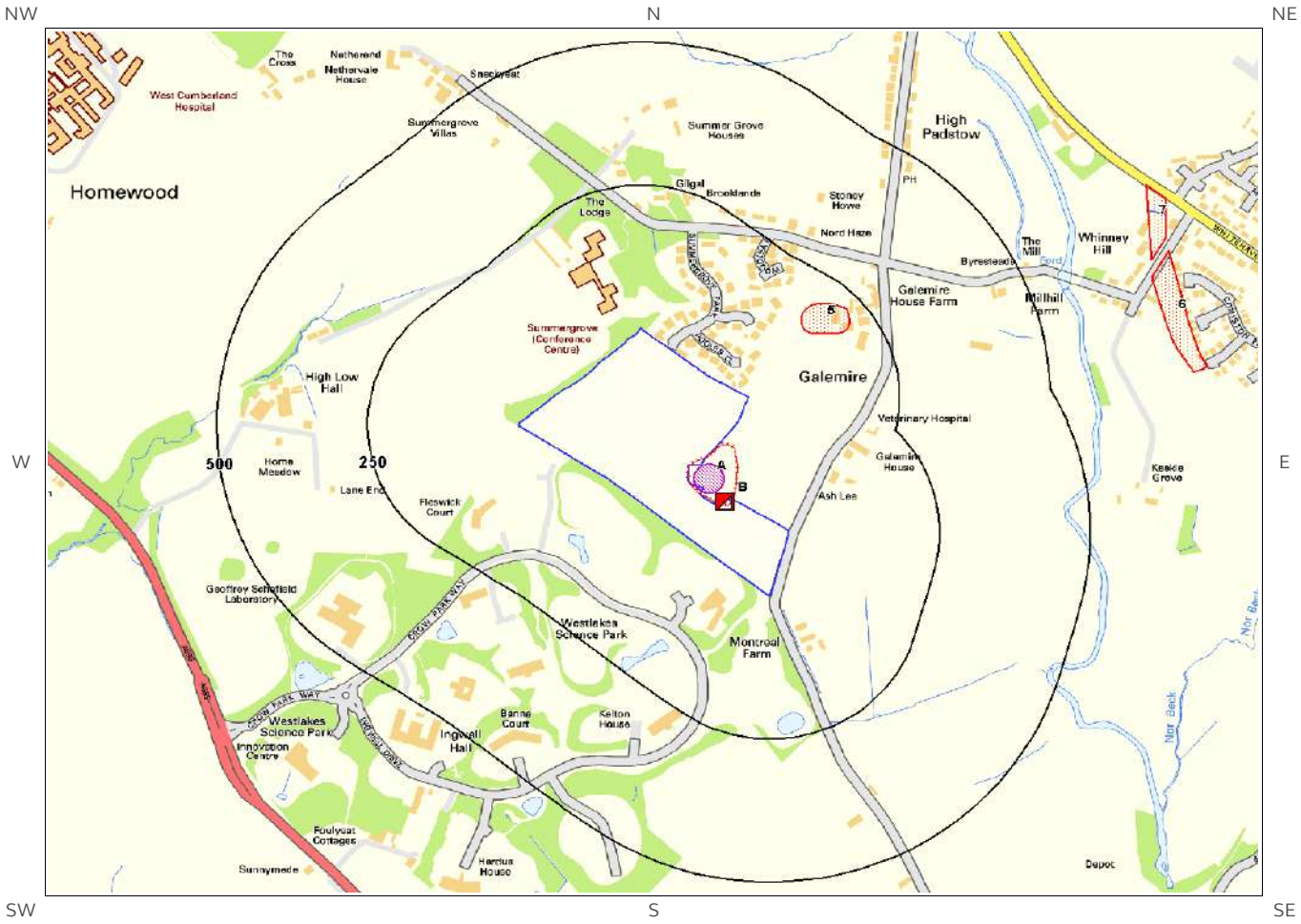
Database searched and no data found.

2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990

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.

3. Landfill and Other Waste Sites Map



Site Outline

250
500
Search Buffers (m)

EA/NRW Active Landfill

EA/NRW Historic Landfill

BGS / DoE Survey Landfill

Historic and Planned Waste Sites

EA/NRW Licensed Waste Site

Local Authority/Historical Mapping Landfill Records

3. Landfill and Other Waste Sites

3.1 Landfill Sites

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

1

The following Environment Agency/Natural Resources Wales landfill records are represented as polygons on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details	
3A	0	On Site	300100 515300	Address: Galemire Quarry, Keekle, Cleator Moor, Cumbria, CA25 5QU Landfill Reference: 57283.0 Environmental Permitting Regulations (Waste) Reference: CUM001 Landfill Type: A05: Landfill taking Non-Biodegradeable Wastes	Operator: Cumbria County Council Status: Closure IPPC Reference: EPR Reference:

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

9

The following landfill records are represented as either points or polygons on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details	
5	150	NE		Site Address: Galemire Farm, Keekle, Cleator Moor, Cumbria Waste Licence: Yes Site Reference: 87 Waste Type: Inert, Industrial Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: 17-May-1982 Licence Surrendered: 11-May-1995 Licence Holder Address: 14 Loop Road South, Whitehaven, Cumbria Operator: - Licence Holder: R and B Milburn First Recorded: 31-Dec-1948 Last Recorded: 31-Dec-1984
6	700	E		Site Address: Railway Cuttings, Whinney Hill, Cleator Moor, Cumbria Waste Licence: Yes Site Reference: 58 Waste Type: Inert Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: 20-Feb-1979 Licence Surrendered: 08-Feb-1993 Licence Holder Address: 55 Washington Street, Workington, Cumbria Operator: - Licence Holder: Newdale Construction Limited First Recorded: 31-Dec-1979 Last Recorded: 30-Sep-1985
7	710	E		Site Address: Railway Cuttings, Whinney Hill, Cleator Moor, Cumbria	Licence Issue: 20-Feb-1979 Licence Surrendered: 08-Feb-1993

ID	Distance (m)	Direction	NGR	Details	
				Waste Licence: Yes Site Reference: 58 Waste Type: Inert Environmental Permitting Regulations (Waste) Reference: -	Licence Holder Address: 55 Washington Street, Workington, Cumbria Operator: - Licence Holder: Newdale Construction Limited First Recorded: 31-Dec-1979 Last Recorded: 30-Sep-1985
Not shown	860	E		Site Address: St Begas, Whitehaven Road, Cleator Moor Waste Licence: - Site Reference: - Waste Type: Inert Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: Licence Surrendered: Licence Holder Address: - Operator: Rev J V Cahalane Licence Holder: - First Recorded: - Last Recorded: 13-Apr-1979
Not shown	930	SE		Site Address: Crossfield Tip, Crossfield Moor, Cleator Moor, Cumberland Waste Licence: - Site Reference: - Waste Type: Commercial Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: Licence Surrendered: Licence Holder Address: - Operator: Ennerdale Rural District Council Licence Holder: - First Recorded: 22-Dec-1970 Last Recorded: -
Not shown	931	SE		Site Address: Montreal Mine, Crossfields Road, Cleator Moor, Cumbria Waste Licence: Yes Site Reference: E108.58, R19, E160.77 Waste Type: Industrial, Commercial, Household Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: 14-Jun-1977 Licence Surrendered: 30-Apr-1994 Licence Holder Address: The Courts, Carlisle, Cumbria Operator: - Licence Holder: Cumbria County Council First Recorded: 31-Dec-1977 Last Recorded: -
Not shown	936	NW		Site Address: Overend Quarry, Overend Road, Overend, Hensingham, Whitehaven, Cumbria Waste Licence: Yes Site Reference: 22 Waste Type: Inert Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: 31-Aug-1977 Licence Surrendered: 06-Jan-1993 Licence Holder Address: Town Hall, Whitehaven Operator: - Licence Holder: Copeland Borough Council First Recorded: 31-Dec-1942 Last Recorded: 31-Dec-1988
Not shown	958	NW		Site Address: Overend Tip, Hensingham, Whitehaven, Cumbria Waste Licence: - Site Reference: - Waste Type: - Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: Licence Surrendered: Licence Holder Address: - Operator: - Licence Holder: - First Recorded: - Last Recorded: -
Not shown	1218	NW		Site Address: Overend Quarry, Overend Road, Overend, Hensingham, Whitehaven, Cumbria Waste Licence: Yes Site Reference: 22 Waste Type: Inert Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: 31-Aug-1977 Licence Surrendered: 06-Jan-1993 Licence Holder Address: Town Hall, Whitehaven Operator: - Licence Holder: Copeland Borough Council First Recorded: 31-Dec-1942 Last Recorded: 31-Dec-1988

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

2

The following landfill records are represented as points on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details	
Not shown	1121	SE	301100.0 514500.0	Address: Crossfield Tip, Crossfield Moor, Cleator Moor, Cum BGS Number: 2480.0	Risk: No risk to aquifer Waste Type: N/A
Not shown	1165	NW	299100.0 516400.0	Address: Overend Tip, Hensingham, Whitehaven, Cumbria BGS Number: 25.0	Risk: Risk not recorded Waste Type: N/A

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

8

The following landfill records are represented as points or polygons on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Site Address	Source	Data Type
Not shown	1123	NW	299140 516387	Refuse Tip	1968 mapping	Polygon
Not shown	1135	NW	299140 516397	Refuse Tip	1968 mapping	Polygon
Not shown	1219	E	301447 514915	Refuse Tip	1966 mapping	Polygon
Not shown	1321	NW	299041 516561	Refuse Tip	1968 mapping	Polygon
Not shown	1322	NW	299041 516560	Refuse Tip	1968 mapping	Polygon
Not shown	1328	S	300133 513773	Refuse Tip	1961 mapping	Polygon
Not shown	1332	E	301540 514854	Refuse Tip	1961 mapping	Polygon
Not shown	1343	NW	298974 516620	Refuse Tip	1972 mapping	Polygon

3.2 Other Waste Sites

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

1

The following waste treatment, transfer or disposal sites records are represented as points on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details		
4A	0	On Site	300075 515339	Type of Site: Landfill Works Site Address: Galemire Quarry Inert Landfill, Galemire, Cleator Moor, Cumbria, CA25 5QX	Planning Application Reference: PL\1479\05 (4/15/9009) Date: 26/10/2015	Further Details: Scheme comprises importation of material to improve the restoration of a former inert landfill site. Data Source: Historic Planning Application Data Type: Point

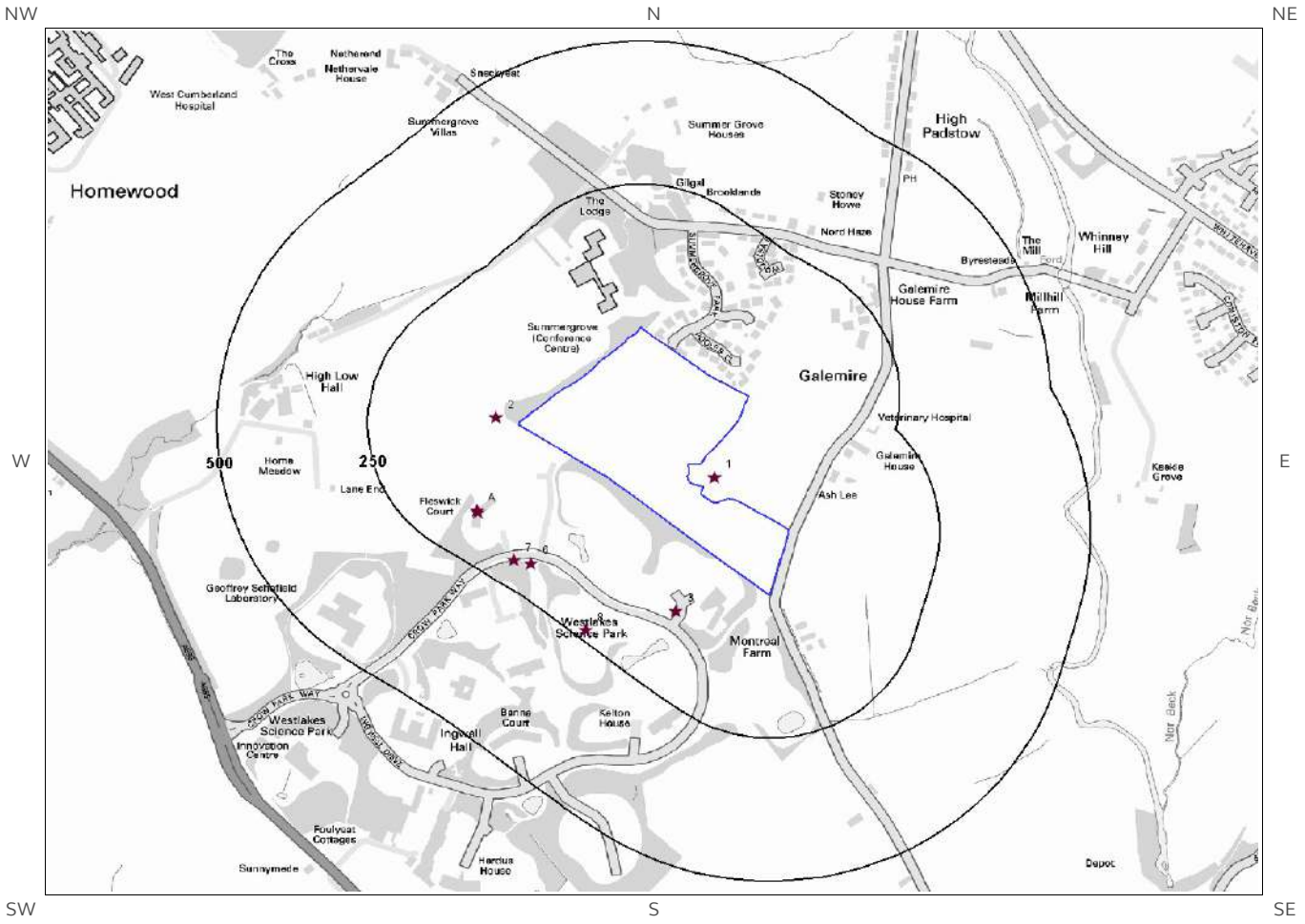
3.2.2 Records of Environment Agency/Natural Resources Wales licensed waste sites within 1500m of the study site:

2

The following waste treatment, transfer or disposal sites records are represented as points on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details	
14B	0	On Site	300100 515300	Site Address: Galemire Quarry, Keekle, Cleator Moor, Cumbria, CA25 5QU Type: Inert LF Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: CUM001 EPR reference: EA/EPR/EP3893ZW/A001 Operator: Cumbria County Council Waste Management licence No: 57283 Annual Tonnage: 24999.0	Issue Date: 17/10/1994 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Closure Site Name: Galemire Quarry Correspondence Address: -
15B	0	On Site	300100 515300	Site Address: Galemire Quarry, Keekle, Cleator Moor, Cumbria, CA25 5QU Type: Landfill taking Non-Biodegradeable Wastes Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: CUM001 EPR reference: EA/EPR/EP3893ZW/V004 Operator: Cumbria County Council Waste Management licence No: 57283 Annual Tonnage: 0.0	Issue Date: 17/10/1994 Effective Date: - Modified: 12/03/2015 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Closure Site Name: Galemire Quarry Correspondence Address: -

4. Current Land Use Map



Site Outline

Search Buffers (m)
250
500

Current Industrial Sites

Petrol & Fuel Sites

Electricity Transmission Cables

Gas Transmission Pipelines

4. Current Land Uses

4.1 Current Industrial Data

Records of potentially contaminative industrial sites within 250m of the study site: 8

The following records are represented as points on the Current Land Uses map.

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
1	25	NE	Tip	300083 515341	Cumbria, CA28	Refuse Disposal Facilities	Infrastructure and Facilities
2	40	W	Pylon	299722 515445	Cumbria, CA24	Electrical Features	Infrastructure and Facilities
3	114	SW	Electricity Sub Station	300019 515108	Cumbria, CA24	Electrical Features	Infrastructure and Facilities
4A	164	SW	Cavendish Nuclear	299690 515283	Fleswick Court, Crow Park Way, Westlakes Science & Technology Park, Moor Row, Cumbria, CA24 3HZ	Industrial Engineers	Engineering Services
5A	165	SW	AECOM	299692 515280	Saltom Suite Fleswick Court, Westlakes Science & Technology Park, Moor Row, Cumbria, Cumbria, CA24 3HZ	Civil Engineers	Engineering Services
6	194	SW	Pylon	299779 515191	Cumbria, CA24	Electrical Features	Infrastructure and Facilities
7	204	SW	Electricity Sub Station	299751 515196	Cumbria, CA24	Electrical Features	Infrastructure and Facilities
8	232	SW	Atkins Group	299871 515074	Atkins Global Rutherford House, Crow Park Way, Westlakes Science & Technology Park, Moor Row, Cumbria, CA24 3HY	Civil Engineers	Engineering Services

4.2 Petrol and Fuel Sites

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

Database searched and no data found.

4.3 National Grid High Voltage Underground Electricity Transmission Cables

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.

4.4 National Grid High Pressure Gas Transmission Pipelines

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.

---

5. Geology

5.1 Artificial Ground and Made Ground

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

Lex Code	Description	Rock Type
WGR-VOID	WORKED GROUND (UNDIVIDED)	VOID

5.2 Superficial Ground and Drift Geology

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

Lex Code	Description	Rock Type
TILLD-DMTN	TILL, DEVENSIAN	DIAMICTON

5.3 Bedrock and Solid Geology

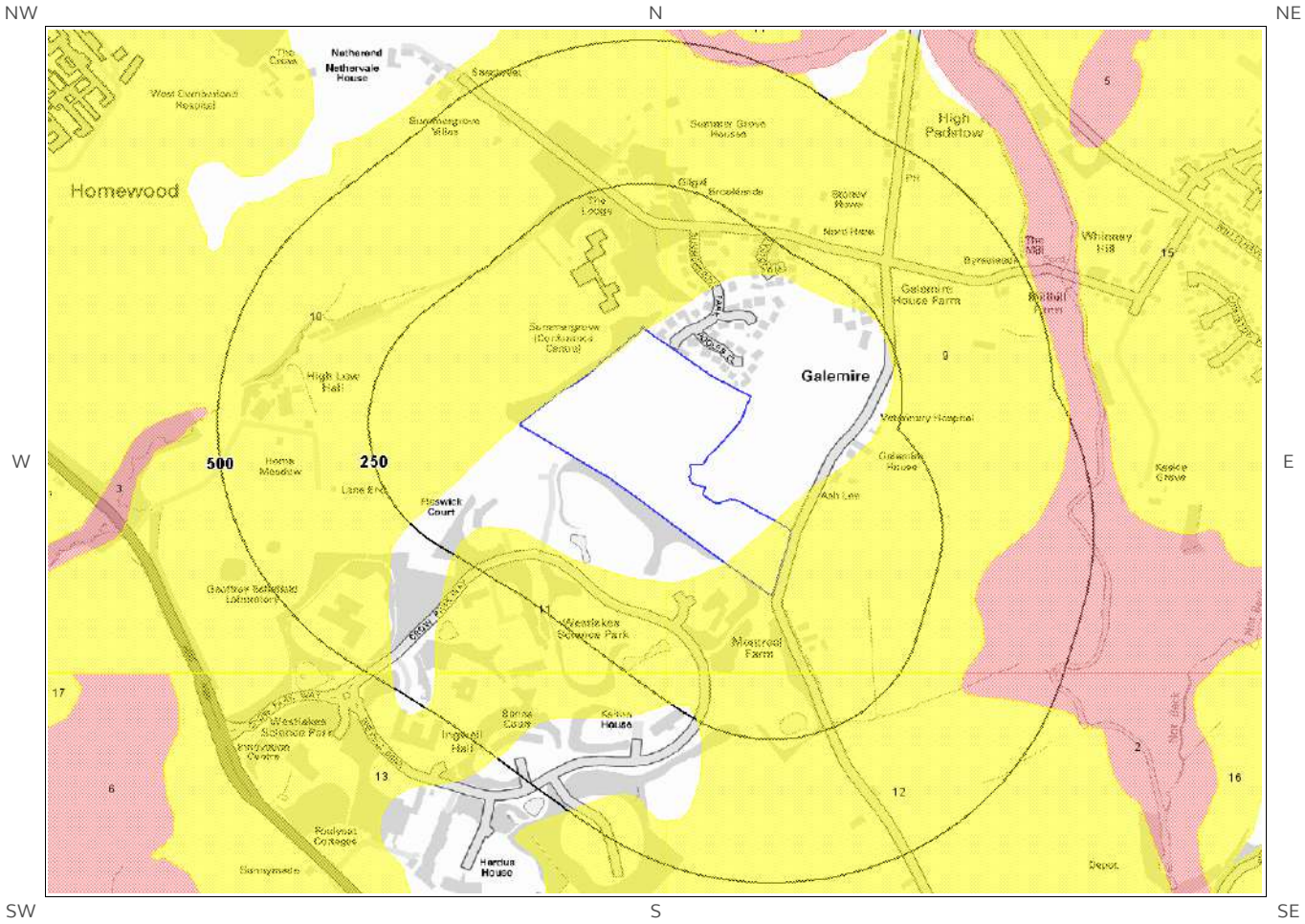
The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
SBS-SDST	ST BEES SANDSTONE MEMBER	SANDSTONE
SBS-SDST	ST BEES SANDSTONE MEMBER	SANDSTONE

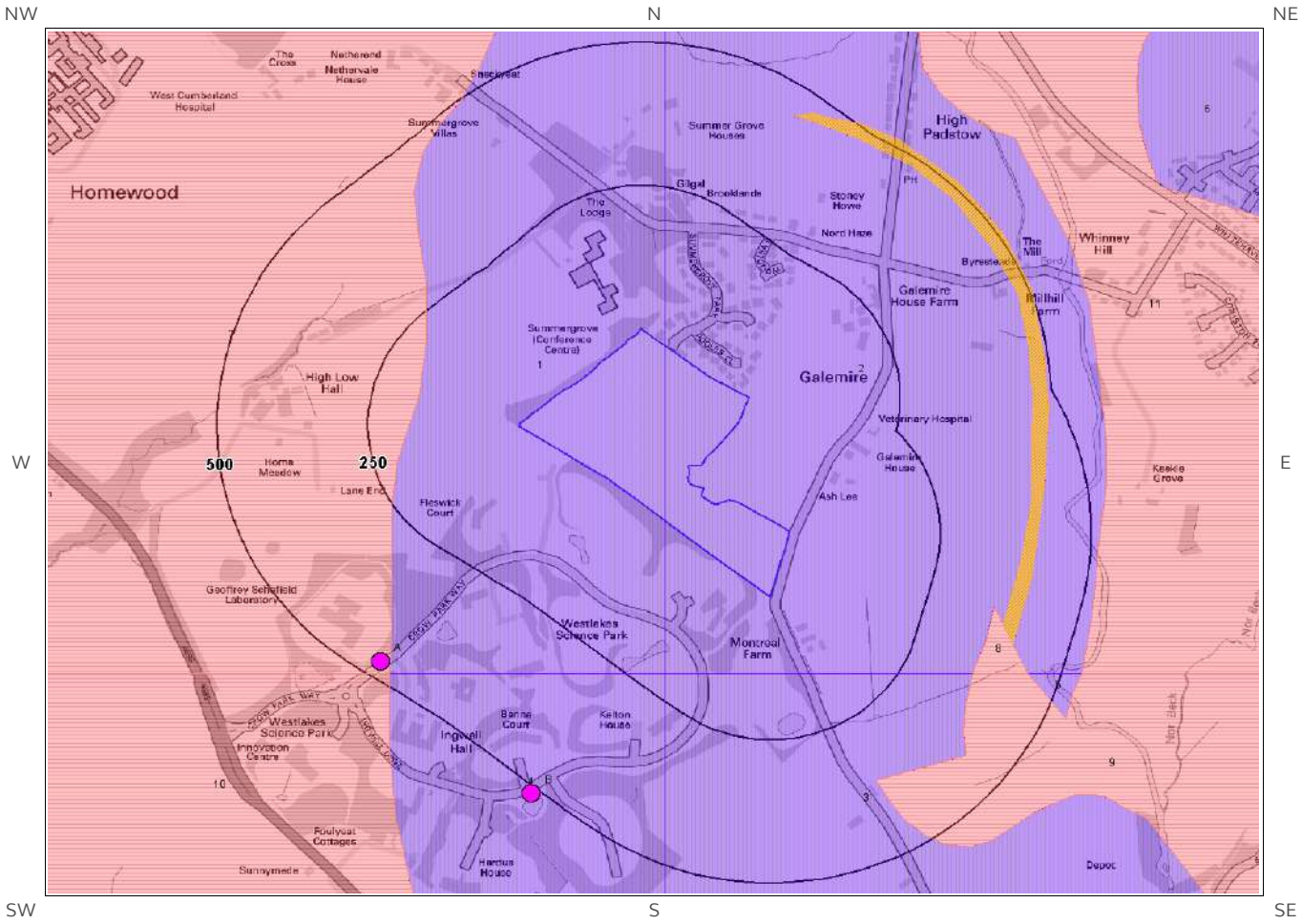
(Derived from the BGS 1:50,000 Digital Geological Map of Great Britain)

6 Hydrogeology and Hydrology

6a. Aquifer Within Superficial Geology



6b. Aquifer Within Bedrock Geology and Abstraction Licences



Site Outline

250
500
Search Buffers (m)

Principal Aquifer

Secondary (A) Aquifer - Permeable Layers

Secondary (B) Aquifer - Lower Permeability Layers

Groundwater Abstraction Licence

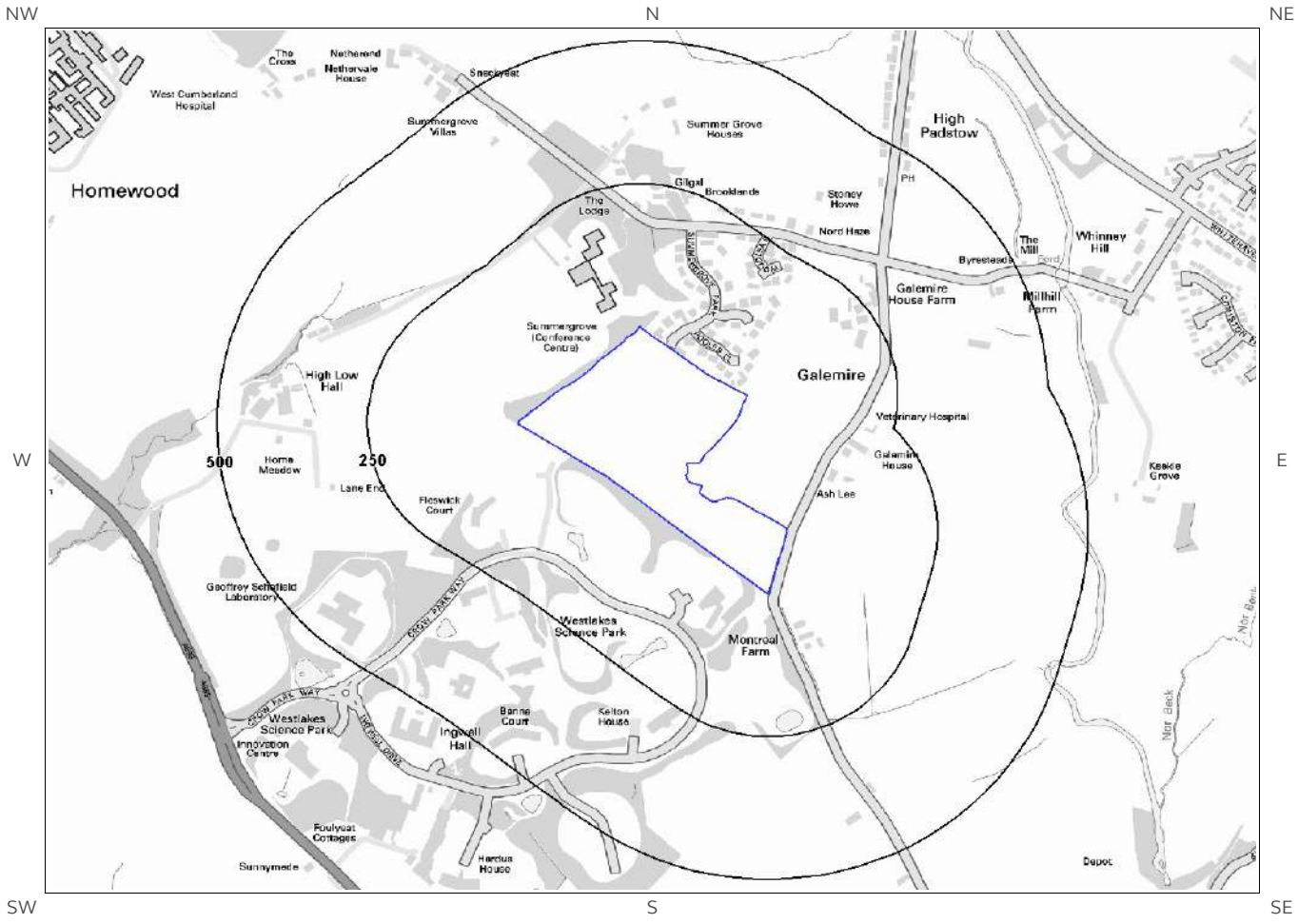
Secondary Aquifer - Undifferentiated Layers

Unproductive

Unknown (lakes and landslip)

Surface Water Abstraction Licence

6c. Hydrogeology – Source Protection Zones and Potable Water Abstraction Licences



Site Outline

250
500
Search Buffers (m)

Source Protection Zone 1 - Inner Catchment

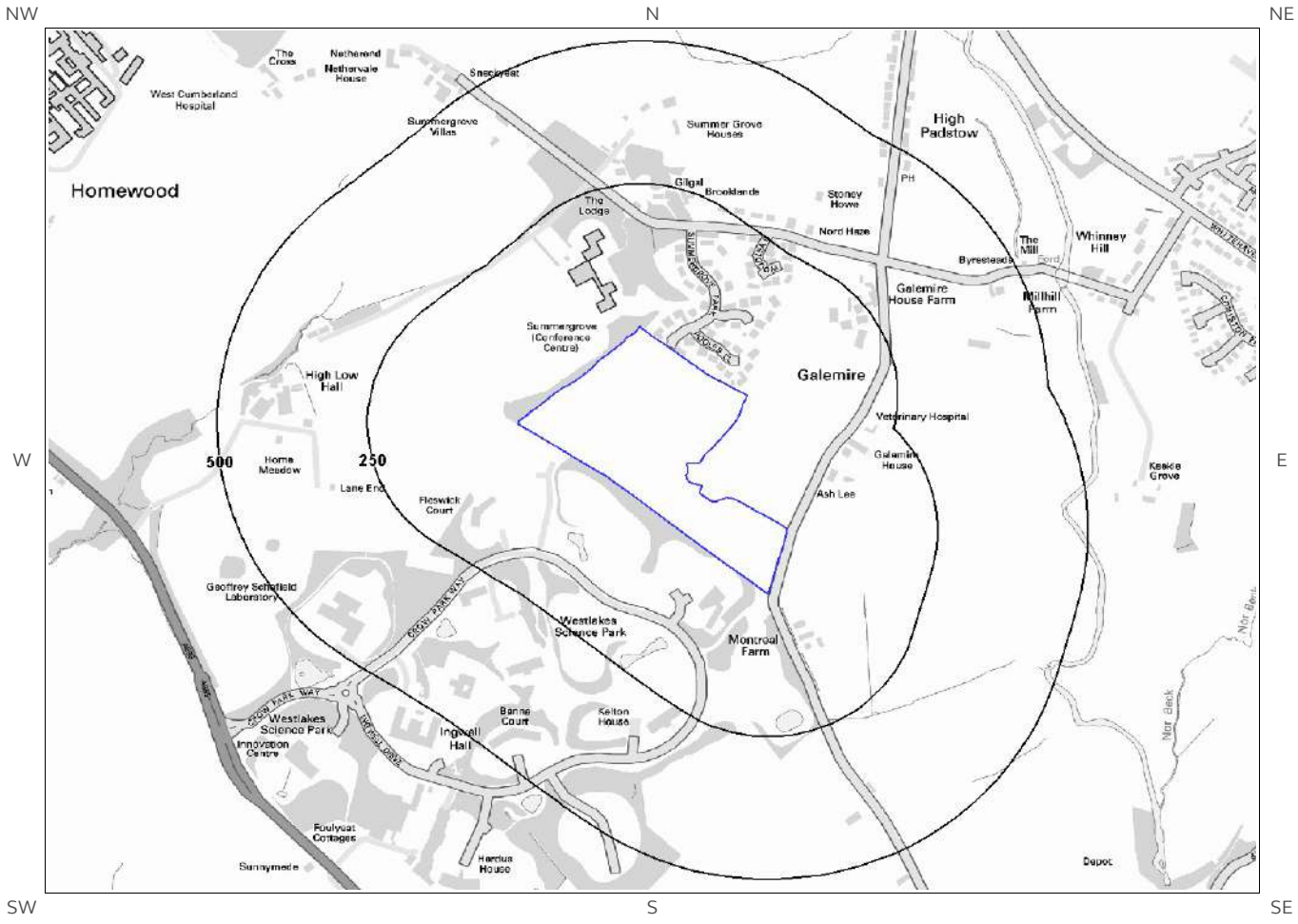
Source Protection Zone 2 - Outer Catchment

Source Protection Zone 3 - Total Catchment

Source Protection Zone 4 - Zone of Special Interest

Potable Water Abstraction Licence

6d. Hydrogeology – Source Protection Zones within confined aquifer



Site Outline

250 500 Search Buffers (m)

Source Protection Zone 1 - Inner Catchment

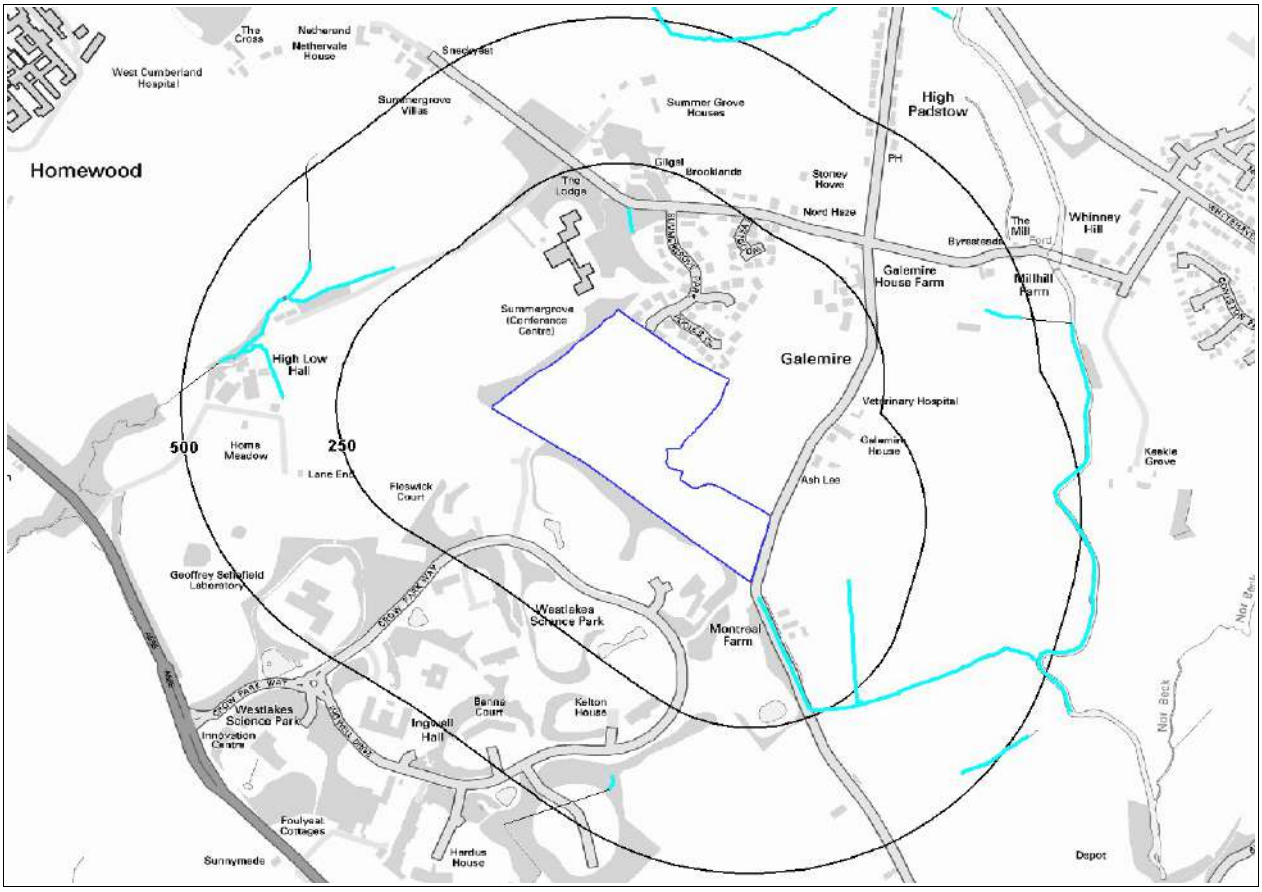
Source Protection Zone 2C - Outer Catchment within Confined Aquifer

Source Protection Zone 3C - Total Catchment within Confined Aquifer

Potable Water Abstraction Licence

6e. Hydrology – Watercourse Network and River Quality

NW N NE



W E

SW S SE

Site Outline

250
500
Search Buffers (m)

Tidal River
Inland River
Underground or Elevated Tidal River
Underground or Elevated Inland River
Foreshore
General Quality Assessment: Chemistry

Canal
Underground or Elevated Canal
Lock or Flight of Locks
Lake, Reservoir, or Marsh
Drain or Transfer
General Quality Assessment: Biology

6.Hydrogeology and Hydrology

6.1 Aquifer within Superficial Deposits

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):

ID	Distance (m)	Direction	Designation	Description
9	0	On Site	Secondary (undifferentiated)	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
10	0	On Site	Secondary (undifferentiated)	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
11	87	SW	Secondary (undifferentiated)	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
12	134	S	Secondary (undifferentiated)	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
13	212	SW	Secondary (undifferentiated)	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
1	321	E	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
2	344	SE	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

6.2 Aquifer within Bedrock Deposits

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):

ID	Distance (m)	Direction	Designation	Description
1	0	On Site	Principal	Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers

ID	Distance (m)	Direction	Designation	Description
2	0	On Site	Principal	Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers
3	134	S	Principal	Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers
7	174	W	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	212	SW	Principal	Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers
8	360	E	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
9	360	E	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
12	383	E	Secondary B	Predominantly lower permeability layers which may store/yield limited amounts of groundwater due to localised features such as fissures, thin permeablehorizons and weathering. These are generally the water-bearing parts of the former non-aquifers
5	446	E	Principal	Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers
10	480	SW	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

6.3 Groundwater Abstraction Licences

Groundwater Abstraction Licences within 2000m of the study site — None identified

Database searched and no data found.

6.4 Surface Water Abstraction Licences

Surface Water Abstraction Licences within 2000m of the study site — Identified

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

ID	Distance (m)	Direction	NGR	Details	
13A	472	SW	299530 515020	Status: Historical Licence No: 2774002010 Details: Make-Up or Top Up Water Direct Source: "Surface, Non-Tidal - North West Region" Point: "SPRING FED CATCHPIT @ WESTLAKES S&T PARK, MOOR ROW" Data Type: Point Name: WESTLAKES PROPERTIES LTD	Annual Volume (m^3): - Max Daily Volume (m^3): - Application No: - Original Start Date: - Expiry Date: 28-Dec-15 Issue No: 1 Version Start Date: 29/12/2000 Version End Date:
14A	472	SW	299530	Status: Historical	Annual Volume (m^3): -

ID	Distance (m)	Direction	NGR	Details	
			515020	Licence No: 2774002010 Details: Make-Up or Top Up Water Direct Source: Surface, Non-Tidal - North West Region Point: SPRING FED CATCHPIT @ WESTLAKES S&T PARK, MOOR ROW Data Type: Point Name: WESTLAKES PROPERTIES LTD	Max Daily Volume (m^3): - Application No: - Original Start Date: - Expiry Date: 28/12/2015 Issue No: 2 Version Start Date: 29/12/2000 Version End Date:
15B	512	SW	299780 514790	Status: Historical Licence No: 2774002010 Details: Make-Up or Top Up Water Direct Source: Surface, Non-Tidal - North West Region Point: SPRING FED CATCHPIT @ WESTLAKES S&T PARK, MOOR ROW Data Type: Point Name: WESTLAKES PROPERTIES LTD	Annual Volume (m^3): - Max Daily Volume (m^3): - Application No: - Original Start Date: - Expiry Date: 28/12/2015 Issue No: 2 Version Start Date: 29/12/2000 Version End Date:
16B	512	SW	299780 514790	Status: Historical Licence No: 2774002010 Details: Make-Up or Top Up Water Direct Source: "Surface, Non-Tidal - North West Region" Point: "SPRING FED CATCHPIT @ WESTLAKES S&T PARK, MOOR ROW" Data Type: Point Name: WESTLAKES PROPERTIES LTD	Annual Volume (m^3): - Max Daily Volume (m^3): - Application No: - Original Start Date: - Expiry Date: 28-Dec-15 Issue No: 1 Version Start Date: 29/12/2000 Version End Date:

6.5 Potable Water Abstraction Licences

Potable Water Abstraction Licences within 2000m of the study site — None identified

Database searched and no data found.

6.6 Source Protection Zones

Source Protection Zones within 500m of the study site — None identified

Database searched and no data found.

6.7 Source Protection Zones within Confined Aquifer

Source Protection Zones within the Confined Aquifer within 500m of the study site None identified

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.

6.8 Groundwater Vulnerability and Soil Leaching Potential

Environment Agency/Natural Resources Wales information on groundwater vulnerability and soil leaching potential within 500m of the study site Identified

Distance (m)	Direction	Classification	Soil Vulnerability Category	Description
0	On Site	Major 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	Major Aquifer/Intermediate Leaching Potential	I1	Soils which can possibly transmit a wide range of pollutants.
299	W	Minor Aquifer/Intermediate Leaching Potential	I1	Soils which can possibly transmit a wide range of pollutants.
452	SE	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.
456	E	Minor Aquifer/High Leaching Potential	H1	Soils which readily transmit liquid discharges because they are shallow or susceptible to rapid flow directly to rock, gravel or groundwater.
478	N	Major Aquifer/High Leaching Potential	H1	Soils which readily transmit liquid discharges because they are shallow or susceptible to rapid flow directly to rock, gravel or groundwater.

6.9 River Quality

Environment Agency/Natural Resources Wales information on river quality within 1500m of the study site Identified

6.9.1 Biological Quality:

Database searched and no data found.

6.9.2 Chemical Quality:

Chemical quality data is based on the General Quality Assessment Headline Indicators scheme (GQAHI). In England, each chemical sample is measured for ammonia and dissolved oxygen. In Wales, the samples are measured for biological oxygen demand (BOD), ammonia and dissolved oxygen. The results are graded from A ('Very Good') to F ('Bad').

The following Chemical Quality records are shown on the Hydrology Map (6e):

					Chemical Quality Grade				
ID	Distance (m)	Direction	NGR	River Quality Grade	2005	2006	2007	2008	2009
Not shown	1104	SE	301000 514400	River Name: Keekle Reach: Moor Row To Ehen End/Start of Stretch: Start of Stretch NGR	B	E	E	E	B

6.10 Ordnance Survey MasterMap Water Network

Ordnance Survey MasterMap Water Network entries within 500m of the study site

This watercourse information is provided by Ordnance Survey MasterMap Water Network. The data provides a detailed centre line following the curve of the waterway precisely, so all distances provided in the report should be understood as measurements to the centreline rather than a measurement to the nearest point of the watercourse. Underground watercourses are inferred from entry and exit points so caution is advised in using these to indicate precise locations of underground watercourses when planning site investigation and development.

The following Ordnance Survey MasterMap Water Network records are represented on the Hydrology Map (6e):

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
1	28 SE	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Ehen-Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
6	28 SE	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Ehen-Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
2	133 N	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Ehen-Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
7	133	Not Specified	Inland river not influenced	Catchment Area: Ehen-Calder

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
	N		by normal tidal action.	Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
3	151 E	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Ehen-Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
8	151 E	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Ehen-Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
4	276 SE	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Ehen-Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
9	276 SE	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Ehen-Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
5	284 NW	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Ehen-Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
10	284 NW	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Ehen-Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
6	337 W	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Ehen-Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
11	337 W	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Ehen-Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
7	373 NW	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Ehen-Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
12	373 NW	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Ehen-Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
8	379 NW	Not Specified	Lake, loch or reservoir.	Catchment Area: Ehen-Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 0.3
13	379 NW	Not Specified	Lake, loch or reservoir.	Catchment Area: Ehen-Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
				conditions) Average Width in Watercourse Section (m): 0.3
9	383 NW	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Ehen-Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.1
14	383 NW	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Ehen-Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.1
10	385 NW	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Ehen-Calder Relationship to Ground Level: Not provided Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
15	385 NW	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Ehen-Calder Relationship to Ground Level: Not provided Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
11	399 SW	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Ehen-Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
Not shown	399 SW	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Ehen-Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
12	415 W	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Ehen-Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.3
17	415 W	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Ehen-Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 1.3
13	423 SW	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Ehen-Calder Relationship to Ground Level: Not provided Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
Not shown	423 SW	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Ehen-Calder Relationship to Ground Level: Not provided Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
14	430 E	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Ehen-Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
19	430 E	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Ehen-Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
15	445 W	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Ehen-Calder Relationship to Ground Level: Not provided Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
Not shown	445 W	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Ehen-Calder Relationship to Ground Level: Not provided Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
16	460 E	River Keekle	Inland river not influenced by normal tidal action.	Catchment Area: Ehen-Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 8.2
Not shown	460 E	River Keekle	Inland river not influenced by normal tidal action.	Catchment Area: Ehen-Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 8.2
17	471 SE	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Ehen-Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
Not shown	471 SE	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Ehen-Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
18	476 E	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Ehen-Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 6.6
23	476 E	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Ehen-Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 6.6
19	480 N	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Ehen-Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
20	480 E	River Keekle	Inland river not influenced by normal tidal action.	Catchment Area: Ehen-Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 8.1
21	480 E	River Keekle	Inland river not influenced by normal tidal action.	Catchment Area: Ehen-Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 10.1
Not shown	480 N	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Ehen-Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
25	480	River Keekle	Inland river not influenced by normal tidal action.	Catchment Area: Ehen-Calder Relationship to Ground Level: On ground surface

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
	E			Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 8.1
26	480 E	River Keekle	Inland river not influenced by normal tidal action.	Catchment Area: Ehen-Calder Relationship to Ground Level: On ground surface Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): 10.1
22	482 E	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Ehen-Calder Relationship to Ground Level: Not provided Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided
27	482 E	Not Specified	Inland river not influenced by normal tidal action.	Catchment Area: Ehen-Calder Relationship to Ground Level: Not provided Permanence: Watercourse contains water year round (in normal conditions) Average Width in Watercourse Section (m): Not Provided

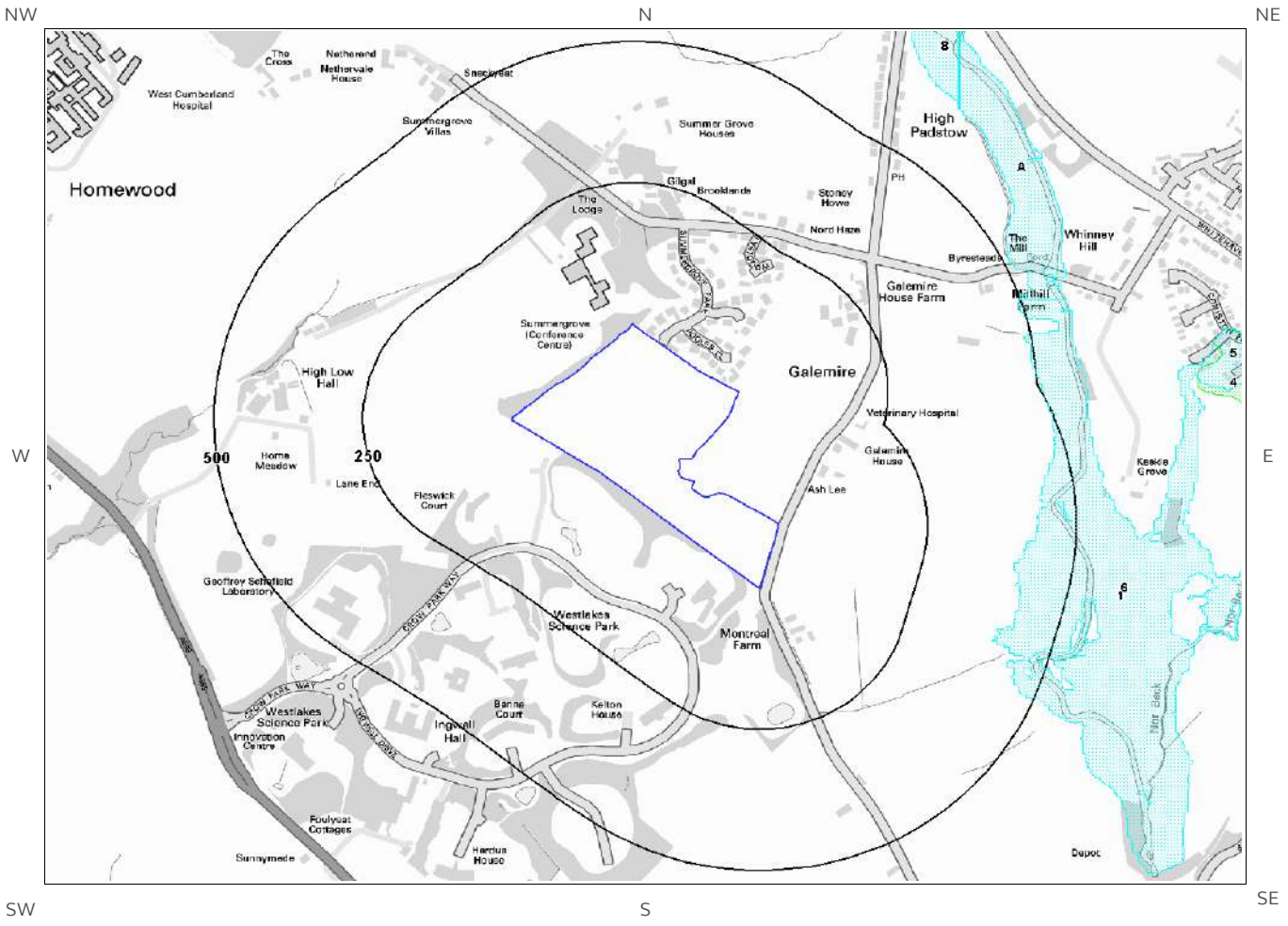
6.11 Surface Water Features

Surface water features within 250m of the study site Identified

The following surface water records are not represented on mapping:

Distance (m)	Direction
28	SE
114	SE
133	N
151	E
167	E
167	SW
167	SW
170	SW
205	S

7a. Environment Agency/Natural Resources Wales Flood Map for Planning (from rivers and the sea)



Site Outline

100
250
Search Buffers (m)

Zone 2 Floodplain

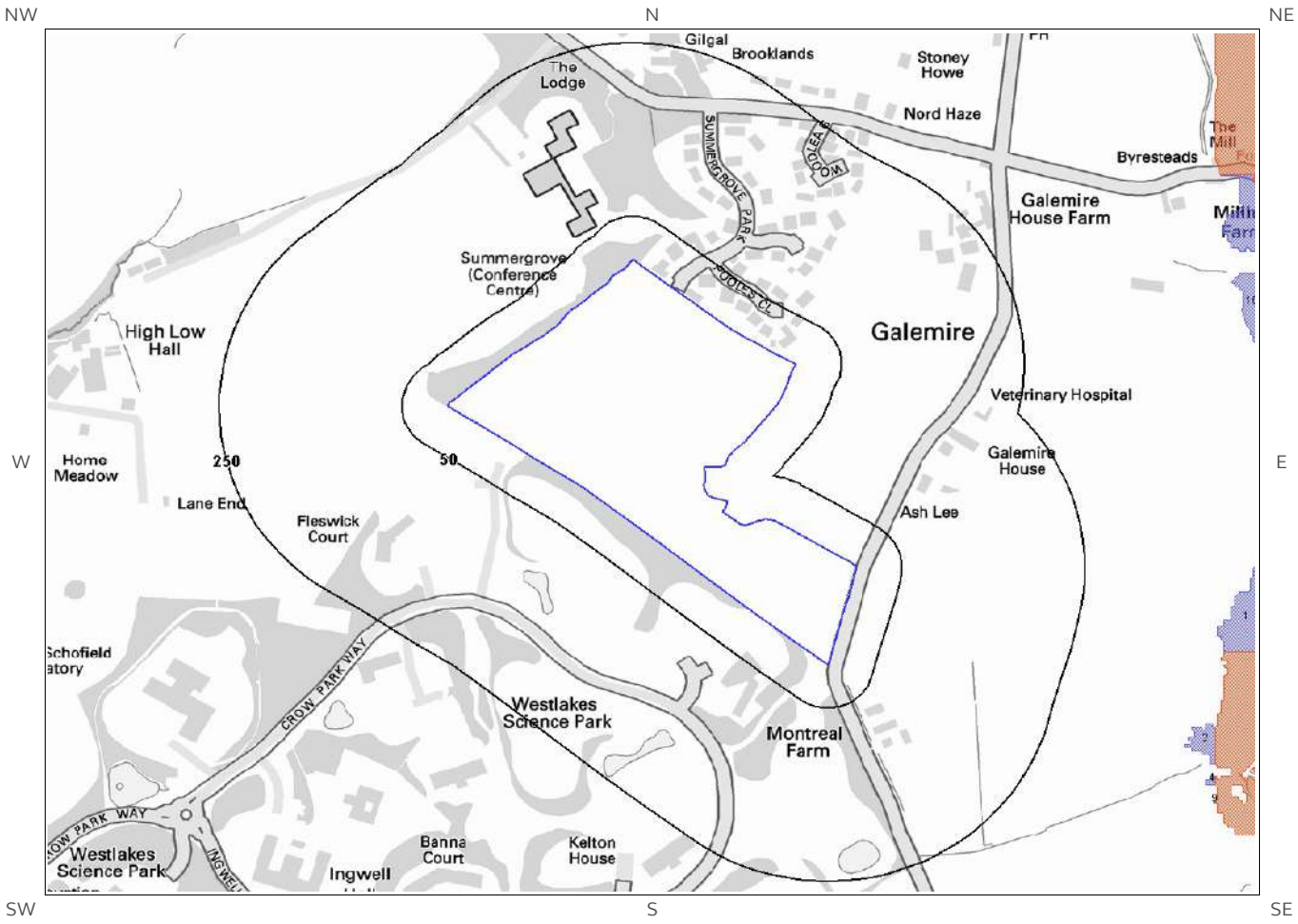
Zone 3 Floodplain

Flood Defences

Area used for Flood Storage

Area Benefiting from Flood Defences

7b. Environment Agency/Natural Resources Wales Risk of Flooding from Rivers and the Sea (RoFRaS) Map



Site Outline

100
250
Search Buffers (m)

RoFRaS Rating

Very Low

Low

Medium

High

7 Flooding

7.1 River and Coastal Zone 2 Flooding

Environment Agency/Natural Resources Wales Zone 2 floodplain within 250m — None identified

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:

Database searched and no data found.

7.2 River and Coastal Zone 3 Flooding

Environment Agency/Natural Resources Wales Zone 3 floodplain within 250m — None identified

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.

Database searched and no data found.

7.3 Risk of Flooding from Rivers and the Sea (RoFRaS) Flood Rating

Highest risk of flooding onsite — Very Low

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 Very Low (less than 1 in 1000) chance of flooding in any given year.

7.4 Flood Defences

Flood Defences within 250m of the study site — None identified

Database searched and no data found.

7.5 Areas benefiting from Flood Defences

Areas benefiting from Flood Defences within 250m of the study site — None identified

7.6 Areas benefiting from Flood Storage

Areas used for Flood Storage within 250m of the study site	None identified

7.7 Groundwater Flooding Susceptibility Areas

7.7.1 British Geological Survey groundwater flooding susceptibility areas within 50m of the boundary of the study site	Identified
Clearwater Flooding or Superficial Deposits Flooding	Clearwater 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 Highest susceptibility to groundwater flooding in the search area based on the underlying geological conditions

Limited potential

Where limited potential for groundwater flooding to occur is indicated, this means that although given the geological conditions there may be a groundwater flooding hazard, unless other relevant information, e.g. records of previous flooding, suggests groundwater flooding has occurred before in this area, you need take no further action in relation to groundwater flooding hazard.

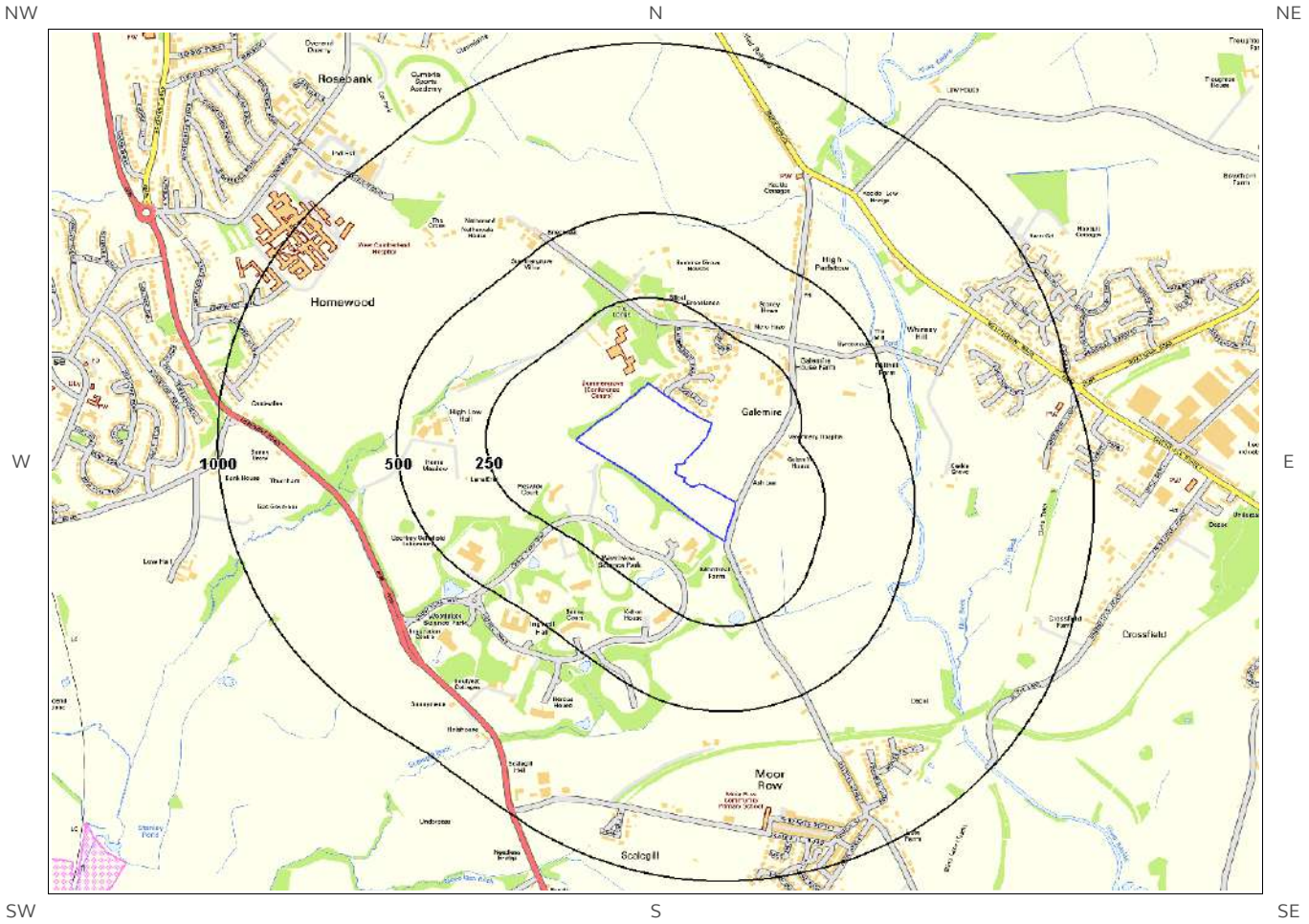
7.8 Groundwater Flooding Confidence Areas

British Geological Survey confidence rating in this result	Low

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.

8. Designated Environmentally Sensitive Sites Map



Site Outline

100
250
Search Buffers (m)

AONB
National Park
SSSI
Special Protection Areas
Nitrate Vulnerable Zones
Green Belt
Environmentally Sensitive Areas
Special Areas of Conservation
World Heritage Sites
Nitrate Sensitive Areas
Ancient Woodland
National Nature Reserve
Local Nature Reserves
Ramsar Sites

8. Designated Environmentally Sensitive Sites

Designated Environmentally Sensitive Sites within 2000m of the study site	Identified

8.1 Records of Sites of Special Scientific Interest (SSSI) within 2000m of the study site:

0

Database searched and no data found.

8.2 Records of National Nature Reserves (NNR) within 2000m of the study site:

0

Database searched and no data found.

8.3 Records of Special Areas of Conservation (SAC) within 2000m of the study site:

0

Database searched and no data found.

8.4 Records of Special Protection Areas (SPA) within 2000m of the study site:

0

Database searched and no data found.

8.5 Records of Ramsar sites within 2000m of the study site:

0

Database searched and no data found.

8.6 Records of Ancient Woodland within 2000m of the study site:

4

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:

ID	Distance (m)	Direction	Ancient Woodland Name	Data Source
Not shown	1375	SW	LOW WALTON WOOD	Ancient and Semi-Natural Woodland
Not shown	1728	SW	LOW WALTON WOOD	Ancient and Semi-Natural Woodland
Not shown	1728	SW	LOW WALTON WOOD	Ancient Replanted Woodland
Not shown	1849	SW	UNKNOWN	Ancient Replanted Woodland

8.7 Records of Local Nature Reserves (LNR) within 2000m of the study site:

0

Database searched and no data found.

8.8 Records of World Heritage Sites within 2000m of the study site:

0

Database searched and no data found.

8.9 Records of Environmentally Sensitive Areas within 2000m of the study site:

0

Database searched and no data found.

8.10 Records of Areas of Outstanding Natural Beauty (AONB) within 2000m of the study site:

0

Database searched and no data found.

8.11 Records of National Parks (NP) within 2000m of the study site:

0

Database searched and no data found.

8.12 Records of Nitrate Sensitive Areas within 2000m of the study site:

0

Database searched and no data found.

8.13 Records of Nitrate Vulnerable Zones within 2000m of the study site:

1

The following Nitrate Vulnerable Zone records produced by DEFRA are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	NVZ Name	Data Source
1	1766	SW	Existing	DEFRA

8.14 Records of Green Belt land within 2000m of the study site:

0

Database searched and no data found.

9. Natural Hazards Findings

9.1 Detailed BGS GeoSure Data

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

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:

Hazard
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

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:

Hazard
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

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:

Hazard
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

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:

Hazard
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

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:

Hazard
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

Maximum Running Sand*[*] 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:

Hazard
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.

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

9.2 Radon

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 site is not in a Radon Affected Area, as less than 1% 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.

10. Mining

10.1 Coal Mining

Coal mining areas within 75m of the study site — Identified

The following coal mining information provided by the Coal Authority is not represented on Mapping:

Distance (m)	Direction	Details
0	On Site	The study site is located within the specified search distance of an identified mining area. Further details concerning this can be obtained from the Coal Authority Helpline on 0845 762 6848.

10.2 Non-Coal Mining

Non-Coal Mining areas within 50m of the study site boundary — Identified

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

Distance (m)	Direction	Name	Commodity	Assessment of likelihood
39.0	SW	Not available	Iron Ore (Non Vein)	Underground mining is known to have occurred within or very close to the area. Potential for difficult ground conditions should be investigated. Potential for localised subsidence is at a level where it should be considered

These are areas known or suspected to contain past underground mining for minerals and/or other materials where workings are likely to be extensive. In the case of mineral veins these are areas within 200m of mapped mineral veins within which it is likely that mining activities may have occurred. 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.

10.3 Brine Affected Areas

Brine affected areas within 75m of the study site — None identified
Guidance: No Guidance Required.

Contact Details

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Email:
Web:**www.bgs.ac.uk**
BGS Geological Hazards Reports and general geological enquiries:
enquiries@bgs.ac.uk

Environment Agency
National Customer Contact Centre, PO Box 544
Rotherham, S60 1BY
Tel: 03708 506 506
Web: **www.environment-agency.gov.uk**
Email: enquiries@environment-agency.gov.uk

Public Health England
Public information access office
Public Health England, Wellington House
133-155 Waterloo Road, London, SE1 8UG
www.gov.uk/phe
Email:**enquiries@phe.gov.uk**
Main switchboard**: 020 7654 8000**

The Coal Authority
200 Lichfield Lane
Mansfield
Notts NG18 4RG
Tel: 0345 7626 848
DX 716176 Mansfield 5
www.coal.gov.uk

Ordnance Survey
Adanac Drive, Southampton
SO16 0AS
Tel: 08456 050505

Local Authority
Authority: Copeland Borough Council
Phone: 0845 054 8600
Web: http://www.copeland.gov.uk
Address: The Copeland Centre, Catherine Street, Whitehaven,

Gemapping PLC
Virginia Villas, High Street, Hartley Witney,
Hampshire RG27 8NW
Tel: 01252 845444

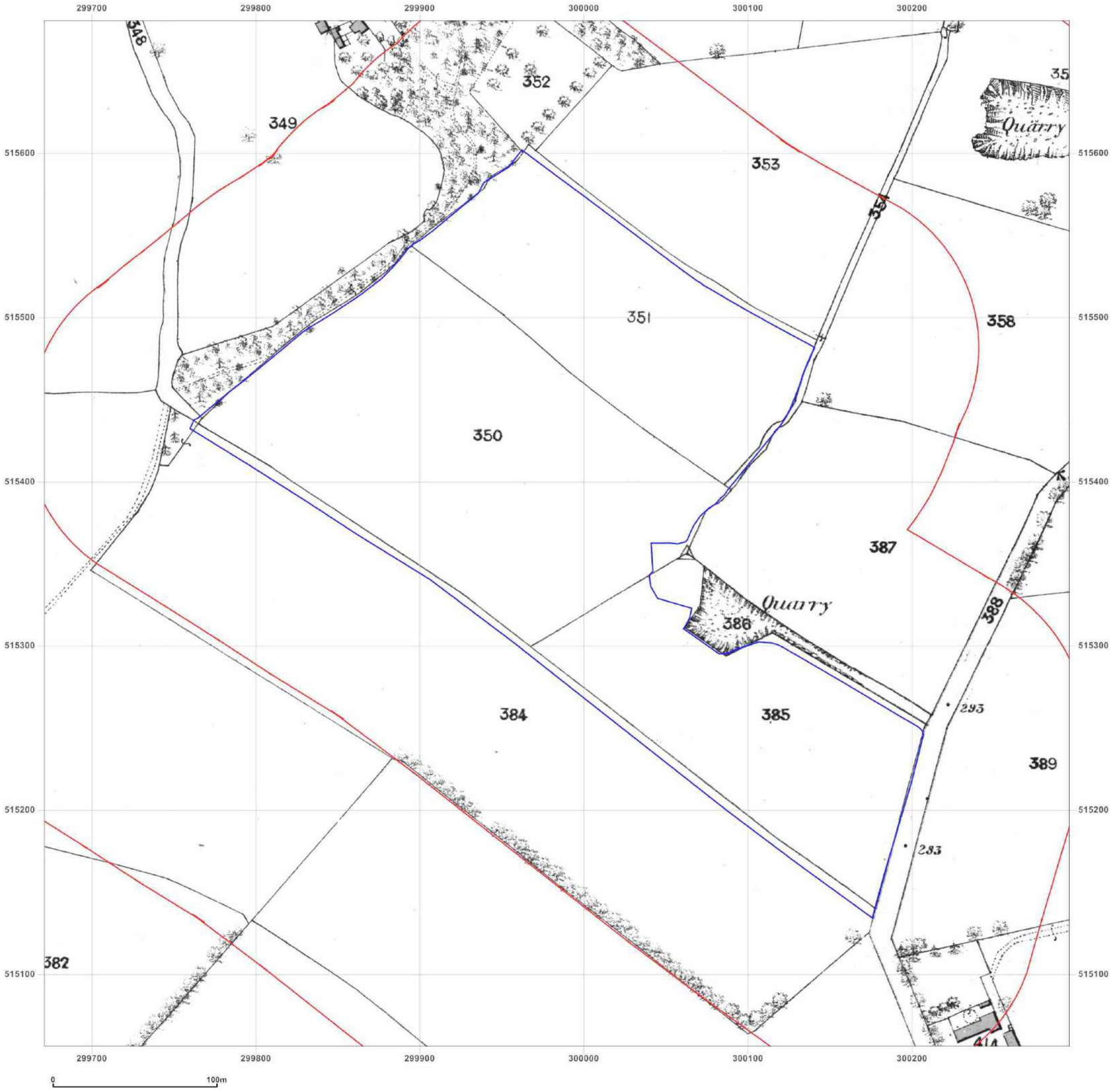
Standard Terms and Conditions

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

https://www.groundsure.com/terms-and-conditions-may25-2018

Appendix III

- Historical Map Extracts



emapsite™

Site Details:

Client Ref: EMS_517324_696159
Report Ref: EMS-517324_696159
Grid Ref: 299983, 515368

Map Name: County Series
Map date: **1865**
Scale: 1:2,500
Printed at: 1:2,500

N
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Surveyed 1865
Revised 1865
Edition N/A
Copyright N/A
Levelled N/A

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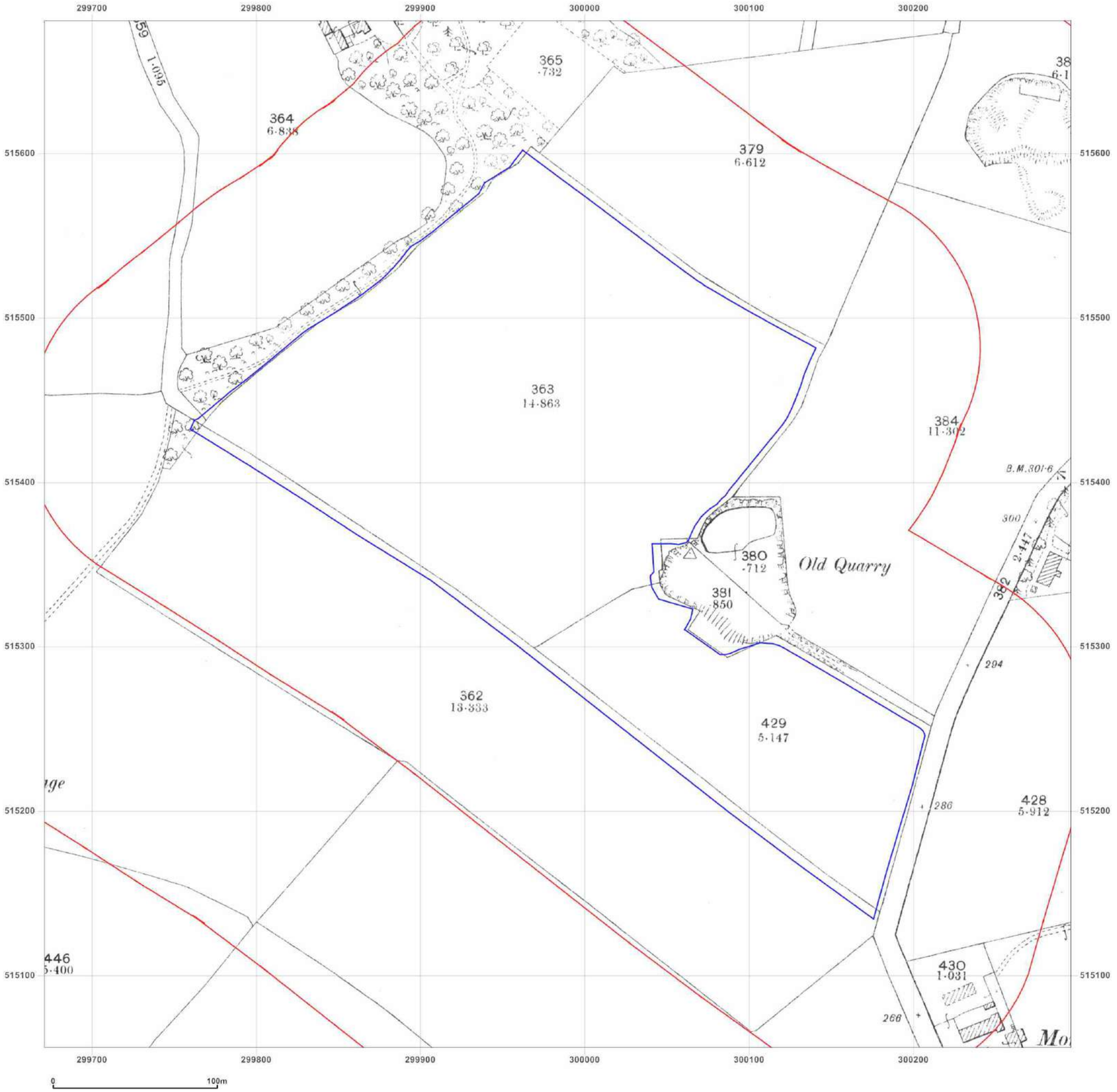
Production date: 13 December 2018

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



emapsite™

Site Details:

Client Ref: EMS_517324_696159
Report Ref: EMS-517324_696159
Grid Ref: 299983, 515368

Map Name: County Series

Map date: **1899**

Scale: 1:2,500

Printed at: 1:2,500

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Surveyed 1899
Revised 1899
Edition N/A
Copyright N/A
Levelled N/A

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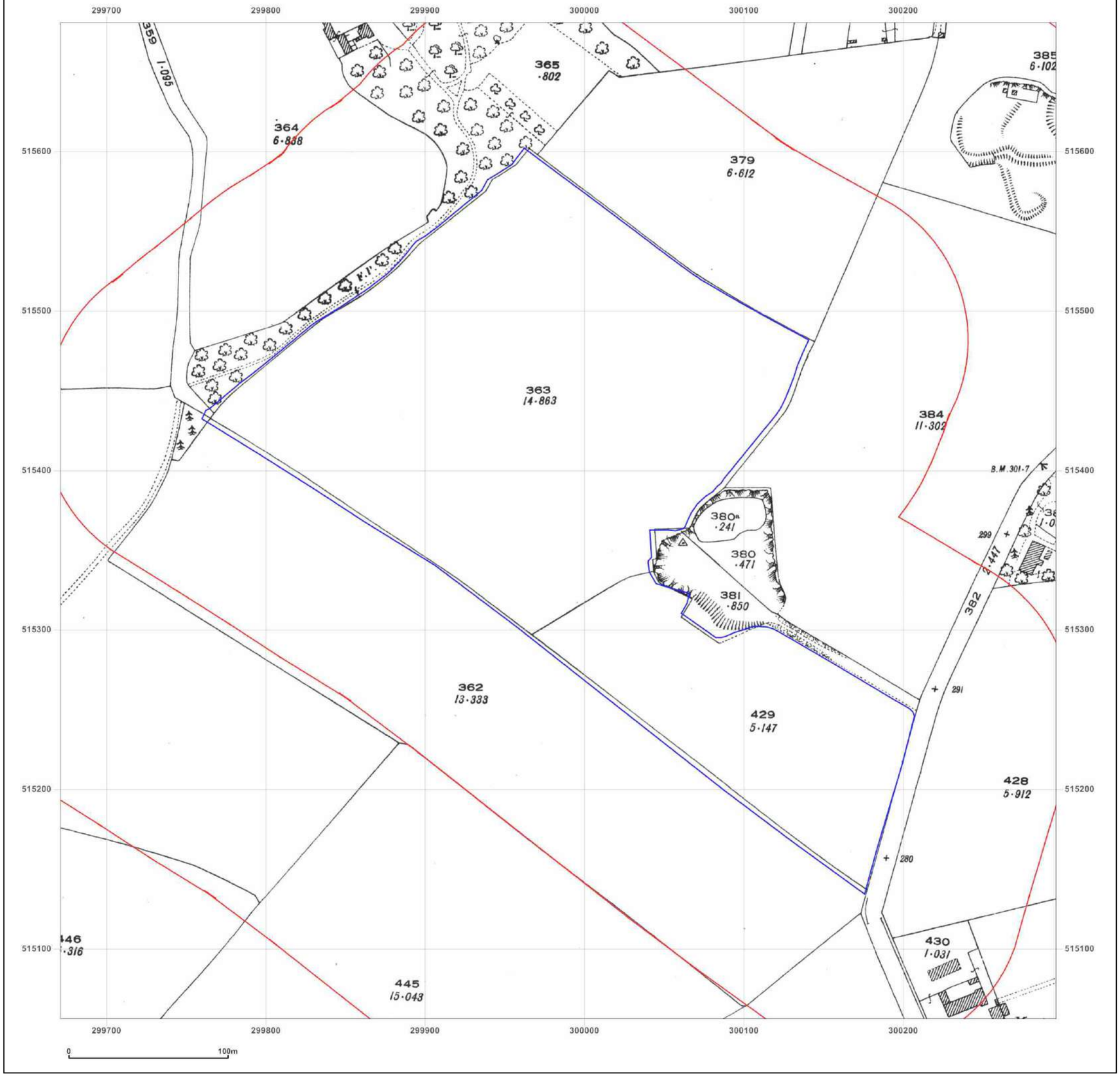

emapsite™

Site Details:

Client Ref: EMS_517324_696159
Report Ref: EMS-517324_696159
Grid Ref: 299983, 515368

Map Name: County Series

Map date: **1925**

Scale: 1:2,500

Printed at: 1:2,500

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Surveyed 1925
Revised 1925
Edition N/A
Copyright N/A
Levelled N/A

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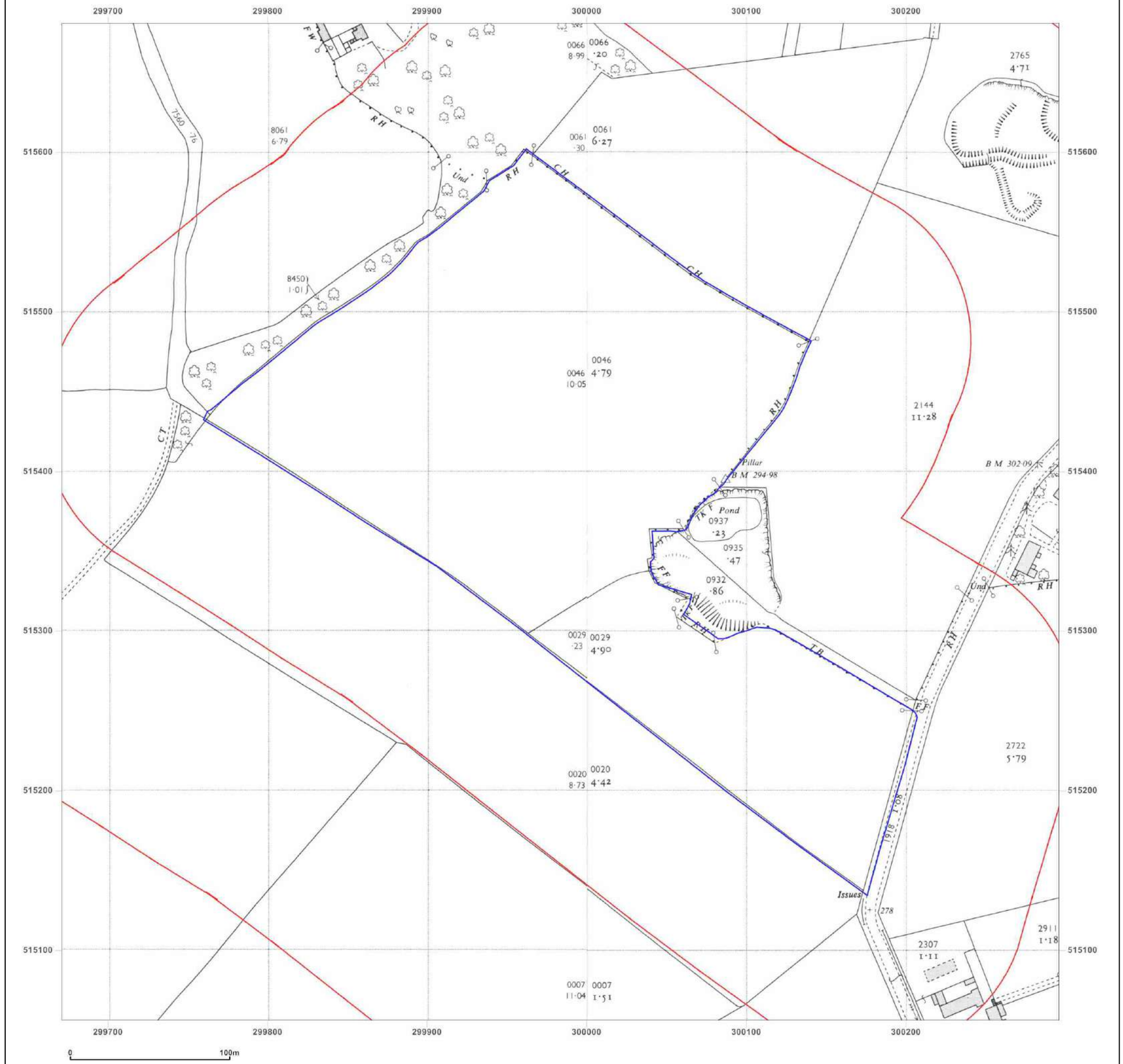

Site Details:

Client Ref: EMS_517324_696159
Report Ref: EMS-517324_696159
Grid Ref: 299983, 515368

Map Name: National Grid

Map date: **1961**

Scale: 1:2,500

Printed at: 1:2,500

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Surveyed 1960 Revised 1961 Edition 1963 Copyright 1963 Levelled 1956	Surveyed 1961 Revised 1961 Edition N/A Copyright 1962 Levelled 1956

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Production date: 13 December 2018

Map legend available at:
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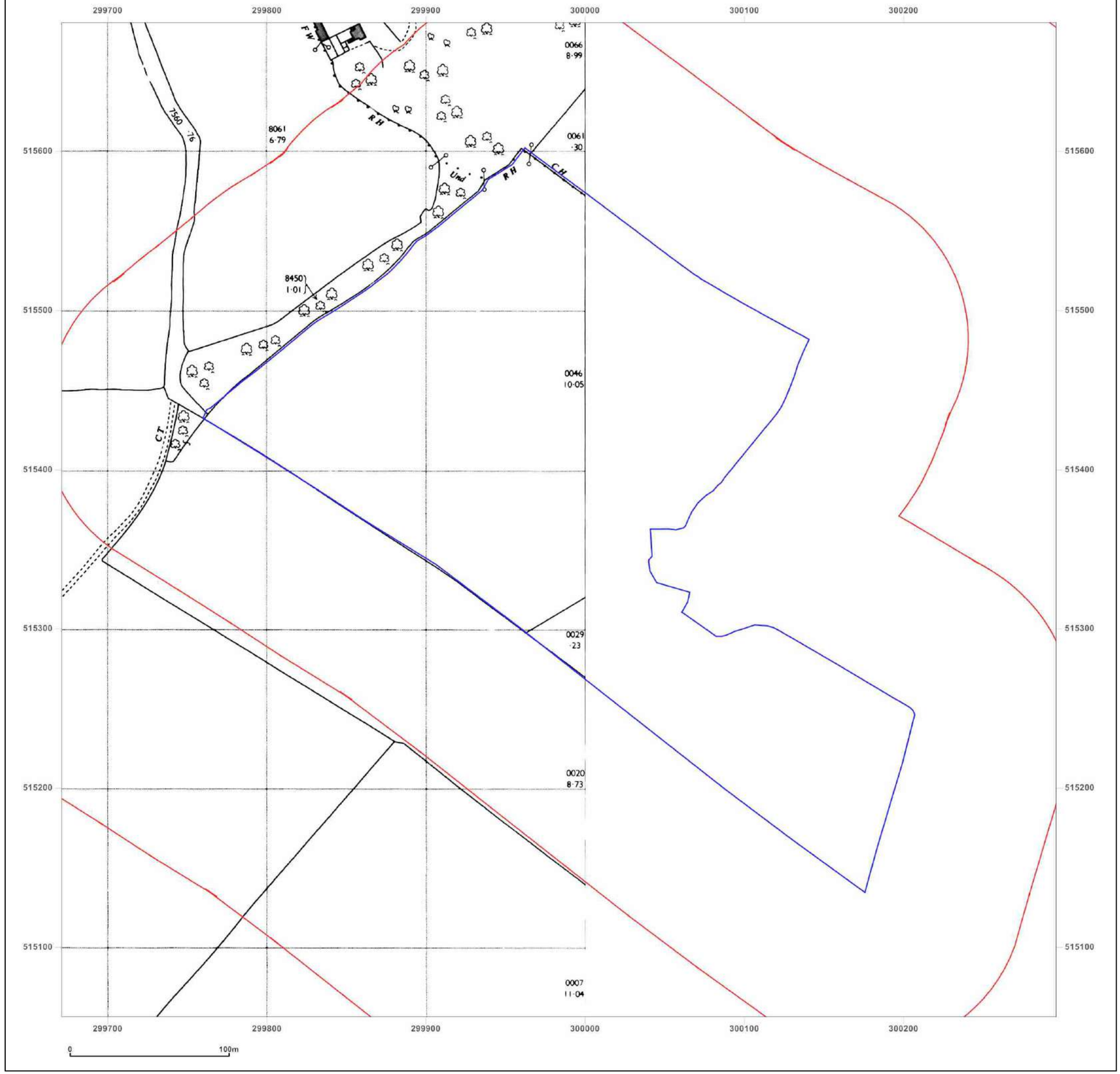

emapsite™

Site Details:

Client Ref: EMS_517324_696159
Report Ref: EMS-517324_696159
Grid Ref: 299983, 515368

Map Name: National Grid

Map date: **1963**

Scale: 1:2,500

Printed at: 1:2,500

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Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

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Map legend available at:
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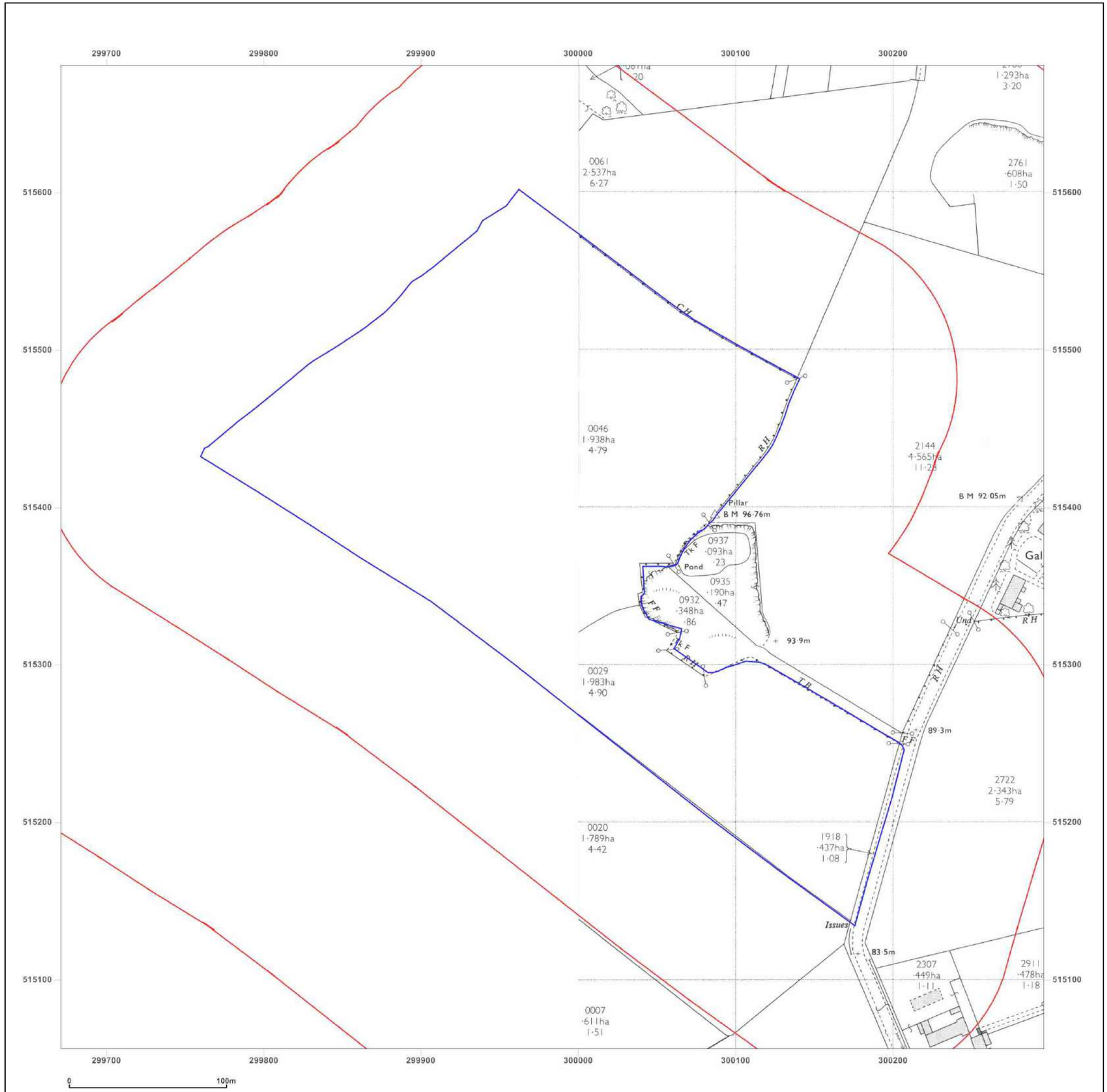

emapsite™

Site Details:

Client Ref: EMS_517324_696159
Report Ref: EMS-517324_696159
Grid Ref: 299983, 515368

Map Name: National Grid

Map date: **1969**

Scale: 1:2,500

Printed at: 1:2,500

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Surveyed 1969
Revised 1969
Edition N/A
Copyright 1970
Levelled 1965

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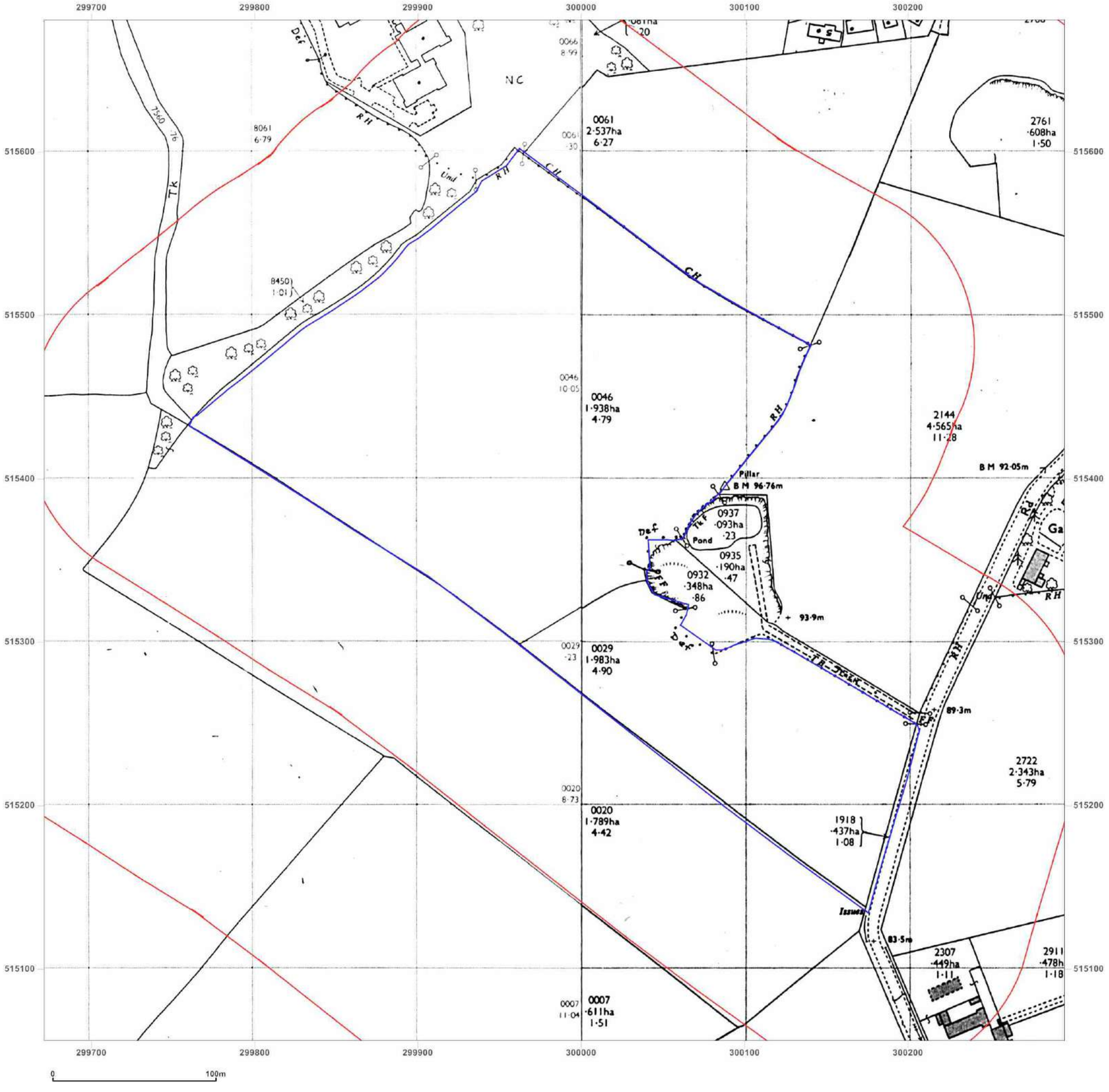

emapsite™

Site Details:

Client Ref: EMS_517324_696159
Report Ref: EMS-517324_696159
Grid Ref: 299983, 515368

Map Name: National Grid
Map date: **1984-1985**
Scale: 1:2,500
Printed at: 1:2,500

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Surveyed 1966 Revised 1984 Edition N/A Copyright 1984 Levelled 1966	Surveyed 1965 Revised 1985 Edition N/A Copyright 1985 Levelled 1965

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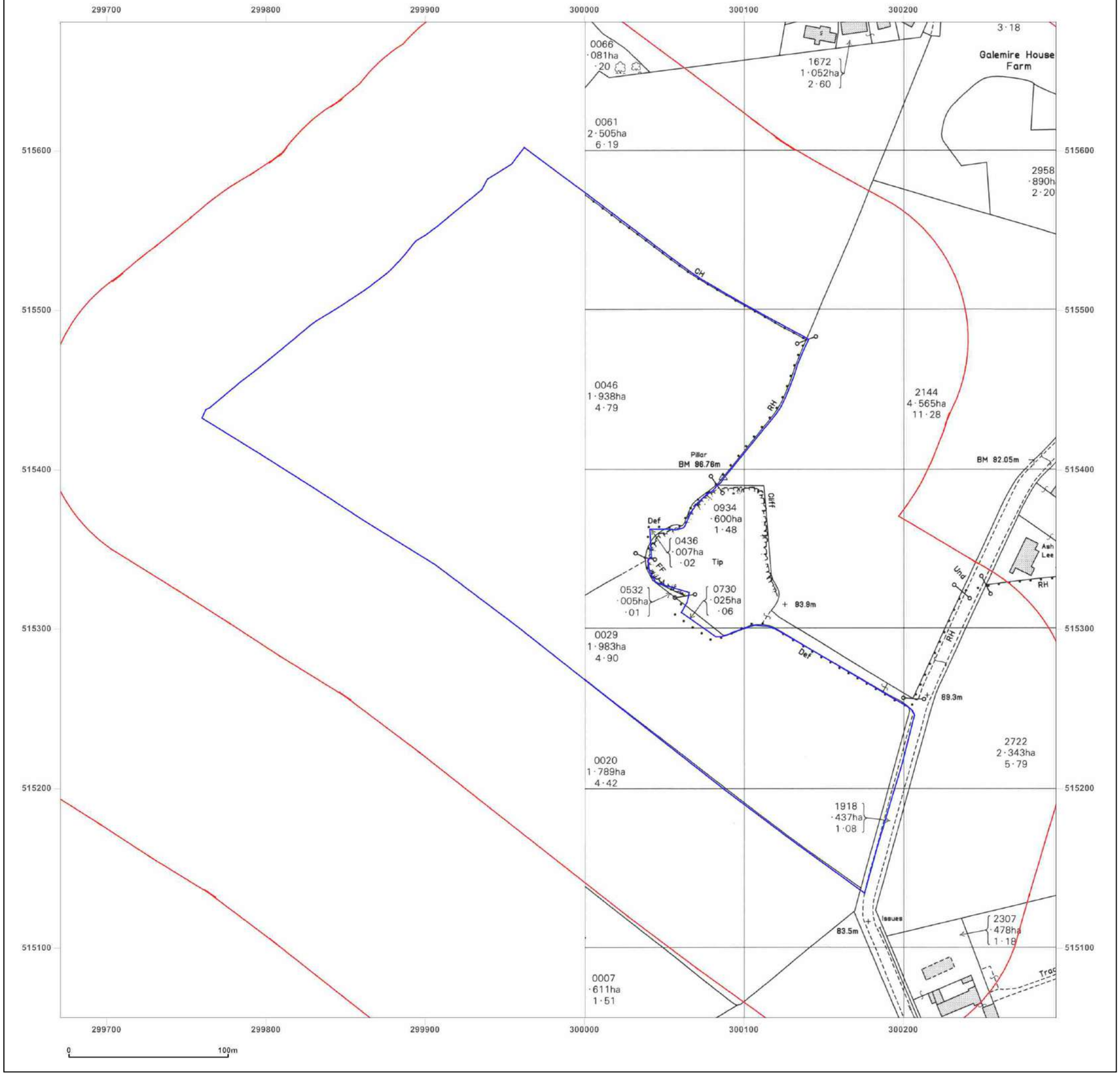

emapsite™

Site Details:

Client Ref: EMS_517324_696159
Report Ref: EMS-517324_696159
Grid Ref: 299983, 515368

Map Name: National Grid
Map date: **1987**
Scale: 1:2,500
Printed at: 1:2,500

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Surveyed 1987
Revised 1987
Edition N/A
Copyright 1989
Levelled 1965

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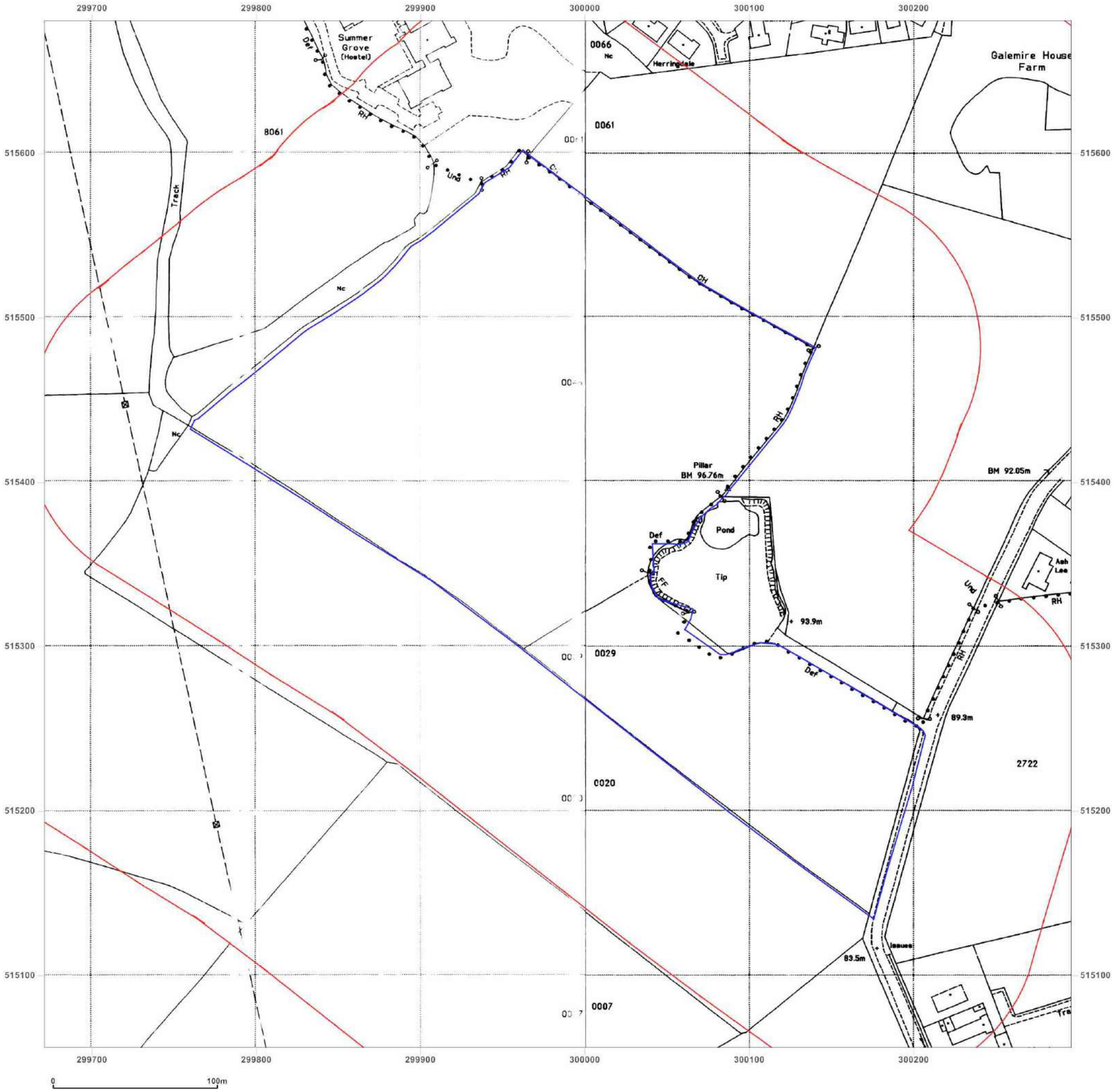

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Site Details:

Client Ref: EMS_517324_696159
Report Ref: EMS-517324_696159
Grid Ref: 299983, 515368

Map Name: National Grid
Map date: **1994**
Scale: 1:2,500
Printed at: 1:2,500

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Surveyed N/A	Surveyed 1994
Revised N/A	Revised N/A
Edition N/A	Edition N/A
Copyright 1994	Copyright 1994
Levelled N/A	Levelled N/A

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