

Development Plans Manager
South Lakeland District Council
Lowther Street
Kendal
LA9 4DL

Our ref VCM/ELL/271-12

Your ref

6 September 2011

Dear Sirs,

South Lakeland Land Allocations Development Plan Document- Further Consultation

We act on behalf of the Ellis Family ("our clients") who own land to the east of Windermere Road, Kendal. Our clients commissioned and submitted a set of reports¹ in support of allocating the site in February 2011. The land has been allocated as a preferred site for future housing development in the Land Allocations DPD, January 2011. Initially Mr Ellis submitted the site for inclusion in the Strategic Housing Land Availability Assessment ("the SHLAA") in February 2009. Since that time the site boundary has changed due to the work carried out by FPCR in the Landscape and Visual Impact Assessment ("LVIA"). This has established a boundary based on the topography of the land and differed slightly from the original submission to the SHLAA. As such, the land is now known as R169M (the SHLAA submission boundary) and RN299# (site incorporating the findings of the LVIA).

In addition to the first set of documents that our clients have submitted, they have also commissioned the following to be prepared and are enclosed:

- Flood Risk and Drainage Assessment (BSC.P)
- Preliminary Ground Investigation (Sirius)
- Ecology Report (FPCR)
- Transport Assessment (Northern Transport)- to follow

In summary, the Flood Risk and Drainage Assessment identifies that the site lies in a wider Flood Risk Zone 1 ie a low probability of flooding. Whilst there is no known positive drainage for the existing site, a suitable system can be installed as part of the development that has the potential to improve the current status of the site and the local flooding that occurs.

The Preliminary Ground Investigation concludes that whilst some further site investigation work is required, there is nothing preventing the development of the site.

The Ecology Report concludes that the development of the site will have a negligible impact on the nearest Statutory Designated Sites and Non-Statutory Designated Sites. The site is considered to have a low biodiversity value. The two hedgerows that exist on the site are to be retained in the development proposals.

¹ Planning Report (Walker Morris), Transport Statement (Northern Transport and Travel Plan Services), Masterplan (FPCR) and Landscape and Visual Impact Assessment (FPCR).

The Transport Assessment has been prepared using data from the County Council and we are currently waiting for the results. They will be sent through to the LDF team once available, however, the initial Transport Statement prepared by Northern Transport finds there to be no insurmountable problems to date.

Together with the original reports submitted, it is considered that there are no constraints to the development of the site. It is deliverable in terms of the tests set out in PPS3, and the more recently published National Planning Policy Framework.

We can also inform you that our clients continue to have dialogue with the National Trust in respect of the covenant issue on this site. Our clients have made proposals to the National Trust for settlement and release of the covenant which the National Trust has acknowledged and are currently considering, the National Trust have proposed a meeting to discuss and finalise the proposals, we are currently waiting for a proposed date for the meeting. We shall provide you with an update once our clients have had a meeting with them.

It is interesting to note in a recent judgement from Judge George Bartlett QC in the Upper Tribunal regarding a case where the National Trust have a covenant over land in Maidstone and where Thames Valley Holding Ltd are applying to develop land for housing, he stated,

"It is entirely plausible that the need for housing in the locality has changed during the intervening period [i.e. since the covenant had been put in place]. Inevitably the land that might now be considered for development will have changed. And planning policy is different. Moreover what is now proposed is not relatively low density development but a scheme producing many more houses. Some of these would be affordable housing, the need for which was not under consideration [in a previous attempt to get the covenant removed]."

Moreover, in refusing to strike out Thames Valley Holding Ltd's case, George Bartlett QC said it was "entirely plausible" that the need for housing land had changed since the earlier decisions. The case is now going to the High Court.

Further Consultation Summer 2011

We note that there is a further consultation event asking for comments on whether the Land Allocations DPD should cover a shorter period ie 10 years rather than 15 years. We do not consider this to be an appropriate option. The LPA have asserted in paragraph 5.1 (i) of their report to Cabinet dated 13th July, 2011² that "there is no compelling planning reason for allocating sites for the period until 2025 in a single allocations document". We disagree with this statement and consider that there are compelling reasons to allocate for at least a 10 year housing land supply and where possible for 15 years.

The Planning and Compulsory Purchase Act, 2004 ("the Act") deals with the examination of DPDs at section 20(5). There are two main issues under which a DPD will be examined, that of legal compliance and soundness. For a plan to be sound, amongst other requirements, the DPD must be consistent with National Planning Policy. PPS3: Housing is the relevant national guidance in this instance. At paragraphs 54-57 of PPS3, advice for determining a housing supply is explained. It states that at the point of adoption, there should be a five year supply of deliverable sites, a specific, developable supply of sites for years 6-10 and also, where possible for years 11-15. Where it is not possible to identify specific sites for years 11-15, broad locations for future growth should be indicated. The Emerging Options Land Allocations DPD currently sets out potential sites to meet the housing requirement to 2025. There are no broad locations for future growth identified as the number of dwellings detailed in the Emerging Options DPD is enough to satisfy the requirement to 2025.

The report to Cabinet suggests that the new time period for the Land Allocations DPD could run until 2020. The same report also states that the LPA's timetable indicates that the DPD should be adopted by 2012. Clearly, for the DPD to be in conformity with PPS3, sites should be allocated to at least 2022 and

² Local Development Framework- Land Allocations Development Plan Document- Progress and Next Steps

where possible to 2027. To reduce the timescale to 2020 ie providing an 8 year supply of dwellings may lead the DPD to be deemed unsound by the Inspector.

The Planning Inspectorate has produced guidance relating to the examination of DPDs³ in accordance with the provisions of the Act. This guidance has a section regarding legal compliance that clearly requests in the box following paragraph 2.3 that "if the DPD is not the Core Strategy, is it in conformity with the Core Strategy?". The Core Strategy was adopted in October 2010 and states in policy CS6.1 that 8,800 dwellings will be built between 2003 and 2025. If the Land Allocations DPD only allocate to 2020, it will fail to be in conformity with the Core Strategy and furthermore, the LPA will only be able to provide an 8 year supply of housing sites. This is not in conformity with the Core Strategy or the provisions of PPS3.

The recently published National Planning Policy Framework ("the NPPF") sets out the Coalition Government's intentions for the way in which the planning system will operate in the future. Notwithstanding that the Government continues to seek to abolish the Regional Strategies, and thereby abolish regional housing targets, paragraph 109 of the NPPF states that there is to be a "significant increase in housing supply" with LPA's having to provide 20% above the locally agreed target to ensure choice and competition in the market for land. The Core Strategy sets out that 8,800 dwellings are to be provided and as such, with 20% extra, 10,560 dwellings are now likely to have to be provided for to 2025. The NPPF also states that local Councils should plan to meet their "full requirement for housing".

It is considered that if the Land Allocations DPD only allocates land to 2020, it will not meet the legal requirements under Section 20(5)(a) of the Act or meet the third test of soundness (consistent with national policy). Our clients suggest that the DPD allocates to 2025, or to 2027 if possible and retains the sites as suggested in the Emerging Options DPD. It is noted that the South Lakeland Strategic Housing Land Availability Assessment 2010 evidences that there is enough land to fulfil the requirements.

We look forward to hearing your views on this point further to these submissions. Please contact us at Kings Court if you would like to discuss further.

Yours faithfully,



Victoria King
Senior Planner

³ Local Development Frameworks- Examining Development Plan Documents: Soundness Guidance August 2009 (2nd Edition)- The Planning Inspectorate



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DRAFT FLOOD RISK & DRAINAGE ASSESSMENT

LAND OFF WINDERMERE ROAD, HALLGARTH, KENDAL

JULY 2011



GB4389



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1.0 Introduction

BSCP have been commissioned to prepare a Flood Risk Assessment to assess the flood risk issues associated with the proposed development of land off Windermere Road, Hallgarth, Kendal, Cumbria.

This Flood Risk Assessment (FRA) follows the guidance and requirements of PPS25 – Planning Policy Statement 25 – Development & Flood Risk, March 2010, HMSO.

The aims of the report are as follows:

- (1) Identify and assess sources of potential flooding.
- (2) Assess risks both to and from the proposed development.
- (3) Assess the potential surface water run-off from the site and how this may be managed to minimise the risk of flooding to adjacent properties within the catchment.

2.0 Existing Site and New Development Description

2.1 Existing Site Location

The site is located on the north west outskirts of Kendal, off the A5284 Windermere Road. The land is currently a Greenfield site adjacent and to the south east of Lane Foot Farm.

The National Grid Reference for the site is SD506940.

The site is bounded by the existing residential developments of High Sparrowmire and High Garth to the east and south respectively, Windermere Road to the south west, the private road leading to Lane Foot Farm to the west with Lane Foot Farm to the north west and open fields along the northern boundary.

Refer Appendix LS1138/L1 – Site Location.

The River Kent is approximately 1 kilometre to the east of the site.



2.2 Existing Site Description

The Greenfield site is part of Lane Foot Farm and is approximately 6 hectares in size. Access is currently from the Farm but the site boundary touches High Sparrowmire in the east and High Garth in the south east. It may be possible to access the site from these points as well as from the Farm access onto Windermere Road in the south west corner.

The ground levels fall from a high level of 83.6m in the south west corner with Windermere Road. The western boundary falls to a level of 73.75m and the north western boundary falls to a low of approximately 60.5m. The south eastern boundary falls to 61.1m, with the eastern boundary having a site low of 59.0m. The eastern boundary then climbs along High Sparrowmire from 60.1m to the northernmost point of the site with a level of 75.24m.

The site is bounded by a post and wire fence along the western boundary with the access track to the Farm and along the north east boundary with High Sparrowmire. Stone walls are located around the rest of the boundary, except where there is open grassland along the northern site boundary. There is also a stone wall and hedge crossing the upper central section of the site, with overhead cables crossing the northern half of the site.

Refer Appendix LS1138/L2 – Existing Site Layout.

Records indicate that there is a public right of way (574009) along the stone wall and hedge in the upper central section of the site.

2.3 Proposed Development

The land has been allocated for housing development in the South Lakeland Draft Site Allocations Development Plan Document.

It is expected that approximately 50% of the site will become hard paved due to buildings and roads. The rest of the site will remain permeable due to garden areas.

The site is relatively steep (1 in 10 in some places) but the development is expected to be constructed on similar levels to the existing site.

Due to the size of the site (6 hectares), the development is expected to be constructed in phases.



3.0 Sources of Potential Flooding

Annex D of PPS25 defines the Flood Risk Zones as below:

Flood Zone 1 Low Probability	Land assessed as having a less than 1 in 1,000 probability of river or sea flooding in any year (<0.1%).
Flood Zone 2 Medium Probability	Land assessed as having between 1 in 100 and 1 in 1,000 annual probability of river flooding (1%-0.1%) or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.5%-0.1%).
Flood Zone 3a High Probability	Land assessed as having a 1 in 100 or greater probability of river flooding (>1%) or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.
Flood Zone 3b Functional Floodplain	Land where water has to flow or be stored at times of flood.

The above Flood Risk Zones are used by the Environment Agency to produce their Flood Maps which can then be used to determine the suitable land use classed by vulnerability in PPS25 Annex D, Table D.2 Flood Risk Vulnerability Classification.

From the Environment Agency Online Flood Maps the site is located in Flood Zone 1 with a low probability (<0.1%) of river or sea flooding in any year. Refer Appendix – Environment Agency Flood Map.

The Sequential Test is a risk based test that aims to steer new development to areas within Flood Zone 1 with the lowest probability of flooding. As the proposed development is within Flood Zone 1, the requirements of the Sequential Test have been satisfied.

The sources of potential flooding to the development site are identified as follows

- (i) From adjacent land
- (ii) From surrounding properties
- (iii) From public sewer systems
- (iv) Groundwater



3.1 Potential Flooding from adjacent land

Flooding from surrounding land due to intense rainfall that is unable to soak into the ground or enter drainage systems, may affect surrounding properties including the redevelopment site.

There have been reports of localised flooding of the site. This is expected to occur in the low central section, probably caused by overland runoff from the steep surrounding grass land. Cumbria County Council do not have any recent reports of flooding along the A5284 Windermere Road. They also state that road gullies are routinely cleaned out according to a cyclic maintenance programme.

3.2 Potential flooding from adjacent properties

Private drainage systems associated with surrounding properties are assumed to be designed to relevant standards at the time of construction & maintained in reasonable working order. Exceptional levels of rainfall may exceed these systems and may affect surrounding properties including the redevelopment site.

The properties of High Garth and High Sparrowmire are at, or slightly below, the boundary levels with the site.

3.3 Potential flooding from public sewer system

United Utilities own and maintain public sewers in this area.

Refer Appendix United Utilities Public Sewer Records

These may exceed their capacity within an extreme event, however the ongoing operational and maintenance responsibility of these systems is with United Utilities.

Due to site levels any exceedence flows from these sewers during an extreme event may affect the eastern side of the new development.

3.4 Potential flooding from groundwater

This is to be further investigated as part of the ongoing site investigations and detailed design.



4.0 Surface Water Run-off Assessment

4.1 Introduction

An important requirement of PPS25 is that the proposed “post-development” surface water run-off does not exceed the existing “pre-development” rates. PPS25 Annex F Managing Surface Water states: *“Surface water arising from a developed site should, as far as is practicable, be managed in a sustainable manner to mimic the surface water flows arising from the site prior to the proposed development, while reducing the flood risk to the site itself and elsewhere, taking climate change into account”*.

Drainage from the roofs of buildings and external paved areas around the buildings are required to comply with the 2002 edition of the Building Regulations 2000 Approved Document – Part H – Drainage and Waste Disposal.

The hierarchy for surface water disposal from a development within the Building Regulations is as below in descending order of preference.

- (1) Discharge to ground via adequate soakaway/infiltration system.
- (2) Discharge to watercourse.
- (3) Discharge to sewer/drain.

4.2 Existing “Pre-development” Run-off Rates

The site is currently Greenfield and is not expected to have any positive drainage system.

Historically, as agricultural land, the site may have underground land drainage installed to help drain the site. These tend to discharge to ditches and watercourses in the surrounding area.

Further drainage investigation works are to be commissioned to identify any current drainage outfall points, possibly to any surrounding drainage ditches or connection to the existing public surface water drainage system.



4.3 Proposed "Post-development" Run-off

In developing the surface water drainage strategy for the site the existing ground conditions are to be investigated as part of the Geotechnical Site Investigation Report to assess the suitability of the ground to accept surface water run-off as part of implementing a Sustainable Urban Drainage System (SUDS).

SUDS, as promoted by PPS25, encourages the use of a number of components to reduce the volume of surface water run-off and control the rate of discharge from a development site. These include the use of preventative measures such as rainwater recycling, infiltration devices that allow water to soak into the ground and the use of attenuation ponds and basins to hold excess water with controlled discharge.

Using MicroDrainage's Rural Run-off calculator, based on IH124 (Institute of Hydrology Report 124 – flood estimation for small catchments), the mean annual maximum flood (QBAR) for the region and the 6 hectare site is 22.7 l/s. Approximately half of the site will continue to have a permeable surface in the form of gardens and verges, so any positive surface water drainage discharging from the site is not expected to be allowed to be more than 11.35 l/s.

Refer – Appendix MicroDrainage Peak Flow Calculator

4.3.1 Discharge to ground via adequate soakaway/infiltration system

For infiltration devices such as soakaway chambers and trenches to operate effectively the permeability of the ground and associated implications in respect of any potential contamination require assessing. This involves the carrying out of on-site percolation tests to establish the permeability rate and its effectiveness in the overall drainage strategy for the development.

As agricultural land, it is unlikely that there will be any ground contamination. A site investigation will be carried out as part of the detailed design but if any contamination is found, it will make the option of soakaways less suitable.

In view of the requirement to consider SUDs as the preferred option for surface water disposal the following evaluation has been carried out to assess the possible use of SUDs components.

Preventative Measure:	Recycling options, including the use of individual water butts for gardens, is to be considered as part of the new development to re-use roof water.
Permeable Surfaces:	The use of permeable surfacing can be considered as part of the overall scheme to reduce the rate of flow from the development. This is likely to be used in private driveways.





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Infiltration Devices
Filter Drains/Soakaway Chamber
Cellular Soakaway Attenuation
Tanks

In situ permeability tests will be required to establish the feasibility of infiltration devices, together with evaluation of any potential issues associated with the presence of any contamination within the site.

Filter Strips
Swales
Basins, Ponds and Wetlands

Consultation with the Planners and the Local Council will be required if these are to be used in a housing development due to the demand on space and operational/safety issues.

Consideration in relation to levels and the topography of the site and the position of public open spaces is also required.

The design of any soakaway systems will be designed to accommodate a 1 in 30 year return period storm with an additional 20% for anticipated future climate change.

Storms of a return period above this up to 1 in 100 year return period with an additional 20% allowance for anticipated future climate change are to be retained within the development site, either within attenuation tanks or by allowing external areas away from buildings, accessways and neighbouring developments to have areas of standing water in extreme events.

4.3.2 Discharge to Watercourse

There are no known water courses for the site to discharge to.

As agricultural land, there may be existing land drainage which eventually outfalls to surrounding watercourse via culverts or open ditches or the public surface water sewer network.

If further investigations reveal such outfalls, the final amount of discharge and how this would be attenuated and restricted from the site is subject to agreement with the relevant authorities (the local Council, Environment Agency, United Utilities etc).

4.3.3 Discharge to sewer/drain

United Utilities sewer records indicate there are no surface water sewers within the development site. There are public surface water sewers in High Garth and High Sparrowmire but not in Windermere Road. United Utilities have been contacted regarding the development but have not provided as yet any indication if, or how much, surface water could be drained via the public sewers.



Using MicroDrainage, a quick storage estimate for the site, based on 3 hectares of impermeable area discharging a rate of 11.35 l/s, requires up to 3,407 cubic metres of storage during a 1 in 30 year storm with 20% climate change. The 1 in 100 year storm will require more storage volume, a total of up to 4,226m³, either underground or by allowing above ground areas away from buildings, accessways and the neighbouring developments to flood temporarily.

Refer – Appendix MicroDrainage Storage Volume Calculations

Foul water discharge from the development will be directed to the nearest public foul sewer, with the agreement of United Utilities.

There are public foul sewers in High Garth and High Sparrowmire but not along Windermere Road.

A surface water and a foul water spur have been shown on the United Utilities sewer records adjacent the site on High Garth. Both are 150mm in diameter. It is possible these were built as part of the Hallgarth estate for future development on the proposed site. They are approximately 6m higher than the lowest level of the proposed site, so would only be able to drain part of the site by gravity. If United Utilities determine that this is the eventual outfall, pumping would be required for the remainder of the site.

4.4 Future Maintenance of the New Drainage Systems

Once completed, the new drainage systems associated with the houses in the development will be maintained by the users, where it is a private drainage system and United Utilities, where it is a public system.

Drainage to be adopted by United Utilities will need to be constructed in line with Building Control and United Utilities' standard details and requirements, in accordance with Sewers for Adoption.

Highway drainage may have to be adopted under a Section 38 Agreement with Cumbria County Council, along with the road network.



5.0 Conclusions

- (1) The development site is located in the Environment Agency's Flood Zone 1 with a low probability of river flooding (<0.1%) in any given year.
- (2) There is no known positive drainage for the existing site. Localised flooding has been known to occur on site but this is thought to be due to the steep topography. Cumbria County Council are not aware of any recent flooding of the A5284 Windermere Road.
- (3) In line with the hierarchy established within the Building Regulations, consideration and further investigation is to be given to disposal of surface water to ground via percolation.
- (4) Other components of SUDs are to be evaluated, including the use of recycling of roofwater, permeable paving for private driveways and underground attenuation systems.
- (5) Surface water runoff from the development up to a 1 in 100 year return period storm, with an additional 20% allowance for anticipated future climate change, will be retained within the development boundary, either in underground attenuation or by allowing above ground areas away from buildings, accessways and the neighbouring developments to have short term standing water during the extreme storm event.
- (6) Private drainage systems will become the maintenance responsibility of the user/developer/managing agent.

Other main drainage and drainage within the new road network will be requested to be adopted by United Utilities and/or Cumbria County Council's Highways Department.
- (7) Foul discharge will be directed to the public foul sewer subject to formal agreement with United Utilities.
- (8) There are potential outfall connections for the site drainage in High Garth. The use of these will need to be agreed with United Utilities.





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APPENDIX

LS1138/L1 - Site Location

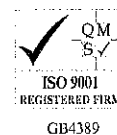
LS1138/L2 - Existing Site Layout

Environment Agency On Line Flood Map

United Utilities Public Sewer Records

MicroDrainage Peak Flow Calculator

MicroDrainage Storage Volume Calculations



GB4389





Land to the East of Windermere Road, Kendal, Cumbria

Ecological Appraisal

May 2011

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Table 2: Non-statutory Sites of Biological Importance

Table 3: Hedgerow Species Composition and HEGS Grades

Table 4: Formula for calculating Root Protection Areas

FIGURES

Figure 1: Site Location and Sites of Conservation Value

Figure 2: Phase 1 Habitat Plan

APPENDICES

Appendix 1: Cumbria Biodiversity Data Centre Consultation Response Summary

Appendix 2: Plant Species Recorded

Appendix 3: Hedgerow Survey data

1.0 INTRODUCTION

- 1.1 The following Ecological Appraisal has been prepared by FPCR Environment & Design Ltd on behalf of Mr Steve Ellis for a proposed residential development on a site to the east of Windermere Road, Kendal, Cumbria. The location and context of the application site is shown on Figure 1.

Site Location and Context

- 1.2 The site is approximately 7ha in size and lies on the north-western edge of Kendal, centred on grid reference SD 505 942. Windermere Road (the A5284) borders the south-western site boundary, residential development associated with Kendal borders the site to the east and southeast, and pastureland lies to the immediate north. An underground brook flows close to the north-western site boundary, within 10m at its closest point, and feeds into a tributary to the River Kent that lies approximately 70m to the west of the site. A public footpath bisects the site linking Low Garth at the eastern boundary to Lane Foot at the northwest corner.
- 1.3 The site is comprised of sections of three fields of sheep-grazed poor semi-improved grassland. Field boundaries are primarily dry stone wall or post and wire fences, but with two relatively short sections of hedgerow present. A sealed access road runs through the south-western corner of the site, and along part of the western boundary. There are no waterbodies within the site. There are no known ponds present within the local area.

Development Proposals

- 1.4 Proposals for the site include the construction of approximately 133 residential properties with associated gardens and access roads. A substantial Green Infrastructure (GI) framework of community parkland, woodland planting, a balancing pond and associated wetland habitats will also be created, with a Central Greenway running through the core of the site along the existing public footpath route, which is to be retained within the development design. Large individual parkland trees will be introduced throughout the Green Infrastructure.
- 1.5 Areas of existing semi-improved grassland habitats will be lost as part of the development, however substantial grassland areas will be retained and enhanced via landscape planting designed to maximise habitat structural diversity and species richness. A short hedge bank towards the eastern boundary will be retained within the development. Existing dry stone walls will be retained where possible or else reused to provide habitat enhancements elsewhere within the site.

2.0 METHODOLOGY

Desk Study

- 2.1 In order to compile existing baseline information, relevant ecological information was requested from both statutory and non-statutory nature conservation organisations including:
- The Cumbria Biodiversity Data Centre
 - The Multi Agency Geographic Information for the Countryside (Magic) website
 - The National Biodiversity Network Gateway (NBN) website
 - The Natural England Nature on the Map website
- 2.2 Further inspection of colour 1:25000 OS base maps (www.ordnancesurvey.co.uk) and aerial photographs from Google Earth (www.maps.google.co.uk) was also undertaken in order to provide additional context and identify any features of potential importance for nature conservation in the wider countryside.
- 2.3 The search area for biodiversity information was related to the significance of sites and species and potential zones of influence, as follows:
- 5km around the application area for sites of International Importance (e.g. Special Areas of Conservation (SACs), Special Protection Areas (SPAs), Ramsar sites).
 - 2km around the application area for sites of National or Regional Importance (e.g. Sites of Special Scientific Interest (SSSIs) and species records (e.g.: protected, UK BAP or notable species).
 - 2km around the application site for sites of County Importance (e.g. Sites of Importance for Nature Conservation (SINC) / Local Wildlife Sites.

Extended Phase 1 Survey

- 2.4 Survey methods followed the extended Phase 1 survey technique as recommended by Natural England (JNCC, 2003). This comprised a systematic walkover of the site in April 2011 to classify and map the principal habitat types present. Target notes were used to record features, habitats or species of particular interest including any invasive weeds, where present. Features such as trees were considered with regard to their ecological value and potential to provide suitable habitats for protected species. Where habitats or features of particular interest exist, more detailed notes and species lists were taken. Whilst the plant species lists obtained should not be regarded as exhaustive, sufficient information was obtained to determine broad habitat types.

Fauna

- 2.5 Throughout the walkover survey, consideration was given to the actual or potential presence of protected species, such as, although not limited to those protected under the Wildlife and Countryside Act 1981 (as amended), the Protection of Badgers Act 1992 and the Conservation of Habitats and Species Regulations 2010. Consideration was also given to the existence and use of the site by other notable fauna such as Biodiversity Action Plan (BAP) or Red Data Book (RDB) species.

Tree Assessment

- 2.6 An assessment was made of trees located within the site by a licensed bat worker from FPCR to assess their potential to support roosting bats to enable recommendations with respect to the proposed works. Trees were examined in September 2010 from ground level, with the aid of binoculars for features that could provide suitable roosting opportunities including cracks, cavities, woodpecker/rot holes, fissures or missing limbs, and for evidence of use by roosting bats such as staining or the presence of bat droppings. Dense ivy cover was also noted when present as this can obscure the aforementioned features. The number, size and condition of these features was then used to give a quantified assessment of potential for bat occupation (See Table 1). 'Bat potential' is a non-quantifiable measure of suitability for bats and is subject to surveyor subjectivity, however the table below classifies the potential category as accurately as possible.

Table 1 – Classification of bat potential in trees

Roost Potential	Description of Feature
Confirmed roost site	The presence of bats within features or the presence of bat evidence in association with suitable features.
High	A large number of potential roost sites/access points and/or more than one feature/s of note such as a large cavity which potentially leads to a roost site.
Moderate/High	A number of potential roost sites/ access points and/or more than one feature/s of note such as a large cavity which potentially leads to a roost site.
Moderate	A number of potential roost sites/access points and/or one feature of note such as a large cavity.
Low/Moderate	A limited number of potential roost site/access point and/or one feature of note.
Low	A limited number of potential roost sites/access points.
None	No access points/roost sites.

- 2.7 In combination with the above, all trees within the site were visually assessed for the existence of large cavities with the potential for use by nesting or roosting barn owl. Additional signs, such as pellets and faecal splashing were also searched for on or around potential perches.

3.0 RESULTS

Desk Study

Statutory Designations

- 3.1 There were no statutory sites of nature conservation importance (e.g. Special Protection Areas (SPA), Special Areas of Conservation (SAC), Ramsar Sites or Sites of Special Scientific Interest (SSSIs)) present within the proposed development site, however there were two SAC/SSSI sites within a 5km radius.
- 3.2 The River Kent SAC lies approximately 0.7km to the northeast of the site and incorporates the River Kent and Tributaries SSSI. There are no Annex I habitats present that are primary reasons for selection of this SAC, however an Annex I habitat was present as a qualifying feature of the SAC: water courses of plain to montane levels with the *Ranunculus fluitantis* and *Callitriche-Batrachion* vegetation. White-clawed crayfish *Austropotamobius pallipes*, an Annex II species is present and is a primary reason for selection of this site. Densities of this species are very high throughout much of the Kent system, particularly in the tributaries, potentially higher than anywhere else in England. Annex II species present as qualifying features, but not primary reasons for site selection include: freshwater pearl mussel *Margaritifera margaritifera* and bullhead *Cottus gobio*.
- 3.3 Morcambe Bay Pavements SAC lies approximately 0.7km to the west of the site at its closest point. Annex I habitats present and a primary reason for selection of this site include: Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp.; *Juniperus communis* formations on heaths or calcareous grasslands; Semi-natural dry grasslands and scrubland on calcareous substrates (*Festuco-Brometalia*); Limestone pavements*; *Tilio-Acerion* forests of slopes, screes and ravines*, and *Taxus baccata* woods of the British Isles*. Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site include: European dry heaths; Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae**, and Old sessile oak woods with *Ilex* and *Blechnum*. Morcambe Bay Pavements SAC is a Site of Invertebrate Significance. An Annex II species present, and that is a primary reason for site selection is the narrow-mouthed whorl snail *Vertigo angustior*. There are no Annex II species present as a qualifying feature, but that are not a primary reason for site selection. *Priority feature.

Non-Statutory Designations

- 3.4 The Cumbria Biodiversity Data Centre has confirmed that the following non-statutory Local Wildlife Sites (LWSs) lie within 2km of the site:

Table 2 – Non-statutory Sites of Ecological Importance

Site Name	Approximate Distance from Site (km)
Serpentine Wood & Kendal Fell Local Wildlife Site An area of trees and shrubs growing over limestone pavement. A Site of Invertebrate Significance.	0.7
Cunswick Fell Local Wildlife Site Includes calcareous grassland with some heath/sedge elements, scattered heath and juniper. A Site of Invertebrate Significance. This site coincides with Morecambe Bay Pavements SAC	1.3

- 3.5 Areas of ancient woodland are associated with Cunswick Scar and Ash Spring Woods approximately 1.5km to the west of the proposed development site.

Protected/Notable Species

- 3.6 The NBN Gateway Table holds post-1990 records of the following protected /notable species records from within the same 10km square (SD59): common toad *Bufo bufo*, great crested newt *Triturus cristatus*, cuckoo *Cuculus canorus**, grasshopper warbler *Locustella naevia**, curlew *Numenius arquata*, tree sparrow *Passer montanus*, grey partridge *Perdix perdix**, house sparrow *Passer domesticus**, hawfinch *Coccothraustes coccothraustes**, lesser red poll *Carduelis cabaret**, lapwing *Vanellus vanellus**, reed bunting *Emberiza schoeniclus**, spotted flycatcher *Muscicapa striata**, tree pipit *Anthus trivialis**, wood warbler *Phylloscopus sibilatrix**, yellowhammer *Emberiza citrinella**, Atlantic salmon *Salmo salar*, brown/sea trout *Salmo trutta*, eel *Anguilla anguilla*, freshwater white-clawed crayfish *Austropotamobius pallipes*, pillwort *Pilularia globulifera*, fly orchid *Ophrys insectifera*, dingy skipper *Erynnis tages*, Duke of Burgundy *Hamearis lucina*, grayling *Hipparchia semele*, high brown fritillary *Argynnis adippe*, northern brown argus *Aricia artaxerxes*, pearl-bordered fritillary *Boloria euphrosyne*, small blue *Cupido minimus*, small heath *Coenonympha pamphilus*, small pearl-bordered fritillary *Boloria selene*, wall *Lasiommata megera*, adder *Vipera berus*, common lizard *Zootoca vivipara*, brown hare *Lepus europaeus*, badger *Meles meles*, polecat *Mustela putorius*, hedgehog *Erinaceus europaeus*, red squirrel *Sciurus vulgaris*, otter *Lutra lutra*, brown long-eared bat *Plecotus auritus*, Brandt's bat *Myotis brandtii*, common pipistrelle *Pipistrellus pipistrelles*, Daubenton's bat *Myotis daubentonii*, Natterer's bat *Myotis nattereri*, noctule bat *Nyctalus noctula*, soprano pipistrelle *Pipistrellus pygmaeus* and whiskered bat *Myotis mystacinus*. (*Birds of Conservation Concern Red List or Schedule 1 Species (RSPB 2009).
- 3.7 The Cumbria Biodiversity Data Centre provided protected and notable species records from within 2km of the site centre including following species: common frog *Rana temporaria*, lapwing *Vanellus vanellus*, woodcock *Scolopax rusticola*, curlew *Numenius arquata*, redshank *Tringa totanus*, common sandpiper *Actitis hypoleucos*, lesser black-backed gull *Larus fuscus*, herring gull *Larus argentatus*, cuckoo *Cuculus canorus*, common swift *Apus apus*, kingfisher *Alcedo atthis*, green woodpecker *Picus viridis*, skylark *Alauda arvensis*, sand martin *Riparia riparia*, swallow *Hirundo rustica*, house martin *Delichon urbicum*, tree pipit *Anthus trivialis*, meadow pipit *Anthus pratensis*, yellow wagtail *Motacilla flava*, grey wagtail *Motacilla cinerea*, dunnoek *Prunella modularis*, redstart *Phoenicurus phoenicurus*, wheatear *Oenanthe oenanthe*, song thrush *Turdus philomelos*, mistle thrush *Turdus viscivorus*, whitethroat *Sylvia communis*, wood warbler *Phylloscopus sibilatrix*, willow warbler *Phylloscopus trochilus*, spotted flycatcher *Muscicapa striata*, marsh tit *Poecile palustris*, starling *Sturnus vulgaris*, house sparrow *Passer domesticus*, linnet *Carduelis cannabina*, redpoll *Carduelis flammea*, bullfinch *Pyrrhula pyrrhula*, yellowhammer *Emberiza citrinella*, Atlantic salmon *Salmo salar*, bullhead *Cottus gobio*, freshwater crayfish *Austropotamobius pallipes*, Scots pine *Pinus sylvestris*, limestone fern *Gymnocarpium robertianum*, bird's-foot sedge *Carex ornithopoda*, bluebell *Hyacinthoides non-scripta*, blue moor-grass *Sesleria caerulea*, pale St John's-wort *Hypericum montanum*, dingy skipper *Erynnis tages*, northern brown argus *Aricia artaxerxes*, comma *Polygonia c-album*, small pearl-bordered fritillary *Boloria selene*, pearl-bordered fritillary *Boloria euphrosyne*, high brown fritillary *Argynnis adippe*, wall *Lasiommata megera*, grayling *Hipparchia semele*, small heath *Coenonympha pamphilus*, hedgehog *Erinaceus europaeus*, brown long-eared bat *Plecotus auritus*, common pipistrelle

Pipistrellus pipistrellus, soprano pipistrelle *Pipistrellus pygmaeus*, whiskered bat *Myotis mystacinus*, Daubenton's bat *Myotis daubentonii*, badger *Meles meles*, otter *Lutra lutra*, polecat *Mustela putorius*, brown hare *Lepus europaeus*. Japanese knotweed *Fallopia japonica* was recorded approximately 1km from the site. Consultation data are summarised in Appendix 1.

Site Description

- 3.8 The application site is comprised of sections of three fields of poor semi-improved grassland, with two relatively short sections of mature, hawthorn-dominated hedgerow along the perimeter of the northernmost field. The remaining field boundaries are dry stone walls or post and wire fences. The fields were sheep grazed at the time of survey, hence had a short (<5cm) sward.
- 3.9 There are no waterbodies present within the site and no known ponds within 500m of the site boundary. There is however an underground brook that flows close to the north-western site boundary.
- 3.10 A sealed access road runs through the south-western corner of the site, and along part of the western boundary to the adjacent Lane Foot Farm and associated buildings. There are no known ponds within 500m of the site boundary.
- 3.11 No non-native, invasive weeds such as Japanese knotweed or giant hogweed were recorded within the site.

Habitats/Flora

- 3.12 The locations of the habitats described below are illustrated in Figure 1 - Phase 1 Habitat Plan. Comprehensive species lists are detailed in Appendix 2.

Semi-improved grassland

- 3.13 The majority of the site was in use as sheep pasture at the time of survey and comprised relatively species-poor semi-improved grassland. Common species present included: perennial rye grass *Lolium perenne*, meadow foxtail *Alopecurus pratensis*, creeping buttercup *Ranunculus repens*, meadow buttercup *R. acris* and white clover *Trifolium repens*, with less frequent yarrow *Achillea millefolium*, daisy *Bellis perennis*, common mouse-ear *Cerastium fontanum*, creeping thistle *Cirsium arvense*, cleavers *Galium aparine*, greater plantain *Plantago major*, silverweed *potentilla anserina*, lesser celandine *Ranunculus ficaria*, broad-leaved dock *Rumex obtusifolius*, dandelion *Taraxacum officinale* agg. and common nettle *Urtica dioica*.

Hedgerows

- 3.14 Hawthorn-dominated mature hedgerows border parts of the northern and southern boundary of the northern field (hedgerows H1 and H2, see Figure 1).
- 3.15 Hedgerow H1 is a low, dense, clipped hedgerow, whereas hedgerow H2 is fenced either side and incorporates a low stone wall / bank and sections of the hedgerow have been laid in recent years.



- 3.16 Species present and HEGS grades are provided in Table 3. Field data used to determine important hedgerows (Hedgerow Regulations 1997) are provided in Appendix 3.



Table 3 – Hedgerow Species Composition and HEGS Grades

Hedge	Length (m)	Species	HEGS Grade	Woody Species /100m	Important Under Habitat Regs	Contains >80% Native Species
H1	55	Hawthorn <i>Crataegus monogyna</i> , elder <i>Sambucus nigra</i> , downy birch <i>Betula pubescens</i> , bramble <i>Rubus fruticosus</i> , dog rose <i>Rosa canina</i> . Ground flora: nettle <i>Urtica dioica</i> , lords-and-ladies <i>Arum maculatum</i> , lesser celandine <i>Ranunculus ficaria</i> , dog rose and bramble.	3+	4	N	Y
H2	75	Hawthorn, elder, holly <i>Ilex aquifolium</i> , bramble, dog rose. Ground flora: lords-and-ladies, common couch <i>Elytrigia repens</i> , rosebay willowherb <i>Epilobium angustifolium</i> , red fescue <i>Festuca rubra</i> , meadowsweet <i>Filipendula ulmaria</i> , wild strawberry <i>Fragaria vesca</i> , cleavers <i>Galium aperine</i> , wood avens <i>Geum urbanum</i> , Yorkshire fog <i>Holcus lanatus</i> , cut-leaved crane's-bill <i>Geranium dissectum</i> , soft rush <i>Juncus effusus</i> , perennial rye grass <i>Lolium perenne</i> , bracken <i>Pteridium aquilinum</i> , meadow buttercup <i>Ranunculus acris</i> , dog rose, bramble, lesser celandine, creeping buttercup <i>Ranunculus repens</i> , dandelion nettle, germander speedwell <i>Veronica chamaedrys</i> , <i>Taraxacum officinale</i> agg. tufted vetch <i>Vicia cracca</i> , bush vetch <i>V. sepium</i> and common dog-violet <i>Viola riviniana</i> .	3+	3	N	Y

- 3.17 Both hedgerows have HEGS grades of 3+, indicating moderate nature conservation value. Neither hedgerow is considered to be important under the Habitat Regulations (above, and Appendix 3), however as they contain more than 80% native woody species both hedgerows meet the criteria for classification as UK BAP priority habitats for conservation.

Trees

- 3.18 In addition to trees occurring within the above hedgerows, there are small numbers of semi-mature and immature trees and hawthorn shrubs growing within the semi-improved grassland, primarily located close to field boundaries. These include individual planted beech *Fagus sylvatica* and pedunculate oak *Quercus robur*, and two immature horse chestnut trees *Aesculus hippocastanum*. There were no veteran or near veteran trees present within the site.



Waterbodies

- 3.19 There were no waterbodies within the site and no known ponds within 500m of the site boundary. A small underground brook flows within 10m of the north-western site boundary at its closest point and feeds into a tributary to the River Kent approximately 70m to the west of the site. Small sections of this brook are visible where the topsoil has collapsed into the watercourse. No construction is proposed within the close vicinity of this brook.



Fauna

Bats

- 3.20 All trees present within the site are immature or semi-mature and in good condition with no features suitable for use by roosting bats such as cracks, cavities or voids noted during ground-based inspection. All trees present within the site were therefore categorised as having no/low roost potential, in accordance with Table 1.
- 3.21 The site for the most part comprised short sward semi-improved grassland fields grazed by sheep with two short sections of low growing hedgerow and provides only low quality foraging and commuting habitat for bats. Hedgerows within the site provide continuous linkages to neighbouring habitats outside but immediately adjacent to the site, including gardens and a tree line that provide limited moderate quality foraging and commuting habitat.
- 3.22 A mature oak outside the southern boundary, and a line of sycamore, hawthorn, elder, ash and hazel outside the site to the northeast will not be modified by the proposed works. These trees will be bordered by areas of public open space within the completed development.

Birds

- 3.23 The publication Birds of Conservation Concern (BoCC) (Eaton et al 2009) lists the status of birds in the UK. The list is divided into three sections:
- Red list species are those that are Globally Threatened according to IUCN criteria; those whose population has declined rapidly (50% or more) in recent years; and those that have declined historically and not shown a substantial recent recovery.
 - Amber list species are those with an unfavourable conservation status in Europe; those with a population or range that has declined moderately (between 25% and 49%) in recent years; those whose population has declined historically but made a substantial recent recovery; rare breeders; and those with internationally important or localised populations.
 - Green list species fulfil none of the above criteria.
- 3.24 Habitats within the site are typical of the wider area. Hedgerows and trees provide some limited potential nesting and feeding opportunities for a range of farmland and urban edge birds including species of conservation concern such as starling *Sturnus vulgaris*, dunnock *Prunella*

modularis and house sparrow *Passer domesticus*. Adjacent semi-improved grassland, gardens and tree cover provide foraging habitat throughout the year.

- 3.25 Only three bird species were recorded within the site during the Phase 1 survey undertaken in April 2011: crow *Corvus corone*, rook *Corvus frugilegus* and great tit *Parus major*. Additional species recorded within a neighbouring tree line outside the site but close to the north-western boundary and leading to Lane Foot Farm, included: chaffinch *Fringilla coelebs*, robin *Erithacus rubecula*, blue tit *Parus caeruleus* and goldfinch *Carduelis carduelis*. None of these species appear on the BoCC red or amber lists or are UK BAP or local BAP priority species.

Badger

- 3.26 The very limited semi-natural habitats and habitat connectivity throughout the site restricts opportunities for use by protected species including badger. No evidence of badger activity such as setts, latrines, hairs, or prints was recorded on site or in adjacent habitats during the survey.

Water Vole and Otter

- 3.27 There were no water courses or static waterbodies within the site and no habitats that were considered to be suitable for use by water vole or otter. There is a tributary of the River Kent outside the site approximately 70m to the west at its closest point that is fed by a small underground brook that runs within 10m of the site boundary. No evidence of either species such as entrance holes, tracks or feeding signs was recorded within the site or adjacent habitats.

Great Crested Newts

- 3.28 Scattered tree, scrub and hedgerow cover within the site provide very limited suitable quality cover for great crested newts during their terrestrial phase. The remainder of the site provides sub-optimal habitat for this species in the form of short grazed grassland. There are no waterbodies present within the site and no known ponds within 500m of the site boundary.

Reptiles

- 3.29 Habitats within the survey area are dominated by short grazed grassland, with habitats suitable for reptiles limited to a short hedge bank adjacent to the western boundary bordered to the north and south by short grazed grassland.

Other Species

- 3.30 No evidence or potentially suitable habitats for any other protected, rare or notable species were recorded.

Survey Limitations

- 3.31 The quality of field data will be affected by the season of the survey, with some plant species only being evident or identifiable at certain seasons. The initial site assessment was completed during the ideal survey period, i.e. during the plant growing season (April-September inclusive), therefore there were no survey timing limitations to the quality of the Phase 1 survey data.

4.0 DISCUSSION AND RECOMMENDATIONS

Proposals

- 4.1 Proposals for the site include the construction of approximately 133 residential properties plus associated gardens and access roads and a substantial area of Green Infrastructure comprising community parkland, woodland planting, a balancing pond and associated wetland habitats. A Central Greenway will be created along the existing public footpath route through the core of the site and large individual parkland trees will be planted throughout the site.
- 4.2 Areas of existing semi-improved grassland habitats and a small number of immature and semi-mature trees will be lost, however the development will retain both existing hedgerows within the design. The dry stone walls will be retained where possible or else reused to provide habitat enhancements elsewhere within the site.

Statutory Designations

- 4.3 There are no statutory sites of nature conservation importance present within the proposed development site, however there are two SAC sites within the local area, both within approximately 0.7km of the site boundary. The River Kent SAC, designated for its water courses of plain to montane levels and populations of white-clawed crayfish lies to the northeast, to the opposite side of a railway. Morecambe Bay Pavements SAC, designated for a variety of features including limestone pavements; *Tilio-Acerion* forests of slopes, screes and ravines, and *Taxus baccata* woods, lies to the west of the site, to the opposite side of the A591 and the A5284.
- 4.4 Potential effects of the proposed development have been considered in relation to the above sites are as follows:

Potential Effects – Direct

Land Take from or Physical Damage to Sites of Nature Conservation Interest

- 4.5 The development proposals will not result in any land take or other direct impact on habitats located within neighbouring sites of nature conservation interest, nor is there any infrastructure that will result in any physical damage to such sites. There will therefore be no direct effect upon the integrity of such sites arising from the proposed development.

Potential effects – Indirect

Potential impacts of increased water pollution on the River Kent SAC and potential changes to hydrology

- 4.6 The River Kent SAC is considered vulnerable to water quality deterioration via pollution in water discharges.

Construction Phase

- 4.7 The developer will accept responsibility to ensure that all areas outside/surrounding the site boundaries are protected from surface water runoff from the site during construction.

- 4.8 All works, including site preparation, construction works, vehicle movement and materials storage will adhere to the Environment Agency Pollution Prevention Guidelines PPG5 in order to minimise the risk of disturbance or pollution of the neighbouring watercourses. All personnel will be familiar with the content of these guidelines prior to commencing work within the site.

Operation Phase

- 4.9 The proposed residential development will increase the amount of surface water runoff locally. The site drainage will therefore be designed such that on-site surface water runoff will be treated via sustainable drainage techniques (SuDS) to minimise the risk of off-site pollution and support groundwater recharge. The design of the SuDS scheme has yet to be finalised, however it is understood that this will incorporate a balancing pond and associated wetland habitats located within an area of public open space as the primary method of surface water disposal from the site. Additional balancing ponds and/or swales will be incorporated within the scheme where possible.
- 4.10 The implementation of the above precautionary works and mitigation will minimise the risk of any significant effect upon the integrity of the River Kent SAC via water pollution arising from the development proposals.

Disturbance, or damage/erosion caused by increased recreation/amenity use

- 4.11 There is potential for the proposed development to result in an increase in visitor pressure to areas that have public access, particularly from dog walkers. Morecambe Bay Pavements SAC for example currently receives high visitor numbers, the majority of which park at Scout Scar resulting in localised erosion from trampling and pollution with dog faeces. A significant increase in visitor pressure has potential to exacerbate such issues.
- 4.12 There are several existing footpaths within the wider area, including one that bisects the site, and that provide a range of routes available for amenity use. These include footpaths that link Kendal to the Morecambe Bay Pavements SAC and to the River Kent. The presence of a network of footpaths is considered to reduce visitor pressure along any particular route however, and there are no footpaths linking the development site directly to the Morecambe Bay Pavements SAC.
- 4.13 The development design incorporates significant areas of public recreational space for new and existing residents to minimise recreation/amenity impacts at neighbouring sites of nature conservation interest. Features include a central greenway incorporating the existing footpath, a new balancing pond and associated wetland area, new informal play areas, woodland planting, pedestrian and cycle access paths. The development plan includes approximately 3.6ha of public open green space for recreational use and to minimise recreational pressures on neighbouring sites of nature conservation interest.

Non-statutory designations

- 4.14 There were no non-statutory designated sites within the site. The nearest non-statutory site was Serpentine Wood and Kendal Fell LWS, which lies approximately 0.7km to the south. Adverse impacts to the LWS arising directly from this scheme are unlikely due to the application site lying to the opposite side of the A254 and pastureland.

Habitats

- 4.15 The degree to which habitats receive consideration within the planning system relies on a number of mechanisms, including:
- Inclusion within specific policy (e.g. veteran trees, ancient woodland and linear habitats in Planning Policy Statement 9 (PPS9), or non-statutory site designation),
 - Identification as a habitat of principal importance for biodiversity under Natural Environment and Rural Communities Act (NERC) 2006 and consequently identification as a Priority Habitat within the UK or local Biodiversity Action Plan (BAP).
- 4.16 The site was dominated by short grazed species poor semi-improved grassland of low ecological value, bounded primarily by post and wire fences and stone walls, but with two sections of native hedgerow also present. Small numbers of trees were present within the site, all were in good condition with no significant potential for use by roosting bats. Tree and hedgerow habitats provided some limited nesting, foraging and commuting opportunities for wildlife, and the hedgerows both met the criteria for classification as UK BAP priority habitats.
- 4.17 All the trees present within the site are likely to be removed as part of the development. These are semi-mature and immature trees of relatively small size. Should it be possible to retain any trees these will be protected from damage and from soil compaction during works by maintaining fenced Root Protection Areas (RPAs), the radii of which will be calculated with reference to the calculation below. A RPA for a single stem tree is equivalent to a circle with a radius 12x the stem diameter, or 10x the basal diameter for trees with more than one stem arising less than 1.5 meters above ground level.

Table 4: Formula for calculating Root Protection Areas

$$\text{RPA (m}^2\text{)} = (\text{stem diameter (mm)} \times 12 / 1000)^2 \times 3.142$$

This figure should be capped to 707m², that is, equivalent to a circle with a radius of 15m, or a square with approximately 26m sides

Taken from Table 2: Calculating the RPA , contained within *BS 5837 (2005)*.

- 4.18 The site landscaping has been designed to provide connectivity throughout the site and to link to habitats with the wider landscape. Open areas of public green space will comprise over 40% of the site area. Hedgerows H1 and H2 will be retained and provide further connectivity between new areas of planting and neighbouring habitats.
- 4.19 A large number of new trees will be planted throughout the site as part of landscaping works, with preference given within the planting scheme for the use of locally native woody species, with an emphasis on species bearing nectar, berries, fruit and nuts, as these enhance the foraging opportunities of local wild fauna including birds and invertebrates. The retained footpath and areas of public open space will be enhanced via the planting of small tree groups, street trees will be planted along new roadside verges to create linear features, and larger areas of native woodland will be created along the north-eastern boundary.
- 4.20 It is recommended that garden planting also utilises species of value to wildlife. Suitable small tree species for inclusion in garden planting schemes include field maple *Acer campestre*, silver birch

Betula pendula, wild cherry *Prunus avium*, bird cherry *P. padus*, holly *Ilex aquifolium*, crab apple *Malus sylvestris*, hazel *Corylus avellana* and rowan *Sorbus aucuparia*. Other suitable species for inclusion within the soft landscaping design include ash *Fraxinus excelsior*, common beech *Fagus sylvatica*, English oak *Quercus robur*, hawthorn *Crataegus monogyna*, blackthorn *P. spinosa*, dog rose *Rosa canina*, honeysuckle *Lonicera periclymenum* and wild privet *Ligustrum vulgare*.

- 4.21 A new permanent pond will be created towards the east of the site, with sections of bank with shallow sloping profiles and/or shallow perimeter shelving, and with deeper ($\geq 1\text{m}$) central areas to encourage use by amphibians. It is recommended that a buffer zone of tall, uncut vegetation be maintained around the perimeter of the pond to minimise disturbance and to encourage a range of wildlife including invertebrates and amphibians.

Protected and or notable species

- 4.22 Principal pieces of legislation protecting wild species are Part 1 of the Wildlife and Countryside Act (as amended) 1981 (WCA) and the Conservation of Habitats and Species Regulations 2010. Some species, for example badgers, also have their own protective legislation (Protection of Badger Act 1992). The impact that this legislation has on the Planning system is outlined in ODPM 06/2005 Government Circular: Biodiversity and Geological Conservation – Statutory obligations and their Impact within the Planning System.
- 4.23 This guidance states that as the presence of protected species is a material consideration in any planning decision, it is essential that the presence or otherwise of protected species, and the extent to which they are affected by proposals is established prior to planning permission being granted. Furthermore, where protected species are present and proposals may result in harm to the species or its habitat, steps should be taken to ensure the long-term protection of the species, such as through attaching appropriate planning conditions for example.
- 4.24 In addition to protected species, there are those that are otherwise of conservation merit, such as those included as priority species in the UK BAP which are also listed as species of principal importance for the purpose of conserving biodiversity under the Natural Environment and Rural Communities (NERC) Act 2006. Where these occur PPS 9 advises that planning authorities should not grant planning consent where harm to a species or their habitats would result unless the need for, and benefits of, the development clearly outweigh that harm.
- 4.25 The implications that various identified species or those that are thought reasonably likely to occur may have for developmental design and programming considerations are outlined below:

Bats

- 4.26 Bats and their habitats are protected under the Wildlife and Countryside Act 1981 (as amended) and by the Conservation of Habitats and Species Regulations 2010. In summary this makes it an offence to damage destroy or obstruct any place used by bats for breeding and shelter, disturb a bat, or kill, injure or take a bat. Seven bat species including soprano pipistrelle and noctule are listed as Species of Principal Importance under the provisions of the NERC Act 2006.
- 4.27 Suitable roost habitats are often associated with buildings or mature trees that support suitable features such as holes, cracks and fissures. Survey of the trees present within the site did not identify any features considered to have potential to support bat roosts, being of relatively young

age and in good condition. There are no built structures within or adjacent to the site, therefore the site is not considered suitable for use by roosting bats.

- 4.28 Principal impacts resulting from the proposed development include potential light pollution of retained and newly created foraging and commuting habitats, including off-site garden habitats and pasture fields. To minimise potential disturbance to such habitats the external lighting scheme will be designed to ensure that light spill onto vegetated areas is minimised. Where lighting is absolutely necessary in areas of tree/shrub planting this will be directional and shaded to minimise light spill onto potential flight lines and foraging habitat.
- 4.29 To further enhance the site for bats, and therefore contribute to the requirements of PPS9 through enhancement of biodiversity, it is recommended that consideration be given to the provision of roosting opportunities on the external walls of new buildings close to existing tree cover or new areas of planting. Suitable designs for inclusion within buildings include bat slates that provide access into roof structures and loft voids, and self contained and maintenance-free bat roosts such as the Schwegler 1FQ and 1WQ designs (see alanaecology.com). There will be no trees retained within the site suitable to support bat boxes.

Birds

- 4.30 Hedgerows and scattered trees within the site provide very limited potential nesting habitat for a range of bird species potentially present in the local area, including a range of UK BAP and BoCC amber and red list species such as dunnoek and starling. Due to the relatively young age and good condition of most of these trees however, there were no nesting opportunities recorded suitable for use by hole-nesting species such as house sparrow. The grassland fields are sheep grazed and as such are not considered to be suitable nesting habitat for ground nesting birds, although these do provide additional foraging opportunities.
- 4.31 Existing hedgerow cover will be retained within the proposed development, however the small number of trees present will most likely all be removed. Any adverse impacts to tree nesting bird species is considered to be relatively minor. Retained habitats will be greatly enhanced via the planting of trees and shrubs throughout the site and along the western boundary, with preference given in the planting scheme to native fruit and flower bearing species.
- 4.32 All nesting birds and their nests are protected under the Wildlife and Countryside Act, 1981 (as amended). Any removal of woody vegetation including hedgerow sections and trees should therefore occur outside of the bird breeding season (March to August inclusive) to minimise the risk of disturbance to breeding birds. If this is not possible, such vegetation should be checked prior to removal by a suitably experienced ecologist. If active nests are found, vegetation should be left untouched and suitably buffered from works until all birds have fledged. Specific advice should be sought prior to undertaking the clearance.
- 4.33 There will be no trees retained within the site suitable to support bird boxes, however consideration should be given to the provision of bird boxes on the external walls of the new buildings, close to the eaves. Suitable designs include house sparrow terrace boxes and hole-fronted designs suitable for use by a wide range of species to enhance nesting opportunities for birds in the local area and therefore contribute to requirements of PPS9 via biodiversity enhancement.

Badger

- 4.34 Habitats within the site have been identified as being of low value to badgers, with no active setts present within the site and with minimal suitable vegetation cover for set creation. Loss of habitats and disturbance over this period is therefore likely to result in negligible effects to the local badger population.
- 4.35 It is however recommended that 'best practise' be employed during development works to ensure potential animal welfare issues during development of the site are minimised. These measures should include covering all deep excavations if left open over night or providing mammal escape ramps where such excavations cannot be covered.

Water Vole

- 4.36 There was no suitable habitat for water vole present within the site. The site was therefore not considered to be of value for water vole, and the presence of this species within the site was not a statutory constraint to the proposed development.

Great crested newts

- 4.37 There are no waterbodies present within the site, and no known ponds within 500m of the site boundary. The neighbouring brook has a sufficiently strong flow to discourage use by newts. Habitats within the site provide poor quality vegetation cover for this species during its terrestrial phase. It is therefore considered highly unlikely that this species would be present within the proposed development area, or that works would impact negatively upon this species.

Reptiles

- 4.38 Habitats within the site were largely sub-optimal for use by reptile species. The hedge bank adjacent to the western boundary provided a small area of suitable habitat, however given its restricted area and relative isolation, surrounded by short grazed pasture, this feature was not considered suitable to support a viable reptile population.

5.0 SUMMARY

Proposals

- 5.1 Proposals for the site include the construction of approximately 133 residential properties with associated gardens, access roads and areas of community parkland, woodland planting, a balancing pond and associated wetland habitats. An existing public footpath route that bisects the site will be retained within the development design.

Statutory Designated Sites

- 5.2 The River Kent SAC lies approximately 0.7km to the northeast of the site boundary, and Morecambe Bay Pavements SAC lies approximately 0.7km to the west. The River Kent SAC lies to the opposite side of a railway, while the Morecambe Bay Pavements SAC lies to the opposite side of the A591 and the A5284. The assessment site does not support any habitats similar to those for which the above sites are designated. It is considered that due to distances from the site and separation by features such as major roads and railways, the construction phase will have a negligible impact on these designated sites.
- 5.3 There is potential for the proposed development to increase visitor pressure to the Morecambe Bay Pavements SAC, however any such increase has been minimised as far as possible via the provision of a large area of public open green space for recreational use within the development incorporating the existing public footpath and the creation of several new footpaths within the site. There are no footpaths linking the development site directly to the Morecambe Bay Pavements SAC and newly created paths will link to residential development to the east of the site, away from the SAC to the west.

Non-Statutory Designated Sites

- 5.4 Non-statutory designated sites do not receive statutory protection. However, they do receive policy protection (as "Local Sites") as reflected in Planning Policy Statement 9 (PPS 9) which suggests that Local Sites can have a fundamental role to play in meeting overall national biodiversity targets and that appropriate weight should be attached to designated sites when making planning decisions.
- 5.5 The nearest local site is Serpentine Wood and Kendal Fell LWS, located approximately 0.7km to the south of the site. The proposals may lead to an increase in use of this site, however access will be limited due to the absence of linking footpaths or roads and the provision of public open green space. It is therefore considered that impacts would be negligible.

Habitats and Protected Species

- 5.6 The site is considered to be of generally low biodiversity value, but with a small number of features of ecological interest including hedgerows that are UK BAP habitats and are also of value to local wildlife, notably nesting birds. There are no other habitats of international, national, county or local importance that would be adversely affected by the proposed development.
- 5.7 Proposals for the site include the removal of existing areas of species-poor semi-improved grassland and the small number of immature and semi-mature trees scattered within the grassland areas. The removal of these existing habitats is not considered to be a significant loss

to the value of the site or wider local nature conservation resource, although such habitats are likely used by a limited range of wildlife including nesting and foraging birds.

- 5.8 The landscape design incorporates new areas of street tree and woodland planting and a large permanent pond with peripheral wetland habitats to enhance biodiversity throughout the site in the long-term and to mitigate for the loss of existing habitats. Species recommendations are provided within Section 4 for areas of new planting and the enhancement of retained habitats within the site. To further enhance the site for wildlife it is recommended that crevice roosting opportunities for bats and a range of bird boxes be provided within the development design.
- 5.9 The two hedgerows comprise over 80% native woody species therefore are considered to be priority habitats for conservation under the UK BAP. These will be retained within the existing development and protected from damage during works using fenced Root Protection Areas. There are no other habitats of international, national, county or local importance that would be adversely affected by the proposed development.
- 5.10 To avoid disturbance to breeding birds, the removal of woody vegetation will be undertaken outside of the bird-breeding season (March to September inclusive). If this is not possible, vegetation will be checked prior to removal by an experienced ecologist.
- 5.11 No other protected species were recorded during site surveys and the site supports few habitats suitable for such species.
- 5.12 The Green Infrastructure to be provided throughout the site, including community parkland, new woodland areas, individual parkland trees, balancing pond(s), wetland habitats and private gardens will enhance habitat structural diversity and species richness throughout the site, benefitting a wide range of wildlife including foraging bats, nesting and foraging birds and invertebrate species.

Appendix 1: Cumbria Biodiversity Data Centre Consultation Response Summary:

Protected and Notable Species Records within 2km of Site Centroid

Taxon Common Name	Taxon Scientific Name	Date	Grid Reference	Location	Designation	Approx Closest Distance from site centre (km)
Common Frog	<i>Rana temporaria</i>	2000	SD507951	Burneside	HabDir:Annex 2/4/5, WACA:Sch5 sect9	0.9
Lapwing	<i>Vanellus vanellus</i>	1997	SD59C	sSD59	Bonn:Annex 1/2, BirdsDir:Annex I or II, Bird:Red, UKBAP:2007, England NERC list	
Woodcock	<i>Scolopax rusticola</i>	2000	SD49X	sSD49	Bonn:Annex 1/2, BirdsDir:Annex I or II, Bird:Amber	
Curlew	<i>Numenius arquata</i>	1999	SD49X	sSD49	Bonn:Annex 1/2, BirdsDir:Annex I or II, Bird:Amber, UKBAP:2007, England NERC list	
Redshank	<i>Tringa totanus</i>	1997	SD59C	sSD59	Bonn:Annex 1/2, BirdsDir:Annex I or II, Bird:Amber	
Common Sandpiper	<i>Actitis hypoleucos</i>	1997	SD59C	sSD59	Bonn:Annex 1/2, Bird:Amber	
Lesser Black-backed Gull	<i>Larus fuscus</i>	2007	SD59B	sSD59	BirdsDir:Annex I or II, Bird:Amber	
Herring Gull	<i>Larus argentatus</i>	2007	SD59B	sSD59	BirdsDir:Annex I or II, Bird:Red	
Cuckoo	<i>Cuculus canorus</i>	1997	SD49W	sSD49	Bird:Red, UKBAP:2007, England NERC list	
Common Swift	<i>Apus apus</i>	2003	SD510933	Kendal_CP	Bird:Amber	1.0
Kingfisher	<i>Alcedo atthis</i>	2009	SD5148993956	Kendal	Bern:A2, BirdsDir:Annex I or II, Bird:Amber, WACA:Sch1 part1	1.0
Green Woodpecker	<i>Picus viridis</i>	1999	SD49W	sSD49	Bern:A2, Bird:Amber	
Skylark	<i>Alauda arvensis</i>	1997	SD49W	sSD49	BirdsDir:Annex I or II, Bird:Red, UKBAP:2007, England NERC list	
Sand Martin	<i>Riparia riparia</i>	2005	SD507955	Burneside	Bern:A2, Bird:Amber	1.3
Swallow	<i>Hirundo rustica</i>	1999	SD49X	sSD49	Bern:A2, Bird:Amber	
House Martin	<i>Delichon urbicum</i>	1999	SD49X	sSD49	Bern:A2, Bird:Amber	
Tree Pipit	<i>Anthus trivialis</i>	1997	SD59B	sSD59	Bern:A2, Bird:Red, UKBAP:2007, England NERC list	
Meadow Pipit	<i>Anthus pratensis</i>	1999	SD49W	sSD49	Bern:A2, Bird:Amber	

Taxon Common Name	Taxon Scientific Name	Date	Grid Reference	Location	Designation	Approx Closest Distance from site centre (km)
Yellow Wagtail	<i>Motacilla flava</i>	1997	SD59B	sSD59	Bern:A2, Bird:Red	
Grey Wagtail	<i>Motacilla cinerea</i>	1999	SD59B	sSD59	Bern:A2, Bird:Amber	
Dunnock	<i>Prunella modularis</i>	1999	SD49X	sSD49	Bern:A2, Bird:Amber	
Redstart	<i>Phoenicurus phoenicurus</i>	1999	SD49X	sSD49	Bern:A2, Bird:Amber	
Wheatear	<i>Oenanthe oenanthe</i>	1999	SD49W	sSD49	Bern:A2, Bird:Amber	
Song Thrush	<i>Turdus philomelos</i>	1999	SD49X	sSD49	BirdsDir:Annex I or II, Bird:Red	
Mistle Thrush	<i>Turdus viscivorus</i>	1999	SD49W	sSD49	BirdsDir:Annex I or II, Bird:Amber	
Whitethroat	<i>Sylvia communis</i>	1997	SD49W	sSD49	Bird:Amber	
Wood Warbler	<i>Phylloscopus sibilatrix</i>	2000	SD59B	sSD59	Bird:Red, UKBAP:2007, England NERC list	
Willow Warbler	<i>Phylloscopus trochilus</i>	1999	SD49X	sSD49	Bird:Amber	
Spotted Flycatcher	<i>Muscicapa striata</i>	1999	SD49X	sSD49	Bern:A2, Bonn:Annex 1/2, Bird:Red, UKBAP:2007, England NERC list	
Marsh Tit	<i>Poecile palustris</i>	1999	SD49X	sSD49	Bern:A2, Bird:Red	
Starling	<i>Sturnus vulgaris</i>	1999	SD49W	sSD49	BirdsDir:Annex I or II, Bird:Red	
House Sparrow	<i>Passer domesticus</i>	1999	SD49X	sSD49	Bird:Red, UKBAP:2007, England NERC list	
Linnet	<i>Carduelis cannabina</i>	1999	SD49X	sSD49	Bern:A2, Bird:Red	
Redpoll	<i>Carduelis flammea</i>	2000	SD59B	sSD59	Bern:A2	
Bullfinch	<i>Pyrrhula pyrrhula</i>	2000	SD49W	sSD49	Bird:Amber	
Yellowhammer	<i>Emberiza citrinella</i>	1999	SD49W	sSD49	Bern:A2, Bird:Red, UKBAP:2007, England NERC list	
Atlantic Salmon	<i>Salmo salar</i>	1993	SD5149694266	sSD59	HabDir:Annex 2/4/5, UKBAP:2007, England NERC list, ConsRegs:Sch3	1.0
Bullhead	<i>Cottus gobio</i>	1999	SD5149694266	sSD59	HabDir:Annex 2/4/5	1.0
Scots Pine	<i>Pinus sylvestris</i>	2001	SD505930	S-SD59-01	Status:NS	1.2
Freshwater Crayfish	<i>Austropotamobius pallipes</i>	1999	SD507950	Carling Beck app.400mts. ptc.R.Kent	HabDir:Annex 2/4/5, RedList Global post94:VU, UKBAP:2007, England NERC list, WACA:Sch5 sect9	0.8

Taxon Common Name	Taxon Scientific Name	Date	Grid Reference	Location	Designation	Approx Closest Distance from site centre (km)
Limestone Fern	<i>Gymnocarpium robertianum</i>	2001	SD5052993062	S-SD59-01	Status:NS	1.1
Bird's-foot sedge	<i>Carex ornithopoda</i>	1980	SD49W		Status:NR	
Bluebell	<i>Hyacinthoides non-scripta</i>	2001	SD5052993062	S-SD59-01	WACA:Sch8	1.1
Blue Moor-grass	<i>Sesleria caerulea</i>	2001	SD505930	S-SD59-01	Status:NS	1.2
Pale St John's-wort	<i>Hypericum montanum</i>	2001	SD505930	S-SD59-01	RedList GB post2001:NT	1.2
Donacia clavipes	<i>Donacia clavipes</i>	1993	SD490938	Cunswick Scar	Notable:B	1.6
Acalles roboris	<i>Kyklioacalles roboris</i>	1993	SD490938	Cunswick Scar	Notable:B	1.6
Dingy Skipper	<i>Erynnis tages</i>	2002	SD504936	Kendal Fell	UKBAP:2007, England NERC list	0.6
Northern Brown Argus	<i>Aricia artaxerxes</i>	2002	SD504936	Kendal Fell	UKBAP:2007, England NERC list, WACA:Sch5 sect9	0.6
Comma	<i>Polygonia c-album</i>	2000	SD507951	Burneside	Nr	0.9
Small Pearl-bordered Fritillary	<i>Boloria selene</i>	2002	SD504936	Kendal Fell	UKBAP:2007, England NERC list	0.6
Pearl-bordered Fritillary	<i>Boloria euphrosyne</i>	2002	SD504936	Kendal Fell	UKBAP:2007, England NERC list, WACA:Sch5 sect9	0.6
High Brown Fritillary	<i>Argynnis adippe</i>	2006	SD496954	Tolson Hall	RedList GB Pre94:VU, UKBAP:2007, England NERC list, WACA:Sch5 sect9	1.5
Wall	<i>Lasiommata megera</i>	2002	SD504936	Kendal Fell	UKBAP:2007, England NERC list	0.6
Grayling	<i>Hipparchia semele</i>	1983	SD491940	Cunswick Scar	UKBAP:2007, England NERC list	1.4
Small Heath	<i>Coenonympha pamphilus</i>	2002	SD504936	Kendal Fell	UKBAP:2007, England NERC list	0.6
Ectemnius sexcinctus	<i>Ectemnius (Clytochrysus) sexcinctus</i>	2001	SD5192	Kendal	Notable:B	
Autumnal Rustic	<i>Eugnorisma glareosa subsp. glareosa</i>	2006	SD507952	Carlingdale		1.0
Shaded Broad-bar	<i>Scotopteryx chenopodiata</i>	2008	SD507952	Burneside	UKBAP:2007, England NERC list	1.0

Taxon Common Name	Taxon Scientific Name	Date	Grid Reference	Location	Designation	Approx Closest Distance from site centre (km)
Spinach	<i>Eulithis mellinata</i>	2006	SD507952	Carlingdale	UKBAP:2007, England NERC list	1.0
Small Phoenix	<i>Ecliptopera silaceata</i>	2007	SD507952	Carlingdale	UKBAP:2007, England NERC list	1.0
Juniper Carpet	<i>Thera juniperata</i>	2009	SD507952	Carlingdale	Notable/Nb	1.0
Streak	<i>Chesias legatella</i>	2006	SD507952	Carlingdale	UKBAP:2007, England NERC list	1.0
Dusky Thorn	<i>Ennomos fuscantaria</i>	2009	SD505955	sSD59	UKBAP:2007, England NERC list	1.3
White Ermine	<i>Spilosoma lubricipeda</i>	2008	SD507952	Burneside	UKBAP:2007, England NERC list	1.0
Buff Ermine	<i>Spilosoma luteum</i>	2007	SD507952	Carlingdale	UKBAP:2007, England NERC list	1.0
Cinnabar	<i>Tyria jacobaeae</i>	2008	SD515941	Kendal	UKBAP:2007, England NERC list	1.0
Autumnal Rustic	<i>Eugnorisma glareosa form edda</i>	2008	SD507952	Burneside		1.0
Small Square-Spot	<i>Diarsia rubi</i>	2009	SD507952	Carlingdale	UKBAP:2007, England NERC list	1.0
Triple-spotted Clay	<i>Xestia ditrapezium</i>	2007	SD507952	Carlingdale	Nr	1.0
Dot Moth	<i>Melanchra persicariae</i>	2009	SD507952	Carlingdale	UKBAP:2007, England NERC list	1.0
Broom Moth	<i>Melanchra pisi</i>	2006	SD507952	Carlingdale	UKBAP:2007, England NERC list	1.0
Feathered Gothic	<i>Tholera decimalis</i>	2008	SD507952	Burneside	UKBAP:2007, England NERC list	1.0
Powdered Quaker	<i>Orthosia gracilis</i>	2007	SD507952	Carlingdale	UKBAP:2007, England NERC list	1.0
Tawny Pinion	<i>Lithophane semibrunnea</i>	2008	SD507952	Burneside	Nr	1.0
Green-brindled Crescent	<i>Allophyes oxyacanthae</i>	2007	SD507952	Carlingdale	UKBAP:2007, England NERC list	1.0
Knotgrass	<i>Acronicta rumicis</i>	2009	SD507952	Carlingdale	UKBAP:2007, England NERC list	1.0
Mouse Moth	<i>Amphipyra tragopoginis</i>	2008	SD507952	Burneside	UKBAP:2007, England NERC list	1.0
Dusky Brocade	<i>Apamea remissa</i>	2009	SD507952	Carlingdale	UKBAP:2007, England NERC list	1.0
Ear Moth	<i>Amphipoea oculatea</i>	2006	SD507952	Carlingdale	UKBAP:2007, England NERC list	1.0

Taxon Common Name	Taxon Scientific Name	Date	Grid Reference	Location	Designation	Approx Closest Distance from site centre (km)
Rosy Rustic	<i>Hydraecia micacea</i>	2009	SD507952	Carlingdale	UKBAP:2007, England NERC list	1.0
Hemerodromia unilineata	<i>Hemerodromia unilineata</i>	1983	SD514937	Kendal	Nr	1.0
Lonchoptera meijeri	<i>Lonchoptera meijerei</i>	1985	SD514937	Kendal	Status:NS	1.0
Tetanocera arrogans	<i>Tetanocera arrogans</i>	1993	SD490938	Cunswick Scar	Nr	1.6
Japanese Knotweed	<i>Fallopia japonica</i>	2006	SD5158993988	sSD59		1.1
Abida secale	<i>Abida secale</i>	1991	SD4992	Bradleyfield	Notable/Nb	
Helicella itala	<i>Helicella itala</i>	1991	SD4992	Bradleyfield	Nr	
Fox-tail Feather-moss	<i>Thamnobryum alopecurum</i>	2001	SD505930	S-SD59-01	RDB3	1.2
West European Hedgehog	<i>Erinaceus europaeus</i>	2008	SD502941	Kendal	UKBAP:2007, England NERC list	0.3
Brown Long-eared Bat	<i>Plecotus auritus</i>	1997	SD506959	Burneside	Bern:A2, Bonn:Annex 1/2, HabDir:Annex 2/4/5, UKBAP:2007, England NERC list, WACA:Sch5 sect9, ConsRegs:Sch2	1.7
Chiroptera	<i>Chiroptera</i>	2009	sd50949385	Kendal, Low Garth	Bern:A2, Bonn:Annex 1/2, HabDir:Annex 2/4/5, WACA:Sch5 sect9	0.5
Common Pipistrelle	<i>Pipistrellus pipistrellus</i>	2003	SD5192	Kendal, Vicarage Drive	Bern:A2, Bonn:Annex 1/2, HabDir:Annex 2/4/5, WACA:Sch5 sect9, ConsRegs:Sch2	0.0
Daubenton's Bat	<i>Myotis daubentonii</i>	2002	SD510950	Burneside	Bern:A2, Bonn:Annex 1/2, HabDir:Annex 2/4/5, WACA:Sch5 sect9, ConsRegs:Sch2	0.9
Eurasian Badger	<i>Meles meles</i>	2010	SD5040195422	sSD59	Protection of Badgers Act	1.2
European Otter	<i>Lutra lutra</i>	2006	SD512949	Burneside	Bern:A2, HabDir:Annex 2/4/5, UKBAP:2007, England NERC list, WACA:Sch5 sect9, ConsRegs:Sch2	1.0
Polecat	<i>Mustela putorius</i>	2002	SD498942	sSD49	HabDir:Annex 2/4/5, UKBAP:2007, England NERC list, ConsRegs:Sch3	0.7
Soprano Pipistrelle	<i>Pipistrellus pygmaeus</i>	2008	SD5146493579	Kendal_CP	HabDir:Annex 2/4/5, UKBAP:2007, England NERC list, ConsRegs:Sch2	1.2

Taxon Common Name	Taxon Scientific Name	Date	Grid Reference	Location	Designation	Approx Closest Distance from site centre (km)
Unidentified UK Pipistrelle	<i>Pipistrellus pipistrellus</i>	1984	SD513944	Kendal, Kentrigger	Bern:A2, Bonn:Annex 1/2, HabDir:Annex 2/4/5, WACA:Sch5 sect9, ConsRegs:Sch2	0.8
Whiskered Bat	<i>Myotis mystacinus</i>	1989	SD515929	Kendal	Bern:A2, Bonn:Annex 1/2, HabDir:Annex 2/4/5, WACA:Sch5 sect9, ConsRegs:Sch2	1.6
Brown Hare	<i>Lepus europaeus</i>	1997	SD500943	Kendal	UKBAP:2007, England NERC list	0.5

Appendix 2: Plant Species Recorded Within Site

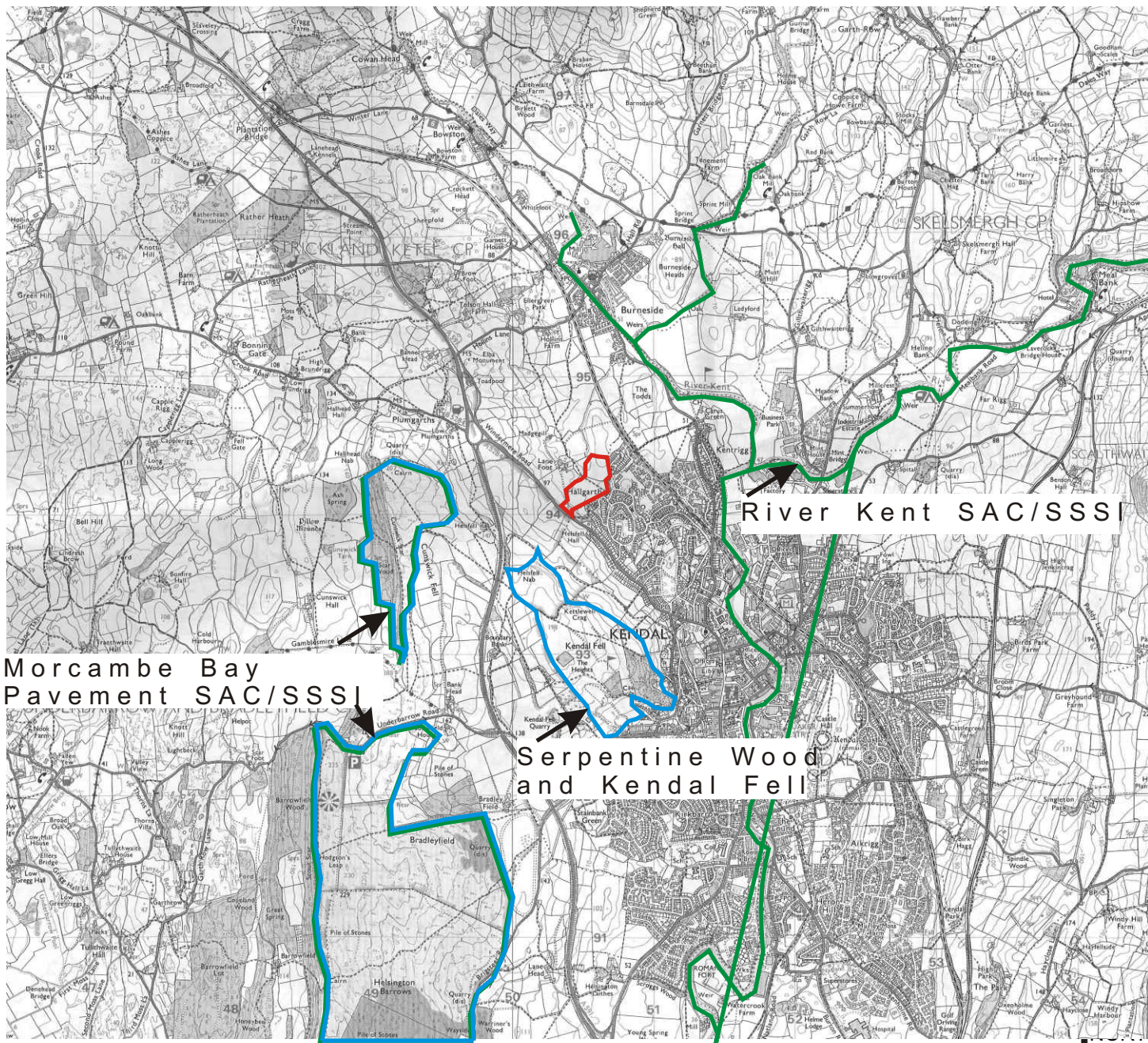
Latin Name	Common Name
Semi-Improved Grassland	
<i>Achillea millefolium</i>	Yarrow
<i>Alopecurus pratensis</i>	Meadow foxtail
<i>Bellis perennis</i>	Daisy
<i>Cerastium fontanum</i>	Common mouse-ear
<i>Cirsium arvense</i>	Creeping thistle
<i>Galium aperine</i>	Cleavers
<i>Lolium perenne</i>	Perennial rye grass
<i>Plantago major</i>	Greater plantain
<i>Argentina anserina</i>	Silverweed
<i>Ranunculus acris</i>	Meadow buttercup
<i>Ranunculus ficaria</i>	Lesser celandine
<i>Ranunculus repens</i>	Creeping buttercup
<i>Rumex obtusifolius</i>	Broad-leaved dock
<i>Taraxacum officinale</i> agg.	Dandelion
<i>Trifolium repens</i>	White clover
<i>Urtica dioica</i>	Common nettle
Eastern Hedgebank	
<i>Arum maculatum</i>	Lords-and-ladies
<i>Crataegus monogyna</i>	Hawthorn
<i>Elytrigia repens</i>	Common couch
<i>Epilobium angustifolium</i>	Rosebay willowherb
<i>Festuca rubra</i>	Red fescue
<i>Filipendula ulmaria</i>	Meadowsweet
<i>Fragaria vesca</i>	Wild strawberry
<i>Galium aperine</i>	Cleavers
<i>Geranium dissectum</i>	Cut-leaved crane's-bill
<i>Geum urbanum</i>	Wood avens
<i>Holcus lanatus</i>	Yorkshire fog
<i>Ilex aquifolium</i>	Holly
<i>Juncus effusus</i>	Soft rush
<i>Lolium perenne</i>	Perennial rye grass
<i>Pteridium aquilinum</i>	Bracken
<i>Ranunculus acris</i>	Meadow buttercup
<i>Ranunculus ficaria</i>	Lesser celandine
<i>Ranunculus repens</i>	Creeping buttercup
<i>Rosa canina</i>	Dog rose
<i>Rubus fruticosus</i> agg.	Bramble
<i>Sambucus nigra</i>	Elder
<i>Taraxacum officinale</i> agg.	Dandelion
<i>Urtica dioica</i>	Common nettle
<i>Veronica chamaedrys</i>	Germander speedwell
<i>Vicia cracca</i>	Tufted vetch
<i>Vicia sepium</i>	Bush vetch
<i>Viola riviniana</i>	Common dog-violet
Northern Hedgerow	
<i>Arum maculatum</i>	Lords-and-ladies
<i>Betula pubescens</i>	Downy birch
<i>Crataegus monogyna</i>	Hawthorn
<i>Ranunculus ficaria</i>	Lesser celandine
<i>Rosa canina</i>	Dog rose
<i>Rubus fruticosus</i>	Bramble

<i>Sambucus nigra</i>	Elder
<i>Urtica dioica</i>	Common nettle
<i>Viola riviniana</i>	Common dog-violet
Field Boundary trees	
<i>Acer pseudoplatanus</i>	Sycamore
<i>Aesculus hippocastanum</i>	Horse chestnut
<i>Corylus avellana</i>	Hazel
<i>Crataegus monogyna</i>	Hawthorn
<i>Fagus sylvatica</i>	Beech
<i>Fraxinus excelsior</i>	Ash
<i>Prunus laurocerasus</i>	Cherry laurel
<i>Quercus robur</i>	Pedunculate Oak
<i>Sambucus nigra</i>	Elder

Appendix 3: Hedgerow Survey Data

Note: Hedgerows indicated in **BOLD** are those with nature conservation priority under HEGS. All hedgerows with $\geq 80\%$ native woody species cover are considered priority habitats for conservation under the UK BAP.

Hedgerow Number	Associated Features: Bank or wall; <10% gaps; Ditch along half its length; connections; >1 standard tree/50m; parallel hedge within 15m or public footpath/bridleway, road used as public path or byway						$\geq 80\%$ Native woody species	Important under Hedgerow Regulations	Grade under HEGS	Total No. Native Woody Species	Species Rich Hedgerow (average of 5+ woody species/30m)
	<10% gaps	Bank/lynchet	No. connections	Ditch along half of length	No. Standard trees/50m	Parallel hedge, footpath or bridleway					
H1	YES	YES	1	NO	0	NO	YES	NO	3+	4	NO
H2	YES	YES	0	NO	0	NO	YES	NO	3+	4	NO



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KEY



Site boundary



SAC/SSSI



Local Wildlife Site (LWS)

Land to the East of Windermere
Road, Kendal

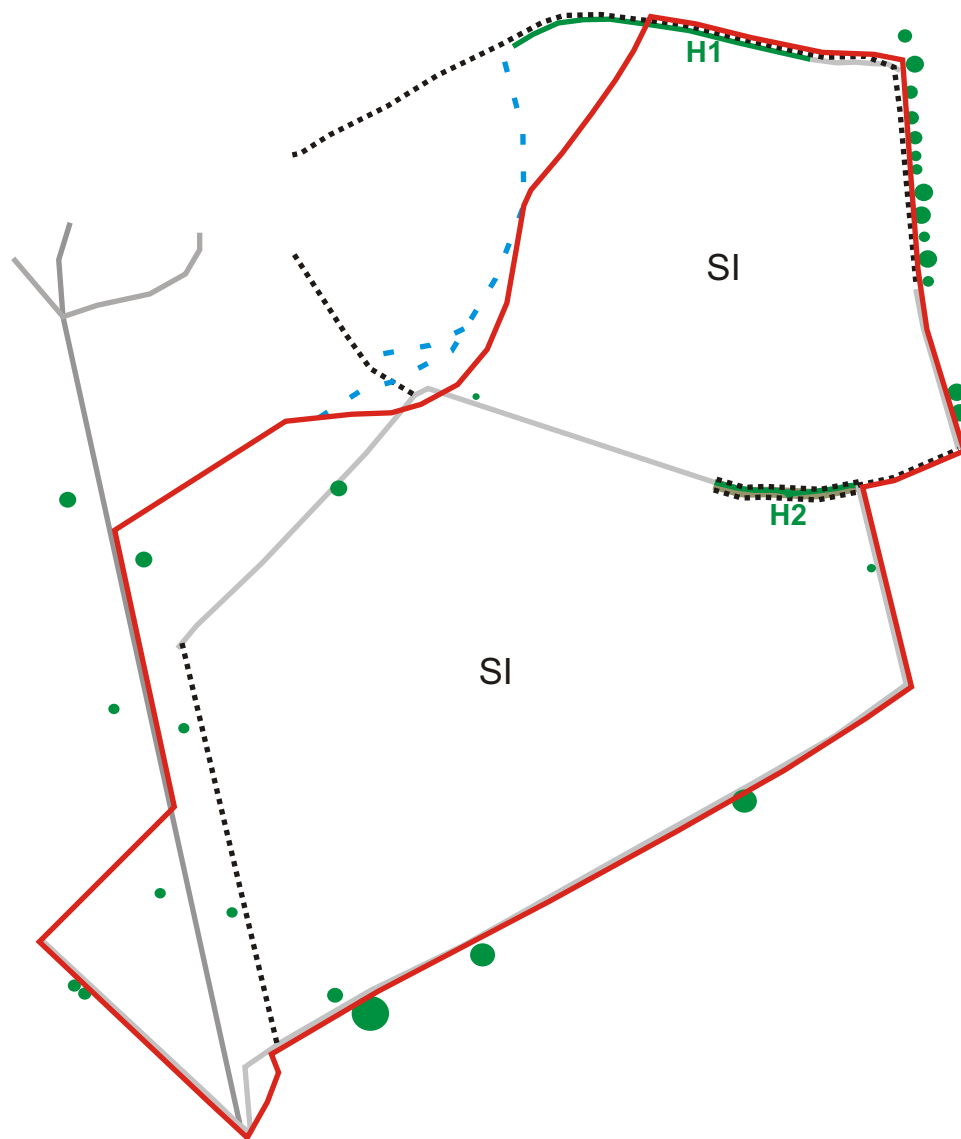
**SITE LOCATION AND SITES OF
NATURE CONSERVATION
VALUE**

Figure 1

Lockington Hall, Lockington,
Derby, DE74 2RH, Tel: 01509 672772
Fax: 01509 674565, mail@fpcr.co.uk

File: J:\4400\4464\4464 Location &

Not to scale. May 2011



Key

	Site boundary
	Semi-improved grassland
	Vegetated hedge bank
	Tree
	Hedgerow
	Underground brook
	Fence
	Stone wall
	Access road

Land to the East of Windermere Road, Kendal

PHASE 1 HABITAT PLAN

Figure 2

Not to scale. May 2011

Lockington Hall, Lockington,
Derby, DE74 2RH, Tel: 01509 672772
Fax: 01509 674565, mail@fpcr.co.uk

File: J:/4400/4464/Core1/4464 Phase 1 Plan Fig 2.cdr



**REPORT C4280
MAY 2011**

PRELIMINARY INVESTIGATION

**of land off
WINDERMERE ROAD, KENDAL**

**prepared for
MR S ELLIS**



REPORT NUMBER:	C4280	REPORT STATUS:	FINAL
REPORT TYPE:	PRELIMINARY INVESTIGATION		
REPORT DATE:	MAY 2011		
SITE:	WINDERMERE ROAD, KENDAL		
PREPARED FOR:	MR S ELLIS		
PREPARED BY:	Sirius Geotechnical and Environmental Ltd 4245 Park Approach Thorpe Park Leeds LS15 8GB	Tel: 01132 649 960 Fax: 01132 649 962	

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PRELIMINARY INVESTIGATION**of land off****WINDERMERE ROAD, KENDAL****Prepared for****MR S ELLIS****CONTENTS****EXECUTIVE SUMMARY**

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APPENDICES

APPENDIX A DRAWINGS

Drawing No.	Title	Scale
C4280/01	Site Location Plan	1:50,000
C4280/02	Site Features Plan	NTS
C4280/03	Site Photographs	NTS
C4280/04	Preliminary Conceptual Site Model	NTS

NTS: Not to Scale

APPENDIX B GROUNDSURE REPORT

EXECUTIVE SUMMARY

Introduction	<p>Sirius Geotechnical and Environmental Ltd (Sirius) were commissioned by Walker Morris, acting on behalf of Mr S Ellis, to undertake a preliminary investigation (desk study) of land off Windermere Road, Kendal, with a view to potential low rise residential development.</p> <p>The site has been recently allocated for housing.</p>
Site Details	<p>The site is an irregular shaped plot of land, divided into two fields.</p> <p>Both fields are currently agricultural pasture land.</p> <p>The site slopes down from the west to east, and steeply from the north-east corner to the south and south-west.</p> <p>A footpath crosses the centre of the site, north-west to south-east, from High Garth towards Lane Foot Farm.</p> <p>Overhead services are present crossing the site on wooden poles.</p>
Site History	<p>The site has remained undeveloped until the present day. The surrounding area has remained largely unchanged, with only the post 1950s development of the adjacent residential estate in the immediate vicinity of the site. The Windermere Branch Railway Line passes the site, 160m to the north-east.</p>
Anticipated Ground Conditions	<p>Available geological information indicates the site is underlain by Glacial Till, overlying a mixture of sandstone, mudstone and limestone.</p>
Mining & Quarrying	<p>Based on the site's geological setting and the CA gazetteer, it is considered that the possibility of the surface stability at the site being affected by past coal mining activities is negligible. Localised metaliferous mining/pitting cannot be completely ruled out.</p>
Landfill	<p>An inactive landfill is recorded 226m north east, and although considered unlikely to pose a significant risk to the proposed development, a gas risk assessment should be undertaken.</p>
Foundations	<p>The nature and depth of foundations will be dependent on any regrade and the detailed site geology, including:</p> <ul style="list-style-type: none"> • Thickness of any made ground; • Presence/extent of any substructures; • Bearing capacity of the natural strata; • Groundwater levels; and, • Proximity to trees where potentially shrinkable soils are present. <p>Slopes of up to approximately 20° are present, and it may be necessary to step foundations in accordance with NHBC Standards Chapter 4.2.</p> <p>Reinforcement of footings maybe required to span different geological units and also to mitigate against the potential risk of dissolution of limestone deposits in the south-west of the site.</p> <p>Parts of the site are quite steep. In order to obtain reasonably level areas it may be necessary to terrace parts of the site. Such terraces are likely to require relatively</p>

	<p>extensive cut and fill operations and the creation of deep made ground. Retaining walls and/or slope stability analyses may be required. Alternative foundation solutions will be required in any areas of deep made ground.</p> <p><u>It is recommended that an intrusive investigation is undertaken to confirm ground conditions and foundation requirements.</u></p>
Contamination	<p>The preliminary conceptual site model indicates that the only pollutant linkage is for hazardous gas migration and inhalation to end users. No other significant linkages considered to pose a potential risk to construction workers, site end users and controlled waters have been identified.</p>
Radon	<p>According to the BGS, full radon protective measures are required for the site.</p>
Further Works	<p>The following ground investigation works are recommended to allow foundation design and determination of any contamination constraints, and abnormal costs:</p> <ul style="list-style-type: none"> • Trial pits to investigate near surface soil and groundwater conditions, and allow recovery of soil and water samples for testing. • Drilling of cable percussive boreholes to prove sufficient natural strata for founding purposes, particularly in sloping areas. • Installation of gas/groundwater monitoring wells in selected cable percussive boreholes. • Chemical and geotechnical laboratory testing to adequately categorise the shallow soils / groundwater. • Gas Monitoring – 6 visits over a 3 month period anticipated to be required by the regulatory authorities. • Reporting. <p>Intrusive ground investigation works should be carried out by a suitably qualified geoenvironmental consultant.</p> <p>It is recommended that an ecological survey be carried out.</p>

1. INTRODUCTION

Sirius Geotechnical and Environmental Ltd (Sirius) were commissioned by Walker Morris, acting on behalf of Mr S Ellis, to undertake a preliminary investigation (desk study) of land off Windermere Road, Kendal (the “site”).

The land has recently been allocated for residential development in the South Lakeland Draft Site Allocations Development Plan. At the time of writing a proposed development layout had not been issued.

The objectives of this investigation were:

- To establish the historical development of the site and immediate surrounding area from a review of historical OS plans;
- To establish the environmental setting of the site;
- To evaluate whether past mining or other extractive industries could have an influence on the site;
- To determine if historical or current activities could give rise to significant ground contamination;
- To determine the potential risk to the development from hazardous ground gas sources including radon; and,
- To provide recommendations for intrusive works required to determine the shallow ground/contamination profile below the site, and foundation solutions and measures to deal with any contamination.

This desk study includes an assessment of information provided by GroundSure Environmental Reports, the British Geological Survey (BGS) and the Coal Authority gazetteer (CA). A site inspection (walk over survey) was undertaken by a Sirius Geoenvironmental engineer on 11th May 2011.

This report presents and interprets the factual information reviewed during this investigation and presents a Preliminary Conceptual Site Model (PCSM) from which ground-related hazards and risks have been assessed.

This report, which was designed to meet the requirements of all relevant current guidance, presents the factual information available during this appraisal, interpretation of the data obtained and recommendations relevant to the defined objectives.

It has been assumed in the production of this report that the site is to be developed for a low rise residential end use. In addition, it is assumed that ground levels will not change significantly from those described in this report. If this is not the case, amendments to the recommendations made in this report may be required.

Where the report refers to the potential presence of invasive plants (such as Japanese Knotweed) or asbestos-containing materials, such observations are for information only and should be verified by a suitably qualified expert.

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2. SITE DETAILS AND DESCRIPTION

Table 2.1 Current Site Overview

Location	The site is located off Windermere Road, Kendal approximately 2km northwest of Kendal town centre. A site location plan is included as Drawing No. C4280/01, within Appendix A.
National Grid Reference	E 350618, N 494308.
Topography and Features	<p>The site is an irregular shaped plot of land, covering approximately 6.6 hectares, divided into two fields.</p> <p>Both fields are currently agricultural pasture land.</p> <p>The site slopes down from the west to east, and steeply from the north-east corner to the south and south-west.</p> <p>A footpath crosses the centre of the site, north-west to south-east, from High Garth towards Lane Foot Farm.</p> <p>Overhead services are present crossing the site on wooden poles.</p>
Site Boundaries	<p>The site is bounded to the north, south and west by open fields and Lane Foot Farm and to the east by residential properties on High Sparrowmire and High Garth.</p> <p>The boundaries comprise a mix of predominantly dry stone walls, with post and rail fences and hedgerow.</p>
Current Land Use	The site is occupied by fields to the south-east of Lane Foot Farm.
Invasive Plant Species	None noted. Hedgerows on site boundary apparently formed of native non-invasive species. An ecological survey should be carried out if not previously undertaken to confirm if any invasive plant species are present.

The main site features are shown on Drawing No. C4280/02 and C4280/03, within Appendix A.

3. ENVIRONMENTAL SETTING

3.1. Introduction

Published environmental, geological and historical data relating to the site has been reviewed. A summary of relevant information is provided below and a copy of the GroundSure Report is enclosed as Appendix B.

3.2. Site History

Table 3.1 presents a summary of the site history from 1859 to 2010. It is not the intention of this report to describe in detail all of the changes that have occurred on or adjacent to the site, only those pertinent to the proposed development.

Table 3.1 Site History

Map Dates	On-Site Features	Off-Site Features (only features within 500m that may affect the site are listed)
1859-1951	Open fields between Lane Foot, Hallgarth and Sparrowmire farms. Spring on north-west boundary. Footpath crosses centre of site north-west to south-east.	Open farmland. Windermere branch line railway 160m north-east (in cutting). Quarries 800m to north-west A number of springs are present within 500m of the site
1951-1969	No significant changes.	Significant residential development on southern and eastern boundaries.
1969-present	The site remains unchanged.	The surrounding area remains largely unchanged.

3.3. Published Geological Information

A summary of available published geological information is provided in Table 3.2 below.

Table 3.2 Geological Summary

Sources of Information	<p>BGS 1:50,000 scale geological map (Sheet 39 – Kendal). Bedrock and Drift Edition.</p> <p>BGS Digitalmap of Great Britain (1:50,000 data).</p>
Made Ground	The 1:50,000 scale geological plans indicate no made ground deposits on the site.
Drift Geology	The site is reported to be underlain by Glacial Till (clayey, silty, sandy gravel).
Solid Geology	<p>Sheet 39 indicates the drift is underlain by Silurian Kendal Group (mudstone and siltstone, overlain by sandstone) in the north-east of the site and Ravenstonedale Group (conglomerate sandstone) in the south-west. The geological section line on the BGS 1:50,000 plan passes directly through the site.</p> <p>The Plumgarth Fault flanks the eastern boundary of the site, trending north-west to south-east, downthrowing strata to the south-west.</p> <p>The BGS digital map sourced both on-line and by GroundSure suggests the site is underlain by three geological units: the Martin Limestone in the south-west, Marsett Sandstone Formation in the centre and the Kirkby Moor Formation (sandstone) in the north-east.</p> <p>The Martin Limestone and Marsett Sandstone are concurrent with the Ravenstonedale Group, with the Kirkby Moor Formation being consistent with the Kendal Group.</p>
Mining and Quarrying	<p>According to the Coal Authority (CA) gazetteer a Coal Mining Report is not required for the site.</p> <p>An area of surface worked ground is shown on the GroundSure Report, relating to railway cuttings, 160m north-east of the site.</p>

3.4. Hydrology and Hydrogeology

A summary of available information pertaining to hydrology and hydrogeology is presented in Tables 3.3 to 3.5 below.

Table 3.3 Surface Water Features

	Presence/location	Comments
EA GQA Classified Watercourses (within 500m)	None recorded.	River Kent located 700m north-east with River Quality A.
Unclassified Watercourses (within 500m)	Unnamed watercourses network 100m north.	Series of becks flowing north and east towards River Kent.
Surface Water Features (Canals, Ponds, Lakes, etc.) (within 250m)	None recorded.	
Surface Water Abstractions (within 500m)	None recorded.	
Flood Risk Status	The site lies outside the recorded Zone 2/3 flood plain at risk of flooding from rivers and sea.	

Table 3.4 Groundwater Occurrence and Abstraction

	Presence/location	Comments
Licensed Abstractions (within 500m)	There are no groundwater abstraction licenses recorded within 500m of the centre of the property.	
Source Protection Zones	The site is not located within a source protection zone.	
Springs/Potable Water Abstractions	There are no potable water abstraction licenses recorded within 2km of the site.	

Table 3.5 Groundwater Vulnerability Status

	Environment Agency Classification
Groundwater Classification	<p>The Glacial Till deposits are classified as unproductive. These are deposits with low permeability that have negligible significance for water supply or river base flow.</p> <p>The solid bedrock strata are classified separately. The Martin Limestone and Marsett Sandstone (conglomerate) is classified as a Secondary A aquifer whilst the Kirkby Moor Sandstone is designated as a Secondary B aquifer under the new aquifer classification system developed by the EA.</p> <p>A “Secondary A” aquifer is defined as permeable layers supporting water supplies at a local level and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.</p> <p>A “Secondary B” aquifer is defined as predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former ‘non-aquifers’.</p>

3.5. Landfilling and Waste Management

Table 3.6 Waste Management Activities

	Presence / Location	Comments
Historic Landfills (within 500m)	None recorded.	
Landmark / BGS / EA Recorded Landfills (within 500m)	There is one recorded landfill site 226m north-east of the site and a second 368m south-east.	Burneside Hall is the closer, licensed to accept difficult waste. Licence no longer active.
Walkover Evidence of Fly-Tipping on Site?	None recorded.	
Ground Gas Risk Assessment Required?	Yes	Historic Landfill located 226m north-east.

NR - none recorded

3.6. Radon Risk

The geological assessment contained within the GroundSure Report, which includes information obtained from the Health Protection Agency and British Geological Survey, states that the site lies within an area in which **full radon protective measures** are required.

3.7. Other

Other potentially contaminative activities or environmental constraints are listed below. The entries relate to activities within approximately 250m of the site, with the exception of COMAH facilities where the assessment is extended to a distance of approximately 1km from the site.

- There are no recorded pollution incidents within 500m of the site.
- There are three electricity substations within 250m of the site.
- The site lies adjacent to the Lake District National Park, to the west of Windermere Road.

4. PREVIOUS INVESTIGATIONS

Sirius have not been made aware of any previous investigations at this site.

5. PRELIMINARY CONCEPTUAL MODEL

Based on the desk study, a preliminary conceptual site model (PCSM) has been developed for the proposed future land use (residential). This summarises the understanding of surface and sub-surface features, the potential contaminant sources, transport pathways and receptors in order to assess potential pollutant linkages.

A qualitative risk assessment has also been made of the likelihood of any pollutant linkage operating and its potential significance.

The preliminary conceptual model is presented in schematic form as Drawing No. C4280/04, in Appendix A.

In summary, the preliminary CSM has identified the following potential pollutant linkages which could result in an unacceptable risk to the proposed end-use, denoted as moderate or higher risk on the CSM:

- Risk from hazardous gas sources, associated with off-site landfill site.

6. CONCLUSIONS AND RECOMMENDATIONS

6.1. General

It is understood that consideration is being given to development of the site with low rise residential properties. The site has been allocated for housing, but at the time of writing no development layout plan had been issued to Sirius.

6.2. Flood Risk

According to the GroundSure Report and the Environment Agency website, the site lies outside an indicative Zone 2 and Zone 3 floodplain at risk of flooding from rivers and sea.

It is understood that a Flood Risk Assessment is being carried out by other parties.

6.3. Geotechnical

Mining and Quarrying

Based on the site's geological setting and the CA gazetteer, it is considered that the possibility of the surface stability at the site being affected by past coal mining activities is negligible.

There is no historical cartographic evidence of quarrying at the site; however, the possibility of encountering unrecorded localised quarries/pits cannot be wholly discounted. It is recommended that all excavations are examined for evidence of quarrying/pitting. If a quarry/pit is suspected, advice should be sought immediately from a suitably qualified engineer.

Foundations

The published geological information, indicates that the site is underlain by Glacial Till, overlying a mixture of sandstone, mudstone and limestone.

These deposits (where undisturbed) are likely to be able to carry lightly loaded structures on spread foundations.

Slopes of up to approximately 20° are present, and it may be necessary to step foundations in accordance with NHBC Standards Chapter 4.2.

Reinforcement of footings maybe required to span different geological units and also to mitigate against the potential risk of dissolution of limestone deposits in the south-west of the site.

Parts of the site are quite steep. In order to obtain reasonably level areas it may be necessary to terrace areas of the site. Such terraces are likely to require relatively extensive cut and fill operations and the creation of deep made ground. Retaining walls and/or slope stability analyses may be required. Alternative foundation solutions will be required in any areas of deep made ground.

It is recommended that an intrusive investigation is undertaken to confirm ground conditions and foundation requirements.

6.4. Contamination Constraints

Risk Evaluation for the Proposed Land Use (Residential)

The preliminary conceptual site model indicates pollutant linkages to receptors in the form of hazardous gas migration. No other significant pollutant linkages have been identified.

6.5. Ground Gas

A risk from hazardous gas sources has been identified as a landfill site 225m from the property.

To confirm the situation regarding hazardous gases on site, from off-site sources, a hazardous gas investigation would be required to determine the need or otherwise for gas protection measures in future buildings.

In addition, according to the BGS, the site lies within an area in which **full radon protective measures** are required.

6.6. Invasive Plants

Invasive plant species were not observed during the site walkover; hedgerows and vegetated areas on the site boundaries were of native non-invasive species. An ecological survey should be carried out if not previously undertaken to confirm if any invasive plant species are present.

7. FURTHER INVESTIGATION

The following ground investigation works are recommended to allow foundation design and determination of any contamination constraints, and abnormal costs:

- Trial pits to investigate near surface soil and groundwater conditions, and allow recovery of soil and water samples for testing.
- Drilling of cable percussive boreholes to prove sufficient natural strata for founding purposes for the proposed development, particularly in sloping areas.
- Installation of gas/groundwater monitoring wells in selected cable percussive boreholes.
- Chemical and geotechnical laboratory testing to adequately categorise the shallow soils / groundwater.
- Gas Monitoring - 6 visits over a 3 month period anticipated to be required by the regulatory authorities.
- Reporting.

Intrusive ground investigation works should be carried out by a suitably qualified geoenvironmental consultant.

It is recommended that an ecological survey be carried out.



APPENDIX A

DRAWINGS

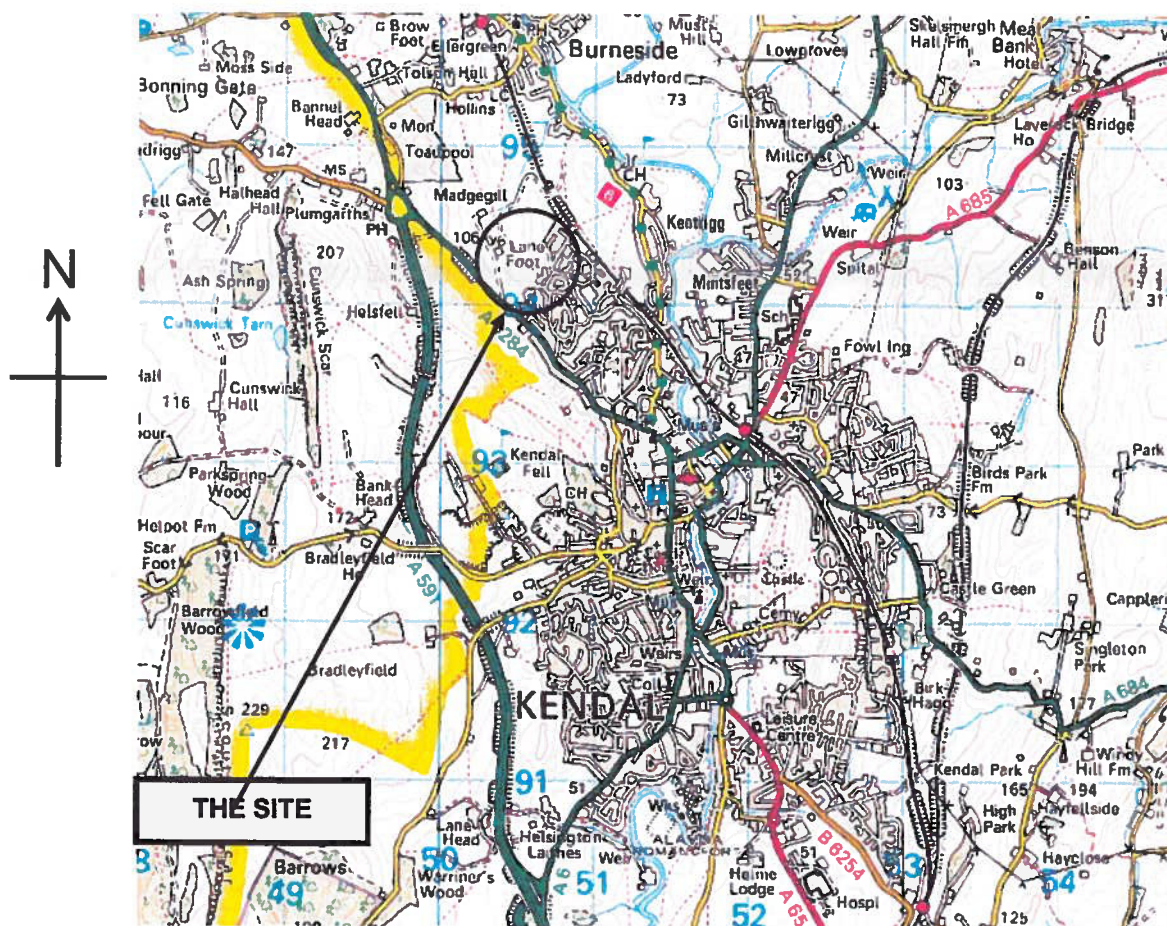


Site Location Plan

Contract Number	C4280
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Contract	Windermere Road, Kendal
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Client	Mr S Ellis
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Sirius Geotechnical & Environmental Ltd, Suite 2, Russel House, Mill Road, Langley moor, Durham DH7 8HJ.
Licence No. 100042005

Scale	1:50,000
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Drawn by	AF
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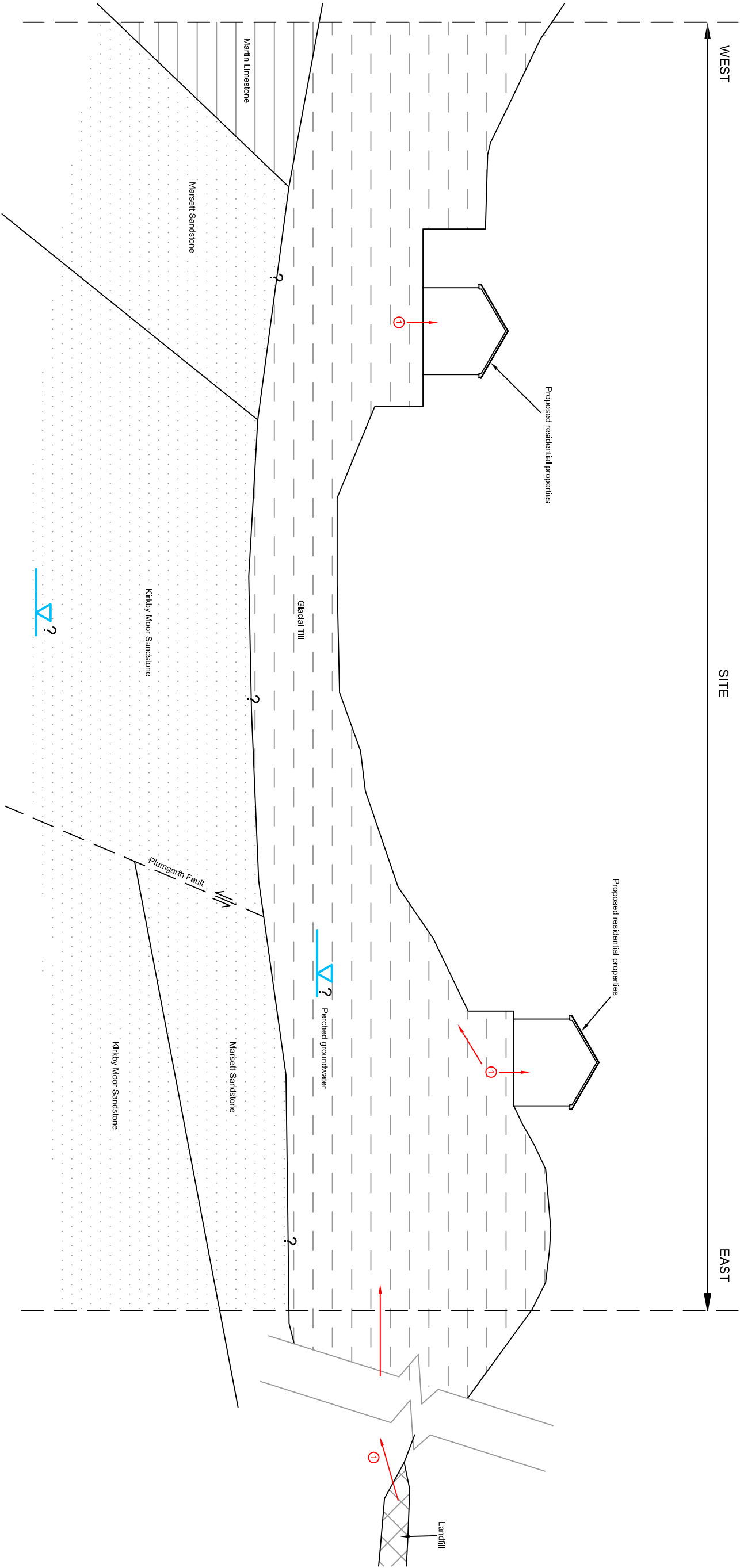
Approved	RIH
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Drawing Number	C4280/01
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NOTES



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A	>>		
B	>>		
C	>>		
D	>>		
SIRIUS GEOTECHNICAL & ENVIRONMENTAL 4245 Park Approach, Thorp Park, Leeds LS15 8GB www.besiriusgroup.com TEL: 0113 254 9960 FAX: 0113 254 9962			
			
MR. S. ELLIS			
SITE			
WINDERMERE ROAD, KENDAL			
DRAWING TITLE			
SITE PHOTOGRAPHS			
DRAWING NO. C4280/03		REVISION NO. 0	
DRAWN BY RM		APPROVED BY RH	
DATE MAY 2011	SCALE NTS	PAPER SIZE A3	



NOTES

REVISION	
0	>>
A	>>
B	>>
C	>>
D	>>

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4245 Park Approach,
Thorne Park,
Leeds
LS15 8GB
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TEL: 0113 264 9960
FAX: 0113 264 9962



MR. S. ELLIS

SITE
WINDERMERE ROAD, KENDAL

DRAWING TITLE
PRELIMINARY CONCEPTUAL
SITE MODEL

DRAWING NO. C4280/04	REVISION NO. 0	
DRAWN BY RM	APPROVED BY RH	
DATE MAY 2011	SCALE NTS	PAPER SIZE A3



APPENDIX B

GROUNDSURE REPORT



Sirius Geotechnical & Environmental Limited
Thorpe Park,
L15 8ZB

GroundSure
Reference:

HMD-283-048792

Your Reference:

C4280/RIH

Report Date:

Apr 6, 2011

Report Delivery
Method:

xml

Client Email:

jodie.cathcart@thesiriusgroup.com

GroundSure EnviroInsight

Address: WINDERMERE ROAD, KENDAL, LA9 5PL

Dear Sir/Madam,

Thank you for placing your order with GroundSure. Please find enclosed the GroundSure EnviroInsight as requested

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

Yours faithfully,

A handwritten signature in black ink, appearing to be "Jodie Cathcart", followed by a small circular mark.

Managing Director
Groundsure Limited

Enc.
GroundSure EnviroInsight

GroundSure EnviroInsight

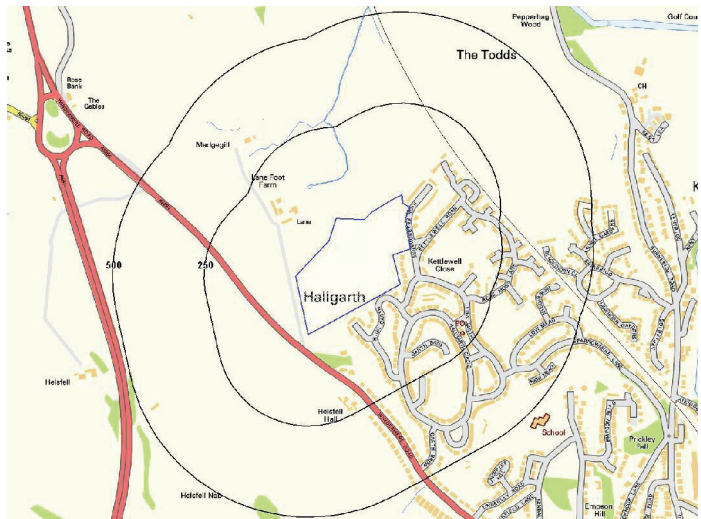
Address: WINDERMERE ROAD, KENDAL, LA9 5PL

Date: Apr 6, 2011

GroundSure Reference: HMD-283-048792

Your Reference: C4280/RIH

Client: Sirius Geotechnical & Environmental Limited



Brought to you by GroundSure

Aerial Photograph of Study Site



Site Name: WINDERMERE ROAD, KENDAL, LA9 5PL
Grid Reference: 350618,494308
Size of Site: 6.61 ha

Aerial photography supplied by Getmapping PLC.
© Copyright Getmapping PLC 2003. All Rights Reserved.

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.

Report Section	Number of records found within (X) m of the study site boundary					
1. Environmental Permits, Incidents and Registers	on-site	0-50	51-250	251-500	501-1000	1000-1500
1.1 Industrial Sites Holding Environmental Permits and/or Authorisations						
Records of historic IPC Authorisations	0	0	0	0	-	-
Records of Part A(1) and IPPC Authorised Activities	0	0	0	0	-	-
Records of Water Industry Referrals (potentially harmful discharges to the public sewer)	0	0	0	0	-	-
Records of Red List Discharge Consents (potentially harmful discharges to controlled waters)	0	0	0	0	-	-
Records of List 1 Dangerous Substances Inventory sites	0	0	0	0	-	-
Records of List 2 Dangerous Substances Inventory sites	0	0	0	0	-	-
Records of Part A(2) and Part B Activities and Enforcements	0	0	0	0	-	-
Records of Category 3 or 4 Radioactive Substances Authorisations	0	0	0	0	-	-
Records of Licensed Discharge Consents	0	0	0	0	-	-
Records of Planning Hazardous Substance Consents and Enforcements	0	0	0	0		
1.2 Records of COMAH and NIHHS sites	0	0	0	0	-	-
1.3 Environment Agency Recorded Pollution Incidents						
National Incidents Recording System, List 2	0	0	0	-	-	-
National Incidents Recording System, List 1	0	0	0	-	-	-
1.4 Sites Determined as Contaminated Land under Part IIA EPA 1990	0	0	0	0	-	-
2. Landfill and Other Waste Sites	on-site	0-50	51-250	251-500	501-1000	1000-1500
2.1 Landfill Sites						
Environment Agency Registered Landfill Sites	0	0	0	0	0	-
Landfill Data – Operational Landfill Sites	0	0	0	0	0	-
Environment Agency Historic Landfill Sites	0	0	0	0	1	2
Landfill Data – Non-Operational Landfill Sites	0	0	1	1	0	-
BGS/DoE Landfill Site Survey	0	0	0	0	0	2
GroundSure Local Authority Landfill Sites Data	0	0	0	0	0	1
2.2 Landfill and Other Waste Sites Findings						
Operational Waste Treatment, Transfer and Disposal Sites	0	0	0	0	-	-
Non-Operational Waste Treatment, Transfer and Disposal Sites	0	0	0	0	-	-
Environment Agency Licensed Waste Sites	0	0	0	0	0	14

3. Current Land Uses	on-site	0-50	51-250	251-500	501-1000	1000-1500
3.1 Current Industrial Sites Data	0	0	3	-	-	-
3.2 Records of Petrol and Fuel Sites	0	0	0	0	-	-
3.3 Underground High Pressure Oil and Gas Pipelines	0	0	0	0	-	-

4. Geology	Description
4.1 Are there any records of Artificial Ground and Made Ground present beneath the study site? *	No
4.2 Are there any records of Superficial Ground and Drift Geology present beneath the study site? *	Yes
4.3 For records of Bedrock and Solid Geology beneath the study site* see the detailed findings section.	
Source: Scale: 1:50,000 BGS Sheet 039	

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

5. Hydrogeology and Hydrology	on-site	0-50	51-250	251-500	501-1000	1001-2000
5.1 Are there any records of Productive Strata in the Superficial Geology within 500m of the study site?				Yes		
5.2 Are there any records of Productive Strata in the Bedrock Geology within 500m of the study site?				Yes		
5.3 Groundwater Abstraction Licences (within 1000m of the study site).	0	0	0	0	0	-
5.4 Surface Water Abstraction Licences (within 1000m of the study site).	0	0	0	0	2	-
5.5 Potable Water Abstraction Licences (within 2000m of the study site).	0	0	0	0	0	0
5.6 Are there any Source Protection Zones within 500m of the study site?					No	
5.7 River Quality	on-site	0-50	51-250	251-500	501-1000	1001-1500
Is there any Environment Agency information on river quality within 1500m of the study site?	No	No	No	No	Yes	Yes
5.8 Detailed River Network entries within 500m of the site	0	0	1	8	-	-
5.9 Surface water features within 250m of the study site	No	No	Yes	-	-	-

6. Flooding	
6.1 Are there any Environment Agency indicative Zone 2 floodplains within 250m of the study site?	No
6.2 Are there any Environment Agency indicative Zone 3 floodplains within 250m of the study site?	No
6.3 Are there any Flood Defences within 250m of the study site?	No
6.4 Are there any areas benefiting from Flood Defences within 250m of the study site?	No
6.5 Are there any areas used for Flood Storage within 250m of the study site?	No
6.6 What is the maximum BGS Groundwater Flooding susceptibility within 50m of the study site?	Very High
6.7 What is the BGS confidence rating for the Groundwater Flooding susceptibility areas?	High

7. Designated Environmentally Sensitive Sites	on-site	0-50	51-250	251-500	501-1000	1001-1500
7.1 Records of Sites of Special Scientific Interest (SSSI)	0	0	0	0	-	-
7.2 Records of National Nature Reserves (NNR)	0	0	0	0	-	-

7.1 Records of Sites of Special Scientific Interest (SSSI)	0	0	0	0	-	-
7.3 Records of Local Nature Reserves (LNR)	0	0	0	0	-	-
7.4 Records of Special Areas of Conservation (SAC)	0	0	0	0	-	-
7.5 Records of Special Protection Areas (SPA)	0	0	0	0	-	-
7.6 Records of Ramsar sites	0	0	0	0	-	-
7.7 Records of World Heritage Sites	0	0	0	0	-	-
7.8 Records of Environmentally Sensitive Areas	0	0	0	0	-	-
7.9 Records of Areas of Outstanding Natural Beauty (AONB)	0	0	0	0	-	-
7.10 Records of National Parks	0	1	0	1	-	-
7.11 Records of Nitrate Sensitive Areas	0	0	0	0	-	-
7.12 Records of Nitrate Vulnerable Zones	0	0	0	0	-	-

8. Natural Hazards

8.1 What is the maximum risk of natural ground subsidence? Moderate

9. Mining

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

9.2 What is the risk of subsidence relating to shallow mining within 150m of the study site? Negligible

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

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. 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.

2. 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.

3. 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 underground oil and gas pipelines.

4. Geology

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

5. Hydrogeology and Hydrology

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

6. Flooding

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

7. 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. These searches are conducted using radii of up to 500m.

8. 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.

9. Mining

Provides information on areas of coal and shallow mining.

10. 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.

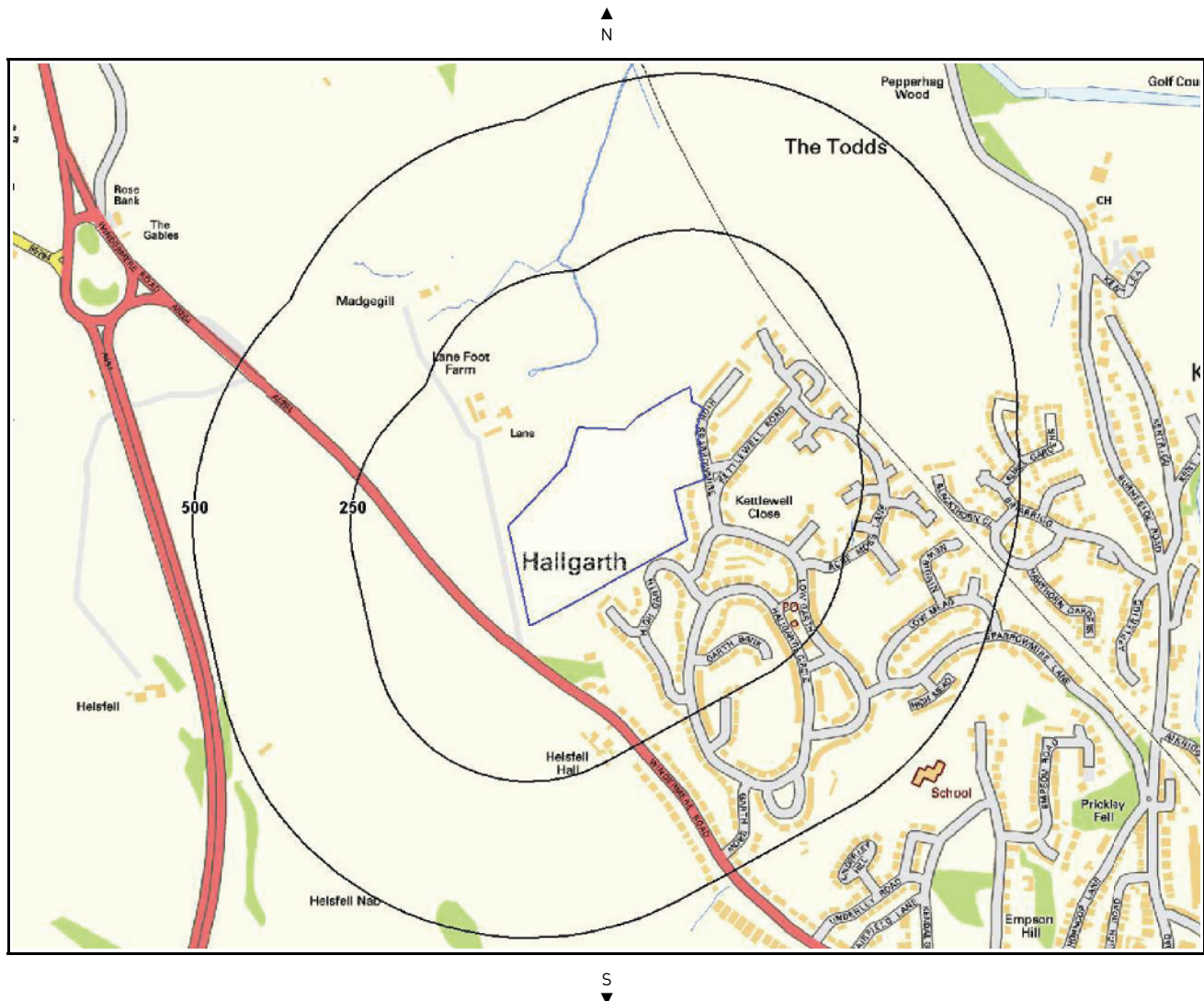
Note: Maps

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. Environmental Permits, Incidents and Registers Map



Authorisations, Incidents and Registers Legend

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

1.Environmental Permits, Incidents and Registers

1.1 Industrial Sites Holding Licences and/or Authorisations

Searches of information provided by the Environment Agency and Local Authorities reveal the following information:

Records of historic IPC Authorisations within 500m of the study site: 0

Database searched and no data found.

Records of Part A(1) and IPPC Authorised Activities within 500m of the study site: 0

Database searched and no data found.

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.

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.

Records of List 1 Dangerous Substances Inventory Sites within 500m of the study site: 0

Database searched and no data found.

Records of List 2 Dangerous Substance Inventory Sites within 500m of the study site: 0

Database searched and no data found.

Records of Part A(2) and Part B Activities and Enforcements within 500m of the study site: 0

Database searched and no data found.

Records of Category 3 or 4 Radioactive Substance Licences within 500m of the study site: 0

Database searched and no data found.

Records of Licensed Discharge Consents within 500m of the study site: 0

Database searched and no data found.

Report Reference: [HMD-283-048792](#)

Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site: 0

Database searched and no data found.

1.2 Dangerous or Hazardous Sites

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

Database searched and no data found.

1.3 Environment Agency Recorded Pollution Incidents

Records of National Incidents Recording System, List 2 within 250m of the study site: 0

Database searched and no data found.

Records of National Incidents Recording System, List 1 within 250m of the study site: 0

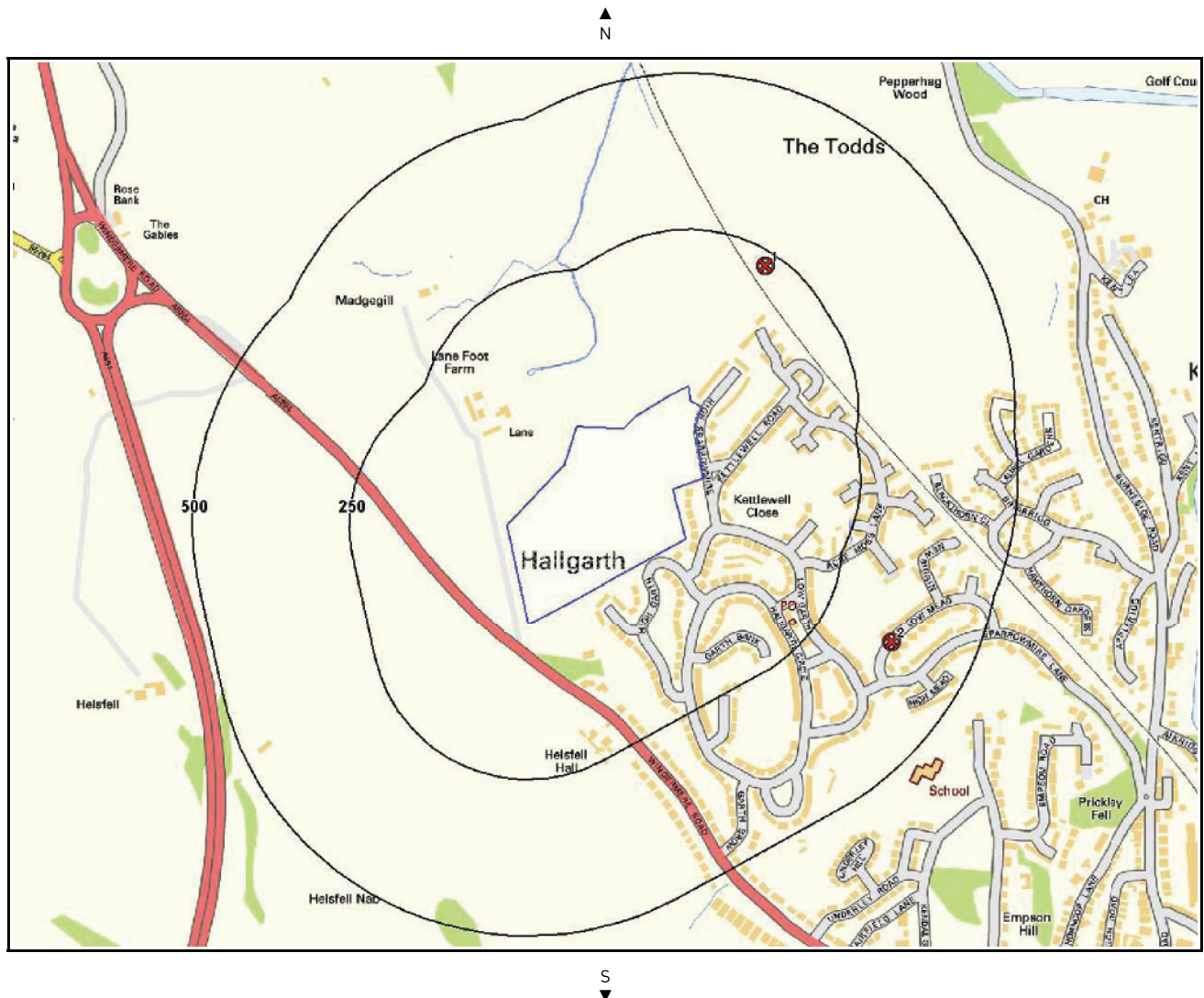
Database searched and no data found.

1.4 Sites Determined as Contaminated Land under Part IIA EPA 1990

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

Database searched and no data found.















2. Landfill and Other Waste Sites Map



Landfill & Other Waste Sites Legend

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	Site Outline		E.A. Active Landfill		Operational Waste Treatment Licence
			E.A. Historic Landfill (Area Data)		Closed Waste Treatment Licence
			E.A. Historic Landfill (Point Data)		REGIS Waste Licence
	250		BGS / DoE Survey Landfill		Operational Landfill
	500		Local Authority Landfill (Area Data)		Closed Landfill
			Local Authority Landfill (Point Data)		

2. Landfill and Other Waste Sites

2.1 Landfill Sites

Records from Environment Agency landfill data within 1000m of the study site: 0

Database searched and no data found.

Records of operational landfill sites sourced from Landmark within 1000m of the study site: 0

Database searched and no data found.

Records of Environment Agency historic landfill sites within 1500m of the study site: 3

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

ID	Distance	Direction	NGR	Details
Not shown	992.0	W	349300, 494500	Site Address: Plumgarths Quarry, Kendal, Cumbria Waste Licence: Yes Site Reference: R24, E160.87, E103.94 Waste Type: , Industrial, Commercial, Household Regis Reference: - Licence Issue: 14/06/1977 Licence Surrendered: - Licence Hold Address: The Courts, Carlise, Cumbria Operator: -
Not shown	1076.0	SE	351600, 493500	Site Address: Dockray Hall Mill, Horncop Concrete Limited., Dockray Hall Mill, Kendal, Cumbria Waste Licence: Yes Site Reference: 11 Waste Type: Inert, Industrial Regis Reference: - Licence Issue: 24/06/1977 Licence Surrendered: 22/04/1993 Licence Hold Address: Dockray Hall Mill, Kendal, Cumbria Operator: -
Not shown	1246.0	S	350600, 492700	Site Address: Kendal Fell Quarry, Underbarrow Road, Kendal, Cumbria Waste Licence: - Site Reference: - Waste Type: , Commercial Regis Reference: - Licence Issue: - Licence Surrendered: - Licence Hold Address: - Operator: Kendal Municipal Borough

Records of non-operational landfill sites sourced from Landmark within 1000m of the study site: 2

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

ID	Distance	Direction	NGR	Details
1	226.0	NE	350800, 494600	Site Address: Burneside Hall, KENDAL, Cumbria Landfill Licence: 090AANAL Agency Reference: Waste Type: Difficult Waste Description: Difficult Landfill Known Restrictions: Waste produced/controlled by licence holder Record Date: 01-Nov-1977 Transfer Date: Modification Date: 01-Dec-1992 Status: Licence lapsed/cancelled/defunct/not applicable/surrendered Category: LANDFILL Regulator: EA - North West Region - North Area (Penrith) Size: Small (<25,000 tonnes/year)
2	368.0	SE	351000, 493995	Site Address: Burneside (East), KENDAL, Cumbria Landfill Licence: 090AJNAL Agency Reference: Waste Type: Inert Waste Description: Inert Landfill Known Restrictions: Waste produced/controlled by licence holder Record Date: 01-Jul-1987 Transfer Date: Modification Date: 01-Dec-1992 Status: Licence lapsed/cancelled/defunct/not applicable/surrendered Category: LANDFILL Regulator: EA - North West Region - North Area (Penrith) Size: Undefined

Report Reference: HMD-283-048792

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	Direction	NGR	Details
Not shown	1129.0	E	351800, 494000	Address: Shadley Quarry, Shadley Rd, St Helens BGS Number: 986.0 Risk: Risk to minor aquifer Waste Type: 156000 galls oily waste & 84000 tons ipw solids on
Not shown	1338.0	S	350600, 492700	Address: Kendal Fell Quarry, Underbarrow Rd, Kendal, Cumbria BGS Number: 47.0 Risk: Risk not recorded Waste Type: N/A

Records of Local Authority landfill sites within 1500m of the study site:**1**

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

ID	Distance	Direction	Site Address	Source	Data Type
Not shown	1267.0	S	Refuse Tip	1967 mapping	Polygon

2.2 Other Waste Sites

Records of operational waste treatment, transfer or disposal sites within 500m of the study site:**0**

Database searched and no data found.

Records of non-operational waste treatment, transfer or disposal sites within 500m of the study site:**0**

Database searched and no data found.

Records of Environment Agency licensed waste sites within 1500m of the study site:**14**

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

ID	Distance	Direction	NGR	Details
Not shown	1332.0	S	350300, 492700	Site Address: Kendal Fell Quarry Phase 1b, Underbarrow Lane, Kendal, Cumbria, LA8 8HB Type: Co-Disposal Landfill Site Size: >= 75000 tonnes Regis Licence Number: THR004 EPR reference: - Operator: 3c Waste Ltd Waste Management licence No: 57292 Annual Tonnage: 2000.0 Issue Date: 05/07/1995 Effective Date: 01/02/2001 Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Transferred Site Name: Kendal Fell Quarry Phase 2 Correspondence Address: -, 3, Sidings Court, White Rose Way, Doncaster, South Yorkshire, DN4 5NU
Not shown	1332.0	S	350300, 492700	Site Address: Kendal Fell Quarry - Phase 1, Underbarrow Lane, Kendal, Cumbria, LA9 5RS Type: Co-Disposal Landfill Site Size: >= 75000 tonnes Regis Licence Number: THR005 EPR reference: - Operator: 3c Waste Limited Waste Management licence No: 57131 Annual Tonnage: 0.0 Issue Date: 16/01/1990 Effective Date: 31/01/2001 Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Transferred Site Name: Kendal Fell Quarry Phase 1 Correspondence Address: -, 3, Sidings Court, White Rose Way, Doncaster, South Yorkshire, DN4 5NU

Not shown	1332.0	S	350300, 492700	Site Address: Kendal Fell Quarry (phase 2), Underbarrow Lane, Kendal, Cumbria, LA9 5RS Type: Co-Disposal Landfill Site Size: >= 25000 tonnes < 75000 tonnes Regis Licence Number: 3CS001 EPR reference: - Operator: 3c's Waste Limited Waste Management licence No: 57132 Annual Tonnage: 0.0	Issue Date: 16/01/1990 Effective Date: 31/01/2001 Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Transferred Site Name: Kendal Fell Quarry Phase 2 Correspondence Address: -, 3, Sidings Court, White Rose Way, Doncaster, South Yorkshire, DN4 5NU
Not shown	1332.0	S	350300, 492700	Site Address: Kendal Fell Quarry Phase 1b, Underbarrow Lane, Kendal, Cumbria, LA8 8HB Type: Co-Disposal Landfill Site Size: < 25000 tonnes Regis Licence Number: THR004 EPR reference: - Operator: Wrg Ltd Waste Management licence No: 57292 Annual Tonnage: 2000.0	Issue Date: 05/07/1995 Effective Date: 01/02/2001 Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Transferred Site Name: Kendal Fell Quarry Phase 1b Correspondence Address: -, 3, Sidings Court, White Rose Way, Doncaster, South Yorkshire, DN4 5NU
Not shown	1332.0	S	350300, 492700	Site Address: Kendal Fell Quarry - Phase 1a, Underbarrow Lane, Kendal, Cumbria, LA9 5RS Type: Co-Disposal Landfill Site Size: >= 75000 tonnes Regis Licence Number: THR005 EPR reference: - Operator: Wrg Ltd Waste Management licence No: 57131 Annual Tonnage: 0.0	Issue Date: 16/01/1990 Effective Date: 31/01/2001 Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Transferred Site Name: Kendal Fell Quarry Phase 1a Correspondence Address: -, 3, Sidings Court, White Rose Way, Doncaster, South Yorkshire, DN4 5NU
Not shown	1332.0	S	350300, 492700	Site Address: Kendal Fell Quarry Phase 1b, Underbarrow Lane, Kendal, Cumbria, LA8 8HB Type: Co-Disposal Landfill Site Size: >= 75000 tonnes Regis Licence Number: THR004 EPR reference: - Operator: Wrg Ltd Waste Management licence No: 57292 Annual Tonnage: 2000.0	Issue Date: 05/07/1995 Effective Date: 01/02/2001 Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Closure Site Name: Kendal Fell Quarry Phase 1b Correspondence Address: -, 3, Sidings Court, White Rose Way, Doncaster, South Yorkshire, DN4 5NU
Not shown	1332.0	S	350300, 492700	Site Address: Land / Premises At, Underbarrow Lane, Kendal, Cumbria, LA9 5RS Type: Co-Disposal Landfill Site Size: < 25000 tonnes Regis Licence Number: THR005 EPR reference: GP3793ZW/V002 Operator: 3 C Waste Ltd Waste Management licence No: 57131 Annual Tonnage: 4440.0	Issue Date: 16/01/1990 Effective Date: 31/01/2001 Modified: 07/08/2008 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: Kendal Fell Quarry Phase 1a Correspondence Address: -, -
Not shown	1332.0	S	350300, 492700	Site Address: Kendal Fell Quarry - Phase 1a, Underbarrow Lane, Kendal, Cumbria, LA9 5RS Type: Co-Disposal Landfill Site Size: < 25000 tonnes Regis Licence Number: THR005 EPR reference: - Operator: Wrg Ltd Waste Management licence No: 57131 Annual Tonnage: 0.0	Issue Date: 16/01/1990 Effective Date: 31/01/2001 Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Closure Site Name: Kendal Fell Quarry Phase 1a Correspondence Address: -, 3, Sidings Court, White Rose Way, Doncaster, South Yorkshire, DN4 5NU
Not shown	1332.0	S	350300, 492700	Site Address: Kendal Fell Quarry Phase 1b, Underbarrow Lane, Kendal, Cumbria, LA8 8HB Type: Co-Disposal Landfill Site Size: < 25000 tonnes Regis Licence Number: THR004 EPR reference: EA/EPR/VP3093ZA/T001 Operator: W R G Ltd Waste Management licence No: 57292 Annual Tonnage: 2000.0	Issue Date: 7/5/1995 Effective Date: 2/1/2001 Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Closure Site Name: Kendal Fell Quarry Phase 1b Correspondence Address: -, 3, Sidings Court, White Rose Way, Doncaster, South Yorkshire, DN4 5NU

Not shown	1362.0	SE	351800, 493400	Site Address: Land / Premises At, Mintsfeet Road South, Kendal, Cumbria, LA9 6ND Type: Metal Recycling Site (mixed MRS's) Size: < 25000 tonnes Regis Licence Number: ALL002 EPR reference: NP3693ZJ/A001 Operator: Allen & Myers Ltd Waste Management licence No: 57272 Annual Tonnage: 6000.0	Issue Date: 01/08/1994 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Mintsfeet Road Correspondence Address: -, -
Not shown	1399.0	E	352100, 494300	Site Address: 12, Shap Road Ind Est, Kendal, Cumbria, LA9 6NZ Type: Household, Commercial & Industrial Waste T Stn Size: < 25000 tonnes Regis Licence Number: B&J001 EPR reference: - Operator: B & J Metals Waste Management licence No: 57504 Annual Tonnage: 0.0	Issue Date: 19/02/1999 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Shap Road Correspondence Address: -, 12, Shap Road Ind Est, Kendal, Cumbria, LA9 6NZ
Not shown	1399.0	E	352100, 494300	Site Address: 12, Shap Road Ind Est, Kendal, Cumbria, LA9 6NZ Type: Household, Commercial & Industrial Waste T Stn Size: < 25000 tonnes Regis Licence Number: B&J001 EPR reference: WP3293ZQ/V002 Operator: John James Keegan & Thomas William Henry Keegan Waste Management licence No: 57504 Annual Tonnage: 15000.0	Issue Date: 19/02/1999 Effective Date: - Modified: 14/01/2004 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: B & J Metals Correspondence Address: -, -
Not shown	1478.0	S	350500, 492550	Site Address: Boundary Bank, Kendal, Cumbria, LA9 5RT Type: Special Waste Transfer Station Size: >= 25000 tonnes < 75000 tonnes Regis Licence Number: LWS001 EPR reference: - Operator: Sita (lancashire) Ltd Waste Management licence No: 57510 Annual Tonnage: 10000.0	Issue Date: 15/02/2000 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Kendal Fell Waste Management Centre Correspondence Address: -, Tustin Court, Portway, Preston, Lancashire, PR2 2YQ
Not shown	1478.0	S	350500, 492550	Site Address: Kendal Fell, Boundary Bank Lane, Kendal, Cumbria, LA9 5RT Type: Special Waste Transfer Station Size: >= 25000 tonnes < 75000 tonnes Regis Licence Number: LWS001 EPR reference: AP3993ZE/V002 Operator: Sita (Lancashire) Ltd Waste Management licence No: 57510 Annual Tonnage: 10000.0	Issue Date: 15/02/2000 Effective Date: - Modified: 14/01/2004 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: Kendal Fell Waste Management Centre Correspondence Address: -, -

3. Current Land Use Map

NW

N

NE

W

E

SW

S

SE



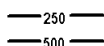
Current Land Use Legend



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Site Outline



Search Buffers (m)



Current Industrial Sites



Petrol & Fuel Sites



Underground High Pressure Oil & Fuel Pipelines

3. Current Land Uses

3.1 Current Industrial Data

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

3

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

ID	Distance	Direction	Company	Address	Activity	Category
1	91.0	E	Electricity Sub Station	LA9	Electrical Features	Infrastructure and Facilities
2	124.0	SE	Electricity Sub Station	LA9	Electrical Features	Infrastructure and Facilities
3	249.0	SE	Electricity Sub Station	LA9	Electrical Features	Infrastructure and Facilities

3.2 Petrol and Fuel Sites

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

0

Database searched and no data found.

3.3 Underground High Pressure Oil and Gas Pipelines

Records of high pressure underground pipelines within 500m of the study site:

0

Database searched and no data found.

4. Geology

4.1 Artificial Ground and Made Ground

Database searched and no data found.

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

4.2 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
ALV-CSSG	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL
ALV-CSSG	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL

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

4.3 Bedrock and Solid Geology

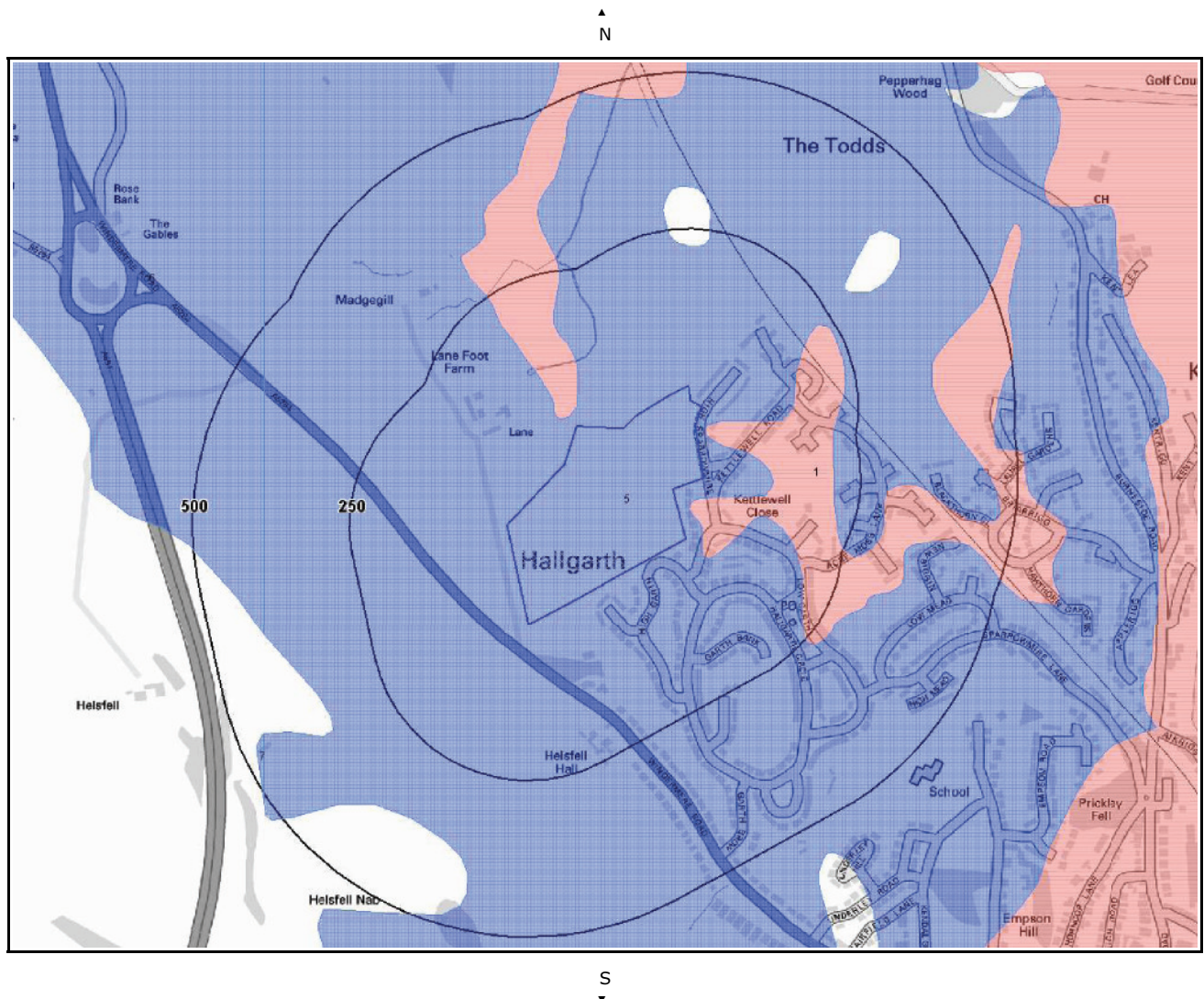
The database has been searched on site, including a 50m buffer.

LEX Code	Description	Rock Type
MASA-CSSM	MARSETT SANDSTONE FORMATION	CONGLOMERATE, SANDSTONE, SILTSTONE AND MUDSTONE
MASA-CSSM	MARSETT SANDSTONE FORMATION	CONGLOMERATE, SANDSTONE, SILTSTONE AND MUDSTONE
KMF-SDST	KIRKBY MOOR FORMATION	SANDSTONE
KMF-SDST	KIRKBY MOOR FORMATION	SANDSTONE
MTL-LMST	MARTIN LIMESTONE FORMATION	LIMESTONE

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

For more detailed geological and ground stability data please refer to the "GroundSure GeoInsight". Available from our website.

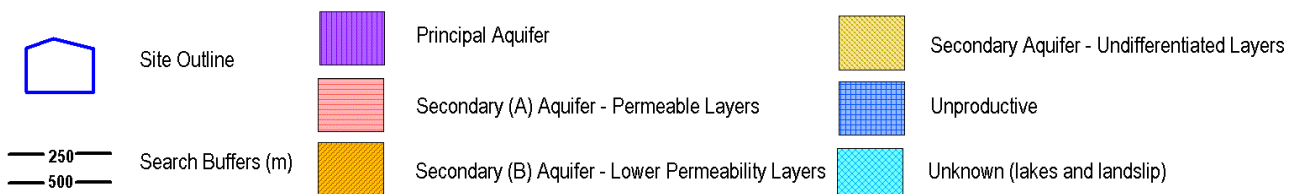
5a. Hydrogeology - Aquifer Within Superficial Geology



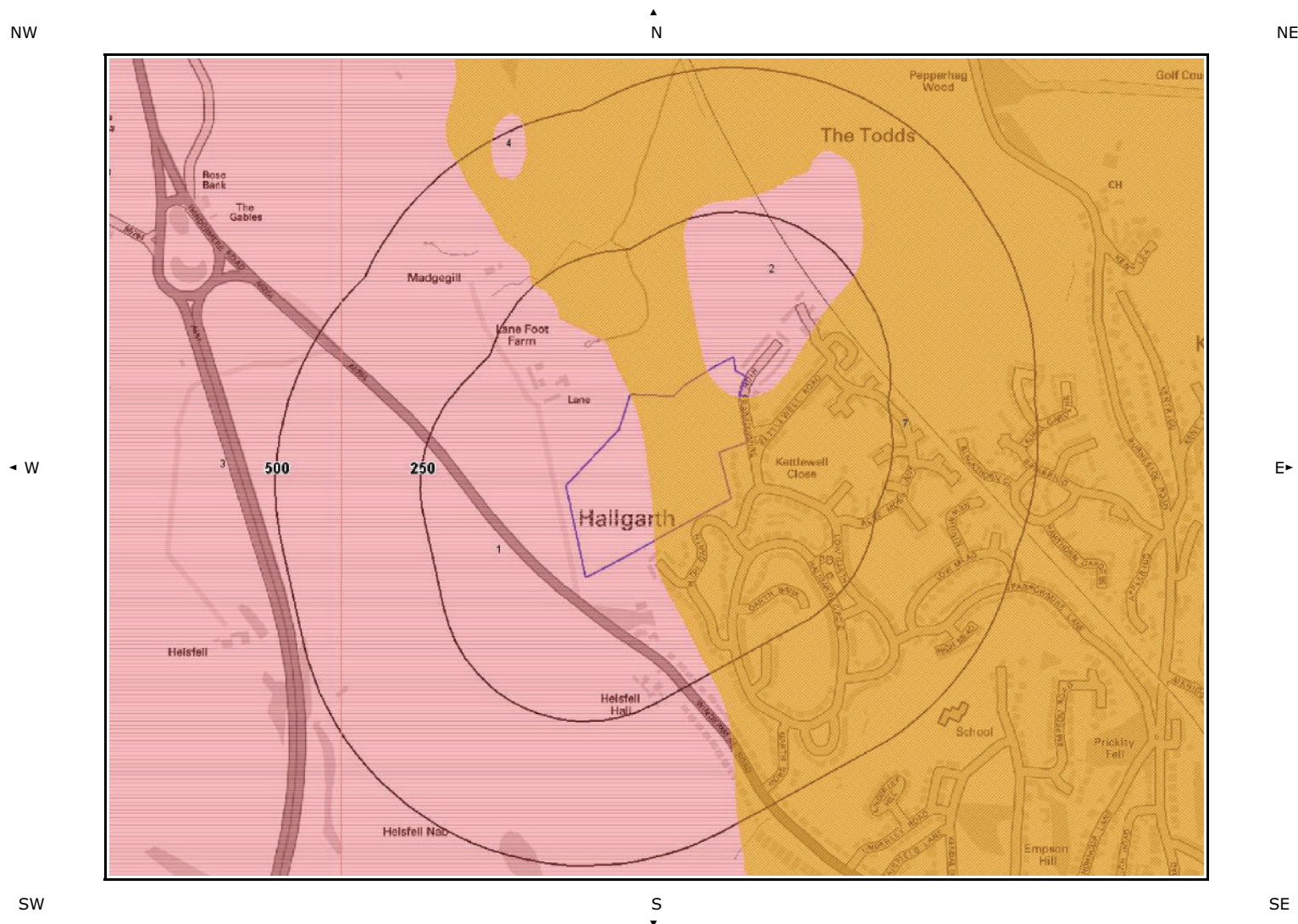
Aquifer Within Superficial Geology Legend



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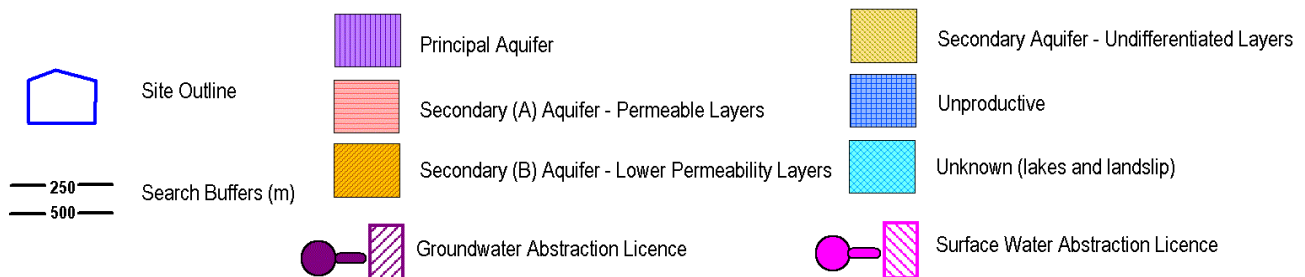
5b. Hydrogeology - Aquifer Within Bedrock Geology and Abstraction Licenses



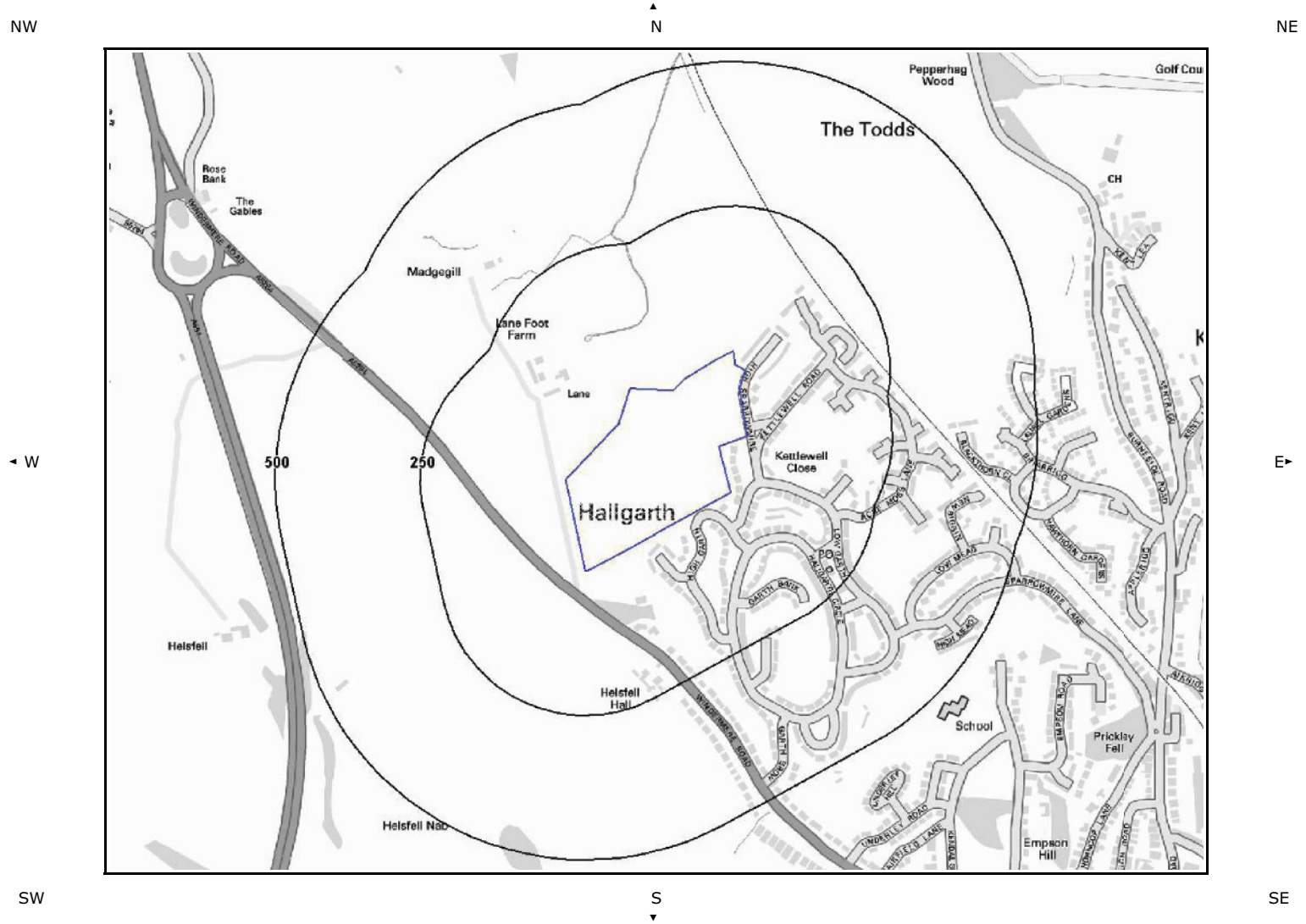
Aquifer Within Bedrock Geology Legend



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5c. Hydrogeology – Source Protection Zones and Potable Water Abstraction Licenses



SPZ and Potable Water Abstraction Licenses Legend

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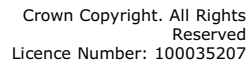
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- Site Outline
- Source Protection Zone 1 - Inner Catchment
- Source Protection Zone 2 - Outer Catchment
- Source Protection Zone 3 - Total Catchment
- Source Protection Zone 4 - Zone of Special Interest
- Potable Water Abstraction Licence
- 250 Search Buffers (m)
- 500 Search Buffers (m)

NE



SE



5. Hydrogeology and Hydrology

5.1 Aquifer within Superficial Deposits

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

Yes

From 1 April 2010, the Environment Agency'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 Enviroinsight User Guide.

The following aquifer records are shown on the Aquifer within Superficial Geology Map (5a):

ID	Distance [m]	Direction	Designation	Description
5	0.0	On Site	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow
1	15.0	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	19.0	NW	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
6	386.0	W	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow
7	456.0	SW	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow

5.2 Aquifer within Bedrock Deposits

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

From 1 April 2010, the Environment Agency'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 Enviroinsight User Guide.

The following aquifer records are shown on the Aquifer within Bedrock Geology Map (5b):

ID	Distance [m]	Direction	Designation	Description
1	0.0	On Site	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
2	0.0	On Site	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
7	0.0	On Site	Secondary B	Predominantly lower permeability layers which may store/yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers
3	386.0	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

ID	Distance [m]	Direction	Designation	Description
4	422.0	NW	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers

5.3 Groundwater Abstraction Licences

Are there any Groundwater Abstraction Licences within 1000m of the study site? **No**

Database searched and no data found.

5.4 Surface Water Abstraction Licences

Are there any Surface Water Abstraction Licences within 1000m of the study site? **Yes**

The following Surface Water Abstraction Licences records are represented as points, lines and regions on the Aquifer within Bedrock Geology Map (5b):

ID	Distance	Direction	NGR	Details
Not shown	927.0	SW	350000, 493200	Licence No: 2673607009 Details: General Farming & Domestic Direct Source: "surface, Non-tidal - North West Region" Point: "spring To North-east Of Boundary Bank Farm,kendal,cumbria" Data Type: Point Annual Volume (m³): - Max Daily Volume (m³): - Application No: 3798 Original Start Date: 11/3/1966 Expiry Date: - Issue No: 101 Version Start Date: 1/10/2001 Version End Date:
Not shown	927.0	SW	350000, 493200	Licence No: 2673607009 Details: General Farming & Domestic Direct Source: Surface, Non-tidal - North West Region Point: Spring To North-east Of Boundary Bank Farm,kendal,cumbria Data Type: Point Annual Volume (m³): - Max Daily Volume (m³): - Application No: 3798 Original Start Date: 11/3/1966 Expiry Date: - Issue No: 100 Version Start Date: 1/4/1987 Version End Date:

5.5 Potable Water Abstraction Licences

Are there any Potable Water Abstraction Licences within 2000m of the study site? **No**

Database searched and no data found.

5.6 Source Protection Zones

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

Database searched and no data found.

5.7 River Quality

Is there any Environment Agency information on river quality within 1500m of the study site?

Yes

Biological Quality:

Biological Quality data describes water quality in terms of 83 groups of macroinvertebrates, some of which are pollution sensitive. The results are graded from A ('Very Good') to F ('Bad').

The following Biological Quality records are shown on the Hydrology Map (5d):

ID	Distance [m]	Direction	NGR	River Details	Biological Quality Grade				
					2005	2006	2007	2008	2009
Not shown	959.0	E	351660, 494310	River Name: Mint Reach: Qsl Kidshowe Beck To Kent End/Start of Stretch: End of Stretch NGR	A	A	A	B	B
Not shown	990.0	N	350700, 495400	River Name: Sprint Reach: Qsl Wren Gill To Kent End/Start of Stretch: End of Stretch NGR	A	A	A	A	A
Not shown	1002.0	E	351700, 494400	River Name: Kent Reach: Mint To Kendal Stw O/f End/Start of Stretch: Start of Stretch NGR	B	B	B	C	C
Not shown	1002.0	E	351700, 494400	River Name: Kent Reach: Qsl At Lingmell Beck To Mint End/Start of Stretch: End of Stretch NGR	B	B	B	B	B

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 (5d):

ID	Distance [m]	Direction	NGR	River Details	Chemical Quality Grade (Headline Indicator)				
					2005	2006	2007	2008	2009
Not shown	930.0	N	350734, 495338	River Name: Kent Reach: Qsl At Lingmell Beck To Mint End/Start of Stretch: Sample Point NGR	A	A	A	A	A
Not shown	959.0	E	351660, 494310	River Name: Mint Reach: Qsl Kidshowe Beck To Kent End/Start of Stretch: End of Stretch NGR	A	A	A	A	A
Not shown	990.0	N	350700, 495400	River Name: Sprint Reach: Qsl Wren Gill To Kent End/Start of Stretch: End of Stretch NGR	A	A	A	A	A
Not shown	1002.0	E	351700, 494400	River Name: Kent Reach: Qsl At Lingmell Beck To Mint End/Start of Stretch: End of Stretch NGR	A	A	A	A	A
Not shown	1484.0	E	352186, 494233	River Name: Mint Reach: Qsl Kidshowe Beck To Kent End/Start of Stretch: Sample Point NGR	A	A	A	A	A

5.8 Detailed River Network

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

Yes

The following Detailed River Network records are represented on the Hydrology Map (5d):

ID	Distance	Direction	Details	
1	101.0	N	River Name: - Water Course Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Catchment: - Drain: NO Main River Status: Currently Undefined
2	255.0	NW	River Name: - Water Course Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Catchment: - Drain: NO Main River Status: Currently Undefined
3	259.0	N	River Name: - Water Course Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Catchment: - Drain: NO Main River Status: Currently Undefined
4	274.0	N	River Name: - Water Course Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Catchment: - Drain: NO Main River Status: Currently Undefined
5	284.0	N	River Name: - Water Course Name: - Welsh River Name: - Alternative Name: -	River Type: Extended Culvert (greater than 50m) Catchment: - Drain: NO Main River Status: Currently Undefined
6	338.0	NW	River Name: - Water Course Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Catchment: - Drain: NO Main River Status: Currently Undefined
7	342.0	NW	River Name: - Water Course Name: - Welsh River Name: - Alternative Name: -	River Type: Extended Culvert (greater than 50m) Catchment: - Drain: NO Main River Status: Currently Undefined
8	362.0	NW	River Name: - Water Course Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Catchment: - Drain: NO Main River Status: Currently Undefined
9	416.0	N	River Name: Drain Water Course Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Catchment: - Drain: YES Main River Status: Currently Undefined

5.9 Surface Water Features

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

Yes

The following surface water records are not represented on mapping:

Distance to Surface Water (m)	on-site	0-50	51-250
Surface water features within 250m of the study site	No	No	Yes

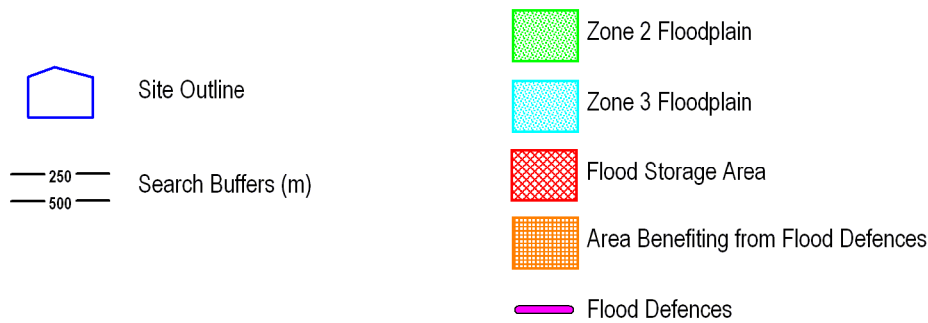
6. Environment Agency Flood Map



Environment Agency Flood Legend



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6. Flooding

6.1 Zone 2 Flooding

Zone 2 floodplain estimates the annual probability of flooding as one in one thousand (0.1%) or greater from rivers and the sea but less than 1% from rivers or 0.5% from the sea. Alternatively, where information is available they may show the highest known flood level.

Is the site within 250m of an Environment Agency indicative Zone 2 floodplain? **No**

Database searched and no data found.

6.2 Zone 3 Flooding

Zone 3 estimates the annual probability of flooding as one in one hundred (1%) or greater from rivers and a one in two hundred (0.5%) or greater from the sea. Alternatively, where information is available they may show the highest known flood level.

Is the site within 250m of an Environment Agency indicative Zone 3 floodplain? **No**

Database searched and no data found.

6.3 Flood Defences

Are there any Flood Defences within 250m of the study site? **No**

6.4 Areas benefiting from Flood Defences

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

6.5 Areas used for Flood Storage

Are there any areas used for Flood Storage within 250m of the study site? **No**

6.6 Groundwater Flooding Susceptibility Areas

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

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

6.7 Groundwater Flooding Confidence Areas

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

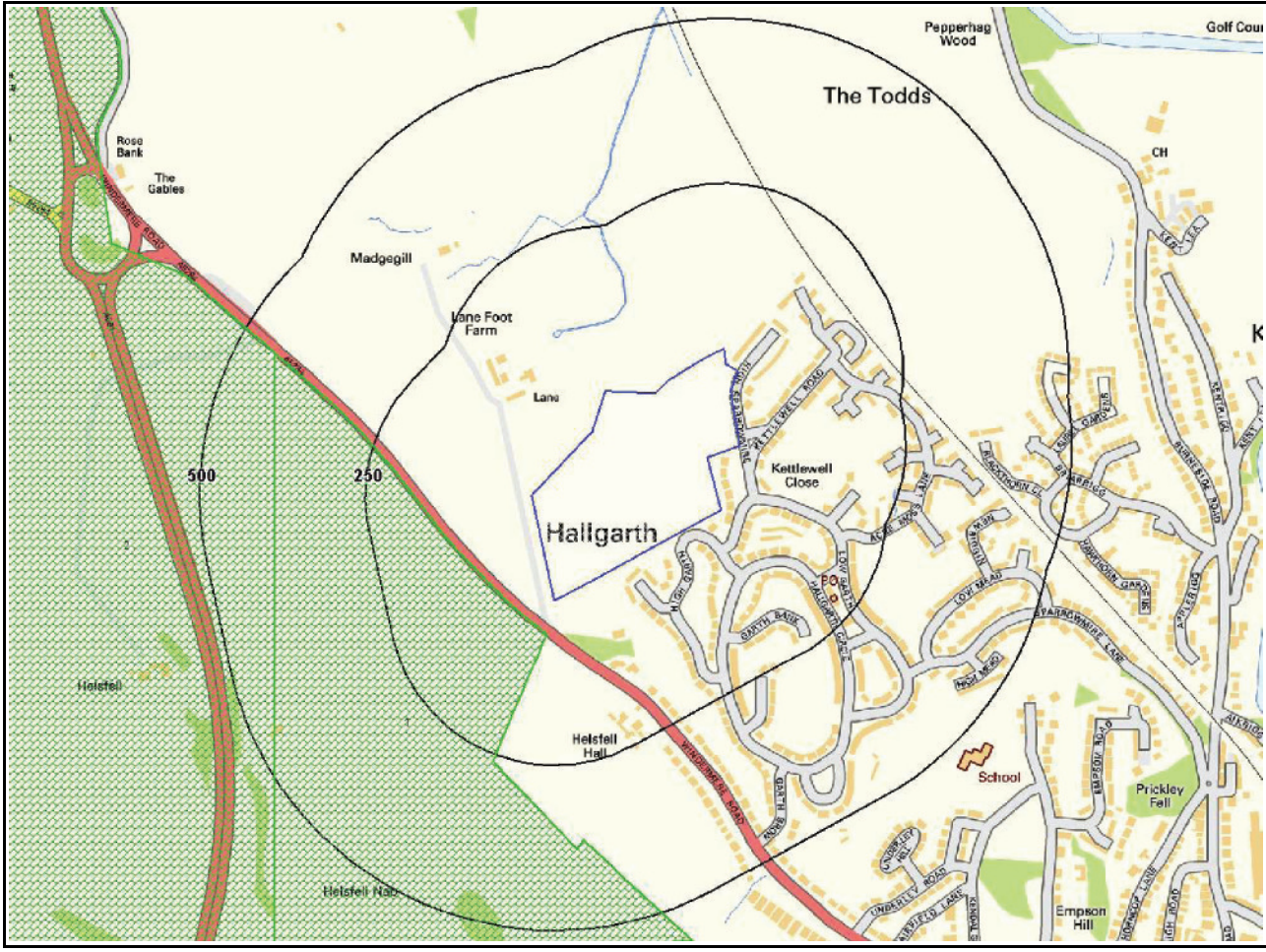
High

Notes:

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

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

7.Designated Environmentally Sensitive Sites Map



Designated Environmentally Sensitive Sites Legend

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- | | | | | |
|------------------------|-------------------------------------|-------------------------|----------------|---------------------------------|
| Site Outline | SAC | SSSI | NNR | World Heritage Sites |
| 250 Search Buffers (m) | SPA | Ramsar | LNR | Environmentally Sensitive Areas |
| 500 | Areas of Outstanding Natural Beauty | Nitrate Sensitive Areas | National Parks | |

7.Designated Environmentally Sensitive Sites

Presence of Designated Environmentally Sensitive Sites within 500m of the study site? **Yes**

Records of Sites of Special Scientific Interest (SSSI) within 500m of the study site: **0**

Database searched and no data found.

Records of National Nature Reserves (NNR) within 500m of the study site: **0**

Database searched and no data found.

Records of Special Areas of Conservation (SAC) within 500m of the study site: **0**

Database searched and no data found.

Records of Special Protection Areas (SPA) within 500m of the study site: **0**

Database searched and no data found.

Records of Ramsar sites within 500m of the study site: **0**

Database searched and no data found.

Records of Local Nature Reserves (LNR) within 500m of the study site: **0**

Database searched and no data found.

Records of World Heritage Sites within 500m of the study site: **0**

Database searched and no data found.

Records of Environmentally Sensitive Areas within 500m of the study site: **0**

Database searched and no data found.

Records of Areas of Outstanding Natural Beauty (AONB) within 500m of the study site: **0**

Database searched and no data found.

Records of National Parks (NP) within 500m of the study site: **2**

The following National Park (NP) records provided by Natural England/Countryside Council for Wales/Scottish Natural Heritage are represented as polygons on the Designated Environmentally Sensitive Sites Map:

[Report Reference: HMD-283-048792](#)

ID	Distance	Direction	NP Name	Data Source
1	46.0	SW	Lake District	Natural England
2	386.0	W	Lake District	Natural England

Records of Nitrate Sensitive Areas within 500m of the study site: 0

Database searched and no data found.

Records of Nitrate Vulnerable Zones within 500m of the study site: 0

Database searched and no data found.

8. Natural Hazards Findings

8.1 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 GeoInsight, available from our website. The following information has been found:

8.1.1 Shrink Swell

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

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

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.

8.1.2 Landslides

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

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

Hazard
Possibility of slope instability problems after major changes in ground conditions. Consideration should be given to stability if changes to drainage or excavations take place. Possible increase in construction cost to reduce potential slope stability problems. Existing property no significant increase in insurance risk due to natural slope instability problems.

8.1.3 Soluble Rocks

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

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

Hazard
Significant soluble rocks are present. Low possibility of subsidence occurring naturally, but may be possible in adverse conditions such as high surface or subsurface water flow. Consider implications for stability when changes to drainage or new construction are planned. For new build site investigation should consider potential for dissolution problems on the site and its surroundings. Care should be taken with local drainage into the bedrock. Some possibility groundwater pollution. For existing property possible increase in insurance risk due to soluble rocks.

8.1.4 Compressible Ground

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

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

Hazard
Report Reference: HMD-283-048792

Significant potential for compressibility problems. Avoid large differential loadings of ground. Do not drain or de-water ground near the property without technical advice. For new build consider possibility of compressible ground in ground investigation, construction and building design. Consider effects of groundwater changes. Extra construction costs are likely. For existing property possible increase in insurance risk from compressibility, especially if water conditions or loading of the ground change significantly.

8.1.5 Collapsible Rocks

What is the maximum Collapsible Rocks* hazard rating identified on the study site? **Null - Negligible**

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

8.1.6 Running Sand

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

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

Hazard
Possibility of running sand problems after major changes in ground conditions. Normal maintenance to avoid leakage of water-bearing services or water bodies (ponds, swimming pools) should reduce likelihood of problems due to running sand. For new build consider possibility of running sand into trenches or excavations if water table is high or sandy strata are exposed to water. Avoid concentrated water inputs to site. Unlikely to be an increase in construction costs due to potential for running sand. For existing property no significant increase in insurance risk due to running sand problems is likely.

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

9. Mining

9.1 Coal Mining

Are there any coal mining areas within 75m of the study site?

No

Database searched and no data found.

9.2 Shallow Mining

What is the subsidence hazard relating to shallow mining on-site*?

Negligible

*Please note this data is searched with a 150m buffer.

9.3 Brine Affected Areas

Are there any brine affected areas within 75m of the study site?

No

Database searched and no data found.

10. Contacts

GroundSure Helpline

Telephone: 08444 159 000
info @ groundsure.com



British Geological Survey (England & Wales)

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



Environment Agency

National Customer Contact Centre
PO Box 544
Rotherham
S60 1BY
Tel: 08708 506 506
Web: www.environment-agency.gov.uk
Email: enquiries@environment-agency.gov.uk



Health Protection Agency

Chilton, Didcot, Oxon, OX11 0RQ
Tel: 01235 822622 www.hpa.org.uk/radiation
Radon measures and general radon information and guidance



The Coal Authority

200 Lichfield Lane, Mansfield, Notts NG18 4RG
Tel: 0845 762 6848. DX 716176 Mansfield 5
www.coal-authority.co.uk
Coal mining reports and related enquiries



Ordnance Survey

Romsey Road
Southampton SO16 4GU
Tel: 08456 050505



Local Authority

Authority: South Lakeland District Council
Phone: 01539 733333
Web: www.southlakeland.gov.uk
Address: South Lakeland House, Lowther Street, Kendal,
LA9 4UF

Get Mapping PLC

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



Acknowledgements

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This report has been prepared in accordance with the GroundSure Ltd standard Terms and Conditions of business for work of this nature.

Report Reference: HMD-283-048792

Standard Terms and Conditions

1 Definitions

In these conditions unless the context otherwise requires:

"Beneficiary" means the Client or the customer of the Client for whom the Client has procured the Services.

"Commercial" means any building which is not Residential.

"Commission" means an order for Consultancy Services submitted by a Client.

"Consultancy Services" mean consultancy services provided by GroundSure including, without limitation, carrying out interpretation of third party and in-house environmental data, provision of environmental consultancy advice, undertaking environmental audits and assessments, Site investigation, Site monitoring and related items.

"Content" means any data, database or other information contained in a Report or Mapping which is provided to GroundSure by a Data Provider.

"Contract" means the contract between GroundSure and the Client for the performance of the Services which arises upon GroundSure's acceptance of an Order or Commission and which shall incorporate these conditions, the relevant GroundSure User Guide, proposal by GroundSure and the content of any subsequent report, and any agreed amendments in accordance with clause 11.

"Client" means the party that submits an Order or Commission.

"Data Provider" means any third party providing Content to GroundSure.

"Data Report" means reports comprising factual data with no professional interpretation in respect of the level of likely risk and/or liability available from GroundSure.

"GroundSure" means GroundSure Limited, a company registered in England and Wales under number 03421028 and whose registered office is at Greater London House, Hampstead Road, London NW1 7EJ.

"Intellectual Property" means any patent, copyright, design rights, service marks, moral rights, data protection rights, know-how, trademark or any other intellectual property rights.

"Mapping" an historical map or a combination of historical maps of various ages, time periods and scales available from GroundSure.

"Order" means an order form submitted by the Client requiring Services from GroundSure in respect of a specified Site.

"Order Website" means online platform via which Orders may be placed.

"Report" means a Risk Screening Report or Data Report for commercial or residential property available from GroundSure relating to the Site prepared in accordance with the specifications set out in the relevant User Guide.

"Residential" means any building used as or suitable for use as an individual dwelling.

"Risk Screening Report" means one of GroundSure's risk screening reports, comprising factual data with interpretation in respect of the level of likely risk and/or liability, excluding **"Consultancy Services"**.

"Services" means the provision of any Report, Mapping or Consultancy Services which GroundSure has agreed to carry out for the Client/Beneficiary on these terms and conditions in respect of the Site.

"Site" means the landsite in respect of which GroundSure provides the Services.

"User Guide" means the relevant current version of the user guide, available upon request from GroundSure.

2 Scope of Services

2.1 GroundSure agrees to carry out the Services in accordance with the Contract and to the extent set out therein.

2.2 GroundSure shall exercise all the reasonable skill, care and diligence to be expected of experienced environmental consultants in the performance of the Services.

2.3 The Client acknowledges that it has not relied on any statement or representation made by or on behalf of GroundSure which is not set out and expressly agreed in the Contract.

2.4 Terms and conditions appearing on a Client's order form, printed stationery or other communication, including invoices, to GroundSure, its employees, servants, agents or other representatives or any terms implied by custom, practice or course of dealing shall be of no effect and these terms and conditions shall prevail over all others.

2.5 In the event that a Client/Beneficiary opts to take out insurance in conjunction with or as a result of the Services, such insurance shall be subject solely to the terms of any policy issued to it in that respect and GroundSure will have no liability therefore.

2.6 GroundSure's quotations/proposals are valid for a period of 30 days only. GroundSure reserves the right to withdraw any quotation at any time before GroundSure accepts an Order or Commission. GroundSure's acceptance of an Order or Commission shall be effective only where such acceptance is in writing and signed by GroundSure's authorised representative or where accepted via GroundSure's Order Website.

3 The Client's obligations

3.1 The Client shall ensure the Beneficiary complies with and is bound by the terms and conditions set out in the Contract and shall provide that GroundSure may in its own right enforce such terms and conditions against the Beneficiary pursuant to the Contracts (Rights of Third Parties) Act 1999. The Client shall be liable for all breaches of the Contract by the Beneficiary as if they were breaches by the Client. The Client shall be solely responsible for ensuring that the Report/Mapping ordered is appropriate and suitable for the Beneficiary's needs.

3.2 The Client shall (or shall procure that the Beneficiary shall) supply to GroundSure as soon as practicable and without charge all information necessary and accurate relevant data including any specific and/or unusual environmental information relating to the Site known to the Client/Beneficiary which may pertain to the Services and shall give such assistance as GroundSure shall reasonably require in the performance of the Services (including, without limitation, access to a Site, facilities and equipment as agreed in the Contract).

3.3 Where Client/Beneficiary approval or decision is required, such approval or decision shall be given or procured in reasonable time as not to delay or disrupt the performance of any other part of the Services.

3.4 The Client shall not and shall not knowingly permit the Beneficiary to, save as expressly permitted by these terms and conditions, re-sell, alter, add to, amend or use out of context the content of any Report, Mapping or, in respect of any Services, information given by GroundSure. For the avoidance of doubt, the Client and Beneficiary may make the Report, Mapping or GroundSure's findings available to a third party who is considering acquiring the whole or part of the Site, or providing funding in relation to the Site, but such third party cannot rely on the same unless expressly permitted under clause 4.

3.5 The Client is responsible for maintaining the confidentiality of its user name and password if using GroundSure's internet ordering service and accepts responsibility for all activity that occurs under such account and password.

4 Reliance

4.1 Upon full payment of all relevant fees and subject to the provisions of these terms and conditions, the Client and Beneficiary are granted an irrevocable royalty-free licence to access the information contained in a Report, Mapping or in a report prepared by GroundSure in respect of or arising out of Consultancy Services. The Services may only be used for the benefit of the Client and those persons listed in clauses 4.2 and 4.3.

4.2 In relation to Data Reports, Mapping and Risk Screening Reports, the Client shall be entitled to make Reports available to (i) the Beneficiary, (ii) the Beneficiary's professional advisers, (iii) any person providing funding to the Beneficiary in relation to the Site (whether directly or as part of a lending syndicate), (iv) the first purchaser or first tenant of the Site (v) the professional advisers and lenders of the first purchaser or tenant of the Site. Accordingly GroundSure shall have the same duties and obligations to those persons in respect of the Services as it has to the Client and those persons shall have the benefit of any of the Client's rights under the Contract as if those persons were parties to the Contract. For the avoidance of doubt, the limitations of GroundSure's liability as set out in clauses 7 and 11.6 shall apply.

4.3 In relation to Consultancy Services, reliance shall be limited to the Client, Beneficiary and named parties on the Report.

4.4 Save as set out in clauses 4.2 and 4.3 and unless otherwise agreed in writing with GroundSure, any other party considering the information supplied by GroundSure as part of the Services, including (but not limited to) insurance underwriters, does so at their own risk and GroundSure has no legal obligations to such party unless otherwise agreed in writing.

4.5 The Client shall not and shall not knowingly permit any person (including the Beneficiary) who is provided with a copy of any Report, (except as permitted herein or by separate agreement with GroundSure) to: (a) remove, suppress or modify any trade mark, copyright or other proprietary marking from the Report or Mapping; (b) create any product which is derived directly or indirectly from the data contained in the Report or Mapping; (c) combine the Report or Mapping with, or incorporate the Report or Mapping into any other information data or service; or (d) re-format or otherwise change (whether by modification, addition or enhancement) data or images contained in the Report or Mapping.

4.6 Notwithstanding clause 4.5, if the Client acts in a professional capacity, it may make reasonable use of a Report and/or findings made as a result of Consultancy Services to advise Beneficiaries. However, GroundSure shall have no liability in respect of any opinion or report given to such Beneficiaries by the Client or a third party.

5 Fees and Disbursements

5.1 GroundSure shall charge the Client fees at the rate and frequency specified in the Contract together, in the case of Consultancy Services, with all proper disbursements incurred by GroundSure in performing the Services. For the avoidance of doubt, the fees payable for the Services are as set out in GroundSure's written proposal, Order Website or Order acknowledgement form. The Client shall in addition pay all value added tax or other tax payable on such fees and disbursements in relation to the provision of the Services.

5.2 Unless GroundSure requires prepayment, the Client shall promptly pay all fees disbursements and other monies due to GroundSure in full without deduction, counterclaim or set off together with such value added tax or other tax as may be required within 30 days from the date of GroundSure's invoice or such other period as may be agreed in writing between GroundSure and the Client ("**Payment Date**"). GroundSure reserves the right to charge interest which shall accrue on a daily basis from 30 days after the date of Payment Date until the date of payment (whether before or after judgment) at the rate of five per cent per annum above the Bank of England base rate from time to time.

5.3 In the event that the Client disputes the amount payable in respect of GroundSure's invoice it shall notify GroundSure no later than 28 days after the date thereof that it is in dispute. In default of such notification the Client shall be deemed to have agreed the amount thereof. As soon as reasonably practicable following receipt of a notification in respect of any disputed invoice, a member of the management team at GroundSure shall contact the Client and the parties shall use all reasonable endeavours to resolve the dispute.

6 Intellectual Property

6.1 Subject to the provisions of clause 4.1, the Client and the Beneficiary hereby acknowledge that all Intellectual Property in the Services and Content are and shall remain owned by either GroundSure or the Data Providers and nothing in these terms purports to transfer or assign any rights to the Client or the Beneficiary in respect of the Intellectual Property.

6.2 The Client shall acknowledge the ownership of the Content where such Content is incorporated or used in the Client's own documents, reports, systems or services whether or not these are supplied to a third party.

6.3 Data Providers may enforce any breach of clauses 6.1 and 6.2 against the Client or Beneficiary.

6.4 The Client acknowledges that the proprietary rights subsisting in copyright, database rights and any other intellectual property rights in respect of any data and information contained in any Report are and shall remain (subject to clause 11.1) the property of GroundSure and/or any third party that has supplied data or information used to create a Report, and that these conditions do not purport to grant, assign or transfer any such rights in respect thereof to a Client and/or a Beneficiary.

6.5 The Client and each of the parties set out in clause 4.2 are permitted to make up to 8 (commercial) or 2 (residential) printed copies of the Report only. Further copies of the Report may not be made in whole or in part without the prior written permission of GroundSure who shall be entitled to make a charge for each additional copy.

6.6 The Client shall (and shall procure that any recipients of the Report as permitted under clause 4.2 shall):

(i) not remove, suppress or modify any trademark, copyright or other proprietary marking belonging to GroundSure or any third party from the Services;

(ii) use the information obtained as part of the Services in respect of the subject Site only, and shall not store or reuse any information obtained as part of the Services provided in respect of adjacent or nearby sites;

(iii) not create any product or report which is derived directly or indirectly from the data contained in the Services (save that those acting in a professional capacity to the Beneficiary may provide advice based upon the Services);

(iv) not combine the Services with or incorporate such Services into any other information data or service; and

(v) not reformat or otherwise change (whether by modification, addition or enhancement), data contained in the Services (save that those acting in a professional capacity to the Beneficiary shall not be in breach of this clause 6.6(v) where such reformatting is in the normal course of providing advice based upon the Services), in each case of parts (iii) to (v) inclusive, whether or not such product or report is produced for commercial profit or not.

6.7 The Client and/or Beneficiary shall and shall procure that any party to whom the Services are made available shall notify GroundSure of any request or requirement to disclose, publish or disseminate any information contained in the Services in accordance with the Freedom of Information Act 2000, the Environmental Information Regulations 2004 or any associated legislation or regulations in force from time to time.

7. Liability

7.1 Nothing in these terms and conditions shall limit GroundSure's liability for causing death or personal injury through negligence or willful default.

7.2 Save as otherwise set out in these conditions, any information provided by one party ("**Disclosing Party**") to the other party ("**Receiving Party**") shall be treated as confidential except so far as authorised by the Disclosing Party to provide such information in whole or in part to a third party.

7.3 Nothing in these conditions shall affect the statutory rights of a consumer under the applicable consumer protection legislation from time to time.

7.4 In relation to Data Reports, Mapping and Risk Screening Reports, GroundSure's liability under the Contract shall cease upon the expiry of six years from the date when the Beneficiary became aware that it may have a claim against GroundSure in respect of the Services provided always that there shall be no liability at the expiration of twelve years from the completion of the Contract. For the avoidance of doubt, any claims in respect of which proceedings are notified to GroundSure in writing prior to the expiry of the time periods referred to in this clause shall survive the expiry of those time periods provided any such claim is actually commenced within six months of notification.

7.5 In relation to Consultancy Services GroundSure's liability under the Contract shall cease upon the expiry of six years from the date the Services were completed.

7.6 GroundSure shall not be liable to the Client or any person to whom the Client provides a copy of a Data Report, Mapping or Risk Screening Report in any circumstances whatsoever unless arising out of a breach on its part of the obligations set out in the Contract.

7.7 GroundSure shall not be liable if the Data Reports, Mapping or Risk Screening Report are used otherwise than as provided or referred to in these conditions and the relevant User Guide.

7.8 Subject to the provisions of clause 7.3, GroundSure makes no representation, warranties, express or implied, as to the accuracy, reliability, completeness, validity or fitness for purpose of any Content and shall not be liable for any omission, error or inaccuracy in relation thereto unless GroundSure should reasonably have been alerted to any omission, error or inaccuracy in the Content.

7.9 Subject to the provisions of clause 7.1 and irrespective of whether multiple parties make use of the same Services the total liability of GroundSure under or in connection with the Contract, whether in contract in tort for breach of statutory duty or otherwise shall not exceed £10 million per claim or series of connected claims,

7.10 Whilst GroundSure will use all reasonable endeavours to maintain operability of its internet ordering service it will not be liable for any loss or damages caused by a delay or loss of use of such service. The Client shall use GroundSure's internet ordering service at its own risk. GroundSure shall not be responsible for any damage to a Client or permitted assignee's computer, software, modem, telephone or other property resulting from the use of GroundSure's internet ordering service.

7.11 The Client accepts, and shall use all reasonable endeavours to procure that anyone who is provided with a copy of the Report accepts, that it has no claim or recourse to any Data Provider or to GroundSure in respect of the acts or omissions of such Data Providers including Content supplied by them.

7.12 GroundSure shall provide the Services using reasonable skill and care, however, GroundSure shall not be liable for any inaccurate statement or risk rating in a Report which resulted from a reasonable interpretation of the Content.

7.13 Subject to clause 7.1, GroundSure shall not be liable to the Client, the Beneficiary or any third party in contract, tort (including, without limitation, negligence) or for misrepresentation or breach of statutory duty or otherwise in respect of any loss of profits, goodwill, revenue or opportunity, or any indirect or consequential loss (even if such loss was reasonably foreseeable).

7.14 GroundSure undertakes for the duration of the liability periods referred to in clauses 7.4 and 7.5 to maintain professional indemnity insurance in respect of its liabilities under this Contract. GroundSure shall produce evidence of such insurance if requested by the Client. A greater level of cover may be available upon request and agreement with the Client.

8. GroundSure right to suspend or terminate

8.1 In the event that GroundSure reasonably believes that the Client or Beneficiary as applicable has not provided the information or assistance required to enable the proper performance of the Services, GroundSure shall be entitled on fourteen days written notice to suspend all further performance of the Services until such time as any such deficiency has been made good.

8.2 GroundSure may additionally terminate the Contract immediately on written notice in the event that:

(i) the Client shall fail to pay any sum due to GroundSure within 28 days of the Payment Date; or

(ii) the Client (being an individual) has a bankruptcy order made against him or (being a company) shall enter into liquidation whether compulsory or voluntary or have an Administration Order made against it or if a Receiver shall be appointed over the whole or any part of its property assets or undertaking or if the Client is struck off the Register of Companies or dissolved; or

(iii) the Client being a company is unable to pay its debts within the meaning of Section 123 of the Insolvency Act 1986 or being an individual appears unable to pay his debts within the meaning of Section 268 of the Insolvency Act 1986 or if the Client shall enter into a composition or arrangement with the Client's creditors or shall suffer distress or execution to be levied on his goods; or

(iv) the Client or the Beneficiary breaches any material term of the Contract (including, but not limited to, the obligations in clause 4) incapable of remedy or if remediable, is not remedied within 14 days of notice of the breach.

9. Client's Right to Terminate and Suspend

9.1 Subject to clause 10.2, the Client may at any time after commencement of the Services by notice in writing to GroundSure require GroundSure to terminate or suspend immediately performance of all or any of the Services.

9.2 The Client waives all and any right of cancellation it may have under the Consumer Protection (Distance Selling) Regulations 2000 (as amended) in respect of the Order of a Report/Mapping. This does not affect the Beneficiary's statutory rights.

10. Consequences of Withdrawal, Termination or Suspension

10.1 Upon termination or any suspension of the Services, GroundSure shall take steps to bring to an end the Services in an orderly manner, vacate any Site with all reasonable speed and shall deliver to the Client/Beneficiary any property of the Client/ Beneficiary in GroundSure's possession or control.

10.2 In the event of termination/suspension of the Contract under clauses 8 or 9, the Client shall pay to GroundSure all and any fees payable in respect of the performance of the Services up to the date of termination/suspension. In respect of any Consultancy Services provided, the Client shall also pay GroundSure any additional costs incurred in relation to the termination/suspension of the Contract.

11. General

11.1 The mapping contained in the Services is protected by Crown copyright and must not be used for any purpose outside the context of the Services or as specifically provided in these terms.

11.2 GroundSure reserves the right to amend these terms and conditions. No variation to these terms shall be valid unless signed by an authorised representative of GroundSure.

11.3 No failure on the part of GroundSure to exercise and no delay in exercising, any right, power or provision under these terms and conditions shall operate as a waiver thereof.

11.4 Save as expressly provided in clauses 4.2, 4.3, 6.3 and 11.5, no person other than the persons set out therein shall have any right under the Contract (Rights of Third Parties) Act 1999 to enforce any terms of the Contract.

11.5 The Secretary of State for Communities and Local Government acting through Ordnance Survey may enforce breach of clause 6.1 of these terms and conditions against the Client in accordance with the provisions of the Contracts (Rights of Third Parties) Act 1999.

11.6 GroundSure shall not be liable to the Client if the provision of the Services is delayed or prevented by one or more of the following circumstances:

(i) the Client or Beneficiary's failure to provide facilities, access or information;

(ii) fire, storm, flood, tempest or epidemic;

(iii) Acts of God or the public enemy;

(iv) riot, civil commotion or war;

(v) strikes, labour disputes or industrial action;

(vi) acts or regulations of any governmental or other agency;

(vii) suspension or delay of services at public registries by Data Providers; or

(viii) changes in law.

11.7 Any notice provided shall be in writing and shall be deemed to be properly given if delivered by hand or sent by first class post, facsimile or by email to the address, facsimile number or email address of the relevant party as may have been notified by each party to the other for such purpose or in the absence of such notification the last known address.

11.8 Such notice shall be deemed to have been received on the day of delivery if delivered by hand, facsimile or email and on the second working day after the day of posting if sent by first class post.

11.9 The Contract constitutes the entire contract between the parties and shall supersede all previous arrangements between the parties.

11.10 Each of the provisions of the Contract is severable and distinct from the others and if one or more provisions is or should become invalid, illegal or unenforceable, the validity and enforceability of the remaining provisions shall not in any way be tainted or impaired.

11.11 These terms and conditions shall be governed by and construed in accordance with English law and any proceedings arising out of or connected with these terms and conditions shall be subject to the exclusive jurisdiction of the English courts.

11.12 If the Client or Beneficiary has a complaint about the Services, notice can be given in any format eg writing, phone, email to the Compliance Officer at GroundSure who will respond in a timely manner.

©GroundSure Limited – January 2011



Sirius Geotechnical & Environmental Limited
Thorpe Park,
L15 8ZB

GroundSure Reference:	HMD-283-048793
Your Reference:	C4280/RIH
Report Date	Apr 6, 2011
Report Delivery Method:	Email - pdf

GroundSure GeoInsight

Address: WINDERMERE ROAD, KENDAL, LA9 5PL

Dear Sir/Madam,

Thank you for placing your order with GroundSure. Please find enclosed the **GroundSure GeoInsight** as requested.

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

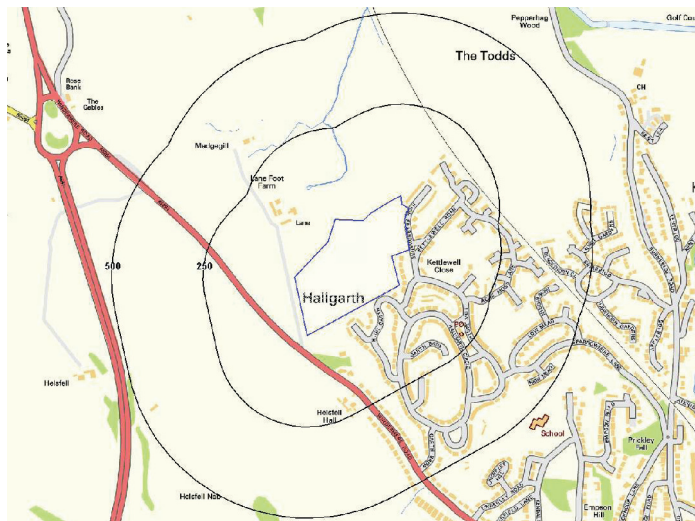
Yours faithfully,

A handwritten signature in black ink, appearing to be "B. J. O.", followed by a small circle and a comma.

Managing Director
Groundsure Limited

Enc.
GroundSure GeoInsight

Your Reference: C4280/RIH



Brought to you by GroundSure

Aerial Photograph of Study Site



Site Name: WINDERMERE ROAD, KENDAL, LA9 5PL
Grid Reference: 350618,494308
Size of Site: 6.61 ha

Aerial photography supplied by Getmapping PLC.
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Overview of Findings

The GroundSure GeoInsight 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 Digital Geological Map of Great Britain, BGS Geosure data; BRITPITS database; Shallow 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.

Report Section	Number of records found within (X) m of the study site boundary
1. Geology	Description
1.1 Artificial Ground,	
1.1.1 Is there any Artificial Ground /Made Ground present beneath the study site?*	No
1.1.2 Are there any records relating to permeability of artificial ground within the study site* boundary?	No
1.2 Superficial Geology & Landslips	
1.2.1 Is there any Superficial Ground/Drift Geology present beneath the study site?*	Yes
1.2.2 Are there any records relating to permeability of superficial geology within the study site* boundary?	Yes
1.2.3 Are there any records of landslip within 500m of the study site boundary?	No
1.2.4 Are there any records relating to permeability of landslips within the study site* boundary?	No
1.3 Bedrock, Solid Geology & Faults	
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 relating to permeability of bedrock within the study site* boundary?	Yes
1.3.3 Are there any records of faults within 500m of the study site boundary?	Yes
1.3.4 Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?	The property is in a Radon Affected Area, as between 10 and 30% of properties are above the Action Level
1.3.5 Is the property in an area where Radon Protection Measures are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment?	Full radon protective measures are necessary

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

Source:Scale 1:50,000 BGS Sheet No:039

2. Ground Workings	on-site	0-50	51-250	251-500	501-1000
2.1 Historical Surface Ground Working Features from Small Scale Mapping	0	0	7	-	-
2.2 Historical Underground Workings Features from Small Scale Mapping	0	0	0	0	0
2.3 Current Ground Workings	0	0	0	0	0

3. Mining, Extraction & Natural Cavities	on-site	0-50	51-250	251-500	501-1000
3.1 Historical Mining	0	0	0	0	0
3.2 Coal Mining	0	0	0	0	0
3.3 Johnson Poole and Bloomer Mining Area	0	0	0	0	0
3.4 Non-Coal Mining*	2	0	0	3	2
3.5 Non-Coal Mining Cavities	0	0	0	0	0
3.6 Natural Cavities	0	0	0	1	1
3.7 Brine Extraction	0	0	0	0	0
3.8 Gypsum Extraction	0	0	0	0	0
3.9 Tin Mining	0	0	0	0	0
3.10 Clay Mining	0	0	0	0	0

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

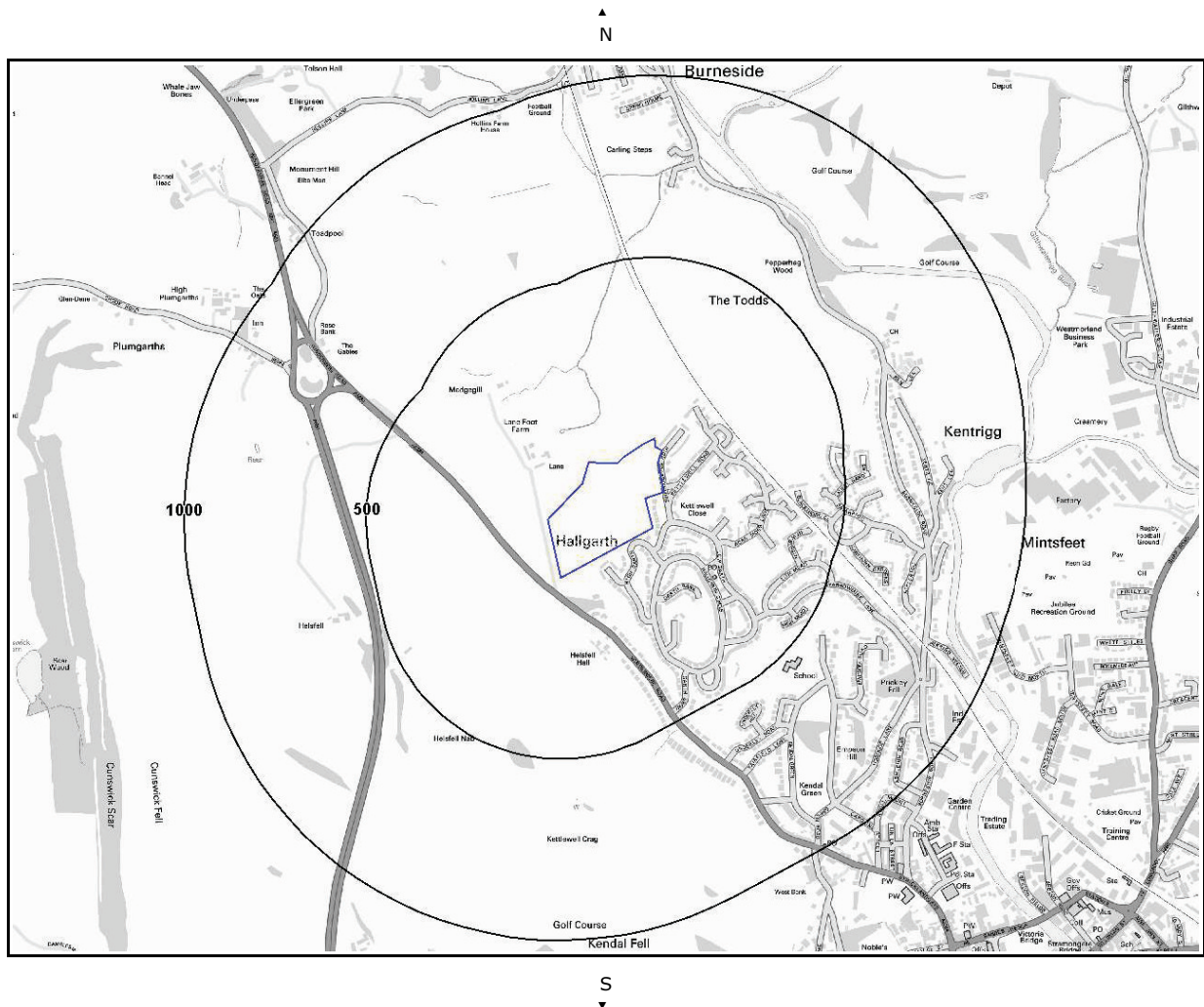
4. Natural Ground Subsidence	on-site*	0-50	51-250	251-500	501-1000
4.1 Shrink-Swell Clay	Very Low	-	-	-	-
4.2 Landslides	Low	-	-	-	-
4.3 Ground Dissolution of Soluble Rocks	Low	-	-	-	-
4.4 Compressible Deposits	Moderate	-	-	-	-
4.5 Collapsible Deposits	Negligible	-	-	-	-
4.6 Running Sand	Low	-	-	-	-

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

5. Borehole Records	on-site	0-50	51-250	251-500	501-1000
5.1 BGS Recorded Boreholes	0	0	0	-	-

6. Estimated Background Soil Chemistry	on-site	0-50	51-250	251-500	501-1000
6.1 Records of Background Soil Chemistry	3	4	0	-	-

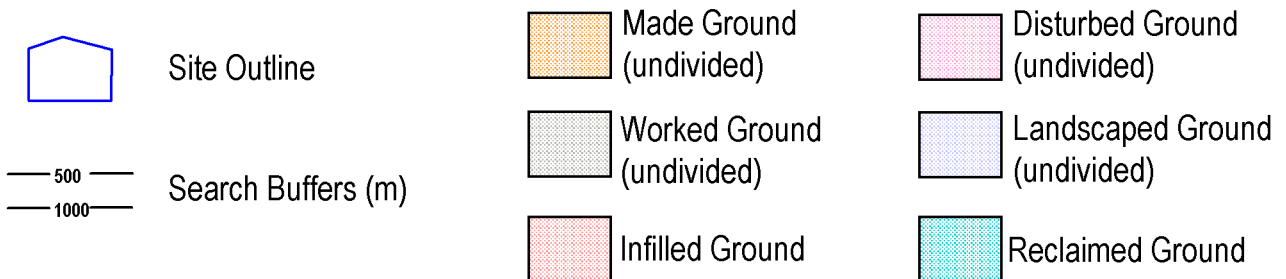
1.1 Artificial Ground Map



Artificial Ground Legend



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

1.1 Artificial Ground

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No:039

1.1.1 Artificial/Made Ground

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

Database searched and no data found.

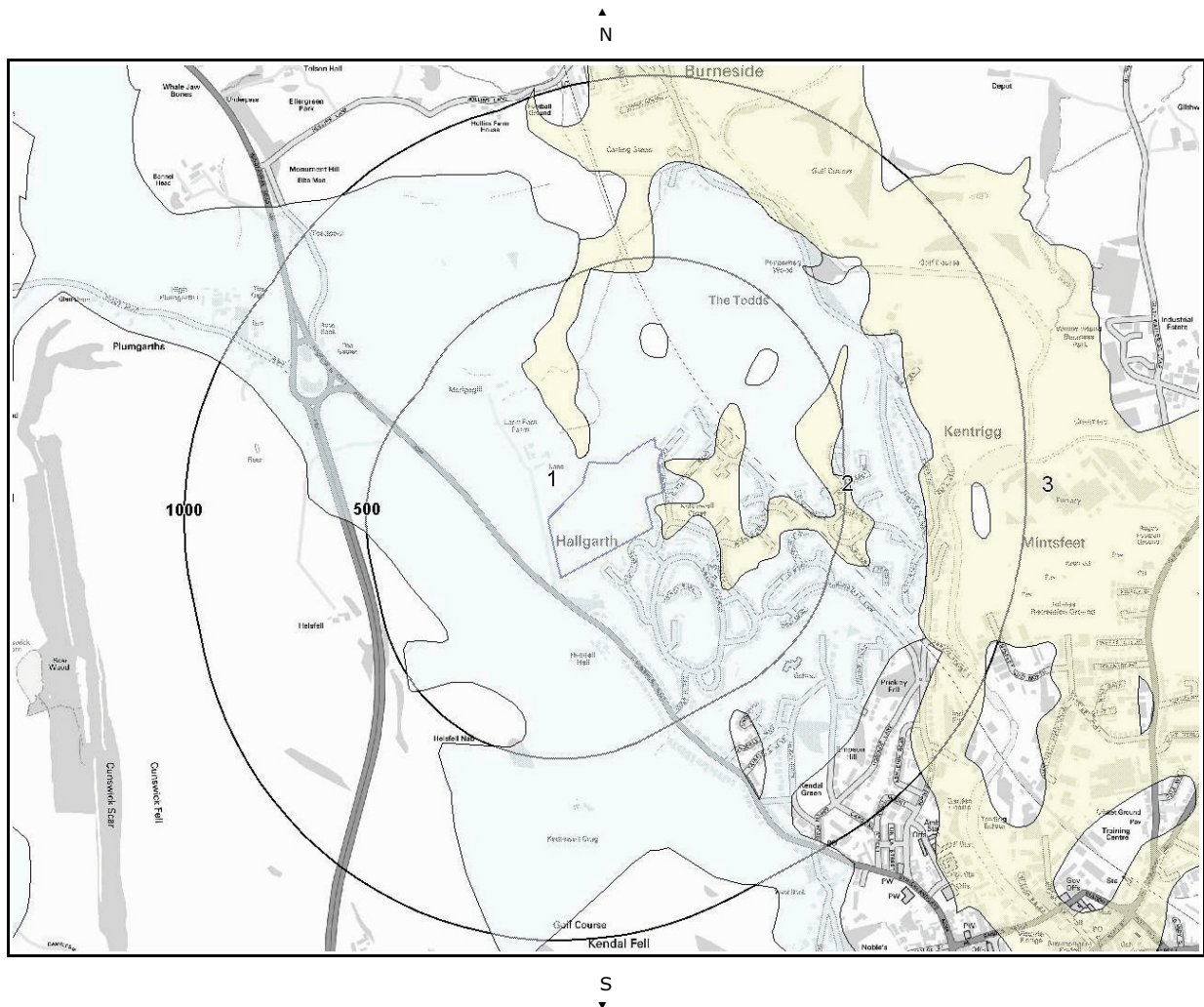
1.1.2 Permeability of Artificial Ground

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

Database searched and no data found.

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

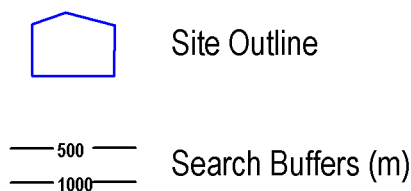
1.2 Superficial Deposits and Landslips Map



Superficial and Landslips Legend



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

1.2 Superficial Deposits and Landslips

1.2.1 Superficial Deposits/Drift Geology

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

ID	Distance (m)	Direction	Lex Code	Description	Rock Description
1	0.0	On Site	TILLD-DMTN	TILL, DEVENSIAN	DIAMICTON
2	15.0	E	ALV-CSSG	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL
3	19.0	NW	ALV-CSSG	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL

1.2.2 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
15.0	E	Intergranular	High	Very Low
19.0	NW	Intergranular	High	Very Low

1.2.3 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, 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.

1.2.4 Landslip Permeability

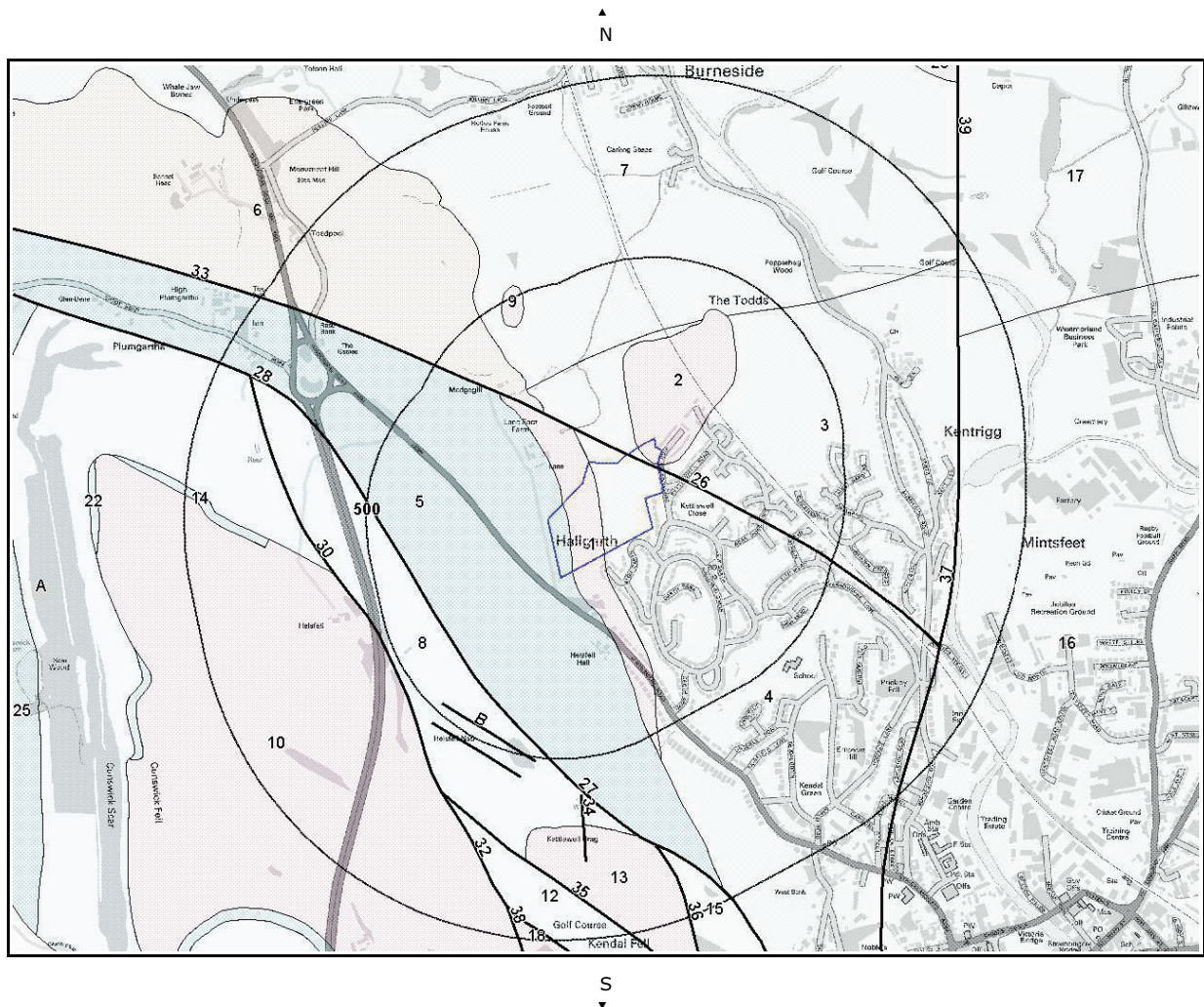
Are there any records relating to permeability of landslips within the study site* boundary?

No

Database searched and no data found.

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

1.3 Bedrock and Faults Map



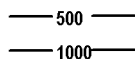
Bedrock & Faults Deposits Legend



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Site Outline



Search Buffers (m)

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

1.3 Bedrock, Solid Geology & Faults

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No:039

1.3.1 Bedrock/Solid Geology

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

ID	Distance (m)	Direction	LEX Code	Rock Description	Rock Age
1	0.0	On Site	MASA-CSSM	Marsett Sandstone Formation - Conglomerate, Sandstone, Siltstone And Mudstone	Chadian / Courceyan
2	0.0	On Site	MASA-CSSM	Marsett Sandstone Formation - Conglomerate, Sandstone, Siltstone And Mudstone	Chadian / Courceyan
3	0.0	On Site	KMF-SDST	Kirkby Moor Formation - Sandstone	Pridoli / Ludfordian
4	0.0	On Site	KMF-SDST	Kirkby Moor Formation - Sandstone	Pridoli / Ludfordian
5	0.0	On Site	MTL-LMST	Martin Limestone Formation - Limestone	Chadian / Tournaisian
6	180.0	NW	MASA-CSSM	Marsett Sandstone Formation - Conglomerate, Sandstone, Siltstone And Mudstone	Chadian / Courceyan
7	257.0	NW	BND-SIMD	Bannisdale Formation - Siltstone And Mudstone, Interbedded	Ludfordian / Gorstian
8	345.0	SW	DLB-CARN	Dalton Formation - Calcarenite	Arundian
9	422.0	NW	MASA-CSSM	Marsett Sandstone Formation - Conglomerate, Sandstone, Siltstone And Mudstone	Chadian / Courceyan

1.3.2 Permeability of Bedrock Ground

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

Distance (m)	Direction	Flow type	Maximum Permeability	Minimum Permeability
0.0	On Site	Fracture	Moderate	Low
0.0	On Site	Fracture	Moderate	Low
0.0	On Site	Fracture	Very High	High
0.0	On Site	Fracture	Moderate	Low

1.3.3 Faults

Are there any records of Faults within 500m of the study site boundary? **Yes**

ID	Distance (m)	Direction	Category Description	Feature Description
26	0.0	On Site	FAULT	Normal fault, inferred; crossmarks on downthrow side
27	345.0	SW	FAULT	Normal fault, inferred; crossmarks on downthrow side
28	405.0	W	FAULT	Normal fault, inferred; crossmarks on downthrow side
29 B	466.0	SW	FAULT	Normal fault, inferred; crossmarks on downthrow side

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 includes an automatically generated 50m buffer zone around the site.

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.

1.3.4 Radon Affected Areas

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

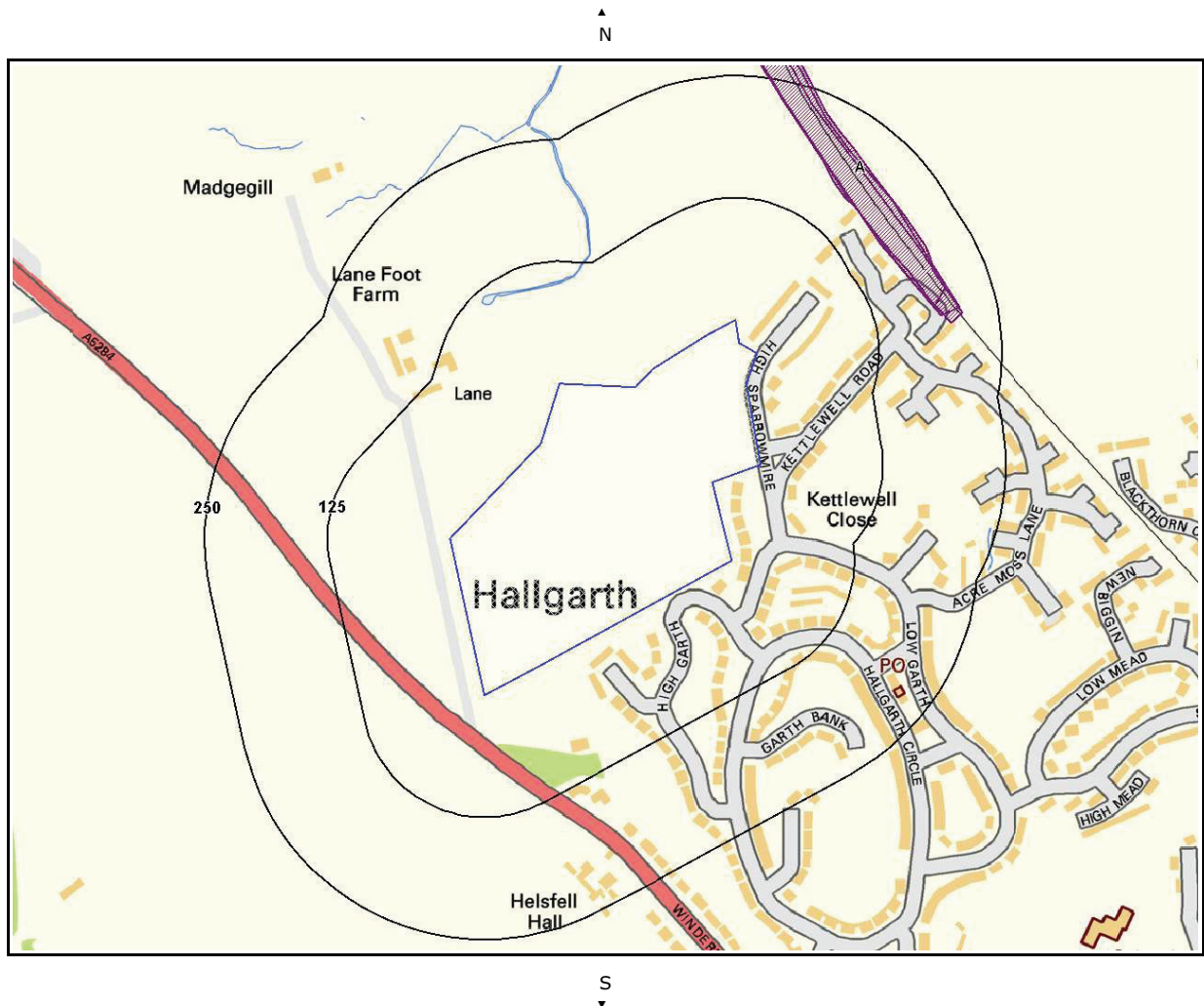
The property is in a Radon Affected Area, as between 10 and 30% of properties are above the Action Level

1.3.5 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?

Full radon protective measures are necessary

2. Ground Workings Map



Ground Workings Legend



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

2. Ground Workings

2.1 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**

The following Historical Surface Ground Working Features are provided by GroundSure:

ID	Distance (m)	Direction	NGR	Use	Date
1A	166.0	NE	350798,494562	Cuttings	1897
2A	166.0	NE	350798,494562	Cuttings	1938
3A	166.0	NE	350789,494574	Cuttings	1991
4A	166.0	NE	350789,494574	Cuttings	1979
5A	166.0	NE	350789,494574	Cuttings	1951
6A	166.0	NE	350789,494574	Cuttings	1969
7A	167.0	NE	350786,494572	Cuttings	1858

2.2 Historical Underground Workings 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? **No**

Database searched and no data found.

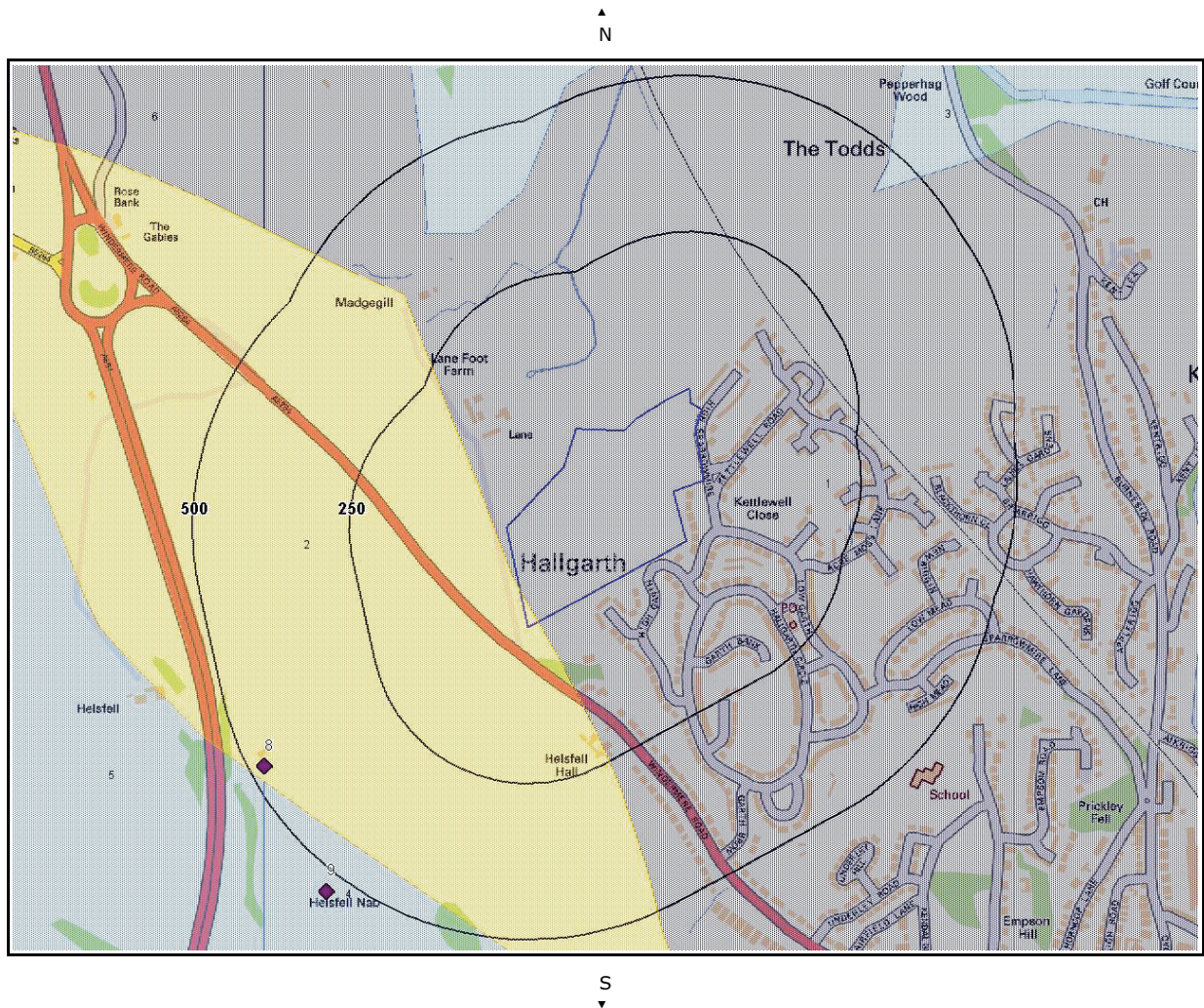
2.3 Current Ground Workings

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? **No**

Database searched and no data found.

3. Mining, Extraction & Natural Cavities Map



Mining, Extraction & Natural Cavities
Legend

Enabled by
Ordnance Survey

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3. Mining, Extraction & Natural Cavities

3.1 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?

No

Database searched and no data found.

3.2 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?

No

Database searched and no data found.

3.3 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. No results found.

3.4 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	0.0	On Site	Not given	Vein Mineral	Rare - Infrequent minor mining may have occurred but restricted in extent.
2	0.0	On Site	Not given	Vein Mineral	Unlikely - Some small scale mining may have occurred but restricted in extent.
3	352.0	NW	Not given	Vein Mineral	Highly Unlikely - Localised small scale mining may have occurred but restricted in extent.
4	444.0	SW	Not given	Vein Mineral	Highly Unlikely - Localised small scale mining may have occurred but restricted in extent.

5	488.0	SW	Not given	Vein Mineral	Highly Unlikely - Localised small scale mining may have occurred but restricted in extent.
6	591.0	NW	Not given	Vein Mineral	Rare - Infrequent minor mining may have occurred but restricted in extent.
Not shown	931.0	NW	Not given	Vein Mineral	Highly Unlikely - Localised small scale mining may have occurred but restricted in extent.

3.5 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? **No**

Database searched and no data found.

3.6 Natural Cavities

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

Are there any Natural Cavities within 1000m of the study site boundary? **Yes**

The following Natural Cavities information provided by Peter Brett Associates:

ID	Distance (m)	Direction	NGR	Superficial Deposits	Bedrock Deposits	Cavity Type and Number
8	478.0	SW	SD	-	Carboniferous Limestone Supergroup, Lower Carboniferous Limestone, Upper Carboniferous Limestone	Vadose Cave x 1
9	533.0	SW	SD	-	Carboniferous Limestone Supergroup, Lower Carboniferous Limestone, Millstone Grit Group	Vadose Cave x 1

3.7 Brine Extraction

This dataset provides information from the Brine Compensation Board which has been discontinued and is now covered by the Coal Authority.

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

Database searched and no data found.

3.8 Gypsum Extraction

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

Report Reference: HMD-283-048793

Are there any Gypsum Extraction areas within 1000m of the study site boundary?

No

Database searched and no data found.

3.9 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. More detailed information on potential Tin Mining may be found in Section 3.3 – Non-Coal Mining Hazards.

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

No

Database searched and no data found.

3.10 Clay Mining

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

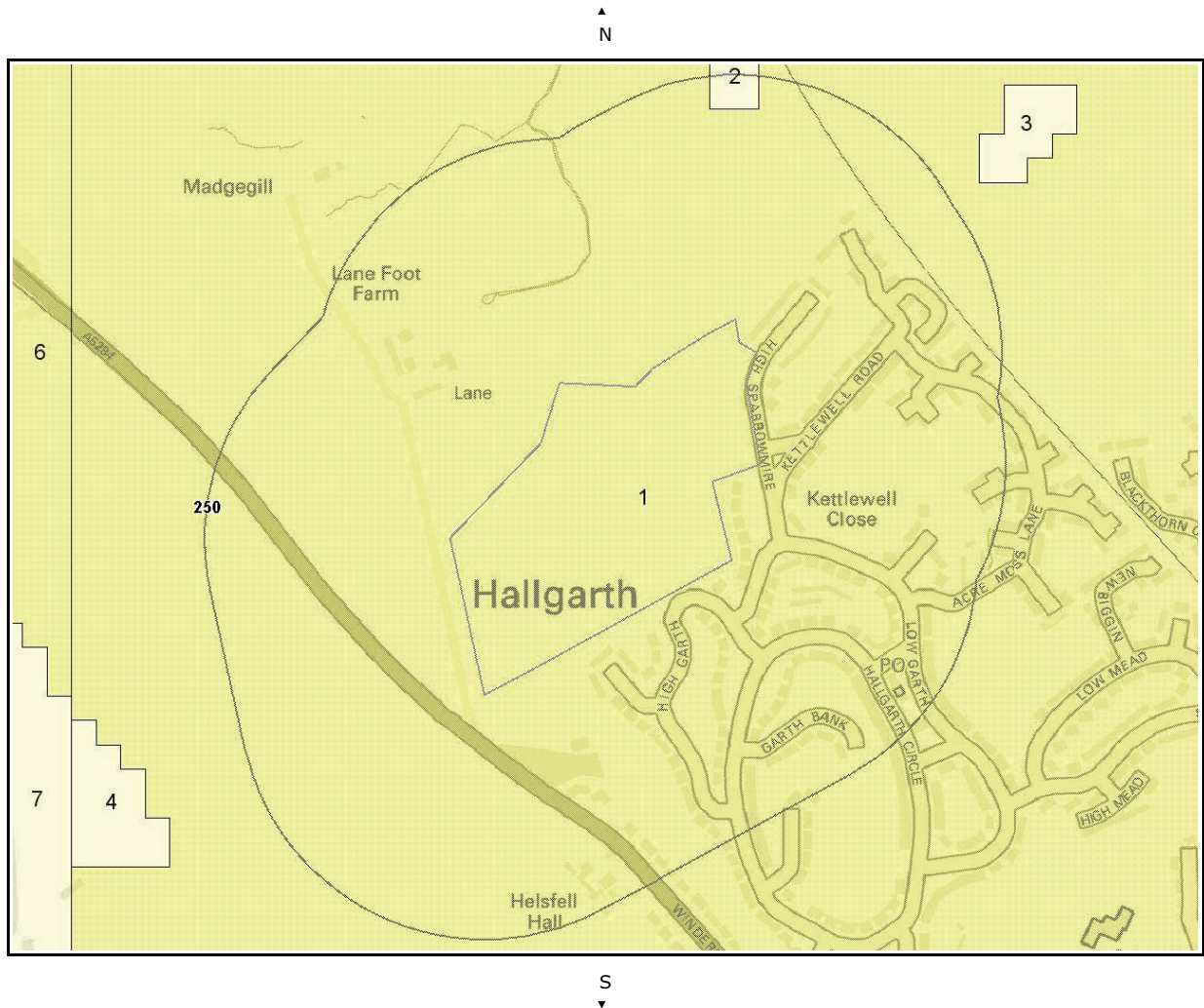
Are there any Clay Mining areas within 1000m of the study site boundary?

No

Database searched and no data found.

4. Natural Ground Subsidence

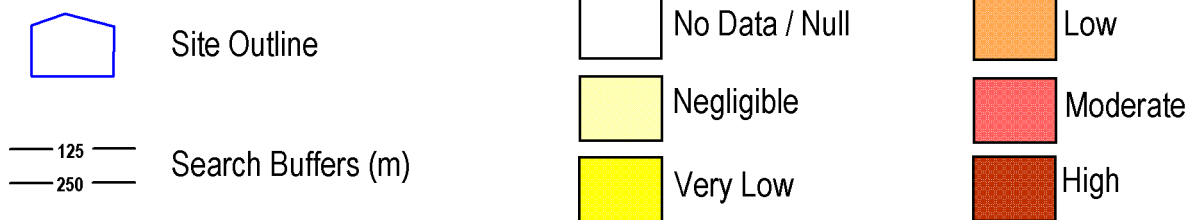
4.1 Shrink-Swell Clay Map



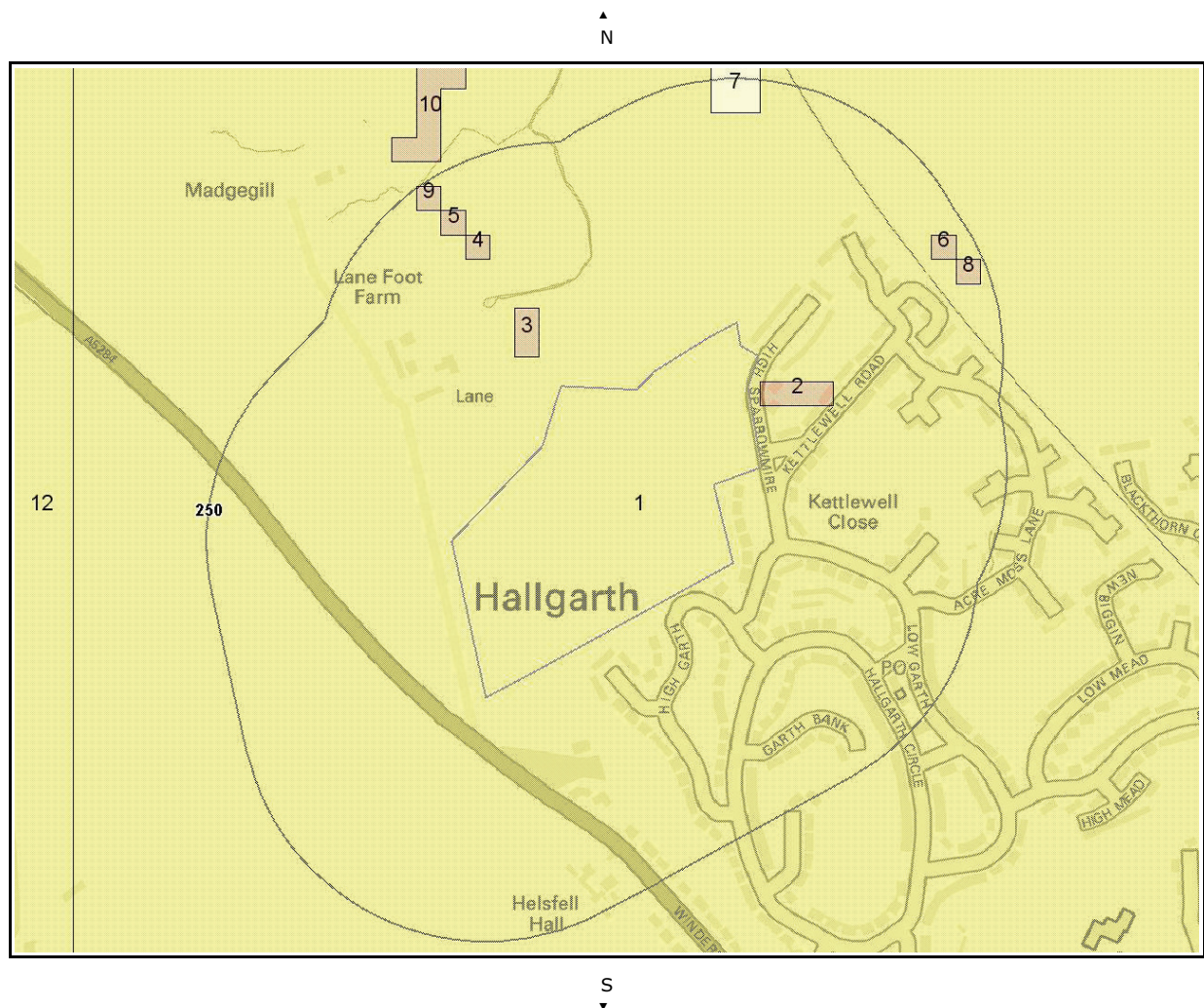
Shrink-Swell Clay Legend



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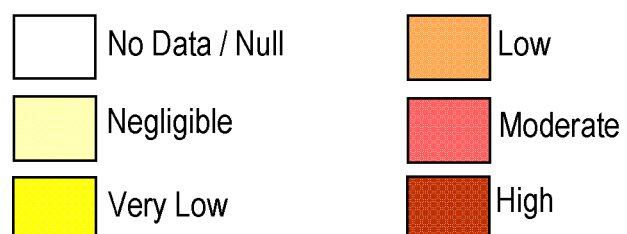
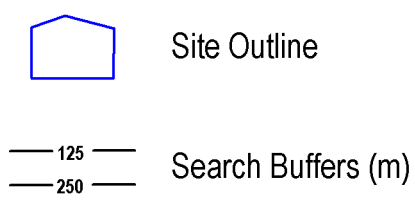
4.2 Landslides Map



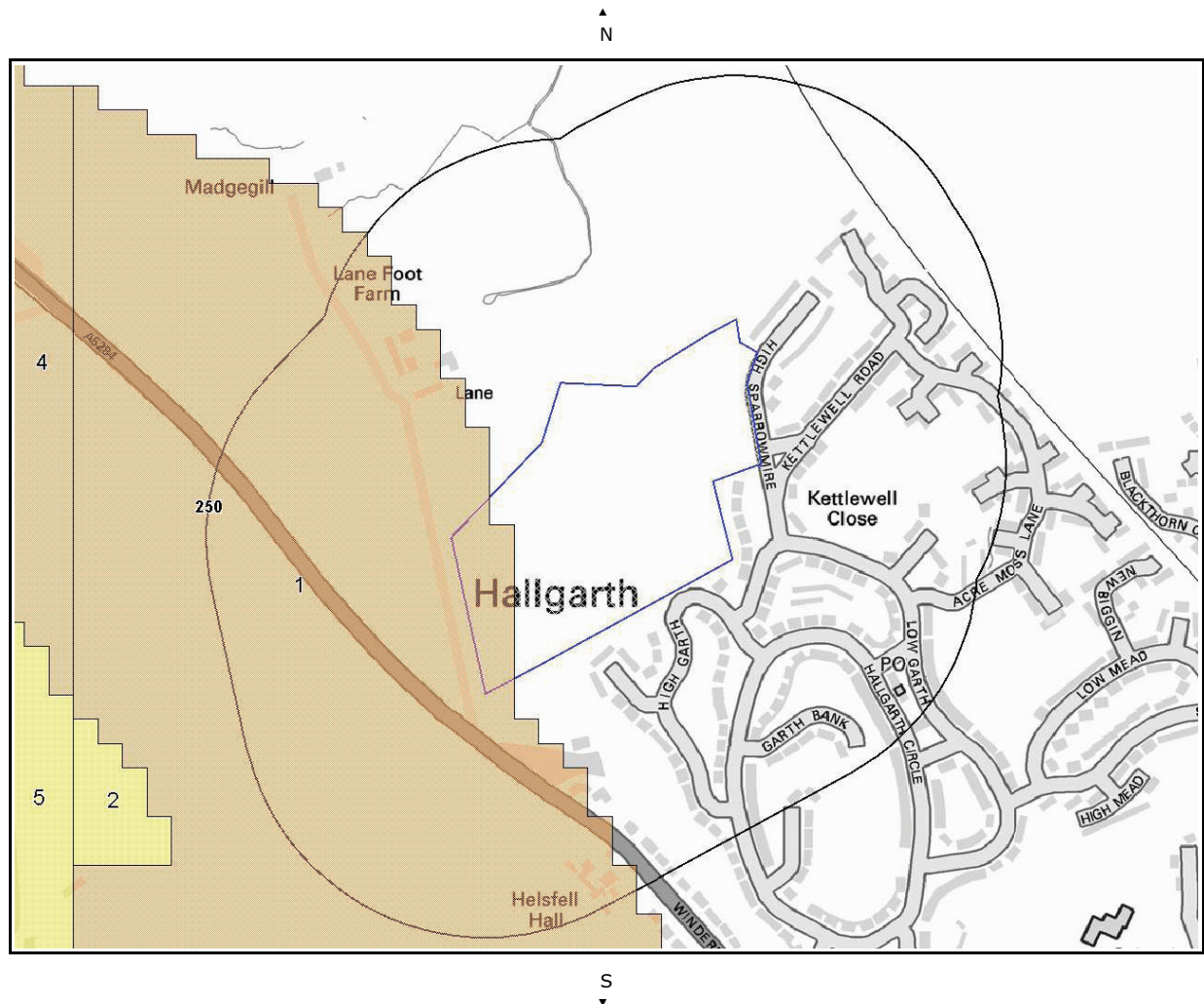
Landslides Legend



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4.3 Ground Dissolution Soluble Rocks Map

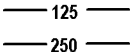



Ground Dissolution Soluble Rocks
Legend


Enabled by
Ordnance Survey


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 Site Outline


 Search Buffers (m)


 No Data / Null

 Negligible

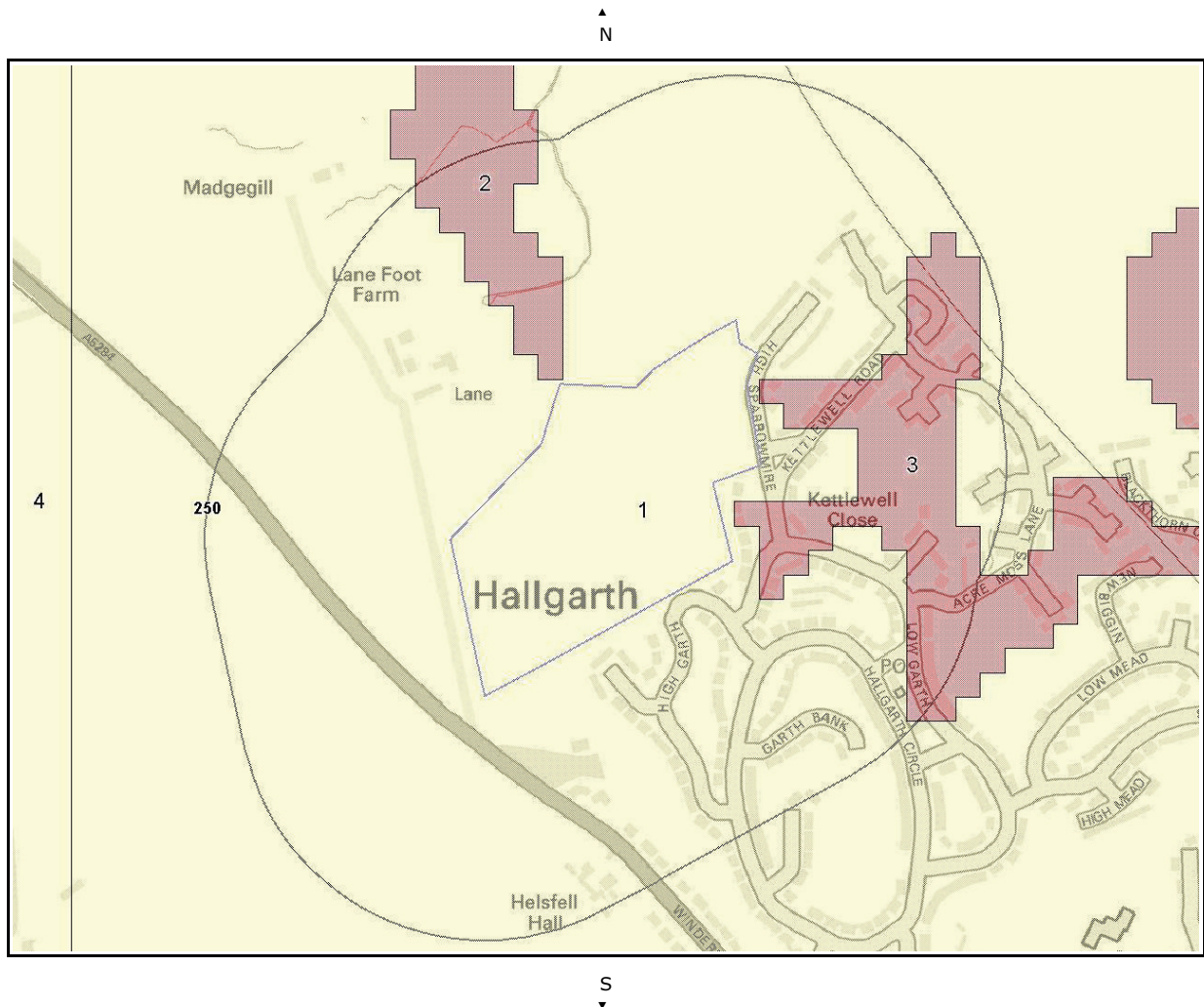
 Very Low

 Low

 Moderate

 High

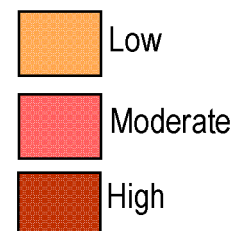
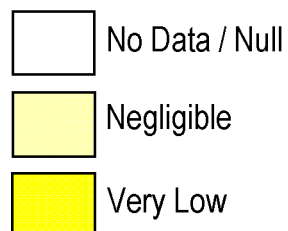
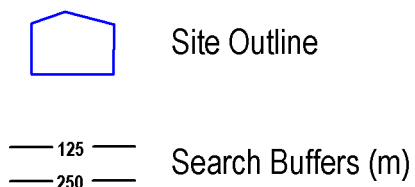
4.4 Compressible Deposits Map



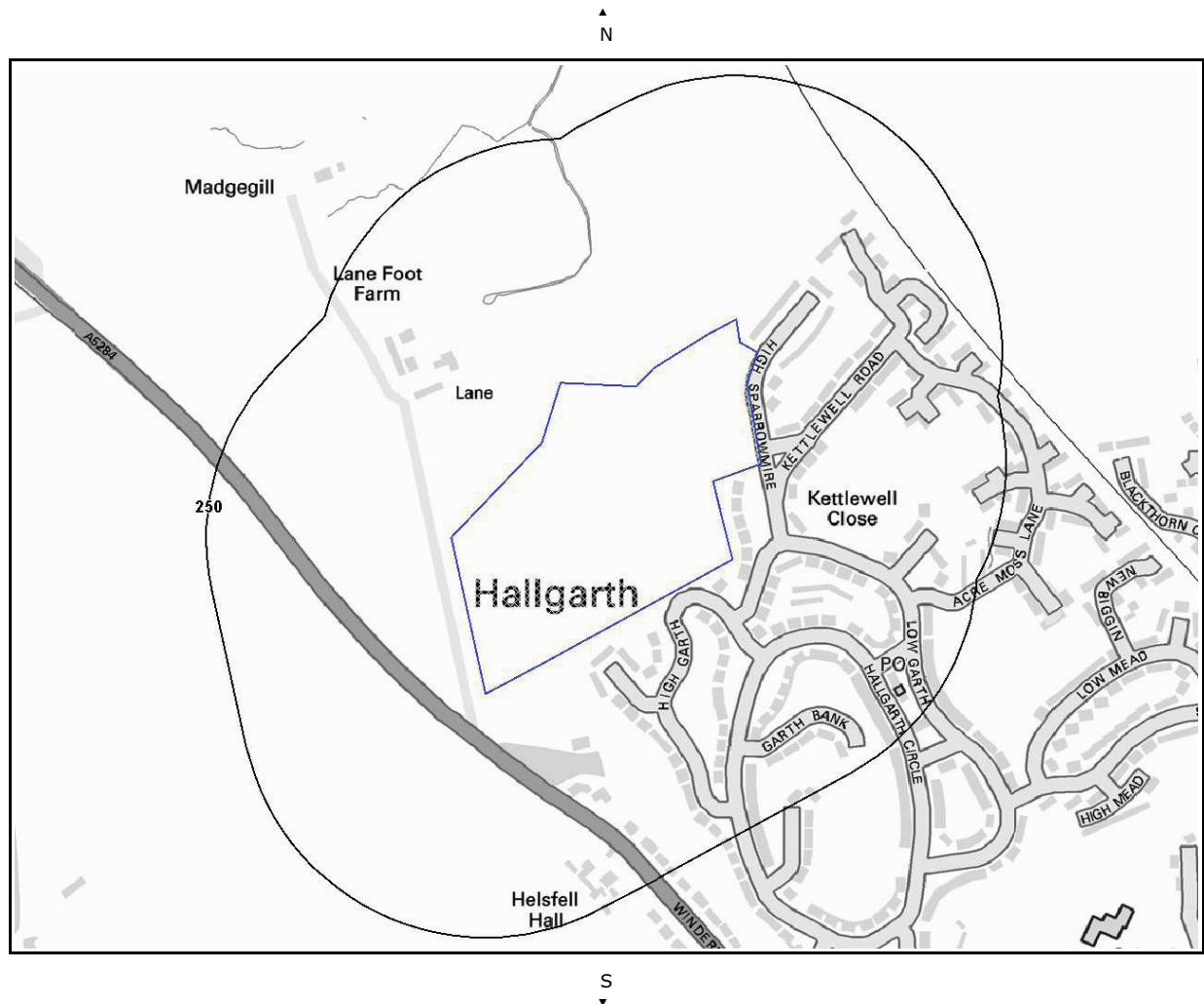
Compressible Deposits Legend



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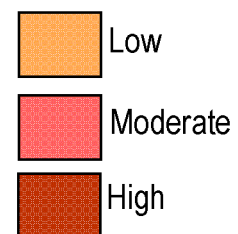
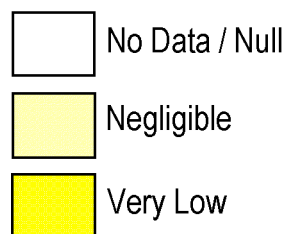
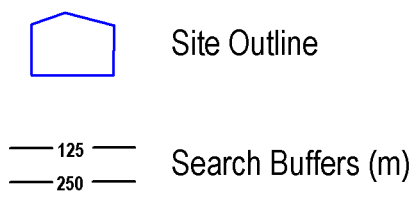
4.5 Collapsible Deposits Map



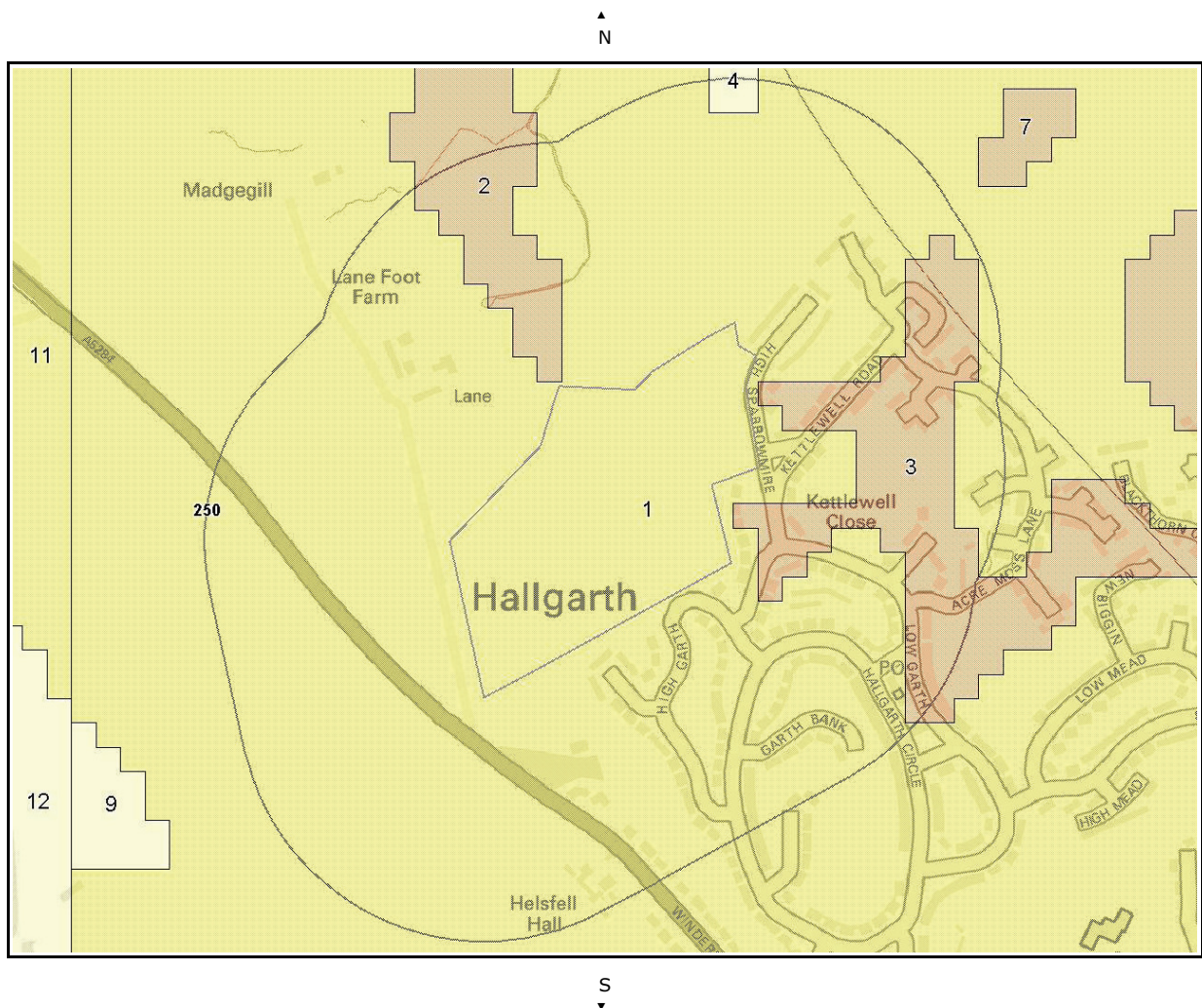
Collapsible Deposits Legend



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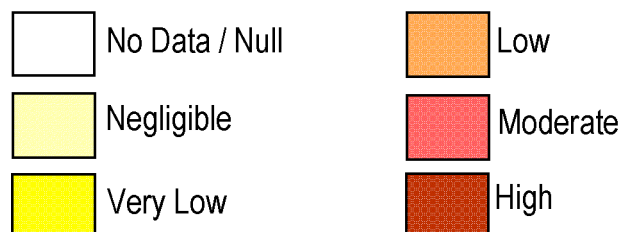
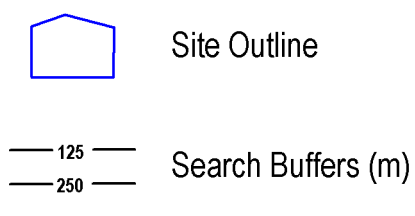
4.6 Running Sand Map



Running Sand Legend



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4. 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? **Moderate**

4.1 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.

4.2 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	9.0	E	Low	Possibility of slope instability problems after major changes in ground conditions. Consideration should be given to stability if changes to drainage or excavations take place. Possible increase in construction cost to reduce potential slope stability problems. Existing property no significant increase in insurance risk due to natural slope instability problems.
3	37.0	NW	Low	Possibility of slope instability problems after major changes in ground conditions. Consideration should be given to stability if changes to drainage or excavations take place. Possible increase in construction cost to reduce potential slope stability problems. Existing property no significant increase in insurance risk due to natural slope instability problems.

4.3 Ground Dissolution of Soluble Rocks

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

ID	Distance (m)*	Direction	Hazard Rating	Details
1	0.0	On Site	Low	Significant soluble rocks are present. Low possibility of subsidence occurring naturally, but may be possible in adverse conditions such as high surface or subsurface water flow. Consider implications for stability when changes to drainage or new construction are planned. For new build site investigation should consider potential for dissolution problems on the site and its surroundings. Care should be taken with local drainage into the bedrock. Some possibility groundwater pollution. For existing property possible increase in insurance risk due to soluble rocks.

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

4.4 Compressible Deposits

The following Compressible Ground 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	5.0	N	Moderate	Significant potential for compressibility problems. Avoid large differential loadings of ground. Do not drain or de-water ground near the property without technical advice. For new build - consider possibility of compressible ground in ground investigation, construction and building design. Consider effects of groundwater changes. Extra construction costs are likely. For existing property - possible increase in insurance risk from compressibility, especially if water conditions or loading of the ground change significantly.
3	9.0	E	Moderate	Significant potential for compressibility problems. Avoid large differential loadings of ground. Do not drain or de-water ground near the property without technical advice. For new build - consider possibility of compressible ground in ground investigation, construction and building design. Consider effects of groundwater changes. Extra construction costs are likely. For existing property - possible increase in insurance risk from compressibility, especially if water conditions or loading of the ground change significantly.

4.5 Collapsible Deposits

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

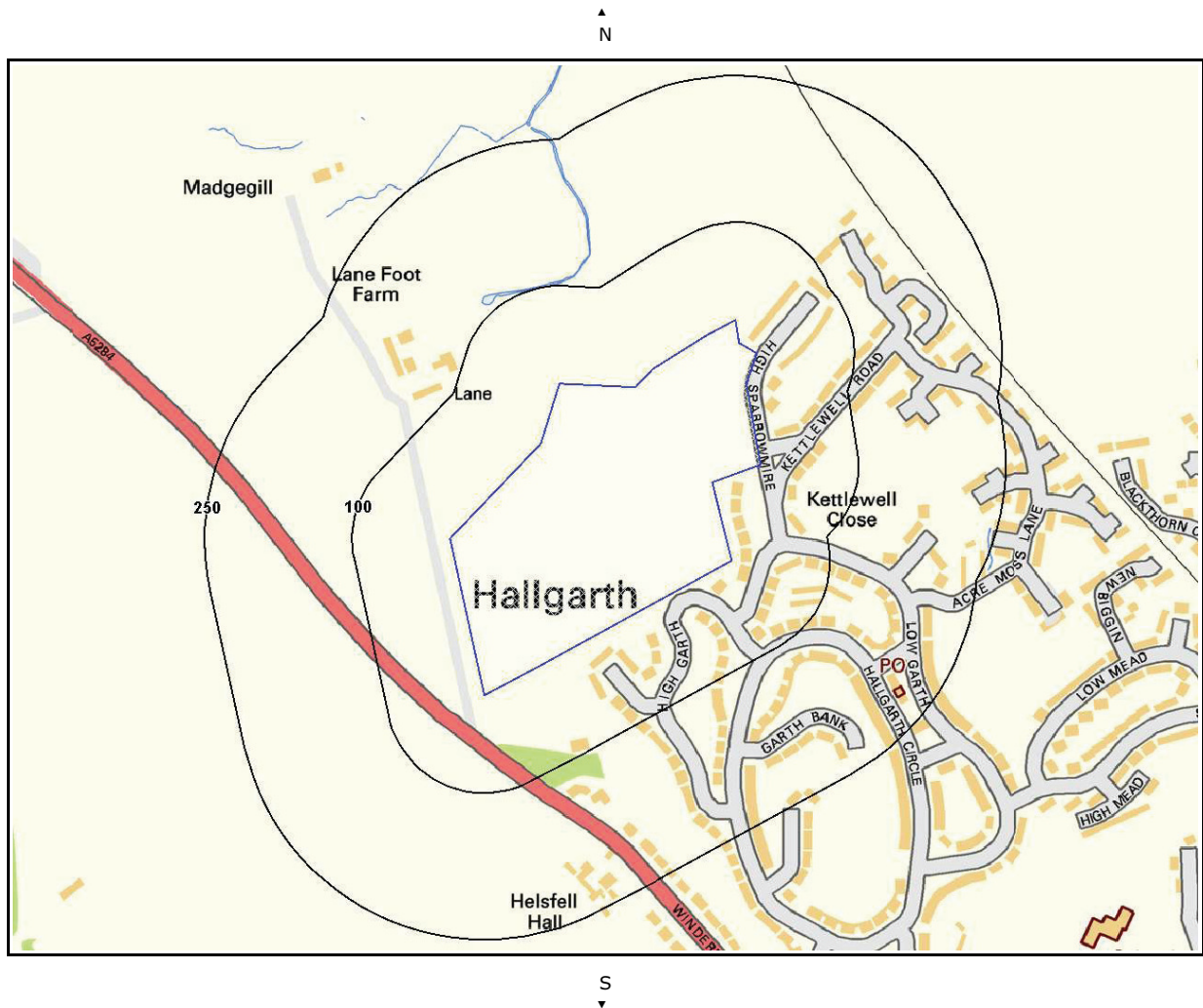
Distance (m)*	Direction	Hazard Rating	Details
0.0	On site	Null-Negligible	No Indicators for collapsible deposits identified. No Special actions required to avoid problems due to collapsible deposit.

4.6 Running Sands

The following Running Sands information is 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	5.0	N	Low	Possibility of running sand problems after major changes in ground conditions. Normal maintenance to avoid leakage of water-bearing services or water bodies (ponds, swimming pools) should reduce likelihood of problems due to running sand. For new build - consider possibility of running sand into trenches or excavations if water table is high or sandy strata are exposed to water. Avoid concentrated water inputs to site. Unlikely to be an increase in construction costs due to potential for running sand. For existing property no significant increase in insurance risk due to running sand problems is likely.
3	9.0	E	Low	Possibility of running sand problems after major changes in ground conditions. Normal maintenance to avoid leakage of water-bearing services or water bodies (ponds, swimming pools) should reduce likelihood of problems due to running sand. For new build - consider possibility of running sand into trenches or excavations if water table is high or sandy strata are exposed to water. Avoid concentrated water inputs to site. Unlikely to be an increase in construction costs due to potential for running sand. For existing property no significant increase in insurance risk due to running sand problems is likely.

5. Borehole Records Map



Borehole Records Legend



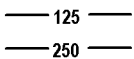
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Site Outline



Borehole Locations



Search Buffers (m)

5. 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:

0

Database searched and no data found.

6. Estimated Background Soil Chemistry

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

7

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

Estimated Geometric Mean Soil Concentrations (mg/kg)							
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	90 - 120 mg/kg	15 - 30 mg/kg	<150 mg/kg
0.0	On Site	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<150 mg/kg
0.0	On Site	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<150 mg/kg
15.0	E	Sediment	<15 mg/kg	<1.8 mg/kg	90 - 120 mg/kg	15 - 30 mg/kg	<150 mg/kg
19.0	NW	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<150 mg/kg
26.0	S	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<150 mg/kg
40.0	SE	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<150 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.

7. Contacts

GroundSure Helpline

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info @ groundsure.com



British Geological Survey Enquiries

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Keyworth, Nottingham NG12 5GG
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Email: enquiries@bgs.ac.uk
Web: www.bgs.ac.uk
BGS Geological Hazards Reports and general geological enquiries



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Tel: www.british-gypsum.com



The Coal Authority

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Acknowledgements

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This report has been prepared in accordance with the GroundSure Ltd standard Terms and Conditions of business for work of this nature.

Standard Terms and Conditions

1 Definitions

In these conditions unless the context otherwise requires:

"Beneficiary" means the Client or the customer of the Client for whom the Client has procured the Services.

"Commercial" means any building which is not Residential.

"Commission" means an order for Consultancy Services submitted by a Client.

"Consultancy Services" mean consultancy services provided by GroundSure including, without limitation, carrying out interpretation of third party and in-house environmental data, provision of environmental consultancy advice, undertaking environmental audits and assessments, Site investigation, Site monitoring and related items.

"Content" means any data, database or other information contained in a Report or Mapping which is provided to GroundSure by a Data Provider.

"Contract" means the contract between GroundSure and the Client for the performance of the Services which arises upon GroundSure's acceptance of an Order or Commission and which shall incorporate these conditions, the relevant GroundSure User Guide, proposal by GroundSure and the content of any subsequent report, and any agreed amendments in accordance with clause 11.

"Client" means the party that submits an Order or Commission.

"Data Provider" means any third party providing Content to GroundSure.

"Data Report" means reports comprising factual data with no professional interpretation in respect of the level of likely risk and/or liability available from GroundSure.

"GroundSure" means GroundSure Limited, a company registered in England and Wales under number 03421028 and whose registered office is at Greater London House, Hampstead Road, London NW1 7EJ.

"Intellectual Property" means any patent, copyright, design rights, service marks, moral rights, data protection rights, know-how, trademark or any other intellectual property rights.

"Mapping" an historical map or a combination of historical maps of various ages, time periods and scales available from GroundSure.

"Order" means an order form submitted by the Client requiring Services from GroundSure in respect of a specified Site.

"Order Website" means online platform via which Orders may be placed.

"Report" means a Risk Screening Report or Data Report for commercial or residential property available from GroundSure relating to the Site prepared in accordance with the specifications set out in the relevant User Guide.

"Residential" means any building used as or suitable for use as an individual dwelling.

"Risk Screening Report" means one of GroundSure's risk screening reports, comprising factual data with interpretation in respect of the level of likely risk and/or liability, excluding "Consultancy Services".

"Services" means the provision of any Report, Mapping or Consultancy Services which GroundSure has agreed to carry out for the Client/Beneficiary on these terms and conditions in respect of the Site.

"Site" means the landsite in respect of which GroundSure provides the Services.

"User Guide" means the relevant current version of the user guide, available upon request from GroundSure.

2 Scope of Services

2.1 GroundSure agrees to carry out the Services in accordance with the Contract and to the extent set out therein.

2.2 GroundSure shall exercise all the reasonable skill, care and diligence to be expected of experienced environmental consultants in the performance of the Services.

2.3 The Client acknowledges that it has not relied on any statement or representation made by or on behalf of GroundSure which is not set out and expressly agreed in the Contract.

2.4 Terms and conditions appearing on a Client's order form, printed stationery or other communication, including invoices, to GroundSure, its employees, servants, agents or other representatives or any terms implied by custom, practice or course of dealing shall be of no effect and these terms and conditions shall prevail over all others.

2.5 In the event that a Client/Beneficiary opts to take out insurance in conjunction with or as a result of the Services, such insurance shall be subject solely to the terms of any policy issued to it in that respect and GroundSure will have no liability therefore.

2.6 GroundSure's quotations/proposals are valid for a period of 30 days only. GroundSure reserves the right to withdraw any quotation at any time before GroundSure accepts an Order or Commission. GroundSure's acceptance of an Order or Commission shall be effective only where such acceptance is in writing and signed by GroundSure's authorised representative or where accepted via GroundSure's Order Website.

3 The Client's obligations

3.1 The Client shall ensure the Beneficiary complies with and is bound by the terms and conditions set out in the Contract and shall provide that GroundSure may in its own right enforce such terms and conditions against the Beneficiary pursuant to the Contracts (Rights of Third Parties) Act 1999. The Client shall be liable for all breaches of the Contract by the Beneficiary as if they were breaches by the Client. The Client shall be solely responsible for ensuring that the Report/Mapping ordered is appropriate and suitable for the Beneficiary's needs.

3.2 The Client shall (or shall procure that the Beneficiary shall) supply to GroundSure as soon as practicable and without charge all information necessary and accurate relevant data including any specific and/or unusual environmental information relating to the Site known to the Client/Beneficiary which may pertain to the Services and shall give such assistance as GroundSure shall reasonably require in the performance of the Services (including, without limitation, access to a Site, facilities and equipment as agreed in the Contract).

3.3 Where Client/Beneficiary approval or decision is required, such approval or decision shall be given or procured in reasonable time as not to delay or disrupt the performance of any other part of the Services.

3.4 The Client shall not and shall not knowingly permit the Beneficiary to, save as expressly permitted by these terms and conditions, re-sell, alter, add to, amend or use out of context the content of any Report, Mapping or, in respect of any Services, information given by GroundSure. For the avoidance of doubt, the Client and Beneficiary may make the Report, Mapping or GroundSure's findings available to a third party who is considering acquiring the whole or part of the Site, or providing funding in relation to the Site, but such third party cannot rely on the same unless expressly permitted under clause 4.

3.5 The Client is responsible for maintaining the confidentiality of its user name and password if using GroundSure's internet ordering service and accepts responsibility for all activity that occurs under such account and password.

4 Reliance

4.1 Upon full payment of all relevant fees and subject to the provisions of these terms and conditions, the Client and Beneficiary are granted an irrevocable royalty-free licence to access the information contained in a Report, Mapping or in a report prepared by GroundSure in respect of or arising out of Consultancy Services. The Services may only be used for the benefit of the Client and those persons listed in clauses 4.2 and 4.3.

4.2 In relation to Data Reports, Mapping and Risk Screening Reports, the Client shall be entitled to make Reports available to (i) the Beneficiary, (ii) the Beneficiary's professional advisers, (iii) any person providing funding to the Beneficiary in relation to the Site (whether directly or as part of a lending syndicate), (iv) the first purchaser or first tenant of the Site (v) the professional advisers and lenders of the first purchaser or tenant of the Site. Accordingly GroundSure shall have the same duties and obligations to those persons in respect of the Services as it has to the Client and those persons shall have the benefit of any of the Client's rights under the Contract as if those persons were parties to the Contract. For the avoidance of doubt, the limitations of GroundSure's liability as set out in clauses 7 and 11.6 shall apply.

4.3 In relation to Consultancy Services, reliance shall be limited to the Client, Beneficiary and named parties on the Report.

4.4 Save as set out in clauses 4.2 and 4.3 and unless otherwise agreed in writing with GroundSure, any other party considering the information supplied by GroundSure as part of the Services, including (but not limited to) insurance underwriters, does so at their own risk and GroundSure has no legal obligations to such party unless otherwise agreed in writing.

4.5 The Client shall not and shall not knowingly permit any person (including the Beneficiary) who is provided with a copy of any Report, (except as permitted herein or by separate agreement with GroundSure) to: (a) remove, suppress or modify any trade mark, copyright or other proprietary marking from the Report or Mapping; (b) create any product which is derived directly or indirectly from the data contained in the Report or Mapping; (c) combine the Report or Mapping with, or incorporate the Report or Mapping into any other information data or service; or (d) re-format or otherwise change (whether by modification, addition or enhancement) data or images contained in the Report or Mapping.

4.6 Notwithstanding clause 4.5, if the Client acts in a professional capacity, it may make reasonable use of a Report and/or findings made as a result of Consultancy Services to advise Beneficiaries. However, GroundSure shall have no liability in respect of any opinion or report given to such Beneficiaries by the Client or a third party.

5 Fees and Disbursements

5.1 GroundSure shall charge the Client fees at the rate and frequency specified in the Contract together, in the case of Consultancy Services, with all proper disbursements incurred by GroundSure in performing the Services. For the avoidance of doubt, the fees payable for the Services are as set out in GroundSure's written proposal, Order Website or Order acknowledgement form. The Client shall in addition pay all value added tax or other tax payable on such fees and disbursements in relation to the provision of the Services.

5.2 Unless GroundSure requires prepayment, the Client shall promptly pay all fees disbursements and other monies due to GroundSure in full without deduction, counterclaim or set off together with such value added tax or other tax as may be required within 30 days from the date of GroundSure's invoice or such other period as may be agreed in writing between GroundSure and the Client ("**Payment Date**"). GroundSure reserves the right to charge interest which shall accrue on a daily basis from 30 days after the date of Payment Date until the date of payment (whether before or after judgment) at the rate of five per cent per annum above the Bank of England base rate from time to time.

5.3 In the event that the Client disputes the amount payable in respect of GroundSure's invoice it shall notify GroundSure no later than 28 days after the date thereof that it is in dispute. In default of such notification the Client shall be deemed to have agreed the amount thereof. As soon as reasonably practicable following receipt of a notification in respect of any disputed invoice, a member of the management team at GroundSure shall contact the Client and the parties shall use all reasonable endeavours to resolve the dispute.

6 Intellectual Property

6.1 Subject to the provisions of clause 4.1, the Client and the Beneficiary hereby acknowledge that all Intellectual Property in the Services and Content are and shall remain owned by either GroundSure or the Data Providers and nothing in these terms purports to transfer or assign any rights to the Client or the Beneficiary in respect of the Intellectual Property.

6.2 The Client shall acknowledge the ownership of the Content where such Content is incorporated or used in the Client's own documents, reports, systems or services whether or not these are supplied to a third party.

6.3 Data Providers may enforce any breach of clauses 6.1 and 6.2 against the Client or Beneficiary.

6.4 The Client acknowledges that the proprietary rights subsisting in copyright, database rights and any other intellectual property rights in respect of any data and information contained in any Report are and shall remain (subject to clause 11.1) the property of GroundSure and/or any third party that has supplied data or information used to create a Report, and that these conditions do not purport to grant, assign or transfer any such rights in respect thereof to a Client and/or a Beneficiary.

6.5 The Client and each of the parties set out in clause 4.2 are permitted to make up to 8 (commercial) or 2 (residential) printed copies of the Report only. Further copies of the Report may not be made in whole or in part without the prior written permission of GroundSure who shall be entitled to make a charge for each additional copy.

6.6 The Client shall (and shall procure that any recipients of the Report as permitted under clause 4.2 shall):

(i) not remove, suppress or modify any trademark, copyright or other proprietary marking belonging to GroundSure or any third party from the Services;

(ii) use the information obtained as part of the Services in respect of the subject Site only, and shall not store or reuse any information obtained as part of the Services provided in respect of adjacent or nearby sites;

- (iii) not create any product or report which is derived directly or indirectly from the data contained in the Services (save that those acting in a professional capacity to the Beneficiary may provide advice based upon the Services);
- (iv) not combine the Services with or incorporate such Services into any other information data or service; and
- (v) not reformat or otherwise change (whether by modification, addition or enhancement), data contained in the Services (save that those acting in a professional capacity to the Beneficiary shall not be in breach of this clause 6.6(v) where such reformatting is in the normal course of providing advice based upon the Services), in each case of parts (iii) to (v) inclusive, whether or not such product or report is produced for commercial profit or not.
- 6.7 The Client and/or Beneficiary shall and shall procure that any party to whom the Services are made available shall notify GroundSure of any request or requirement to disclose, publish or disseminate any information contained in the Services in accordance with the Freedom of Information Act 2000, the Environmental Information Regulations 2004 or any associated legislation or regulations in force from time to time.
- 7. Liability**
- 7.1 Nothing in these terms and conditions shall limit GroundSure's liability for causing death or personal injury through negligence or willful default.
- 7.2 Save as otherwise set out in these conditions, any information provided by one party ("**Disclosing Party**") to the other party ("**Receiving Party**") shall be treated as confidential except so far as authorised by the Disclosing Party to provide such information in whole or in part to a third party.
- 7.3 Nothing in these conditions shall affect the statutory rights of a consumer under the applicable consumer protection legislation from time to time.
- 7.4 In relation to Data Reports, Mapping and Risk Screening Reports, GroundSure's liability under the Contract shall cease upon the expiry of six years from the date when the Beneficiary became aware that it may have a claim against GroundSure in respect of the Services provided always that there shall be no liability at the expiration of twelve years from the completion of the Contract. For the avoidance of doubt, any claims in respect of which proceedings are notified to GroundSure in writing prior to the expiry of the time periods referred to in this clause shall survive the expiry of those time periods provided any such claim is actually commenced within six months of notification.
- 7.5 In relation to Consultancy Services GroundSure's liability under the Contract shall cease upon the expiry of six years from the date the Services were completed.
- 7.6 GroundSure shall not be liable to the Client or any person to whom the Client provides a copy of a Data Report, Mapping or Risk Screening Report in any circumstances whatsoever unless arising out of a breach on its part of the obligations set out in the Contract.
- 7.7 GroundSure shall not be liable if the Data Reports, Mapping or Risk Screening Report are used otherwise than as provided or referred to in these conditions and the relevant User Guide.
- 7.8 Subject to the provisions of clause 7.3, GroundSure makes no representation, warranties, express or implied, as to the accuracy, reliability, completeness, validity or fitness for purpose of any Content and shall not be liable for any omission, error or inaccuracy in relation thereto unless GroundSure should reasonably have been alerted to any omission, error or inaccuracy in the Content.
- 7.9 Subject to the provisions of clause 7.1 and irrespective of whether multiple parties make use of the same Services the total liability of GroundSure under or in connection with the Contract, whether in contract in tort for breach of statutory duty or otherwise shall not exceed £10 million per claim or series of connected claims,
- 7.10 Whilst GroundSure will use all reasonable endeavours to maintain operability of its internet ordering service it will not be liable for any loss or damages caused by a delay or loss of use of such service. The Client shall use GroundSure's internet ordering service at its own risk. GroundSure shall not be responsible for any damage to a Client or permitted assignee's computer, software, modem, telephone or other property resulting from the use of GroundSure's internet ordering service.
- 7.11 The Client accepts, and shall use all reasonable endeavours to procure that anyone who is provided with a copy of the Report accepts, that it has no claim or recourse to any Data Provider or to GroundSure in respect of the acts or omissions of such Data Providers including Content supplied by them.
- 7.12 GroundSure shall provide the Services using reasonable skill and care, however, GroundSure shall not be liable for any inaccurate statement or risk rating in a Report which resulted from a reasonable interpretation of the Content.
- 7.13 Subject to clause 7.1, GroundSure shall not be liable to the Client, the Beneficiary or any third party in contract, tort (including, without limitation, negligence) or for misrepresentation or breach of statutory duty or otherwise in respect of any loss of profits, goodwill, revenue or opportunity, or any indirect or consequential loss (even if such loss was reasonably foreseeable).
- 7.14 GroundSure undertakes for the duration of the liability periods referred to in clauses 7.4 and 7.5 to maintain professional indemnity insurance in respect of its liabilities under this Contract. GroundSure shall produce evidence of such insurance if requested by the Client. A greater level of cover may be available upon request and agreement with the Client.
- 8. GroundSure right to suspend or terminate**
- 8.1 In the event that GroundSure reasonably believes that the Client or Beneficiary as applicable has not provided the information or assistance required to enable the proper performance of the Services, GroundSure shall be entitled on fourteen days written notice to suspend all further performance of the Services until such time as any such deficiency has been made good.
- 8.2 GroundSure may additionally terminate the Contract immediately on written notice in the event that:
- (i) the Client shall fail to pay any sum due to GroundSure within 28 days of the Payment Date; or
- (ii) the Client (being an individual) has a bankruptcy order made against him or (being a company) shall enter into liquidation whether compulsory or voluntary or have an Administration Order made against it or if a Receiver shall be appointed over the whole or any part of its property assets or undertaking or if the Client is struck off the Register of Companies or dissolved; or
- (iii) the Client being a company is unable to pay its debts within the meaning of Section 123 of the Insolvency Act 1986 or being an individual appears unable to pay his debts within the meaning of Section 268 of the Insolvency Act 1986 or if the Client shall enter into a composition or arrangement with the Client's creditors or shall suffer distress or execution to be levied on his goods; or
- (iv) the Client or the Beneficiary breaches any material term of the Contract (including, but not limited to, the obligations in clause 4) incapable of remedy or if remediable, is not remedied within 14 days of notice of the breach.
- 9. Client's Right to Terminate and Suspend**
- 9.1 Subject to clause 10.2, the Client may at any time after commencement of the Services by notice in writing to GroundSure require GroundSure to terminate or suspend immediately performance of all or any of the Services.
- 9.2 The Client waives all and any right of cancellation it may have under the Consumer Protection (Distance Selling) Regulations 2000 (as amended) in respect of the Order of a Report/Mapping. This does not affect the Beneficiary's statutory rights.
- 10. Consequences of Withdrawal, Termination or Suspension**
- 10.1 Upon termination or any suspension of the Services, GroundSure shall take steps to bring to an end the Services in an orderly manner, vacate any Site with all reasonable speed and shall deliver to the Client/Beneficiary any property of the Client/ Beneficiary in GroundSure's possession or control.
- 10.2 In the event of termination/suspension of the Contract under clauses 8 or 9, the Client shall pay to GroundSure all and any fees payable in respect of the performance of the Services up to the date of termination/suspension. In respect of any Consultancy Services provided, the Client shall also pay GroundSure any additional costs incurred in relation to the termination/suspension of the Contract.
- 11. General**
- 11.1 The mapping contained in the Services is protected by Crown copyright and must not be used for any purpose outside the context of the Services or as specifically provided in these terms.
- 11.2 GroundSure reserves the right to amend these terms and conditions. No variation to these terms shall be valid unless signed by an authorised representative of GroundSure.
- 11.3 No failure on the part of GroundSure to exercise and no delay in exercising, any right, power or provision under these terms and conditions shall operate as a waiver thereof.
- 11.4 Save as expressly provided in clauses 4.2, 4.3, 6.3 and 11.5, no person other than the persons set out therein shall have any right under the Contract (Rights of Third Parties) Act 1999 to enforce any terms of the Contract.
- 11.5 The Secretary of State for Communities and Local Government acting through Ordnance Survey may enforce breach of clause 6.1 of these terms and conditions against the Client in accordance with the provisions of the Contracts (Rights of Third Parties) Act 1999.
- 11.6 GroundSure shall not be liable to the Client if the provision of the Services is delayed or prevented by one or more of the following circumstances:
- (i) the Client or Beneficiary's failure to provide facilities, access or information;
- (ii) fire, storm, flood, tempest or epidemic;
- (iii) Acts of God or the public enemy;
- (iv) riot, civil commotion or war;
- (v) strikes, labour disputes or industrial action;
- (vi) acts or regulations of any governmental or other agency;
- (vii) suspension or delay of services at public registries by Data Providers; or
- (viii) changes in law.
- 11.7 Any notice provided shall be in writing and shall be deemed to be properly given if delivered by hand or sent by first class post, facsimile or by email to the address, facsimile number or email address of the relevant party as may have been notified by each party to the other for such purpose or in the absence of such notification the last known address.
- 11.8 Such notice shall be deemed to have been received on the day of delivery if delivered by hand, facsimile or email and on the second working day after the day of posting if sent by first class post.
- 11.9 The Contract constitutes the entire contract between the parties and shall supersede all previous arrangements between the parties.
- 11.10 Each of the provisions of the Contract is severable and distinct from the others and if one or more provisions is or should become invalid, illegal or unenforceable, the validity and enforceability of the remaining provisions shall not in any way be tainted or impaired.
- 11.11 These terms and conditions shall be governed by and construed in accordance with English law and any proceedings arising out of or connected with these terms and conditions shall be subject to the exclusive jurisdiction of the English courts.
- 11.12 If the Client or Beneficiary has a complaint about the Services, notice can be given in any format eg writing, phone, email to the Compliance Officer at GroundSure who will respond in a timely manner.

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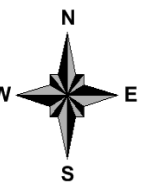
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Report Ref: HMD-283-048791
Grid Ref: 350540, 494220

Map Name: MasterMap

Map date: 2011

Scale: 1:2,500

Printed at: 1:2,500



2011

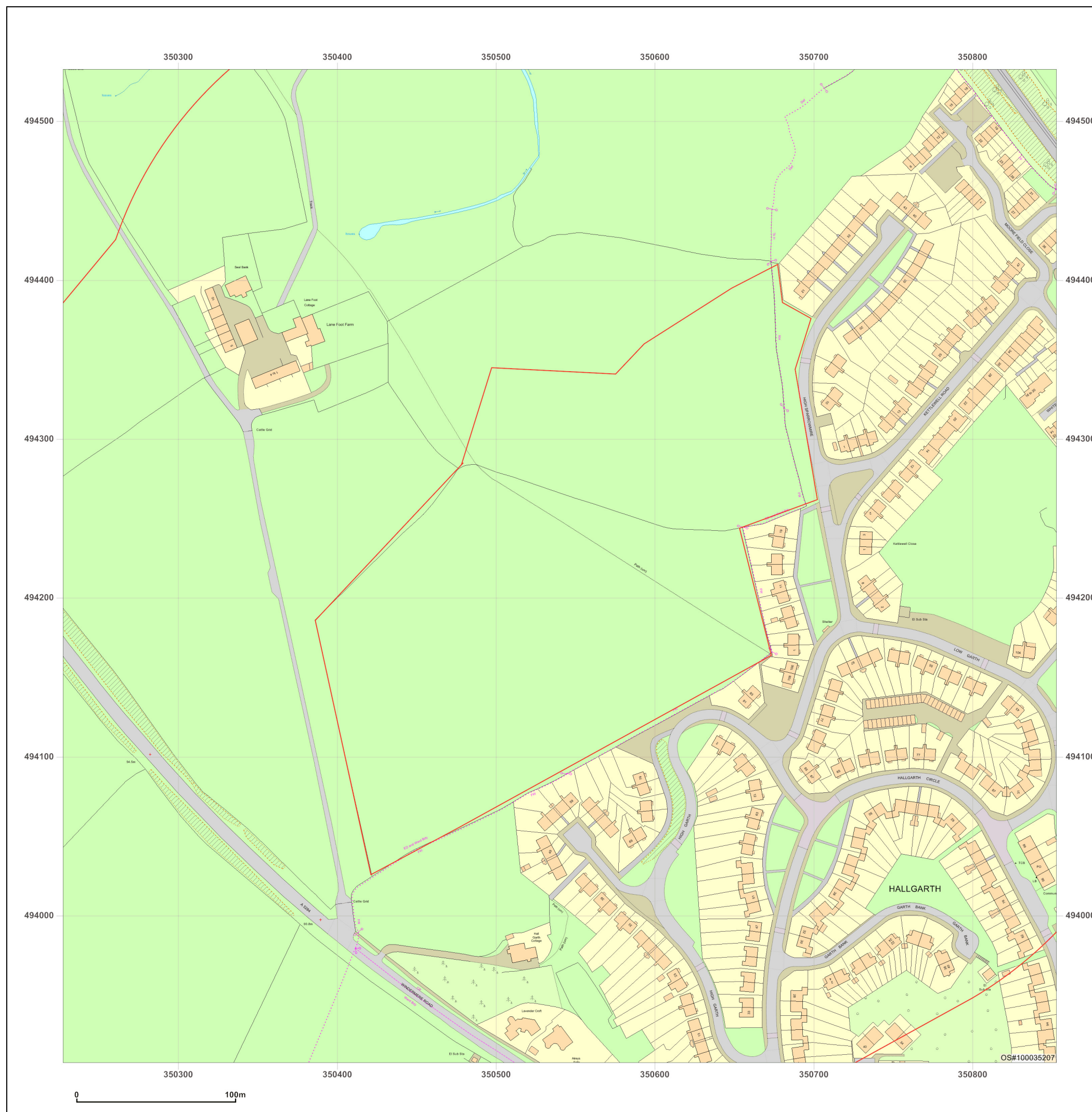


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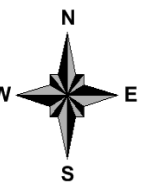
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Report Ref: HMD-283-048791
Grid Ref: 350540, 494220

Map Name: National Grid

Map date: 1995

Scale: 1:1,250

Printed at: 1:2,500



Surveyed 1995
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Edition N/A
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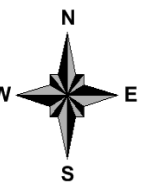
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Report Ref: HMD-283-048791
Grid Ref: 350540, 494220

Map Name: National Grid

Map date: 1994

Scale: 1:1,250

Printed at: 1:2,500



Surveyed N/A
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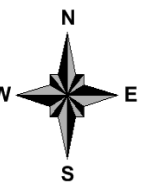
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Report Ref: HMD-283-048791
Grid Ref: 350540, 494220

Map Name: National Grid

Map date: 1975

Scale: 1:1,250

Printed at: 1:2,500



Surveyed 1974
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Edition N/A
Copyright 1975
Levelled 1971

Surveyed 1974
Revised 1974
Edition N/A
Copyright 1975
Levelled 1954

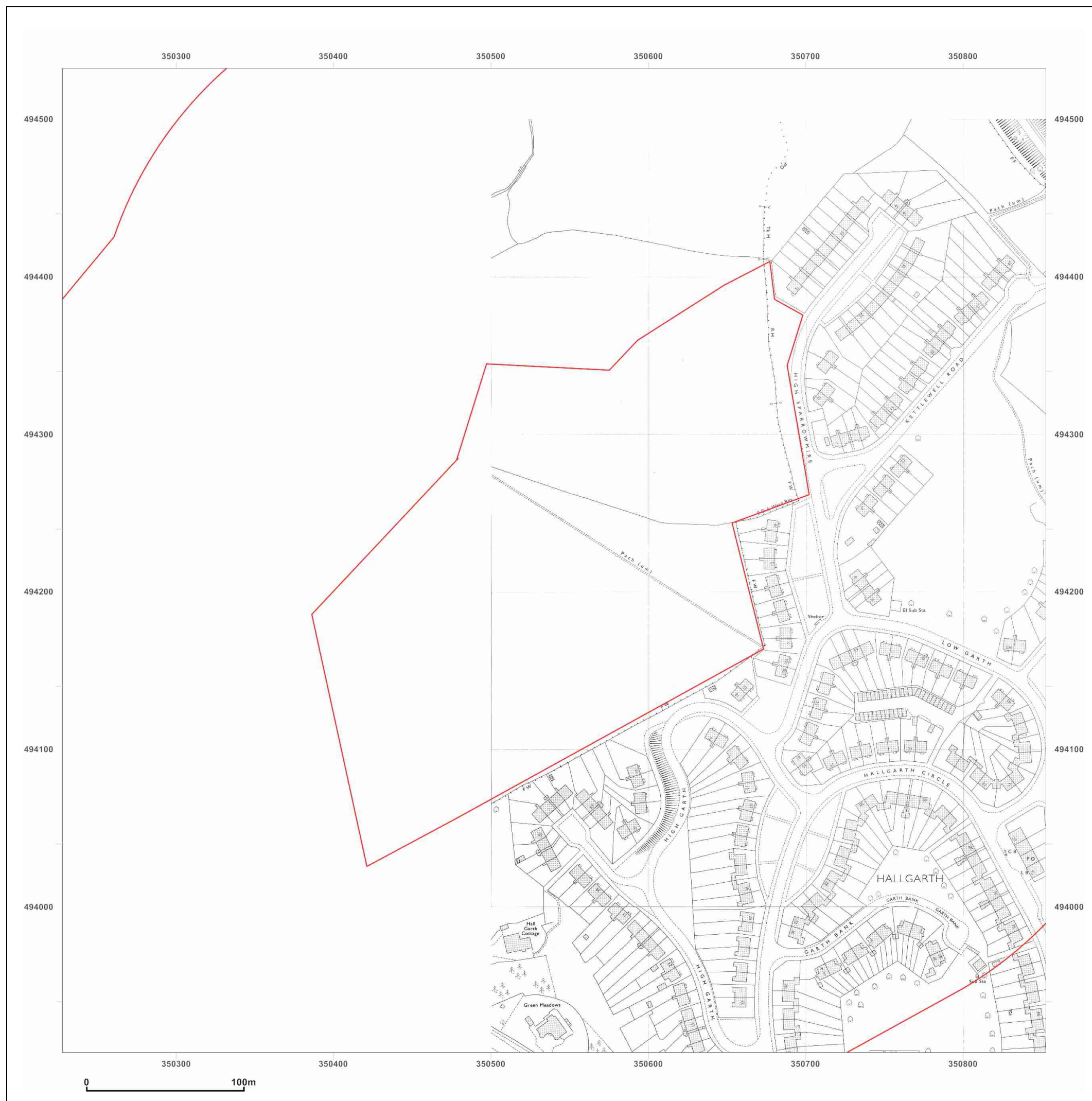


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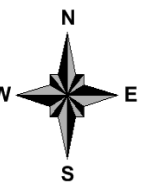
Client Ref: C4280/RIH
Report Ref: HMD-283-048791
Grid Ref: 350540, 494220

Map Name: National Grid

Map date: 1967

Scale: 1:2,500

Printed at: 1:2,500



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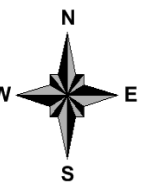
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Report Ref: HMD-283-048791
Grid Ref: 350540, 494220

Map Name: County Series

Map date: 1914

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1914
Revised 1914
Edition NA
Copyright NA
Levelled NA

Surveyed 1914
Revised 1914
Edition NA
Copyright NA
Levelled NA

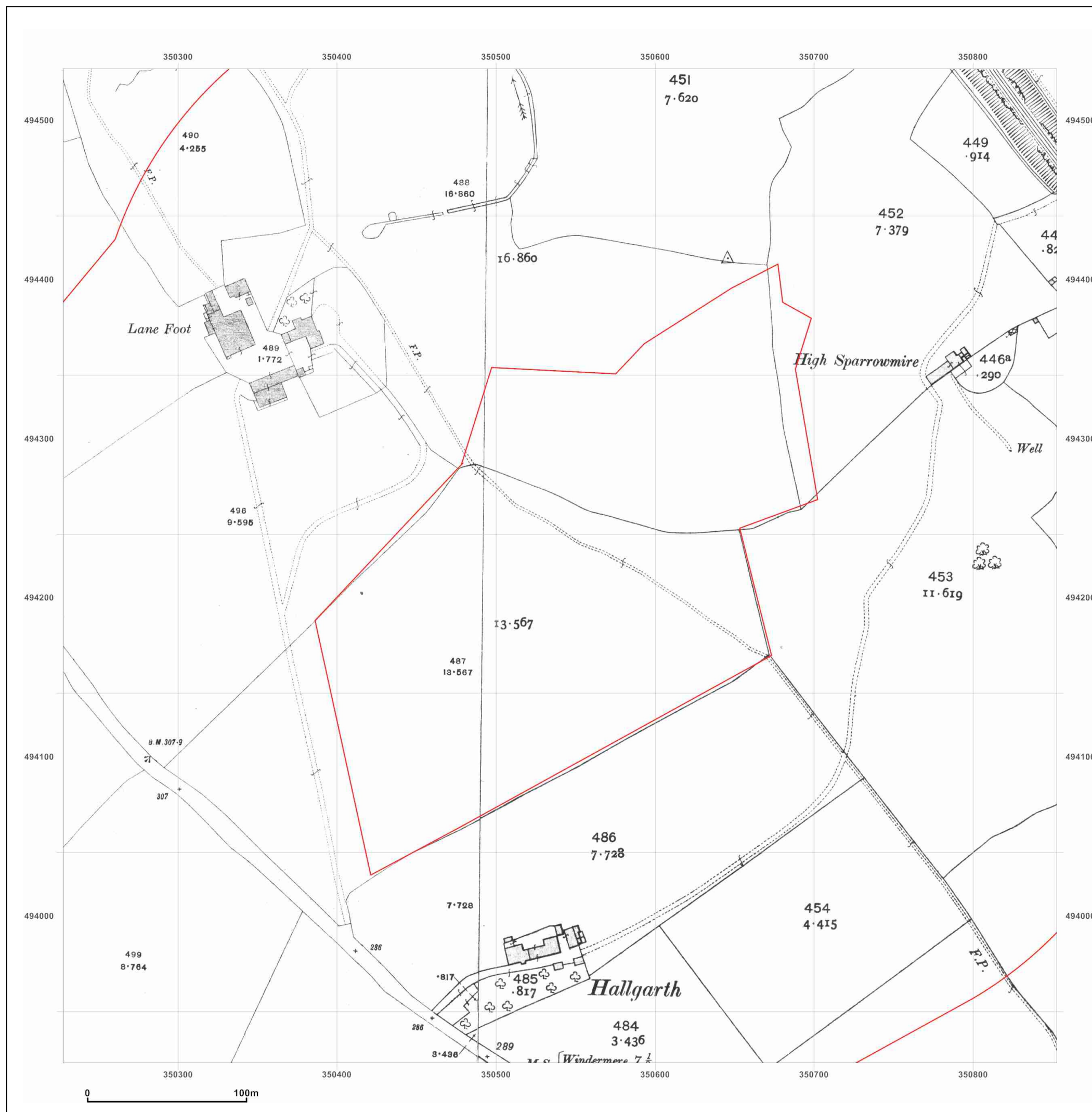


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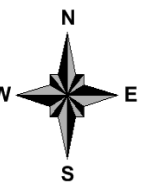
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Grid Ref: 350540, 494220

Map Name: County Series

Map date: 1898

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1898
Revised 1898
Edition NA
Copyright NA
Levelled NA

Surveyed 1898
Revised 1898
Edition NA
Copyright NA
Levelled NA

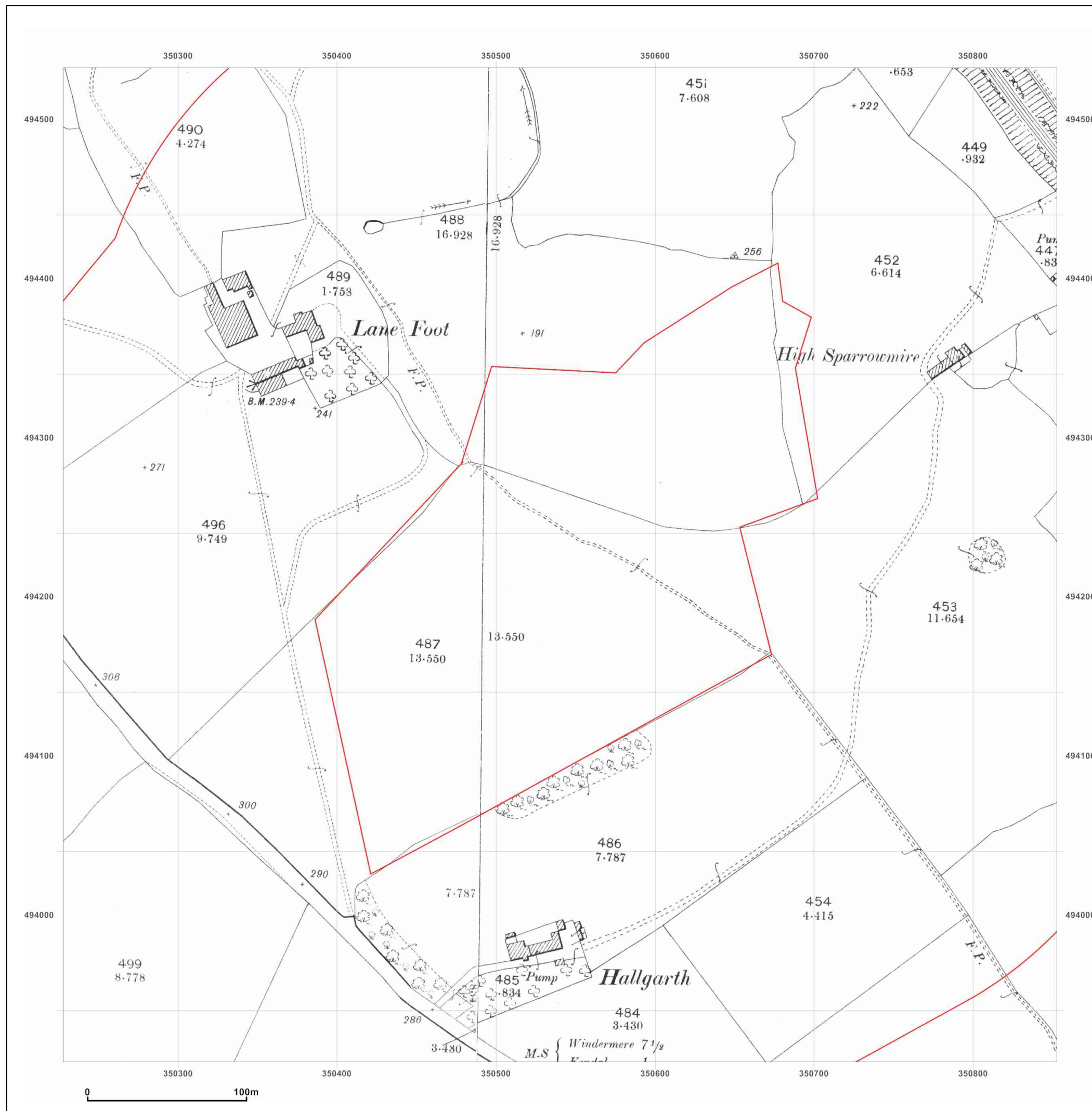


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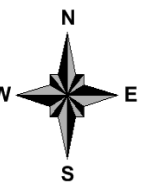
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Report Ref: HMD-283-048791
Grid Ref: 350540, 494220

Map Name: County Series

Map date: 1859

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1859
Revised 1859
Edition NA
Copyright NA
Levelled NA

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Copyright NA
Levelled NA

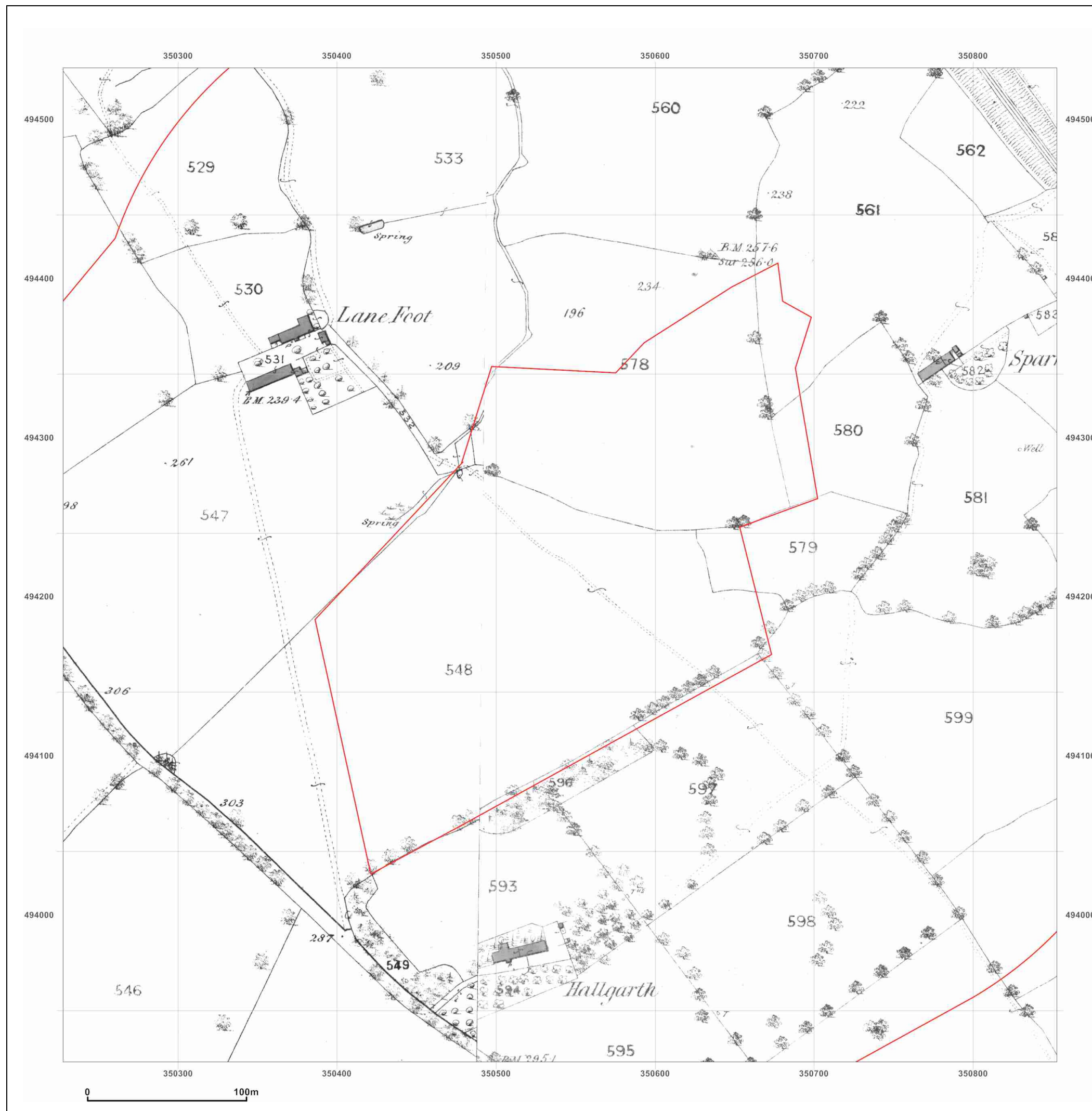


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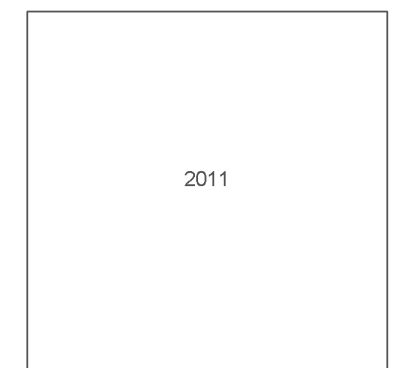
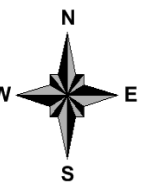
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Map Name: National Grid

Map date: 2011

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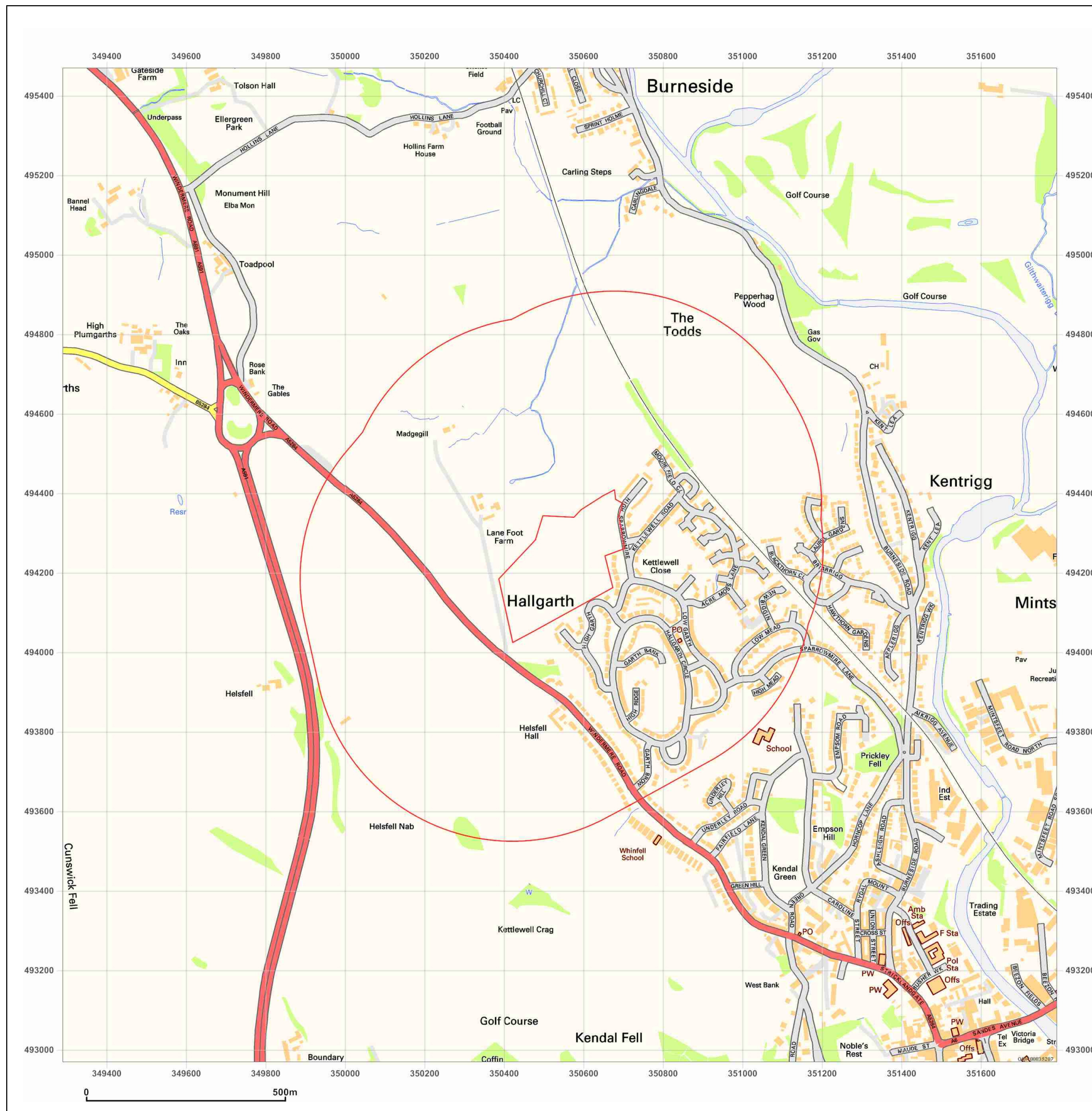


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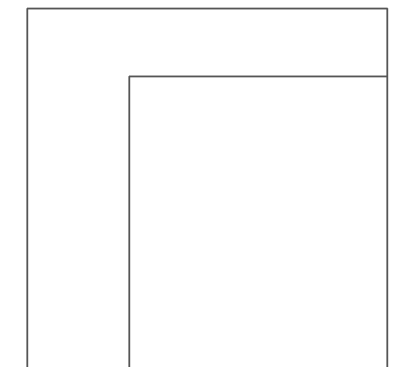
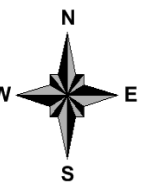
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Report Ref: HMD-283-048791
Grid Ref: 350540, 494220

Map Name: National Grid

Map date: 1991

Scale: 1:10,000

Printed at: 1:10,000



Surveyed 1990
Revised 1991
Edition NA
Copyright NA
Levelled NA

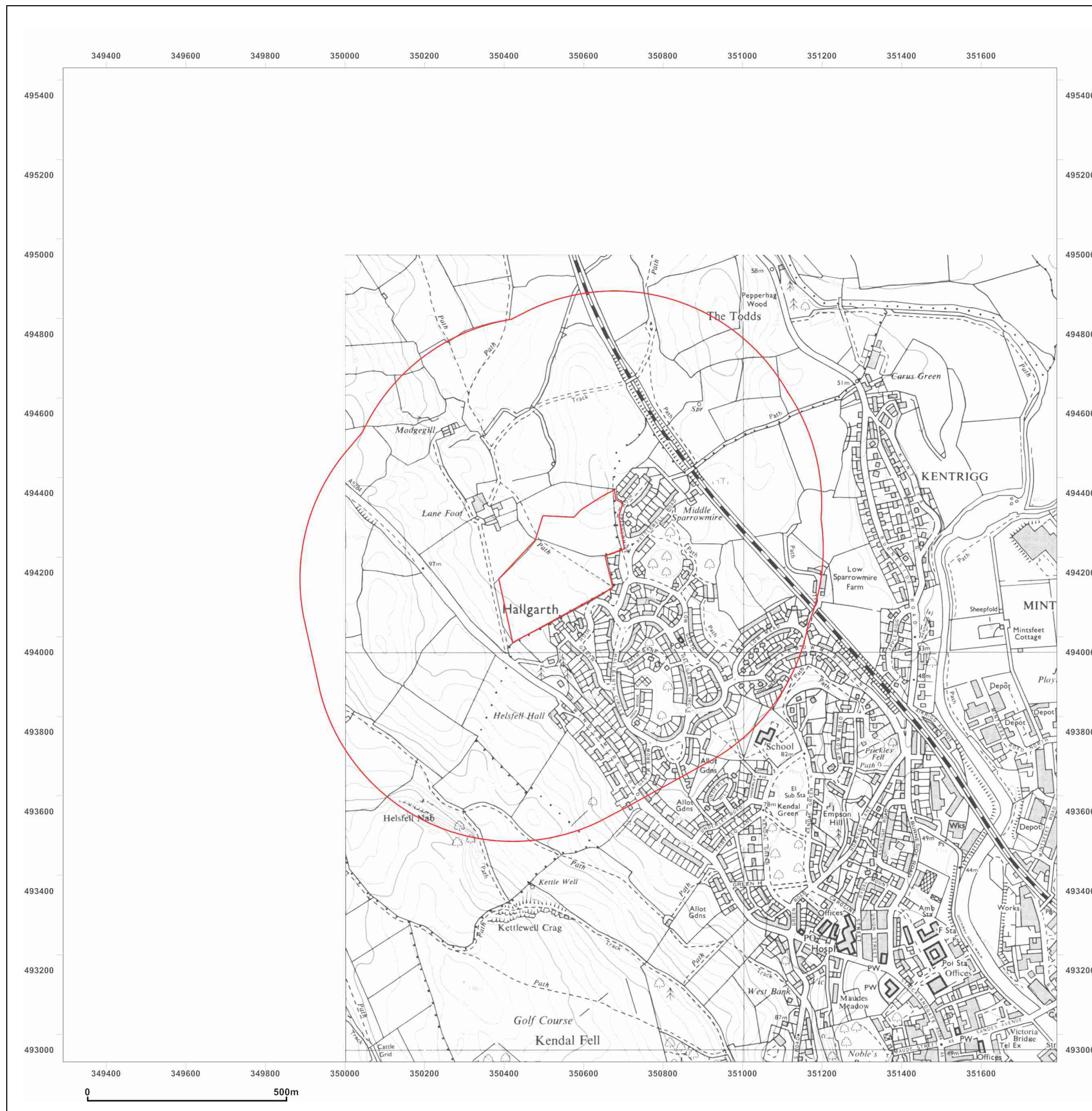


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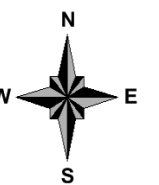
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Grid Ref: 350540, 494220

Map Name: National Grid

Map date: 1974-1979

Scale: 1:10,000

Printed at: 1:10,000



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Edition NA
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Levelled NA

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Revised 1974
Edition NA
Copyright NA
Levelled NA

Surveyed 1971
Revised 1975
Edition NA
Copyright NA
Levelled NA

Surveyed 1975
Revised 1979
Edition NA
Copyright NA
Levelled NA

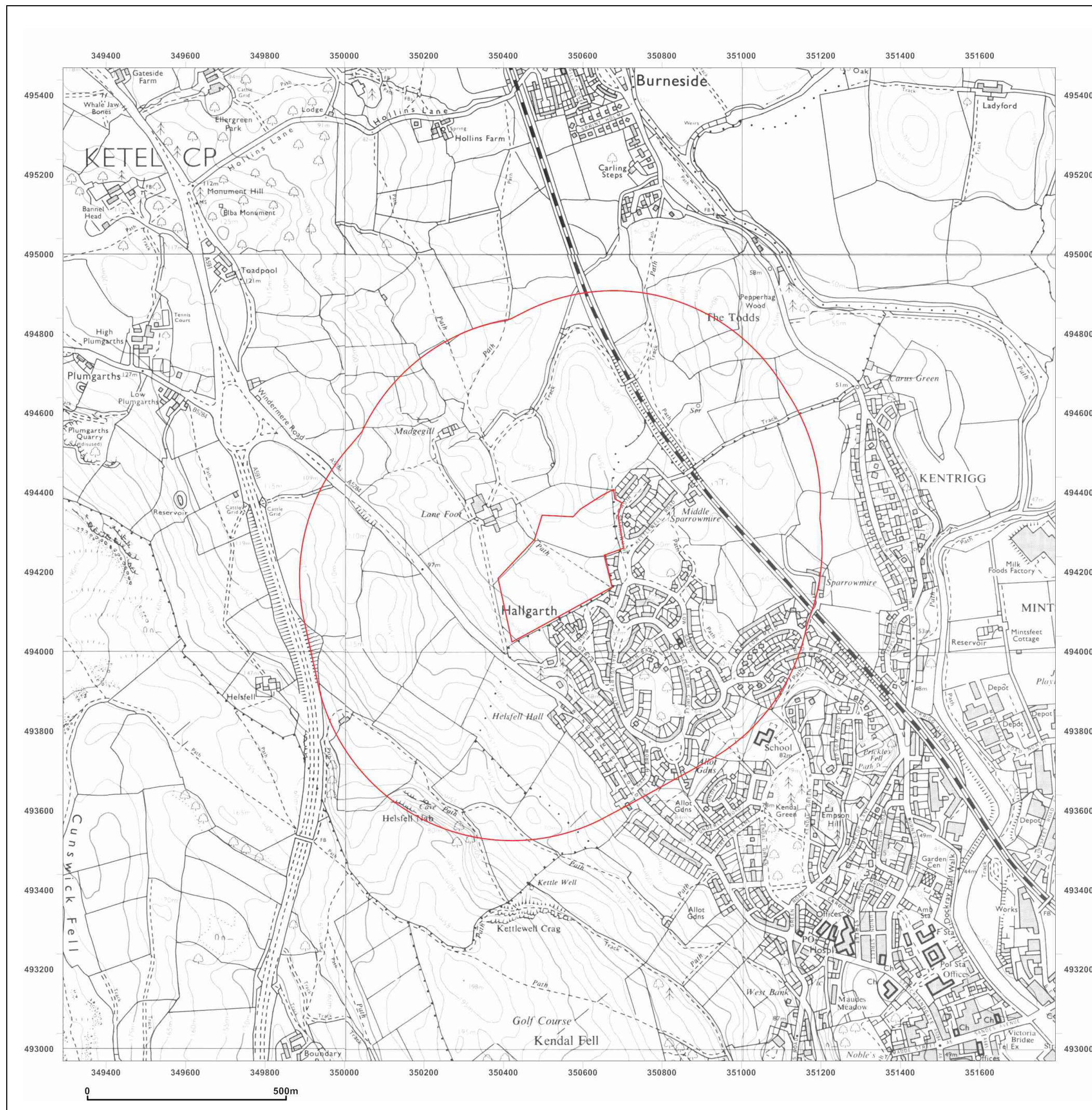


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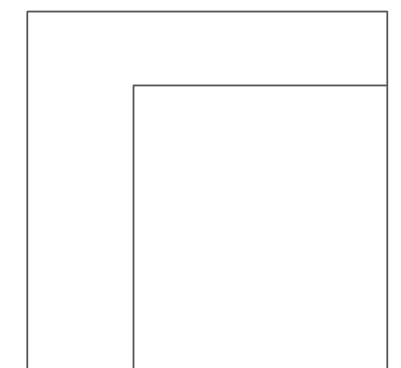
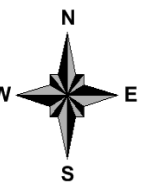
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Report Ref: HMD-283-048791
Grid Ref: 350540, 494220

Map Name: Provisional

Map date: 1969

Scale: 1:10,560

Printed at: 1:10,560



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Revised 1969
Edition NA
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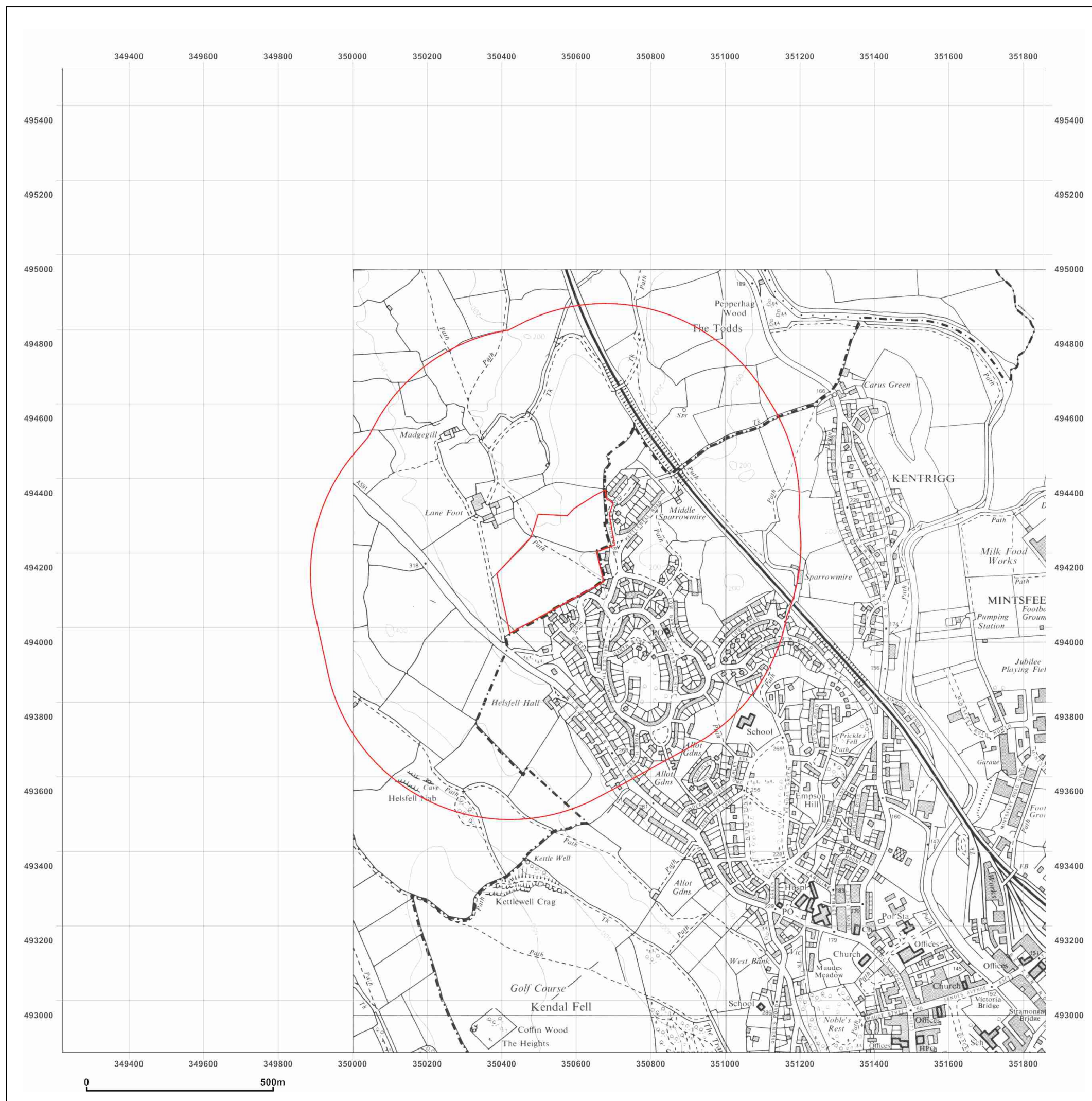


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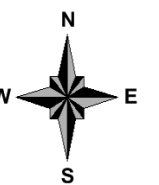
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Grid Ref: 350540, 494220

Map Name: Provisional

Map date: 1951

Scale: 1:10,560

Printed at: 1:10,560



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Edition NA
Copyright NA
Levelled NA

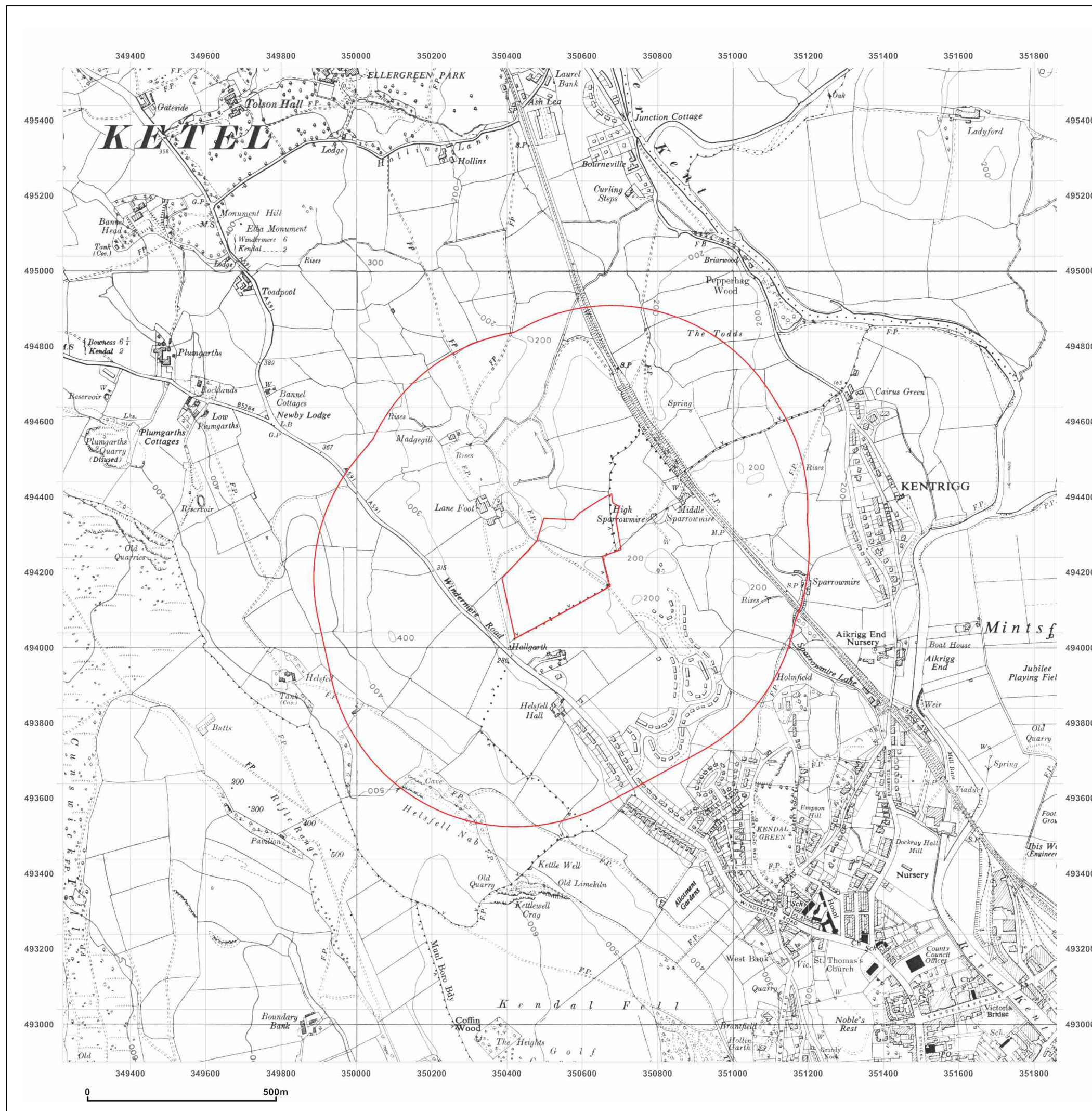


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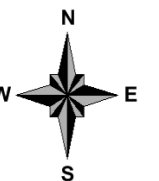
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Report Ref: HMD-283-048791
Grid Ref: 350540, 494220

Map Name: County Series

Map date: 1920

Scale: 1:10,560

Printed at: 1:10,560



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Edition NA
Copyright NA
Levelled NA

Surveyed 1857
Revised 1920
Edition 1920
Copyright NA
Levelled NA

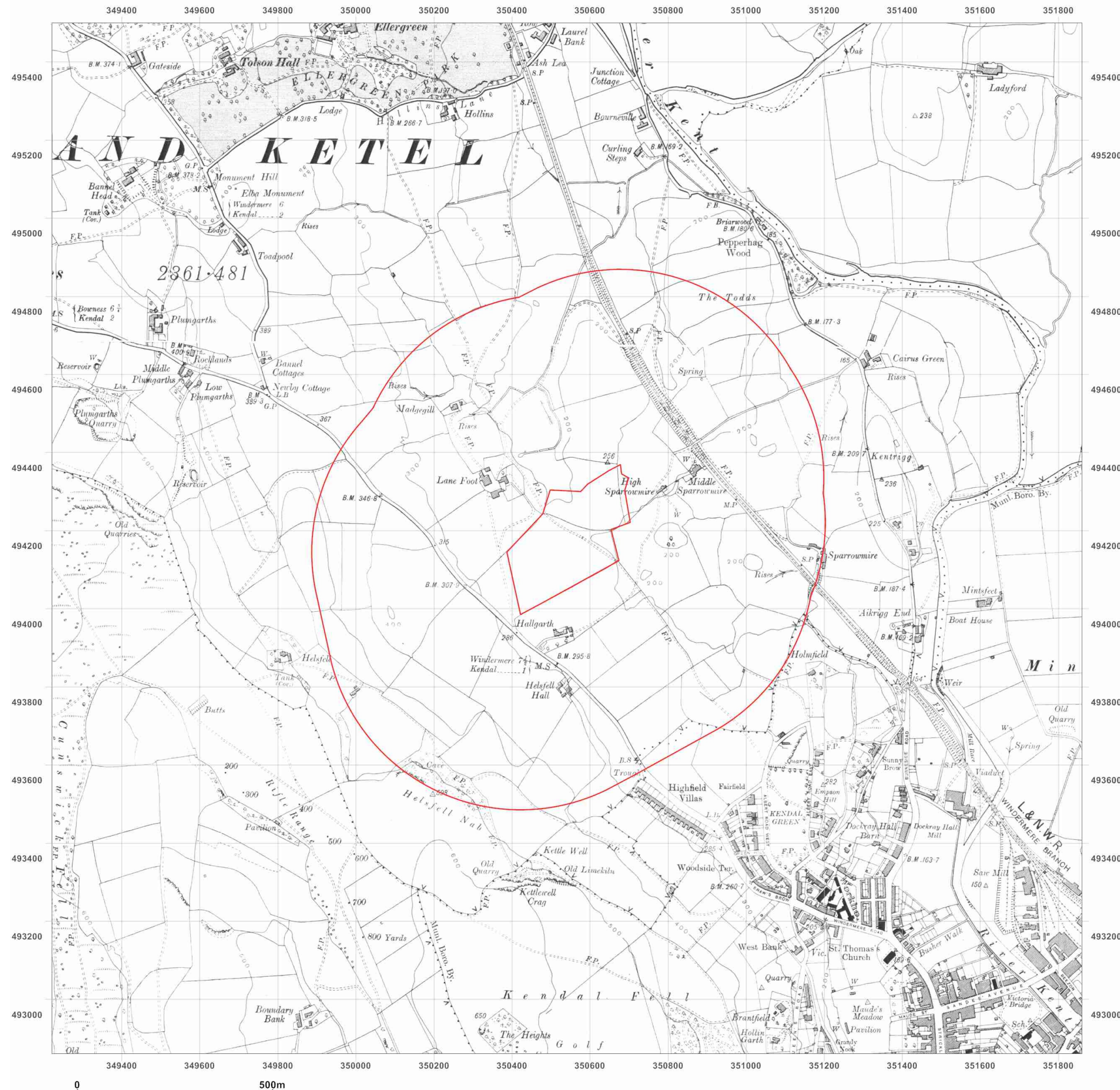


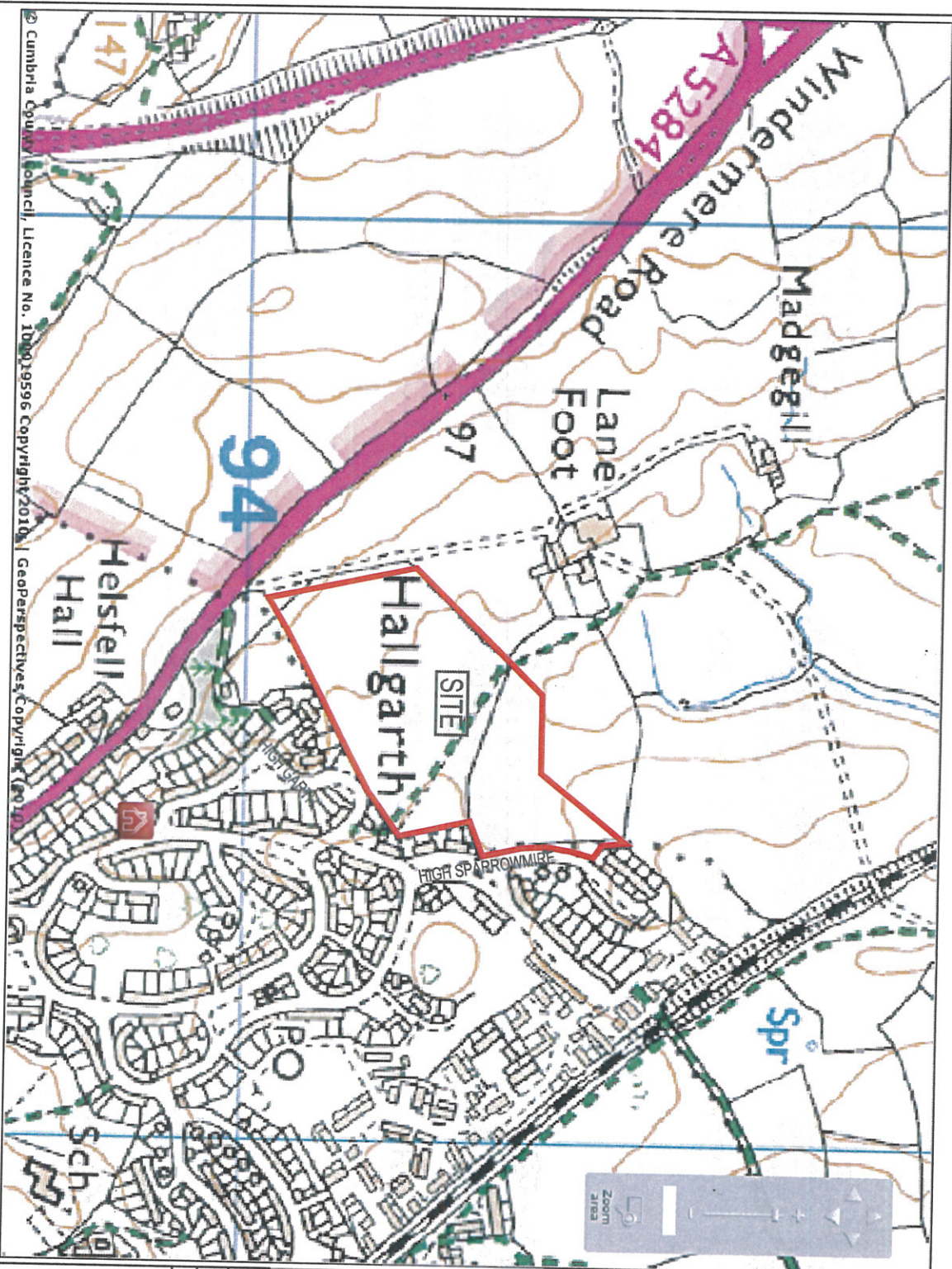
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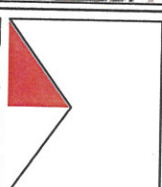
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Rev	Date	Description	By	CHK	App

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Smeaton House
Holt Park District Centre
Leeds
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PROJECT Land off Windermere Road, Kendal

TITLE

Site Location Plan

DRAWING No. LS1138 L1 SCALE NTS REV P1

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Risk of Flooding from Rivers and Sea

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place name:

Overview map:

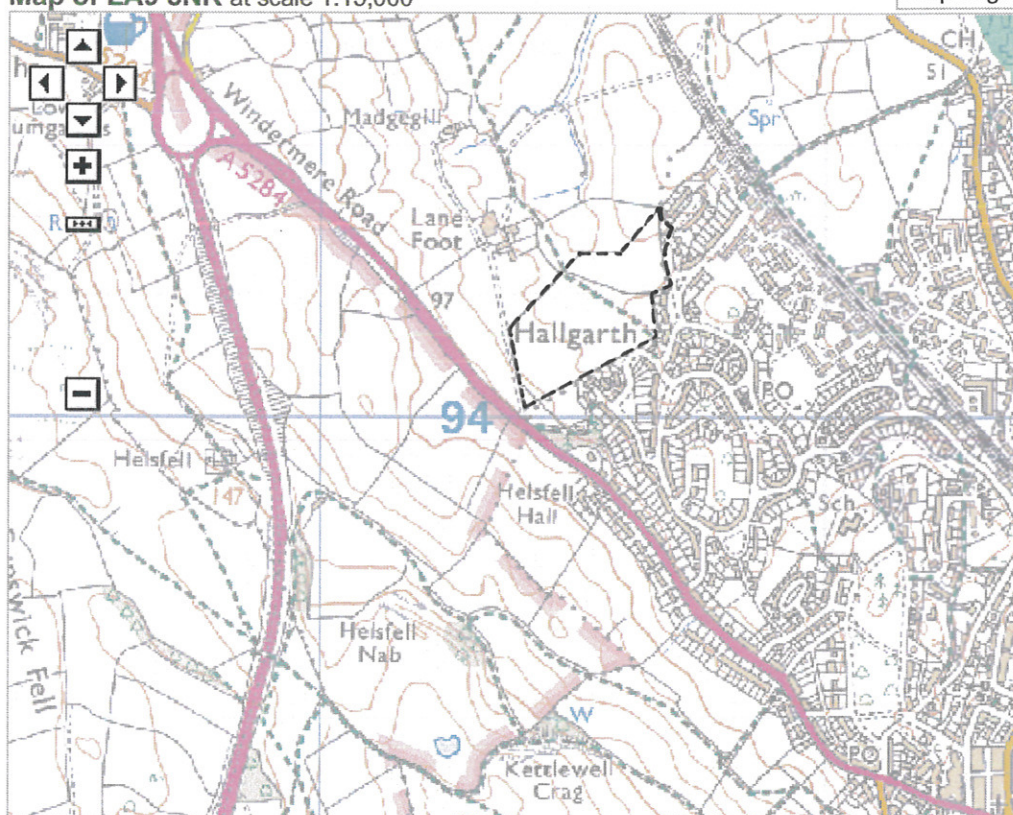


Other topics for this
area...

[Risk of Flooding
from Rivers and
Sea](#)[Risk of Flooding
from Reservoirs](#)[Flood Warning
Areas](#)[River and Sea
Levels](#)[Landfill](#)[Pollution](#)[Air Pollution](#)[River Quality](#)[Bathing Water
Quality](#)[Groundwater](#)[River Basin
Management Plans
- Rivers](#)[River Basin
Management Plans
- Lakes](#)

Map of LA9 5NR at scale 1:15,000

Map Legend



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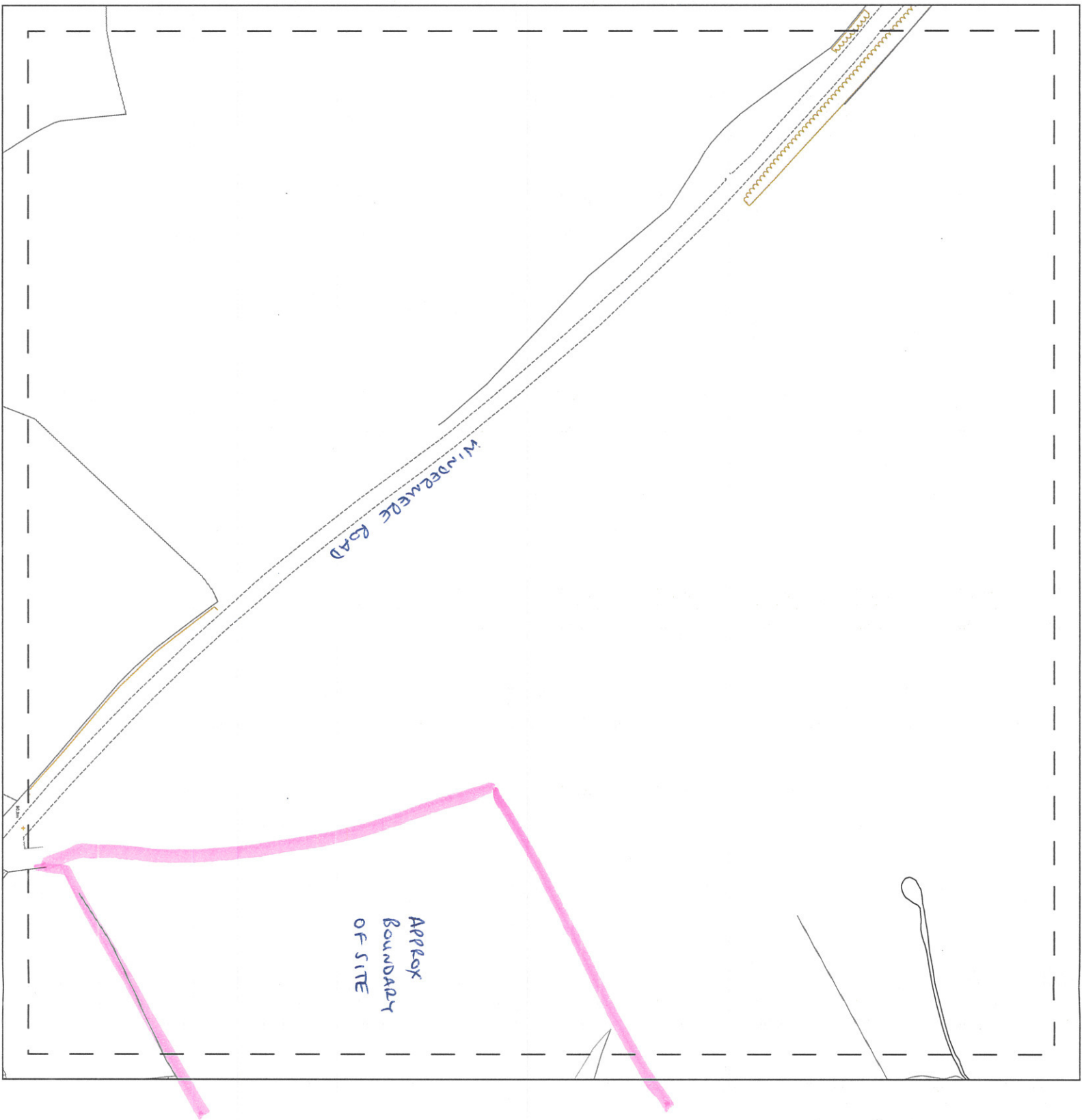
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Flood Map – Information Warnings

Manchester Ship Canal

Flood Mapping of the Manchester Ship Canal in Trafford, Salford and Warrington may be subject to a result of representations. For further information please contact the Environment Agency on 0161 275 2000. Users of the Flood Zone Map should be aware that we have received a Judicial review challenging the mapping of the Manchester Ship Canal at Trafford, Salford and Warrington on the ground that the map is flawed in respect of our consideration of the role of the sluice gates in preventing flooding. We are defending the challenge and believe and are advised that it is ill-founded. Nevertheless, in the event of a determination of the challenge, users of the map need to consider whether the existence of the sluice gates on the basis of it, affects the weight they judge may be given to the zoning of the Manchester Ship Canal on the Flood Map.



OS Sheet No: SD5094SW
Scale 1:1250 Date: 15-Jul-2011

Printed by: Donna Camblin

There are no nodes in SD5094SW.

WASTE WATER SYMBOLOGY



Note - ALL flow direction arrows are BLUE - colour not significant

NODE TABLE ABBREVIATIONS

MANHOLE FUNCTION

- F Fail
- S Surface
- O Overflow
- C Combined
- T Transition
- U Unspecified

MANHOLE / NODE TYPE

- M Manhole
- J Junction
- L Lateral
- H Hatchbox
- R Redding Eye
- F Outlet
- V Combined Sewer
- P Pumping Station
- S Sockaway
- D Dual Function
- Manhole
- W Treatment Works
- G Gnot
- (to allow pipe bends)

SEWER SHAPE

- C Circular
- E Egg
- O Oval
- F Flat Top
- R Rectangular
- S Square
- T Trapezoidal
- A Arch
- B Barrel
- H Horseshoe
- U Unspecified

SEWER MATERIAL

- AC Asbestos Cement
- BR Brick
- CI Cast Iron
- SI Spun (Grey) Iron
- CO Concrete
- CS Concrete Segments (Bolted)
- CS Concrete Segments (Unbolted)
- CC Concrete Box Culvert
- DI Ductile Iron
- GR Glass Reinforced Concrete
- GS Glass Reinforced Plastic
- PS Plastic / Steel Composite
- PV Polyvinyl Chloride
- PE Polyethylene
- RP Reinforced Plastic Matrix
- ST Steel
- UC Unlined Clay (All Clayware)
- PP Polypropylene
- PF Pitch Fibre
- MA Masonry - In Regular Courses
- MA Masonry - Randomly Coursed
- U Unspecified

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No Nodes
Sheet 1 of 1



