LITHOS

Preliminary Geoenvironmental Investigation

Land at Wigton Heath Farm

For Park Lane Homes

Report no: 4382/1

Date: May 2022

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WIGTON HEATH FARM SUMMARY OF GEOENVIRONMENTAL ISSUES

Job No.	4382	**Site area/ha**	0.8 ha (1.95 acres)
Client:	Park Lane Homes	**NGR:**	SE 324 410
Site:	Wigton Heath Farm	**Nearest postcode:**	LS17 8WB

The site is located off Manor House Lane (via Wigton Heath), approximately 7.5km north of Leeds city centre, and currently comprises Wigton Heath Farm. The site was formerly open farmland until the 1960s when Wigton Heath Farm is first shown on old maps. The farm comprises three buildings, two of which are in poor state of repair. The surrounding land was used for storage of scrap material, waste, and vehicles but has now been cleared of all waste and scrap material leaving the derelict farm buildings.

Lithos were commissioned by PLH to provide a preliminary geoenvironmental appraisal of the site. It is understood that the site is to be redeveloped for a residential use; a proposed layout is not currently available.

Lithos' investigation included an inspection of historical and geological maps and information provided by the British Geological Survey, the Landmark Information Group, and QGIS. In addition, a site inspection has been carried out.

A summary of salient geoenvironmental issues is provided in the table below.

Issue	Remarks
Anticipated ground conditions	Based on observations made during the site walkover, and given site's former uses veneer of Granular Made ground in the farmyard area and beneath any hard standing/concrete floor slabs. Beyond the footprint of the farmyard, topsoil (likely 0.3m thick) is anticipated over Granular residual soils (weathered sandstone) likely to c. 1.5m depth
Anticipated contamination	It is considered likely that some (probably minor) ground contamination will be present in shallow soils.
Mining & quarrying	This site is located beyond the CA's defined coalfields. Two former sandstone quarries are present to the south within 250m of the site's boundary. One has been infilled with unknown material, whilst the other is now a pond.
Hazardous gas	The site is in an area where less than 1% of homes are estimated to be above the radon action level. The site is located within 250m of backfilled sandstone quarries. Whilst risks appear low, monitoring (6 visits over 3 months) would be prudent to determine whether or not there is a need for protection measures in the proposed new build.
Flooding & drainage	The site lies in Flood Zone 1, where the risk of flooding from rivers or the sea is classified as low. Given anticipated ground conditions, soakaways may provide a viable solution for the disposal of surface water, subject to on testing.
Preparatory works	Demolition of existing buildings and grubbing up of hardstand. Site wide vegetation and topsoil stripping.
Anticipated foundation solutions	All plots at the site will be founded on traditional strip foundations at a minimum depth of 900mm; founding stratum will likely be Granular Residual Soils (sand and gravels)
Recommendations for ground investigation	Machine-excavated trial pits to determine near surface ground conditions including depth to bedrock, the presence of obstructions, groundwater and stability. Dynamic sampling (mini-boreholes) to allow investigation in areas of limited access.

At this stage, anticipated significant abnormals relating to geoenvironmental issues at the site are:

- Demolition of existing buildings, including grubbing up all hardstanding.
- Chasing out of made ground if encountered.

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Appendix B – Drawings

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4382/1	Site location plan
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4382/5	Preliminary conceptual site model

Appendix C - Commission

Appendix D – Historical OS plans*

Appendix E – Search responses*

From	Date	Content
Landmark	12th April 2022	Envirocheck report

* Some of this data is not included within the paper or PDF copies of this report; by request, it can be provided on a CD.

FOREWORD (preliminary geoenvironmental investigation report)

This report has been prepared for the sole use and reliance of the Client named on page 1 and cannot be relied upon by any other parties without the express written authorisation of Lithos Consulting Limited (Lithos). Any unauthorized third party relies on this report at their own risk and the authors owe them no duty of care.

This report has been reviewed by a Competent Person, as defined in the National Planning Policy Framework. We ensure that all projects are managed by individuals with necessary experience, relevant qualifications, and current membership of a relevant professional organisation. Records of engineers, project managers and reviewers involved in this project are maintained by us. Lithos QA/QC procedures for all our work forms an integral part of our ISO9001 accreditation and as such is regularly audited.

The report presents observations and factual data obtained during our site investigation, and provides an assessment of geoenvironmental issues with respect to information provided by the Client regarding the proposed development. Further advice should be sought from Lithos prior to significant revision of the development proposals.

The report should be read in its entirety, including all associated drawings and appendices. Lithos cannot be held responsible for any misinterpretations arising from the use of extracts that are taken out of context. However, it should be noted that in order to keep the number of sheets of paper in the hard copy to a minimum, some information (e.g. full copy of the Landmark/Groundsure Report) is only included within the "electronic", PDF Report on the accompanying CD.

The findings and opinions conveyed in any Desk Study section of the report (including review of any third party reports) are based on information obtained from the sources listed, which Lithos understands are reliable. Reasonable skill, care and diligence has been applied in examining the information obtained. However, Lithos accept no responsibility for inaccuracies in the data supplied or for opinions based on any such inaccurate data.

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

Lithos reserve the right to amend their conclusions and recommendations in the light of further information that may become available.

PRELIMINARY GEOENVIRONMENTAL INVESTIGATION OF LAND AT WIGTON HEATH FARM

1 INTRODUCTION

1.1 The commission and brief

1.1.1 Lithos Consulting were commissioned by Park Lane Homes to carry out a preliminary geoenvironmental investigation of land at Wigton Heath Farm.

1.1.2 Correspondence regarding Lithos' appointment, including the brief for this investigation, is included in Appendix C. The agreed scope of works included:

- A site walkover and inspection
- An assessment of land use history
- Determination of the site's environmental setting
- Assessment of anticipated ground conditions, including potential contaminants
- Assessment of anticipated foundation and engineering issues associated with redevelopment for a residential end-use
- Provision of recommendations for an appropriate ground investigation

1.1.3 This Preliminary Investigation comprised an inspection of historical and geological maps and information provided by the British Geological Survey, and the Landmark Information Group, and QGIS[1]. In addition, a site inspection has been carried out by Lithos.

1.1.4 Primary aims of this investigation were to identify salient geoenvironmental issues affecting the site to enable design and costing of an appropriate intrusive investigation.

1.2 The proposed development

1.2.1 It is understood that consideration is being given to redevelopment of the site with two or three storey domestic dwellings, associated gardens, POS and adoptable roads and sewers. No site layout has been provided at this stage.

1.3 Report format and limitations

1.3.1 Standard definitions, procedures and guidance are contained within Appendix A, which includes background, generic information on assessment of the site's environmental setting.

1.3.2 General notes and limitations relevant to all Lithos preliminary investigations are described in the Foreword and should be read in conjunction with this report. The text of the report draws specific attention to any modification to these procedures and to any other special techniques employed.

[1] *An Open Source Geographic Information System used by Lithos to access publicly available Government held digital data.*

2 SITE DESCRIPTION

2.1 General

2.1.1 The site's location is shown on Drawing 4382/1 presented in Appendix B to this report. Site details are summarised in the table below.

Detail	Remarks
Location	7.6 km north of Leeds city centre
NGR	SE 324 410
Area	0.8 ha (1.95 acres)
Known services	Likely underground private utilities, locations unknown

2.2 Site features

2.2.1 Lithos completed a walkover survey of the site on 21st April 2022.

2.2.2 Existing salient features, at the time of the walkover are presented on Drawing 4382/3 in Appendix B to this report and summarised in the table below.

Feature	Remarks
Current access	Off Manor House Lane (via Wigton Heath)
Topography	Relatively flat
Approximate areas	1,600m^2 buildings 100m^2 mature trees & hedgerows 800m^2 gravel hardstanding 4,950m^2 grass & overgrown areas 420m^2 concrete hardstand
Nature of boundaries	North, south and west – post and wire fencing East – no defined boundary
Surrounding land uses	North - Open grassed fields with Sturdy (Stank) Beck c. 500m beyond. East – Open grassed fields with a barn (oriented east west), woodlands and golf course beyond. South – Woodland with golf course beyond. West – Open grass field with two residential properties and Leeds Grammar School beyond.

2.2.3 A selection of site photographs are included on Drawing 4382/4.

2.2.4 The site is roughly square with a rectangular segment removed from the northeast corner. The north, south and west boundaries are defined by wooden post and wire fencing. The eastern boundary is undefined and cuts through a large east-west oriented barn. Access to this parcel of land is along a concreted, then gravelled track (Wigton Heath) off Manor House Lane and via a newly installed metal gate in the southwestern corner of the site.

2.2.5 The neighbouring fields to the north, east and west are grassed and used for livestock farming. At the time of the walkover, only the western field was in use with a herd of sheep. To the south of the site is an unmanaged mature woodland, comprising mainly of silver birch. Within this woodland are former quarries, one infilled and the other now a pond. The woodland area is very soft and boggy.

2.2.6 Within the site boundary are 3 distinct buildings.

2.2.7 The first in the west is the concrete frame remnants of a former barn, now overgrown with brambles and grass, as such it was not possible to examine the base of the structure. Large timbers scatter the floor, perhaps part of the former roof.

2.2.8 The second and central building consists of six smaller and conjoined barns, each with varying design and construction, common building materials included red bricks, steel frame, a tin or cement sheet roof and concrete floor slab. These buildings were in very poor state of repair with the north-eastern barn having lost much of its tin roof cladding whilst other areas had full roof collapse and extensive damage to brick walls. This central building is 'U' shaped and has an area of concrete hardstanding creating a courtyard. This courtyard is partially portioned into smaller areas by breeze block walls. It was noted during the walkover that at least 6 inspection pits had been excavated and left open on the corners of the building, presumed to examine the existing foundations.

2.2.9 The third building is a long and tall east-west oriented barn (through which the eastern site boundary passes). This barn is the only structure still in use and is constructed with a steel frame, breeze block walls, timber cladding, cement sheet roof and concrete floor slab. At the time of the walkover the eastern end was used as hay bale storage, whilst the western end was a temporary sheep pen (with lambs).

2.2.10 Stockpiles of material, mostly soils and rubbish were encountered sporadically across the site. The approximate locations of the inspection pits and stockpiles can be seen on Drawing 4382/3 in Appendix B to this report.

2.2.11 Beyond the buildings to the north, the site is partially overgrown with long grass, small shrubs, and occasional trees along the western boundary. It was noted that bricks, concrete cobbles, and generally undesirable surface materials were sporadically present amongst the overgrown grass within c. 20m of the building's footprints. To the south and weaving in between the buildings were tracks for vehicular access, these often comprises compacted mud, bricks, concrete cobbles, gravel, and hardcore surfacing. Adjacent to the southern boundary is an area of grass, formerly used as rubbish and scrap storage, one stockpile of material remains in the southeast.

2.2.12 The site has not always been as clear of material as it currently is. Satellite imagery from c. 2015 to 2020, suggests the site was occupied by a static caravan in the current courtyard and overflowed with waste material, machinery, plant (excavators, trailers, tractors), scrap, tyres, and numerous other items. As such, this makes properly characterising the site in terms of contaminants and former uses more challenging and a precautionary approach should be taken.

3 SITE HISTORY

3.1 In order to investigate the development history and previous land uses at the site and immediate surrounding land, site centred extracts from Ordnance Survey (OS) plans dating back to 1851 have been examined. These plans are presented in Appendix D to this report.

3.2 The table below provides a summary of the salient points relating to the history of the site with respect to the proposed end use. It is not the intention of this report to describe in detail all the changes that have occurred on or adjacent to the site. Significant former uses/operations are highlighted in **bold** text for ease of reference.

Date	Site	Surrounding land
1851	Single parcel of land denoted as 'rough pasture' with hedgerow along the southern and western boundary.	Open fields to the north and east. Open fields with two **sandstone quarries** to the south and southwest. Pond c. 300m southwest. Open fields with Wigton Lane and Manor House beyond.
1893	No significant changes (site no longer denoted as rough pasture).	Open fields to the south not woodland with southwestern quarry infilled and southern quarry shown as a pond.
1921		Small building constructed c. 200m southwest of the site.
1934		Creation of Wigton Moor Golf Course c. 250m south of the site. Expansion of little buildings to the southwest.
1965	Central building of Wigton Heath farm constructed, with new field boundaries and a track to the north and east.	Expansion of Alwoodley north towards the site c. 1km south. Construction of Wigton Heath Farm Cottages c. 200m west.
1988	East west oriented barn constructed, and one field boundary removed.	No significant changes
2000	No significant changes	Leeds Grammar School constructed c. 500m west.
2021		No significant changes

4 ENVIRONMENTAL SETTING

4.1 General

4.1.1 Notes describing how the site's environmental setting has been assessed are included in Appendix A to this report. Reference has been made to publicly available Government held digital data via QGIS (an Open-Source Geographic Information System). The responses received from the BGS and extracts from the Landmark Report are presented in Appendix E.

Issue	Data reviewed	
Geology	1:50,000 BGS map (Sheet 70) BGS Logs	Drift soils – None. Solid (bedrock) – Midgley Grit Sandstone Strata Dip – c. 1˚ to 2 ˚ south. Faults – None.
Mining	Coal Authority	This site is located beyond the Coal Authority's defined coalfields.
Quarrying	Historical OS plans	Two sandstone quarries; one c. 100m south and one c. 130m southwest. Southwestern quarry infilled by 1893. Southern one now a pond.
Landfills	Envirocheck	No known landfills within 250m
Radon	Public Health England	The site lies in an area where <1% of homes are estimated to be above the action level. Therefore, no radon protective measures are required.
Hydrogeology	Environment Agency electronic open data via QGIS	Source Protection Zone – No. Aquifer – None (Drift); Secondary A (Solid). Groundwater abstractions – Alwoodley Golf Club (c. 550m south), used for spray irrigation of course, 1966 to present. Soil leaching potential – Low. Pollution incidents – None of significance.
Hydrology	Envirocheck Report	Nearest watercourse(s) – Sturdy (Stank) Beck (tributary of the river Wharfe) c. 500m north of the site. Water quality - Moderate. Pollution incidents – None of significance. Abstractions – None of significance Discharge consents – None of significance.
Flood risk	Environment Agency electronic open data via QGIS	The site lies in Flood Zone 1, where the risk of flooding from rivers or the sea is classified as low.

4.2 Quarries

4.2.1 Two sandstone quarries are shown on the 1851 1:10,000 historical OS plans, with on c. 100m south and a second c. 130m southwest of the site's southern boundary.

4.2.2 Information from the Landmark Envirocheck report and BGS Mineral Site records suggest the quarries fell under the name of Wigton Moor and targeted the Carboniferous Midgley Grit sandstone. Both quarries are recorded as ceased with the southwestern one being infilled and the southern one becoming a pond by 1894.

4.2.3 The depth of these quarries remains unknown as does the backfill material of the quarry to the southwest. At present, a scar on the landscape shows the faint outline of the infilled quarry, whilst the southern quarry is still a pond.

4.3 Hazardous gas

Methane & carbon dioxide

4.3.1 The site might be affected by hazardous gas as it is located within 250m of backfilled sandstone quarries.

4.3.2 Whilst risks appear low, monitoring would be prudent.

Radon

4.3.3 Requirements with respect radon measures are set out in Building Regulations Approved Document C. Probability bandings (based on the proportion of properties in a given area that exceed the Action Level; currently 200 $Bq.m^{-3}$) are used to determine whether a property requires no, basic or full measures. At present Approved Document C advocates basic measures for the probability banding 3% to 10% (full measures if >10%).

4.3.4 Information from Landmark suggests that radon protection measures are not required. This is confirmed by the Public Health England UK radon map which indicates that the site lies in an area where **less than 1%** of homes are estimated to be above the action level.

4.3.5 As such, no special precautions against radon gas are required on this site.

4.4 Agriculture

4.4.1 Historical plans show that the site has been occupied by grassed farmland to the north. Generally farming is not considered likely to have caused significant ground contamination. However, activities such as slurry spreading, the discharge of chemicals to ground, and unregulated burial are known to have occurred on farmland. Potential contaminants associated with farming activity could include any of the following.

Agricultural activity	Potential contaminant
Carcase burial	Anthrax & other biohazards
Fuel storage	Hydrocarbons, methane, oxygen depletion
Equipment maintenance	Hydrocarbons, metals
Waste burial, land levelling, backfilling ponds/quarries	Methane, metals, PAH etc
Derelict buildings, construction of farm access tracks.	Asbestos

4.4.2 Whilst it is likely that pesticides have been applied during arable use of the land, these are not likely to include the persistent organochloride pesticides such as Dieldrin, Aldrin, DDT etc. Pesticides routinely used on arable crops the UK (Phenoxy Acetic acid herbicide or PAAH) rapidly degrade in soils or leach via rainwater infiltration to groundwater. It is highly unlikely these would be detected by soil sampling and therefore it is not proposed to undertake analysis of these.

4.4.3 The generation of ground gas in quantities with the potential to impact upon the proposed development would only occur with the presence of significant quantities of organic matter. Ground gas monitoring is not considered necessary unless significant quantities of organic matter are identified during the ground investigation.

4.5 Other uses (vehicle storage, scrapyard & waste materials)

4.5.1 As seen from the satellite and arial images, the site was formerly filled with scrap materials, waste, old vehicles, and machinery. These pose a significant risk to ground contamination particularly with regards to organic contaminants, from fuels, greases, oils, degreasers, cleaners etc as well as inorganic determinands.

4.6 Preliminary conceptual site model

4.6.1 An assessment of potential contaminants associated with the former use as a farm has been undertaken. As a consequence of this assessment, anticipated potential contaminants, within soil and/or groundwater include:

- Inorganics (metals, asbestos associated with made ground and the possible use of pesticides and fertilisers)
- Asbestos arising from dilapidated farm buildings
- TPH & PAH (fuels, oils associated with machinery use, maintenance and use of the site as a storage area for waste and disused farm machinery)
- VOC & SVOC (associated with cleaners and degreasers likely to have been stored and used across the site)

4.6.2 A preliminary conceptual site model, presented as Drawing 4382/5 in Appendix B, has been prepared after consideration of all the data presented in Sections 2 to 4.

4.6.3 Clearly, the conceptual model will be subject to modification in light of data arising from the proposed intrusive ground investigation.

4.6.4 Potential contaminant linkages are shown on the preliminary conceptual site model. These include dermal, inhalation and indigestion of organic and inorganic contaminants. Volatilization of organics and migration of gas into the site from the nearby backfilled quarries.

5 LAND CONTAMINATION - PART IIA & PLANNING

5.1 Local Authorities have responsibilities with respect to land contamination in the context both of Part IIA of the Environmental Protection Act 1990, and Planning.

5.2 The contaminated land regime in Part IIA was introduced specifically to address the historical legacy of land contamination. It applies where there is unacceptable risk, assessed on the basis of the current use and the relevant circumstances of the land. It is not directed to assessing risks in relation to a future use of the land that would require a specific grant of planning permission. This is primarily a task for the planning system, which aims to control development and land use in the future.

Planning

5.3 As of 27th March 2012, Planning Policy Statement (PPS23) was replaced by the National Planning Policy Framework (NPPF). The NPPF (updated in July 2021) includes the following with respect to contamination and site investigation:

5.4 'Where a site is affected by contamination or land stability issues, responsibility for securing a safe development rests with the developer and/or landowner.

5.5 Planning policies and decisions should ensure that:

- The site is suitable for its new use taking account of ground conditions and land instability, including from natural hazards or former activities such as mining, pollution arising from previous uses, and any proposals for mitigation including land remediation or impacts on the natural environment arising from that remediation;
- After remediation, as a minimum, land should not be capable of being determined as contaminated land under Part IIA of the environmental protection act 1990; and
- Adequate site investigation information, prepared by a competent person, is presented'.

5.6 Annex 2 of the NPPF states that 'all investigations of land potentially affected by contamination should be carried out in accordance with established procedures (such as BS10175[2])'.

This site

5.7 The underlying sandstone is classified as a Secondary A aquifer. The nearest surface watercourse is the Sturdy (Stank) Beck, which flows in an north-eastern direction, approximately 500m beyond the site's northern boundary. Therefore, the site's environmental setting is considered to be of moderate sensitivity.

5.8 With respect to human health, the proposed end use (residential) is also sensitive.

5.9 The current use of the site is considered likely to have given rise to some ground contamination. However, it is considered that the site should be suitable for the proposed use, subject to implementation of appropriate preparatory works.

[2] *BS10175 (2011) - Code of practice for the investigation of potentially contaminated sites*

6 GROUND INVESTIGATION DESIGN

6.1 General

6.1.1 Given the sensitivity of the proposed development and the risk of contamination identified in the preliminary conceptual site model, ground investigation is considered essential.

6.2 Anticipated ground conditions & potential issues

6.2.1 Based on the data reviewed in Section 4 (Environmental Setting), anticipated ground conditions are expected to comprise:

Anticipated condition	Remarks
Made ground	Veneer of Granular Made ground to c. 0.5m depth in the farmyard area and beneath any hard standing/concrete floor slabs.
Natural soils	Beyond the footprint of the farmyard, topsoil (likely 0.3m thick) is anticipated over Granular residual soils (weathered sandstone) likely to c. 1.5m depth
Bedrock	Midgley Grit Sandstone anticipated from 1.5m depth
Groundwater	Likely at depth within the sandstone bedrock.

6.2.2 Based on the data above and that in Sections 2 (Site Description) and 3 (History), potential ground-related issues associated with this site are likely to include:

Type of issue	Specific issue	Remarks
Potential on-site contamination sources	1. Reworked topsoil (inorganics, organics) 2. Made ground & stockpiles of material 3. Asbestos sheeting 4. Organic contaminants (fuels, greases, etc)	1. Associated with farming 2. Will require chasing out for disposal to landfill or burial beneath hardstanding. 3. Asbestos used on the farm buildings as cement sheet cladding 4. From farm machinery and maintenance
Potential off-site contamination sources	1. Backfilled sandstone quarries	1. Possible gas source that could migrate into the site.
Potential geotechnical hazards	1. Relict buried obstructions 2. Deep MG	1. Obstructions will require chasing out 2. May require chasing out or an alternative foundation solution.
Other potential constraints	1. Underground and/or overhead utilities	1. Will require diversionary works if to remain in service and can't be accommodated into the site layout.

6.3 Ground investigation design & strategy

6.3.1 The preliminary conceptual site model has been used as a basis for design of an appropriate ground investigation, the scope of which is summarised below.

Exploratory holes	Purpose
About 10 Trial Pits	To determine the general nature of soils underlying the site, including the: • Nature, distribution and thickness of made ground • Nature, degree and extent of contamination • Proportion of undesirable elements e.g. biodegradable matter, foundations etc • Suitability of the ground for founding structures and highways
Of which 3 Trial Pits	To determine whether soakaways could be utilised for storm water drainage
Dynamic sampling (mini boreholes) c. 6 no.	In areas of restricted access and to: • Enable inspection of concrete slabs via c. 450mm diameter cored hole. • Confirm the strength (density) of natural in-situ granular soils via SPTs. • Install wells in order to allow subsequent monitoring for hazardous gas

6.3.2 Proposed exploratory hole locations should be selected to provide a representative view of the strata beneath the site and to target potential areas of interest identified in Section 6.2 above. A nominal 25m grid spacing should be appropriate, with additional exploratory locations scheduled as necessary in light of the ground conditions actually encountered.

6.3.3 Representative soil samples of natural and any man-made ground should be taken during the works. The number of soil samples taken should be reflective of the geological complexity actually encountered, but in general about 3 samples should be taken from most exploratory holes.

6.3.4 The investigation should be undertaken in general accordance with:

- BS5930:2015 "Code of practice for site investigation"
- BS10175:2017 "Code of practice for the investigation of potentially contaminated sites"
- "Technical Aspects of Site Investigation" – EA R&D Technical Report P5-065/TR (2000)
- "Development of appropriate soil sampling strategies for land contamination" – EA R&D Technical Report P5-066/TR (2001)

6.3.5 **Trial pitting** will enable determination of:

- Nature, distribution and thickness of shallow soils
- Nature of made ground (uppermost 3m to 4m), including:
  - visual/olfactory evidence of potential contamination and the proportion of undesirable elements e.g. biodegradable matter, relict foundations etc
  - the proportion of "oversize", boulder-sized material
- Suitability of the ground for soakaways
- Suitability of the ground for founding structures and highways

6.3.6 The mechanical excavator should be equipped with a breaker to enable excavation through near-surface and buried concrete slabs and obstructions, through surface hardstand and, where necessary, in bedrock for soakaway tests.

6.3.7 The in-situ shear strengths of any cohesive soils encountered should be determined by use of a hand-held shear vane.

6.3.8 The ground is expected to predominantly comprise sand & gravel, and consequently soakaways may work. Testing should be carried out in at least 3 trial pits in order to assess the suitability of soakaways as a solution for the discharge of surface water run-off

6.3.9 It should be noted that if the initial soakaway tests yield satisfactory results, in order to obtain approvals from the LLFA, Highways etc, the drainage designer is likely to require further testing: (a) within 25m of proposed chamber locations; and (b) to include 3 fills.

6.3.10 Access constraints within the farmyard area and associated buildings will necessitate the use of **dynamic sampling** techniques (mini-boreholes). It should be noted that window sampling allows only a limited inspection of the ground (cf trial pitting). Consequently, some uncertainties may remain and a supplementary, post-demolition ground investigation may be required.

6.3.11 **Mini-boreholes** will:

- Enable inspection of concrete slabs (thickness & any reinforcement) and underlying sub-base (especially with respect to fragments of ACM). A concrete corer can be used to cut a neat hole (450mm diameter). Hand digging within the cored hole to about 0.75m would allow sampling of shallow strata.
- Enable assessment of the density of granular soils either via discrete SPTs or dynamic probing
- Allow the installation of gas monitoring wells.
- Allow investigation within buildings (including those still in use) and in areas of limited headroom.
- Minimise disturbance of the surface (a 150mm diameter tarmac/concrete core can be lifted and put to one side), allowing subsequent reinstatement.

6.3.12 Routine **geotechnical soils analysis** (moisture content, Atterberg limits, pH, water soluble sulphate) should be scheduled on about 10 samples.

6.3.13 Historical mapping, site inspection and review of historical information suggests the potential presence of sources of contamination. Sampling of the existing topsoil should be undertaken to confirm its suitability for re-use. At least 10 samples should be taken with analysis to include pH, metals, TOC, speciated PAH and asbestos ID.

6.3.14 Further sampling should be undertaken if made ground is encountered in the exploratory holes.

6.3.15 It would also be prudent to analyse about 6 topsoil samples to check compliance with BS3882[3] requirements, via testing for visible contaminants, sharps and clay/sand/silt content.

6.3.16 Appropriate **chemical analyses** based on the findings of this Report should be allowed for. This is likely to comprise 12 samples for a suite including heavy metals, asbestos ID, TOC, banded TPH (with supplementary speciation where appropriate), speciated PAH, VOCs & SVOCs. In the event that ground contamination is more significant or different to that anticipated, it might be necessary to carry out additional chemical testing.

6.3.17 Monitoring wells should be installed in about 6 shallow dynamic sampling boreholes. The generation potential of potential **gas** sources (backfilled quarries) is considered likely to be Very Low. Therefore, in accordance with CIRIA Report C665[4], it would be prudent to initially allow for 6 visits over a 3-month period. A hazardous gas risk assessment should be issued on completion of monitoring.

6.3.18 On completion of the fieldwork and laboratory testing a comprehensive bound, factual and interpretative report should be issued. This should contain detailed engineering records, laboratory test results, copies of all relevant correspondence and drawings of the site. The report should also include qualitative risk assessment with respect to both controlled waters and human health.

[3] *BS3882:2015. Specification for topsoil. Published by BSI Standards Limited.*

[4] *CIRIA C665: Assessing risks posed by hazardous ground gases to buildings (2007).*

7 CONCLUSIONS & RECOMMENDATIONS

7.1 General

7.1.1 The site comprises c. 0.8 hectares of land located off Manor House Lane (via Wigton Health) about 7.6km north of Leeds city centre. The site was formerly open farmland until the 1960s when Wigton Heath Farm is first shown on old maps. The site has now been cleared of all waste and scrap material leaving the derelict farm buildings.

7.1.2 It is understood that PLH are considering acquisition of the site with a view to redevelopment with housing.

7.1.3 The main issues considered in this report, and in particular in Sections 3 & 4 are based on a review of historical maps, walkover and review of available geological/environmental data. This report provides an assessment of geoenvironmental issues and implications associated with the proposed residential redevelopment of the site, together with any implications for current use of the site.

7.2 Mining and quarrying

7.2.1 This site is located beyond the CA's defined coalfields.

7.2.2 Two former sandstone quarries are present to the south within 250m of the site's boundaries.

7.2.3 Whilst one quarry has been a pond since 1894, the second was infilled with unknown materials in 1893

7.3 Hazardous gas

7.3.1 The site is in an area where less than 1% of homes are estimated to be above the radon action level.

7.3.2 The site is not in area considered susceptible to mines gas, nor is it underlain by shallow mineworkings. However, the site is located within 250m of backfilled sandstone quarries. Whilst risks appear low, monitoring (6 visits over 3 months) would be prudent to determine whether or not there is a need for protection measures in the proposed new build.

7.4 Foundations

7.4.1 At present, no geotechnical ground investigation data is available and consequently it is only possible to estimate the ground conditions. Before firm foundation recommendations can be given, it will be necessary to undertake an appropriate ground investigation. However, tentative recommendations are provided below.

7.4.2 Made ground is not generally considered a suitable founding material and foundations should be taken through it, into underlying natural in-situ strata of adequate bearing capacity.

7.4.3 All concrete slabs and service ducts will require breaking out during the demolition of existing buildings. Foundations of plots that conflict with relict foundations should be taken to greater depth than the relict foundations and into natural ground of adequate bearing capacity.

7.4.4 The published geological data suggests that the site us underlain by Midgley Grit sandstone with no drift deposits. Therefore, anticipated ground conditions beyond the expected made ground or topsoil are likely to comprises of granular residual soils (sand and gravel of sandstone) to c. 1.5m with the sandstone bedrock below.

7.4.5 Weathered sandstone or medium dense granular drift deposits should provide sufficient bearing capacity to enable the adoption of strip footings for two storey housing. Reinforcement, as a precaution against differential settlement, is recommended only where foundation excavations encounter significant lateral and vertical variations in strata.

7.4.6 If rock is encountered at shallow depth, foundations should be placed entirely on rock and not partially on rock and partially on residual soil. This may, depending on surface gradient, necessitate significant over deepening of foundations.

7.5 Highways and external works

7.5.1 Given the relatively level nature of the site, there should be no requirement for retaining walls, underbuild, tanking etc.

7.5.2 Granular soils should yield a CBR of at least 5%. This value should be verified prior to or during construction.

7.6 Soakaways & drainage

7.6.1 Given anticipated ground conditions, soakaways may provide a viable solution for the disposal of surface water, subject to on testing. However, if these prove ineffective the ground should have the capacity to absorb surface water run-off, and systems which spread infiltration over a wider area (e.g. an infiltration basin, swales and\or pervious paving) may provide the best solution.

7.6.2 Alternative SUDS options (see CIRIA C753[5] for further details) include:

- Pervious Pavements – provide a surface suitable for pedestrian and/or vehicular traffic, while allowing rainwater to infiltrate into subsurface storage, with subsequent infiltration or controlled discharge. Pavement could be porous (water able to infiltrate across entire surface material; e.g. reinforced grass), or permeable (water infiltrates via joints between concrete blocks).
- Swales – linear grassed features in which surface water can be stored or conveyed. Where suitable, swales can be designed to allow infiltration.

7.6.3 Yorkshire Water have published a guide[6] for developers and designers outlining their design requirements for surface water attenuation assets.

7.6.4 With respect to detention basins, which should normally be dry, water table levels should be taken from borehole monitoring wells over 4 consecutive seasons, for at least 3 points in the basin area. The detention basin should be designed to ensure that there is a minimum of 1m of unsaturated soil between the maximum groundwater level and the lowest part of the structure.

7.7 Contamination

7.7.1 The site's environmental setting is considered to be of moderate sensitivity. With respect to human health, the proposed end use (residential) is also sensitive.

7.7.2 Based on observations made during the site walkover, and given site's former uses, a veneer of made ground is anticipated, and it is considered likely that some ground contamination will be present in shallow soils.

[5] *CIRIA C753 (2015) – The SuDS Manual.*

[6] *Design Requirements for Surface Water Attenuation Assets, February 2017.*

7.7.3 No potentially heavily contaminative industrial land uses were identified as having been present on the site. However, arable farming has historically been carried out. The farming activities and made ground associated with building may have given rise to contamination.

7.7.4 Consequently, a ground investigation is required in order to assess the degree and extent of any ground contamination and enable the preparation of a Remediation Strategy.

7.8 Potential development constraints

7.8.1 Any utilities present which are to remain in service will create a potential development constraint unless they can be relocated. Additional enquiries are required to ascertain the feasibility of such diversionary works and the particular easement required by each service undertaker if they remain in-situ.

7.9 Further investigation

7.9.1 Whilst the site is considered suitable for its current and proposed use, the proposed change in use will require intrusive investigation.

7.9.2 This would include:

- Machine-excavated trial pits to determine near surface ground conditions including depth to bedrock, the presence of obstructions, groundwater and stability
- Dynamic sampling (mini-boreholes) in areas of limited access
- Geotechnical soils analysis to enable foundation recommendations
- Chemical testing on soil samples to assess the significance of contamination, if any

7.9.3 An appropriate ground investigation strategy is presented in Section 6.3.

Appendix A

General Notes

01 - Environmental setting
Generic notes – geoenvironmental Investigations

General

Third party information obtained from the British Geological Survey (BGS), the Coal Authority, the Local Authority etc is presented in the "Search Responses" Appendix of this Geoenvironmental Report.

Geology, mining & quarrying

In order to establish the geological setting of a site, Lithos refer to BGS maps for the area, and the relevant geological memoir. Further information is sourced by reference to current and historical OS plans.

In July 2011, the Coal Authority (CA) formalised their requirements in relation to planning applications and introduced some new terminology. The CA, using its extensive records has prepared plans for all coalfield Local Planning Authorities, which effectively refines the defined coalfield areas into High Risk and Low Risk areas. **High Risk** areas are likely to be affected by a range of legacy issues that pose a risk to surface stability, including: mine entries; shallow coal workings; workable coal seam outcrops; mines gas; and previous surface mining sites. **Low Risk** areas comprise the remainder of the defined coalfield, and are areas where no known defined risks have been recorded; although there may still be unrecorded issues. Where a site lies within either a High or Low Risk area, a mining report is obtained from the CA.

Landfills

Reference is made to publicly available Government held digital data via **QGIS** (an Open Source Geographic Information System), data from Landmark or Groundsure, and sometimes the Environment Agency and the Local Authority with respect to known areas of landfilling within 250m of the proposed development site.

Historical OS plans are also inspected for evidence of backfilled quarries, railway cuttings, colliery spoil tips etc.

Radon

Radon is a colourless, odourless gas, which is radioactive. It is formed in strata that contain uranium and radium (most notably granite), and can move though fissures eventually discharging to atmosphere, or the spaces under and within buildings. Where radon occurs in high concentrations, it can pose a risk to health.

In order to assess potential risks associated with radon gas, Lithos refer to BRE Report BR211[1], and the Public Health England website. Advice on the limitation of exposure of the population to radon in buildings was originally published in 1990 by the National Radiological Protection Board (NRPB), which joined the Health Protection Agency (HPA) in 2005; the HPA updated NRPB advice in July 2010[2]. The HPA became part of Public Health England in 2013.

The HPA recommended that the NRPB radon Action Level for homes be retained, and a new Target Level for radon in homes be introduced. The values of the Action Level and Target Level, expressed as the annual average radon concentration in the home, are 200 Bqm^{-3} and 100 Bqm^{-3} respectively. The Target Level was to provide an objective for remedial action in existing homes and preventive action in new homes.

The term 'radon Affected Area' is defined as those parts of the country with >1% of homes estimated to be above the Action Levels. The NRPB first indicated which parts of the country should be regarded as radon Affected Areas in 1990. A more detailed mapping method was developed by the HPA in conjunction with the British Geological Survey in 2007[3]. The level of protection needed is site-specific and can be determined by reference to this mapping on the Public Health England website, which indicates the highest radon potential within each 1km grid square. Each 1km grid square is classified on the basis of the percentage of existing homes within that grid square estimated to have radon concentrations above the Action Level. There are 6 'bands': <1%; 1 to 3%; 3 to 5%; 5 to 10%; 10 to 30%; and >30%.

The NRPB advised that action should be taken to reduce radon concentrations in existing homes if the radon concentration exceeded the Action Level of 200 Bqm^{-3} in room air averaged over a year; ten times the average UK domestic radon concentration. NRPB advice informed changes in the requirements for radon protection in new buildings.

- **Basic** preventive measures are required in new buildings, extensions, conversions and refurbishments if the probability of exceeding the Action Level is **>3%** in England and Wales, and >1% in Scotland and Northern Ireland.
- Provision for further preventive (**Full**) measures is required in new buildings if the probability of exceeding the Action Level is **>10%**.

At present Building Regulations Approved Document C advocates basic measures for the probability banding 3% to 10%, and full measures if >10%. However, Public Health England would like to see all new build include basic measures.

Action & Target Levels should also be applied to non-domestic buildings with public occupancy exceeding 2,000 hrs/yr and to all schools.

Hydrogeology

Reference is made to publicly available Government held digital data via QGIS, and Landmark or Groundsure with respect to:

- Groundwater quality
- Recorded pollution incidents
- Licensed groundwater abstractions

From April 2010 the EA's Groundwater Protection Policy uses aquifer designations that are consistent with the Water Framework Directive. These designations reflect the importance of aquifers in terms of groundwater as a resource (drinking water supply), but also their role in supporting surface water flows and wetland ecosystems. The aquifer designation data is based on geological mapping provided by the British Geological Survey. The maps are split into two different types of aquifer designation:

- Superficial (Drift) - permeable unconsolidated (loose) deposits. For example, sands and gravels
- Bedrock - solid permeable formations e.g. sandstone, chalk and limestone

The maps display the following aquifer designations:

Principal aquifers: These are layers of rock or superficial deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. In most cases, principal aquifers are aquifers previously designated as major aquifer.

Secondary aquifers: These include a wide range of rock layers or superficial deposits with an equally wide range of water permeability and storage. Secondary aquifers are subdivided into three types:

- **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
- **Secondary B** - 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
- Secondary undifferentiated - In most cases, this is because the rock type in question has previously been designated as both a minor and non-aquifer in different locations due to the variable characteristics.

[1] BRE Report BR211, 2015: "Radon: guidance on protective measures for new buildings.

[2] Limitation of Human Exposure to Radon, Documents of the Health Protection Agency - Radiation, Chemical and Environmental Hazards, RCE-15. July 2010.

[3] Miles JCH, Appleton JD, Rees DM, Green BMR, Adlam KAM and Myers AH (2007). Indicative Atlas of Radon in England and Wales. Chilton, HPA-RPD-033.

Unproductive strata: These are rock layers or superficial deposits with low permeability that have negligible significance for water supply or river base flow.

The EA maps only display the principal and secondary aquifers as coloured areas. All uncoloured areas on the map will be unproductive strata. However, for uncoloured areas on the superficial (drift) designation map it is not possible to distinguish between areas of unproductive strata and areas where no superficial deposits are present; to do this, it is necessary to consult the published geological survey maps.

For the purposes of the EA's Groundwater Protection Policy the following default position applies, unless there is site specific information to the contrary:

- If no superficial (drift) aquifers are shown, the bedrock designation is adopted
- In areas where the bedrock designation shows unproductive strata (the uncoloured areas) the superficial designation is adopted
- In all other areas, the more sensitive of the two designations is used (e.g. If secondary superficial overlies principal bedrock, an overall designation of principal is assumed)

The EA have also designated groundwater Source Protection Zones, which are based on proximity to a groundwater source (springs, wells and abstraction boreholes). The size of a Source Protection Zone is a function of the aquifer, volume of groundwater abstracted and the effective rainfall, and may vary from tens to several thousand hectares.

Hydrology

Reference is made to publicly available Government held digital data via QGIS, and Landmark or Groundsure with respect to:

- Surface water quality
- Recorded pollution incidents
- Licensed abstractions (groundwater & surface waters)
- Licensed discharge consents
- Site susceptibility to flooding

The EA have set **water quality** targets for all rivers. These targets are known as River Quality Objectives (RQOs). The water quality classification scheme used to set RQO planning targets is known as the River Ecosystem scheme. The scheme comprises five classes (RE1 to RE5) which reflect the chemical quality requirements of communities of plants and animals occurring in our rivers.

General Quality Assessment (GQA) grades reflect actual water quality. They are based on the most recent analytical testing undertaken by the EA. There are 6 GQA grades (denoted A to F) defined by the concentrations of biochemical oxygen demand, total ammonia and dissolved oxygen.

The susceptibility of a site to **flooding** is assessed by reference to a Flood Map on the Environment Agency's website. These maps show natural floodplains - areas potentially at risk of flooding if a river rises above its banks, or high tides and stormy seas cause flooding in coastal areas. There are two different kinds of area shown on the Flood Map:

1. Dark blue areas (Flood Zone 3) could be flooded by the sea by a flood that has a 0.5% (1 in 200) or greater chance of happening each year, or by a river by a flood that has a 1% (1 in 100) or greater chance of happening each year
2. Light blue areas (Flood Zone 2) show the additional extent of an extreme flood from rivers or the sea. These outlying areas are likely to be affected by a major flood, with up to a 0.1% (1 in 1000) chance of occurring each year

These two colours show the extent of the natural floodplain if there were no flood defences or certain other manmade structures and channel improvements. Where there is no blue shading (Flood Zone 1), there is less than a 0.1% (1 in 1000) chance of flooding occurring each year.

The maps also show all flood defences built in the last five years to protect against river floods with a 1% (1 in 100) chance of happening each year, or floods from the sea with a 0.5% (1 in 200) chance of happening each year, together with some, but not all, older defences and defences which protect against smaller floods.

The Agency's assessment of the likelihood of flooding from rivers and the sea at any location is based on the presence and effect of all flood defences, predicted flood levels, and ground levels.

It should also be noted that as the floodplain shown is the 1 in 100 year, areas outside this may be flooded by more extreme floods (e.g. the 1 in 1000 year flood). Also, parts of the areas shown at risk of flooding will be flooded by lesser floods (e.g. the 1 in 5 year flood). In some places due to the shape of the river valley, the smaller floods will flood a very similar extent to larger floods but to a lesser depth.

If a site falls within a floodplain, it is recommended that a flood survey be undertaken by a specialist who can advise on appropriate mitigating measures; i.e. raising slab levels, provision of storage etc. In accordance with Chapter 10 of the National Planning Policy Framework, a site-specific flood risk assessment is required for: proposals of 1 hectare or greater in Flood Zone 1, or in an area within Flood Zone 1 which has critical drainage problems (as notified to the local planning authority by the Environment Agency); and any new development in Flood Zones 2 and 3.

COMAH & explosive sites

Lithos obtain information from Landmark or Groundsure with respect to Control of Major Accident Hazards (COMAH) or explosive sites within 1km of the proposed development site. Lithos' report refers to any that are present, and recommends that the Client seeks further advice from the HSE.

Areas around COMAH sites (chemical plants etc) are zoned with respect to the implementation of emergency plans. The HSE are a statutory consultee to the local planning authority for all COMAH sites. The COMAH site may have to revise its emergency action plan if development occurs. This might be quite straightforward or could entail significant expenditure. Consequently, the COMAH site may object to a proposed development (although it is the Local Authority who have final say, and they are likely to place more weight on advice from the HSE).

Preliminary conceptual site model

The site's environmental setting (and proposed end use) is used by Lithos to assess the significance of any contamination encountered during the subsequent ground investigation.

Assessment of contaminated land is based on an evaluation of pollutant linkages (source-pathway-receptor). Contaminants within the near surface strata represent a potential source of pollution. The environment (most notably groundwater), site workers and end users are potential receptors.

Potential pollutant linkages are shown on a preliminary conceptual site model (pCSM). A CSM is essentially a cross-section through a site that reflects both the surface topography and underlying geology, and shows surface features of interest. The most significant sources of contamination are then superimposed onto this cross-section together with potential receptors (human health & controlled waters), and plausible pathways between the two. In addition to environmental issues, the CSM should also highlight geotechnical issues.

A pCSM is prepared after consideration of all available "desk study" data, and before design of the ground investigation. Data reviewed should include historical plans (with superimposition on a current-day plan), previous SI reports, geological maps etc. The pCSM, in conjunction with knowledge of site constraints (buildings, services, slopes etc) is used to design the ground investigation.

The revised CSM takes account of data obtained during the ground investigation, including the distribution of made ground, the nature and distribution of contamination etc.

Appendix B

Drawings

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CLIENT	PARK LANE HOMES
JOB TITLE	WIGTON HEATH FARM, ALWOODLEY
DRAWING TITLE	SITE LOCATION PLAN
DRAWN	AP
DATE	13/04/2022
CHECKED	REG
DATE	13/04/2022
STATUS	FOR COMMENT ☐ DRAFT ☐ FOR APPROVAL ☐ FINAL ☑
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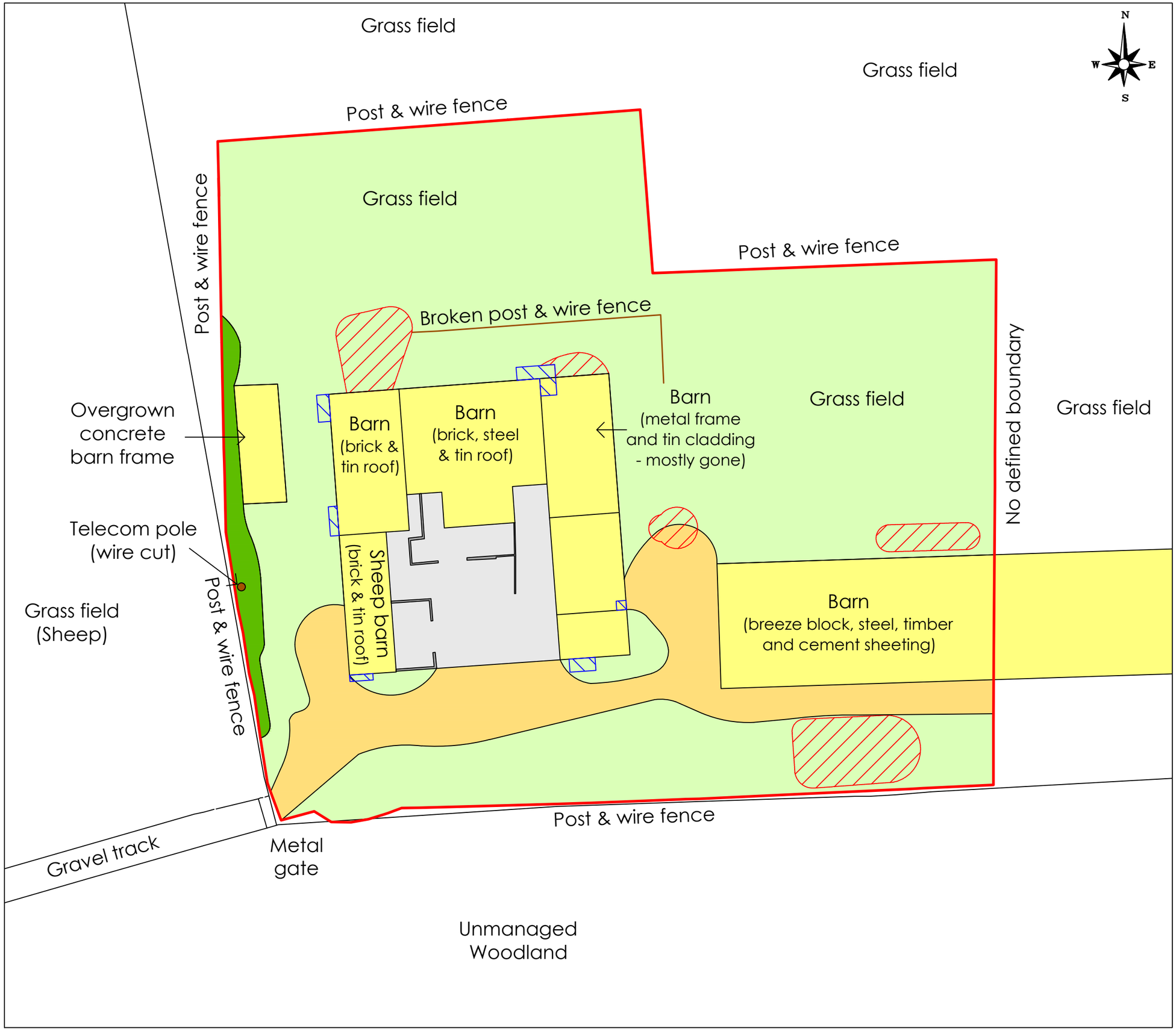
SHEET	A4
DRAWING NO.	4382/1
REVISION	



NOTES

- GRASS & OVERGROWN AREAS
- BUILDING
- CONCRETE HARDSTANDING
- WALL
- GRAVEL SURFACING
- MATURE TREES & HEDGEROWS
- THIRD PARTY FOUNDATION TRIAL PITS
- STOCKPILES
- FENCE
- APPROXIMATE SITE BOUNDARY

REV.	DESCRIPTION	DATE

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CLIENT

PARK LANE HOMES

JOB TITLE

WIGTON HEATH FARM, ALWOODLEY

DRAWING TITLE

SITE FEATURES

DRAWN	DATE	STATUS
AP	21/04/2022	FOR COMMENT ☐
CHECKED	DATE	FOR APPROVAL ☐
REG	21/04/2022	DRAFT ☐
		FINAL ☑

SCALE	SHEET	DRAWING NO.	REVISION
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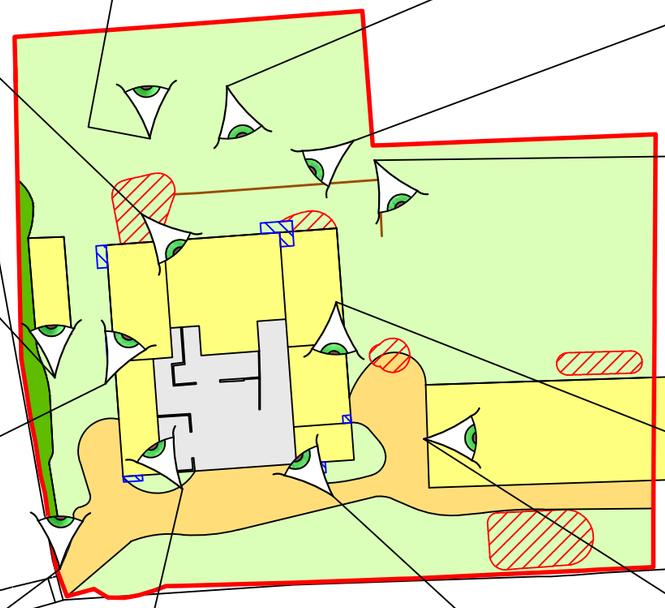

N

W E

S

NOTES

- GRASS & OVERGROWN AREAS
- BUILDING
- CONCRETE HARDSTANDING
- WALL
- GRAVEL SURFACING
- MATURE TREES & HEDGEROWS
- THIRD PARTY FOUNDATION TRIAL PITS
- STOCKPILES
- FENCE
- APPROXIMATE SITE BOUNDARY
- LOCATION & ORIENTATION OF PHOTOGRAPH

REV.	DESCRIPTION	DATE

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CLIENT

PARK LANE HOMES

JOB TITLE

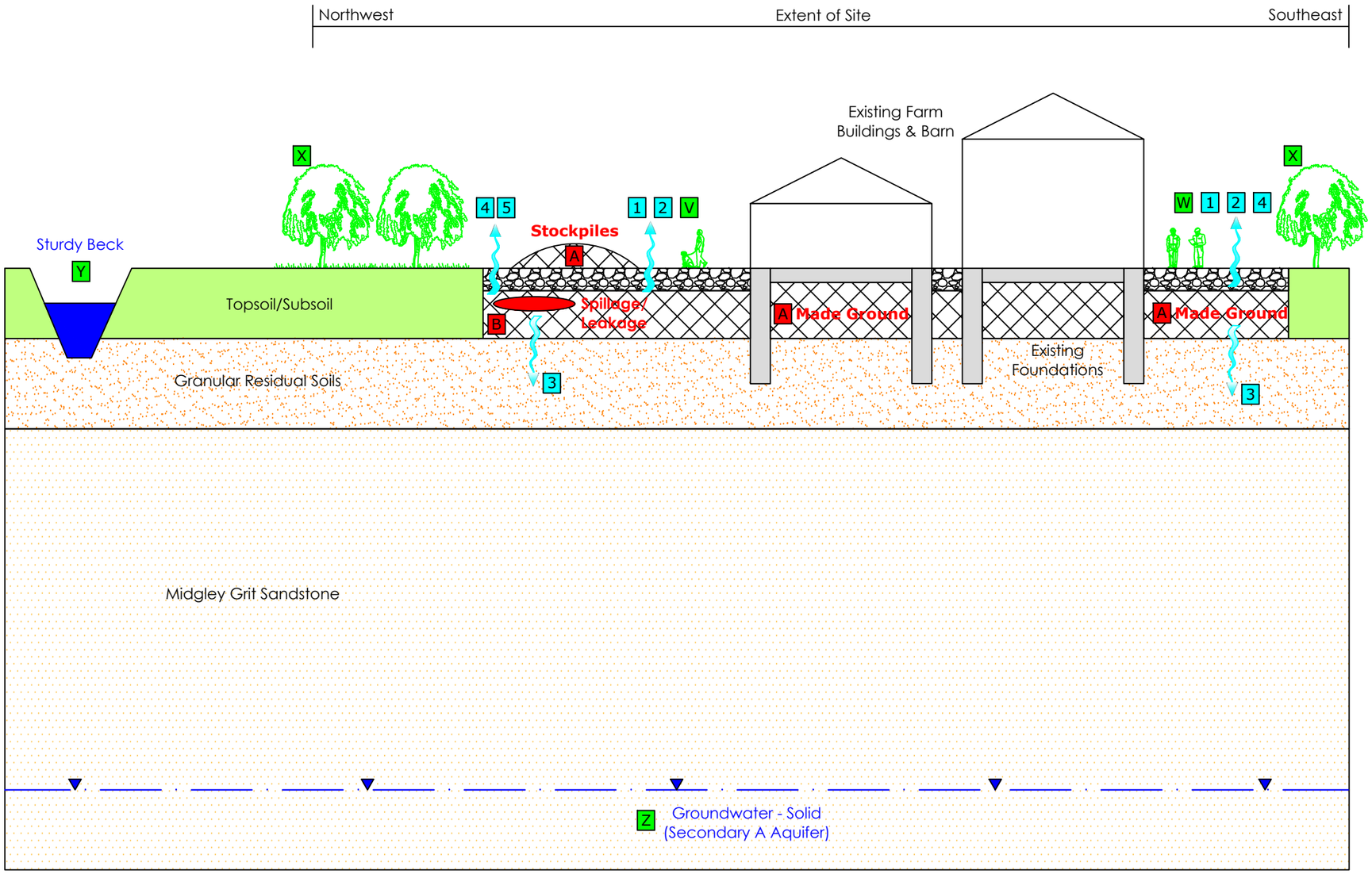
WIGTON HEATH FARM, ALWOODLEY

DRAWING TITLE

SITE PHOTOGRAPHS

DRAWN	DATE	STATUS
AP	21/04/2022	FOR COMMENT ☐
CHECKED	DATE	FOR APPROVAL ☐
REG	21/04/2022	DRAFT ☐
		FINAL ☑

SCALE	SHEET	DRAWING NO.	REVISION
NOT TO SCALE	A3	4382/4	



SOURCES	PATHWAYS	RECEPTORS
A MADE GROUND (INORGANICS)	1 DERMAL CONTACT	V END USERS (RESIDENTS)
B LEAKAGE/SPILLAGE (ORGANICS)	2 INGESTION/INHALATION	W SITE WORKERS
	3 LEACHING OF CONTAMINANTS	X VEGETATION
	4 UPTAKE BY PLANTS	Y SURFACE WATERS
	5 VOLATILISATION	Z GROUNDWATER

NOTES

REV.	DESCRIPTION	DATE

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CLIENT

PARK LANE HOMES

JOB TITLE

WIGTON HEATH FARM, ALWOODLEY

DRAWING TITLE

PRELIMINARY CONCEPTUAL SITE MODEL

DRAWN	DATE	STATUS
AP	21/04/2022	FOR COMMENT ☐
CHECKED	DATE	FOR APPROVAL ☐
REG	21/04/2022	DRAFT ☐
		FINAL ☑

SCALE	SHEET	DRAWING NO.	REVISION
Not to scale	A3	4382/5	

Appendix C

Commission

002/4382/JBR/reg

24th February 2022

Registered in England 07068066

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LS22 5DZ

T 01937 545 330

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Mr J Clink
Kingston House
87 Wike Ridge Lane
Slaid Hill
Leeds
LS17 8TX

Dear James

Wigton Heath Farm, Alwoodley

Further to your recent invitation, please find attached our proposal for undertaking a site investigation on the above land. We understand that proposed development will include traditional 2 storey domestic dwellings with associated gardens, POS and adoptable roads and sewers; although no layout is available yet.

Review of the information supplied suggests that the site consists of a single parcel of land of (c. 0.7 hectares). Review of Google Maps suggests the site is currently occupied by two dilapidated farm buildings, associated materials and structures.

Brief review of internet data suggests the site:

- Appears to have remained undeveloped until c. 1950 when farm buildings/structures were constructed;
- Is not located within 250m of a known landfill site, but is located within 250m of backfilled sandstone **quarries**
- Is not within a groundwater source protection zone;
- Is in an area where the risk of encountering UXO is considered low; and
- Is located beyond the Coal Authority's defined coalfields.

Brief examination of the relevant geological map suggests the site is underlain by Midgley Grit (sandstone) likely completely weathered near surface to a sandy Clays/gravelly Sands.

Ground investigation is generally best undertaken once site operations have ceased and preferably post-demolition; access constraints associated with existing buildings, operations and underground service runs, can prevent thorough inspection of the ground via extensive trial pitting/trenching. Consequently, some uncertainties may remain and a supplementary, post-demolition ground investigation may be required by the relevant regulatory authorities. Nonetheless, useful data can be obtained at this time and we will certainly aim to resolve as much uncertainty relating to ground as possible, in order to enable you to make an unconditional offer for the site.

We will need a Promap or topo survey in CAD format, to provide a base plan for technical drawings etc. If you do not have one, we could obtain at cost plus £.

Our site investigation will be undertaken in accordance with UK good practice (as outlined in BS5930, BS10175, LCRM etc). Our Report may not be fully compliant with Eurocode 7 (EC7) and will not purport to be a Ground Investigation Report, nor a Geotechnical Design Report as defined by EC7. Our ground appraisal is intended to assist others as they proceed with design of the proposed development.

This proposal allows for the following works:

Desk study: Environmental search data and historical maps (obtained from Landmark or Groundsure), will be reviewed in order to determine whether past land uses have had any effect on the proposed development. In addition, published geological plans of the area will be examined.

We will also visit site to review current operations and undertake a walkover survey.

Fieldwork: We have allowed for day's trial pitting and a day's dynamic sampling using a mini percussion drilling rig. All trial pits and boreholes will be supervised and logged by an experienced geoenvironmental engineer.

Trial pitting will enable us to determine the:

- Nature of any made ground, including:
  - visual/olfactory evidence of potential contamination and the proportion of undesirable elements e.g. biodegradable matter, relict foundations etc
  - the proportion of "oversize", boulder-sized material
- Nature, distribution and thickness of shallow soils
- Suitability of the ground for soakaways
- Suitability of the ground for founding structures and highways

The mechanical excavator used to excavate trial pits will be equipped with a breaker to enable excavation through near-surface and buried concrete slabs and obstructions and where necessary in bedrock (for soakaway tests).

Representative soil samples of natural and man-made ground, including any contaminated samples, will be taken during the works. In-situ shear strengths of any cohesive soils encountered will be determined by the use of a hand-held shear vane.

We will make every effort to compact arisings and 'sweep' them over each trial pit. However, you should be aware that on completion of the investigation, "graves" of spoil (each about 3m long by 1m wide) unsuitable for trafficking, will be left up to 400mm proud at each trial pit location. At this stage, no allowance has been made for any further reinstatement such as removal of excess arisings, replacement of turf or reinstatement of the hardstanding etc.

If the pitting encounters significant thicknesses of made ground or very soft/loose deposits (neither considered likely), boreholes may be required to obtain geotechnical data from greater depth. We will advise you of any need for boreholes within 2 days of completion of the pitting.

Soakaway testing will also be carried out in at least 3 pits in order to assess suitability of the ground for plot and highway surface water drainage. This will provide an 'initial sweep' at relatively wide spacings and often with only 1 or 2 fills.

It should be noted that if the initial soakaway tests yield satisfactory results, in order to obtain approvals from the LLFA, Highways etc, the drainage designer is likely to require further testing: (a) within 25m of proposed chamber locations; and (b) to include 3 fills.

Mini-boreholes are proposed here in order to:

- Enable inspection of concrete slabs (thickness & any reinforcement) and underlying sub-base (especially with respect to fragments of ACM).
- Allow the installation of gas monitoring wells.
- Assess of the density of granular soils either via discrete SPTs
- Allow investigation within buildings (including those still in use) and in areas of limited headroom.
- Minimise disturbance of the surface (a 150mm diameter tarmac/concrete core can be lifted and put to one side), allowing subsequent reinstatement.

Given the likely presence of shallow sandstone bedrock, it may be necessary to advance the boreholes with rotary open hole drilling rig. Drilling technique will be determined on completion of the pitting; if rotary drilling is required, there would be an E\O cost of £.

Exploratory holes will be positioned a hand-held GPS (typically +/- 3m accuracy); if required we could arrange for a **surveyor** to pick-up exploratory holes (and provide co-ordinates/ground levels) for an E\O cost of £.

Given the likely presence of backfilled quarries within 250m of the site, we have allowed for the installation of wells in 6 holes and monitoring for hazardous **gas** (and any shallow groundwater).

The generation potential of this gas source is considered likely to be Very Low. Therefore, in accordance with CIRIA Report C665, we have initially allowed for 6 visits over a 3-month period. A hazardous gas risk assessment will be issued on completion of monitoring.

We strongly recommend that gas wells be decommissioned after monitoring has been completed. Decommissioning involves removal of the metal covers, unscrewing the upper 1m to 2 m of pipework and filling the void / remaining well with bentonite.

Decommissioning of monitoring wells prevents gas migration into sub-floor voids. Subject to your instruction, we will decommission accessible wells after the last monitoring visit for an E\O price of £. We will contact you to seek instruction following issue of our gas risk assessment.

Testing: This will comprise routine **geotechnical** soils analysis, including 10 moisture content & Atterberg limits, and 10 pH & water-soluble sulphate.

This site is brownfield and therefore likely to be underlain by made ground which in turn is likely to be subject to re-engineering prior to the construction of new estate roads. Consequently, there is no merit in obtaining CBR values at this stage.

At this stage, we have no reason to expect wide areas of the site to be underlain by significant thicknesses of made ground. Consequently, we have only allowed for **contaminant** testing of up to 12 made ground samples, plus a further 10 samples of topsoil to confirm its suitability for re-use. The test suite will include heavy metals, speciated PAH, and banded TPH (with supplementary speciation as/where appropriate).

Visible contaminants, sharps and the clay/sand/silt content of 3 topsoil samples will be determined to check compliance with BS3882 requirements.

If more significant made ground is encountered, we will inform you immediately and provide costs for the recommended chemical testing.

Within in our proposal we have allowed for the screening (ID) of 22 samples for asbestos. In the event that positive IDs are reported, it is likely that we will need to schedule further analysis (asbestos quantification), in order to determine the significance of the results. Asbestos quantification is currently a relatively expensive test and consequently we have not allowed for it at this stage. We will inform you immediately after receipt of results if we consider asbestos quantification is required.

Reporting & timescales: In order to provide you with sufficient information to enable assessment of abnormal costs at the earliest opportunity we will issue a concise overview report within 3 days of fieldwork completion.

On completion of the desk study, fieldwork and laboratory testing a comprehensive, factual and interpretative report will be issued. This will contain exploratory hole logs, laboratory test results, copies of all relevant correspondence and drawings of the site. The report will include qualitative risk assessment with respect to both controlled waters and human health. The report will also include consideration of foundation types.

At the time of writing, fieldwork could be commenced within 4 weeks of receipt of your written instruction to proceed. Our comprehensive geoenvironmental appraisal report will be issued within 4 weeks of fieldwork completion. This report will comment on issues associated with hazardous gas, but the gas risk assessment will not be issued until monitoring is completed.

A completed copy of the **YW** Contaminated Land Assessment Form will be included in an Appendix to our Report. However, the proposed route(s), and total length, of water supply pipes are not currently known and no allowance has been made for laboratory testing of soil samples in line with UKWIR guidance.

Given previous usage of this land, it is considered highly likely that a **Remediation Strategy** report will be required by the Local Authority. We will provide a fee proposal on issue of our geoenvironmental appraisal.

It should be noted that a Remediation Strategy outlines the remediation objectives necessary to protect environmental receptors and render a site suitable for the proposed end use. A Remediation Strategy is not the same as a Method Statement; the latter should be prepared subsequently, usually by a Contractor, in order to detail how the objectives will be achieved.

A copy of the final report will be issued to the relevant regulatory authorities on receipt of written instruction from yourselves.

Invoicing: The attached proposal provides a breakdown of the costs associated with this project. This breakdown is for information only and the proposal can be regarded as a lump sum price of **£**. Variation will only occur in the event that a given item is not undertaken or that substantial additional works are recommended, in which case we will inform you immediately, provide costs for the required works, and seek your prior consent. Revision of the costings provided may be required if works are not instructed within 6 months of the date this proposal was issued.

Our proposal allows for submission of the report to the Local Authority and NHBC, and for submission of a single piece of subsequent correspondence with each regulator to address any queries they may have. Any further meetings, correspondence etc, would be chargeable.

We will submit invoices for this project on completion of each Item(s) instructed.

Please note if following instruction of the works outlined in this proposal, it is necessary to subsequently **postpone or cancel**, this should be done at least 3 working days before Lithos are due to commence intrusive investigation on site. We reserve the right to charge a cancellation fee in the event of later notification to cover plant / drill rig costs and abortive consultancy time. The cancellation fee will not exceed £.

Health, safety & welfare: The works outlined above will be carried out in accordance with Lithos' task- and site- specific Risk Assessments and Method Statements.

Details of welfare will be included within the Method Statements. However, this investigation is expected to be completed within 3 working days and therefore it is not considered reasonably practicable to provide formal welfare facilities, and our proposal makes no allowance for so doing.

Utility plans are required in order to protect operatives from the hazards associated with striking buried services and avoid potentially substantial disruption\repair costs. We will make every effort not to damage any services (including review of utility plans and use of a CAT detector). However, Lithos cannot accept liability for damage to any underground services that are not accurately marked on plans made available to us prior to commencement of our field investigation, or have not been accurately marked on the ground by a responsible third party (e.g. utility company, site owner).

Most developers have copies of the necessary utility plans (including electricity, gas, water, drainage & telecom), and it would be appreciated if you could forward these prior to the proposed fieldworks.

However, if you do not have the necessary plans, Lithos will obtain them direct from each of the utility companies.

It is highly likely that the site is underlain by many "private" services and drains etc which will not be shown on statutory utility plans. Consequently, it would be appreciated if copies of plans showing these services could be made available to our field engineer, and\or someone with site knowledge could advise us with respect to safe locations for our exploratory holes.

Under the **CDM** Regulations 2015, Lithos must be provided with pre-construction information already in your possession, or information that can reasonably be obtained through sensible enquiry. This information must be relevant to the project, have an appropriate level of detail, and be proportionate to the nature of the risks.

If no other designers or contractors have been appointed, Lithos could perform the role of Principal Contractor but only for the duration of the site investigation outlined in this proposal. If you require us to perform the role of Principal Contractor, please make this clear in your instruction. It should be noted that we are not suitably qualified to perform either role where other designers or contractors are also appointed.

It is anticipated that the site investigation outlined in this proposal will be undertaken several months before any construction is commenced on site. Consequently, our works can be considered in isolation and, given the anticipated number of person days on site, this site investigation is not notifiable to the HSE.

Further work: In addition to the investigation outlined above, the following further works may ultimately be required:

- Further **pitting** and testing of the anticipated veneer of made ground within the curtilage of the farm buildings may be required on vacation.
- If the initial **soakaway** tests yield satisfactory results, it may be necessary to:
  - Undertake further testing in order to obtain approvals from the LLFA etc: (a) within 25m of proposed chamber locations; and (b) to include 3 fills.
  - Install groundwater monitoring wells to depths of around 5m in at least 3 boreholes. Given the anticipated depth to bedrock, these boreholes might need to be advanced by rotary probing.
  - The wells should then be monitored on at least 7 occasions; monthly for 3 months, and then bi-monthly for a further 8 months.
- Preparation of a **Remediation Strategy**

Terms & conditions: This work will be undertaken in accordance with our Standard Terms and Conditions, a copy of which are enclosed.

It is hoped the above is sufficient for your present needs. However, should you require any further information, please contact the undersigned.

Yours sincerely

James Brown
Engineer
for and on behalf of
LITHOS CONSULTING LIMITED

Terms and Conditions for the Appointment of Lithos Consulting Limited

V007.20

1 DEFINITIONS AND INTERPRETATION

1.1 In this Agreement, unless the context otherwise requires, the following words and expressions have the following meanings:

"Agreement" shall mean these Terms (entitled "Terms and Conditions for the Appointment of Lithos Consulting"), the Proposal, any document recording the Client's unequivocal acceptance of the Proposal and any other documents or parts of other documents expressly referred to in any of the foregoing:

"Client" shall mean the party for whom the Services are being provided by Lithos;

"Documents" shall mean all documents of any kind and includes plans, drawings, reports, programmes, specifications, Bills of Quantities, calculations, letters, e-mails, faxes, memoranda, films and photographs (including negatives), or any other form of record prepared or provided or received by, or on behalf of Lithos, and whether in paper form or stored electronically or on disk, or otherwise;

"Lithos" shall mean Lithos Consulting Limited whose registered office is at Parkhill, Walton Road, Wetherby, West Yorkshire, LS22 5DZ.

"Intellectual Property" includes all rights to, and any interests in, any patents, designs, trade marks, copyright, know-how, trade secrets and any other proprietary rights or forms of intellectual property (protectable by registration or not) in respect of any technology, concept, idea, data, programme or other software (including source and object codes), specification, plan, drawing, schedule, minutes, correspondence, scheme, programme, design, system, process logo, mark, style, or other matter or thing, existing or conceived, used, developed or produced by any person;

"Parties" shall mean the Client and Lithos

"Project" shall mean the project described in the Proposal and any enquiry from the Client on which Lithos has based its Proposal;

"Proposal" means the offer document prepared by Lithos in response to an enquiry or otherwise, in connection with the proposed provision of the Services;

"Services" means the work and services relating to the Project to be provided by Lithos pursuant to the Agreement and as set out in the Proposal and shall include any additions or amendments thereto made in accordance with these Terms;

"Terms" means these terms entitled "Lithos Consulting Terms of Appointment".

1.2 Words importing the singular only shall also include the plural and vice versa, where the context requires.

1.3 Words importing persons or parties shall include firms, corporations and any organisation having legal capacity and vice versa, where the context requires; and words importing a particular gender include all genders.

1.4 The sub-headings to the clauses of these Terms are for convenience only and shall not affect the construction of the Agreement.

1.5 A reference to legislation includes that legislation as from time to time amended, re-enacted or substituted and any Orders in Council, orders, rules, regulations, schemes, warrants, by-laws, directives or codes of practice issued under any such legislation.

1.6 In the event of conflict between the documents forming part of the Agreement, the Proposal shall prevail, followed by the Terms.

2 APPOINTMENT

2.1 The Client agrees to engage Lithos and Lithos agrees to provide the Services in accordance with the provisions of the Agreement.

3 OBLIGATIONS OF LITHOS

3.1 Lithos shall perform the Services using the reasonable standard of skill and care normally exercised by similar professional Environmental firms in performing similar services under similar conditions.

3.2 Lithos shall use all reasonable endeavours to perform the Services in accordance with all relevant environmental and safety legislation.

4 OBLIGATIONS OF THE CLIENT

4.1 Throughout the period of this Agreement the Client shall afford to Lithos or procure the affording to Lithos of access to any site where access is required for the performance of the Services.

4.2 The Client accepts responsibility for ensuring that Lithos is notified in writing of all special site and/or plant conditions, including without prejudice to the generality of the foregoing, the existence and precise location of all underground services, cables, pipes, drains or underground buildings, constructions or any hazards known or suspected by the Client, which the Client shall clearly mark on the ground or identify on accurate location plans supplied to Lithos prior to the commencement of the Services. The Client shall also inform Lithos in writing of any relevant operating procedures including any site safe operating procedures and any other regulations relevant to the carrying out of the Services. The Client shall indemnify Lithos against all costs, claims, demands and expenses arising as a result of any non-disclosure in this respect, including but not limited to indemnification against any action brought by the owner of the land or otherwise.

4.3 If the Client discovers any conflict, defect or other fault in the information or designs provided by Lithos pursuant to the Agreement, he will advise Lithos in writing of such defect, conflict or other fault and Lithos shall have the right to rectify the same or where necessary, to design the solution for rectification of any works carried out by others pursuant the conflicting, defective or in any other way faulty information or designs.

5 INTELLECTUAL PROPERTY

5.1 The copyright in all Intellectual Property prepared by or on behalf of Lithos in connection with the Project for delivery to the Client shall remain vested in Lithos.

5.2 The Client shall have a non-exclusive licence to copy and use such Intellectual Property for purposes directly related to the Project. Such licence shall enable the Client to copy and use the Intellectual Property but solely for its own purposes in connection with the Project and such use shall not include any licence to reproduce any conceptual designs or professional opinions contained therein nor shall it include any license to amend any drawing, design or other Intellectual Property produced by Lithos.

5.3 Should the Client wish to use such Intellectual Property in connection with any other works or for any other purpose not directly related to the Project or wish to pass any Intellectual Property to any third party, it must obtain the prior written consent of Lithos. The giving of such consent shall be at the discretion of Lithos and shall be upon such terms as may be required by Lithos. Lithos shall not be liable for the use by any person of such Intellectual Property for any purpose other than that for which the same were prepared by or on behalf of Lithos.

5.4 Ownership of any proposals submitted to the Client that are not subsequently confirmed as part of the Services to be provided for the Client remain with Lithos and such proposals must not be used as the basis for any future work undertaken by the Client or a third party and no liability can be accepted howsoever arising from such proposals.

5.5 In the event of the Client being in default of payment of any fees or other amounts due, Lithos may suspend further use of the licence on giving 2 days' notice of the intention to do so. Use of the licence may be resumed on receipt of the outstanding amounts.

6 TITLE

6.1 Lithos shall transfer only such title or rights in respect of the Documents as it has, and if any part is purchased from a third party Lithos shall transfer only such title or rights as that party had and has transferred to Lithos.

6.2 Title in the Documents shall remain with and shall not pass to the Client until the amount due under the invoice(s) (including interest and costs) has been paid in full.

6.3 Until title passes, the Client shall hold the Documents as bailee for Lithos and shall store or mark them so that they can at all times be identified as the property of Lithos.

6.4 At any time before title passes (save and except where payment is not due), but only after prior consultation with the Client, Lithos may without any liability to the Client repossess and use or sell all or any of part of the Documents and by doing so terminate the right of the Client to use, sell or otherwise deal in the Documents.

6.5 Lithos may maintain an action for the price of the Documents notwithstanding that title in them has not passed to the Client.

7 CONFIDENTIALITY AND DATA PROTECTION

7.1 Lithos undertakes not to divulge or disclose to any third party without the written consent of the Client information which is designated confidential by the Client or which can reasonably be considered to be confidential and arises during the performance of the Services unless required to do so by law or necessary in the proper performance of its duties in relation to the Project, or in order to make full frank and proper disclosure to its insurers or intended insurers, or to obtain legal or accounting advice.

7.2 Subject to the above and Lithos' Privacy Policy which can be found on www.lithos.co.uk, Lithos shall be permitted to use information related to the Services it provides in connection with the Project for the purposes of marketing its services and in proposals for work of a similar type.

8 THIRD PARTIES

8.1 The Agreement or any part thereof or any benefit or interest thereunder may not be assigned by the Client without the prior written consent of Lithos. The giving of such consent shall be at the discretion of Lithos and Lithos will only agree to an assignment on its terms and in return for payment of a fee by the Client to Lithos to cover Lithos' legal and other costs associated with any assignment.

8.2 The Agreement shall not confer and shall not purport to confer on any third party any benefit or any right to enforce any term of this Agreement for the purposes of the Contracts (Rights of Third Parties) Act 1999 or otherwise.

8.3 Lithos will consider and may consent to any request from the Client for Lithos to enter a collateral warranty with a third party with regard to the Services provided under the Agreement. The giving of such consent shall be at the discretion of Lithos and Lithos will only enter a collateral warranty on its terms and in return for payment of a fee by the Client to Lithos to cover Lithos' legal and other costs associated with any collateral warranty.

9 INSURANCE

9.1 Lithos warrants to the Client that there is in force a policy of Professional Indemnity insurance covering its liabilities for negligence under this Agreement, with a limit of indemnity of £5,000,000 (FIVE MILLION POUNDS) any one claim, save for pollution and contamination claims and asbestos claims both of which carry £2,000,000 (TWO MILLION) in the aggregate cover. This policy is annually renewable and whilst renewal is not automatic, Lithos agrees to use reasonable endeavours to maintain such insurance at all times until six years from the date of the completion (or termination) of the Services under the Agreement, provided such insurance is available at commercially reasonable rates having regard, inter alia, to premiums required and policy terms obtainable.

9.2 If for any period such insurance is not available at commercially reasonable rates, Lithos shall forthwith inform the Client and shall obtain in respect of such period such reduced level of Professional Indemnity insurance as is available and as would be fair and reasonable in the circumstances for Lithos to obtain.

10 LIMITATIONS ON LIABILITY

10.1 Unless otherwise agreed in writing, Lithos' liability under or in connection with the Agreement whether in contract, tort, negligence, breach of statutory duty or otherwise (other than in respect of personal injury or death) shall be limited to and shall not exceed the lesser of either the level of insurance cover referred to within clause 9.1 above, or 20 times the total value of invoices issued to the Client for consultancy work instructed under the Agreement.

10.2 No action or proceedings under or in respect of the Agreement whether in contract, tort, negligence, under statute or otherwise shall be commenced against Lithos after the expiry of a period of six years from the date of the completion (or termination) of the Services under the Agreement.

10.3 Whilst Lithos will scan all potential exploratory locations with a Cable Avoidance Tool, Lithos shall not be liable for any damage to underground services, cables, pipes, drains or underground buildings, constructions and the like which were either not marked on site or for which accurate plans were not provided.

10.4 Lithos shall not be liable for the cost of rectifying any defect, conflict or other fault in the information or designs provided by Lithos or for the cost of designing a solution for and rectifying any subsequent works carried out by others pursuant to the conflicting, defective or in any other way faulty information or designs, unless Lithos has been advised in writing of the same by the Client and has been given the opportunity to rectify the same or where necessary, to design the solution for rectification of any subsequent works carried out by others pursuant to the same.

11 PAYMENT

11.1 Invoices for services rendered will be submitted for payment in accordance with the Proposal.

11.2 The due date for payment is the date of the invoice and the final date for payment is 28 days from the date of the invoice.

11.3 If the Client disputes the amount included for payment in an invoice a written notice must be served on Lithos by the Client not later than 14 days before the final date for payment. If no notice is given the amount due shall be the amount stated in the invoice.

11.4 In the event of failure on the part of the Client to pay any monies in accordance with the foregoing payment provisions, Lithos will be entitled to charge interest on any monies owed to it by the Client, such interest to be at a rate of 8% above the base rate of a clearing bank from time to time calculated from the final date for payment to the date of actual payment on a compound basis.

12 DELAY

12.1 Lithos will comply with any timescale agreed for completion of the Services unless delayed or prevented by circumstances beyond its reasonable control and in the event of any such circumstances arising Lithos undertakes to complete the Services within a reasonable period, but will not be liable to the Client for any delay as a result.

13 TERMINATION

13.1 The Agreement may be terminated by either party in the event of the other making a composition or arrangement with its creditors, becoming bankrupt, or being a company, making a proposal for a voluntary arrangement for a composition of debts, or has a provisional liquidator appointed, or has a winding-up order made, or passes a resolution for voluntary winding-up (except for the purposes of a bona fide scheme of amalgamation or reconstruction), or has an administrator or an administrative receiver appointed to the whole or any part of its assets. Notice of termination must be given to the party which is insolvent by the other party.

13.2 If for any reason the performance of the Services by Lithos is suspended for a period in excess of three calendar months then Lithos shall be entitled to terminate its appointment in respect of the Services by seven days written notice to the Client.

13.3 If the Client shall fail to pay in full any sum due under the terms of the Agreement by the final date for payment for that sum and no effective notice of intention to withhold payment has been issued, Lithos may serve written notice on the Client demanding payment within 14 days of such notice. If the Client shall fail to comply with such notice, Lithos shall be entitled to terminate its employment under the Agreement forthwith.

13.4 Any termination of the appointment of Lithos howsoever caused shall be without prejudice to the right of Lithos to require payment for all services performed up to the date of such termination including but not limited to payment of a fair and reasonable proportion of any figure identified in the Proposal or otherwise for fees in respect of a particular service which Lithos has started, but not completed.

14 NOTICES

14.1 Any notice provided for in the Agreement shall be in writing and shall be deemed to be properly given if delivered by hand or sent by first class post to the address of the relevant party as may have been notified by each party to the other or, in the absence of notification, to the address of Lithos set out above or to the registered address of the Client.

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

15 ENTIRE AGREEMENT

15.1 The Agreement constitutes the complete and entire agreement between the Client and Lithos with respect to the Services and supersedes any prior oral and/or written warranties, terms, conditions, communications and representations, whether express or implied and any claim against Lithos in respect of the Services can only be made in contract under the provisions of the Agreement and not otherwise under the law or tort or otherwise.

15.2 No amendments, modifications or variation of the Agreement shall be valid unless made in writing and agreed to by both the Client and Lithos; such agreement must be recorded in writing by at least one of the Parties.

15.3 Lithos will not be bound by any standard or printed terms or conditions furnished by the Client in any of its documents unless Lithos specifically states in writing separately from such documents that it intends such terms and conditions to apply.

16 DISPUTES AND GOVERNING LAW

16.1 The Agreement shall be governed by and construed in accordance with English law and the Parties irrevocably and unconditionally submit to the jurisdiction of the English Courts.

16.2 Where the Housing Grants, Construction and Regeneration Act 1996 applies, any dispute between the Parties may be referred to adjudication in accordance with The Scheme for Construction Contracts Regulations 1998 or any amendment or modification thereof being in force at the time of the dispute, as applicable to England, Wales, Scotland and Northern Ireland.

Alex Petts

From: Reg
Sent: 08 April 2022 12:18
To: Alex Petts
Subject: 4382, Wigton Heath Farm, Alwoodley

From: James Clink <jamesclink@parklanehomes.co.uk>
Sent: 07 April 2022 17:16
To: Reg <Reg@lithos.co.uk>
Cc: Ben Smith <bensmith@parklanehomes.co.uk>
Subject: RE: Wigton Heath Farm, Alwoodley

Hi Reg,

Apologies for the delay in coming back to you on this. We have had a few last-minute legal hurdles to get over.

We would like to proceed initially with the phase 1 desktop study.

Please can you let us know your availability and timescales?

Kind regards

PARK LANE HOMES LIMITED
James Clink
Land and Sales Director
jamesclink@parklanehomes.co.uk

t: +44 (0) 113 268 3416
w: www.parklanehomes.co.uk

From: Reg <Reg@lithos.co.uk>
Sent: 24 February 2022 14:39
To: James Clink <jamesclink@parklanehomes.co.uk>
Cc: Ben Smith <bensmith@parklanehomes.co.uk>
Subject: Wigton Heath Farm, Alwoodley

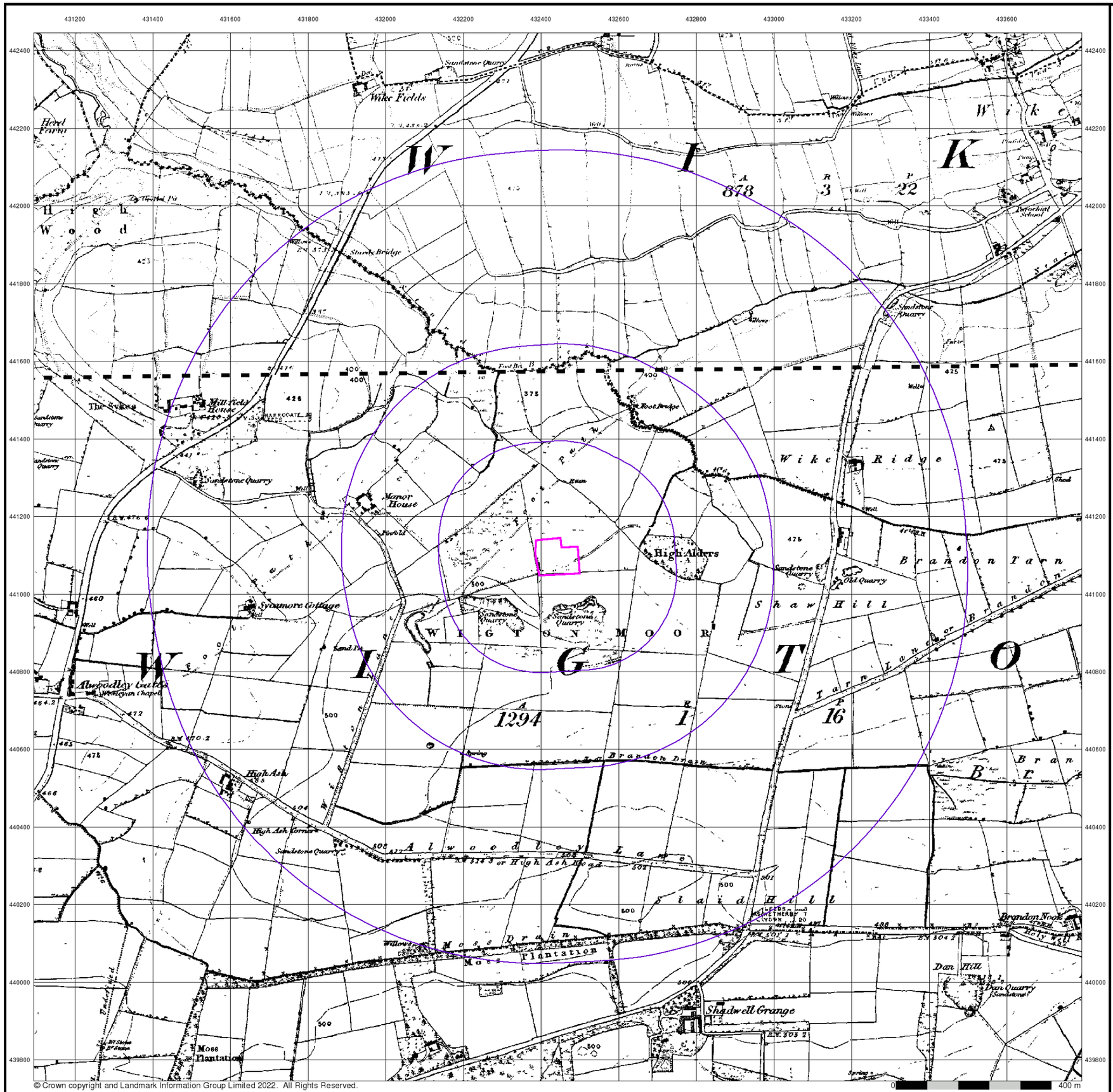
Afternoon James
SI quote attached. As always, this allows for a robust scope of works that should enable you to submit a bid that is unconditional with respect to ground and discharge ground-related planning conditions.
This is a relatively costly job, largely due to the need for gas risk assessment and the miscellany of problems often associated with farmyards. We've also allowed for some soakaway testing but could knock this Item out if you don't require.
We would expect to be on site within 4 weeks of instruction, with a summary of initial findings issued within 2 to 3 days of fieldwork completion. Our final SI Report should be available within 8 weeks of instruction (although a quicker turnaround might be possible).
As requested, we'd issue our Report in joint names – PLH & Landowner (name TBC)
Any queries, please call.
Regards

Mark Perrin
Director
Lithos Consulting Ltd
M 07703 396 635
DD 01937 545 331

LITHOS CONSULTING
www.lithos.co.uk

Appendix D

Historical OS Plans



LITHOS CONSULTING

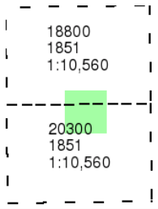
Yorkshire

Published 1851

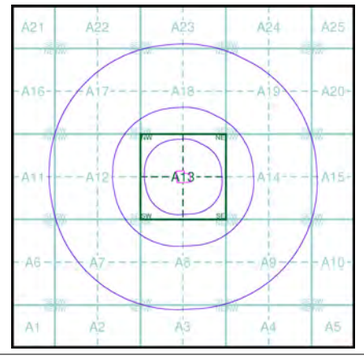
Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)



Historical Map - Slice A



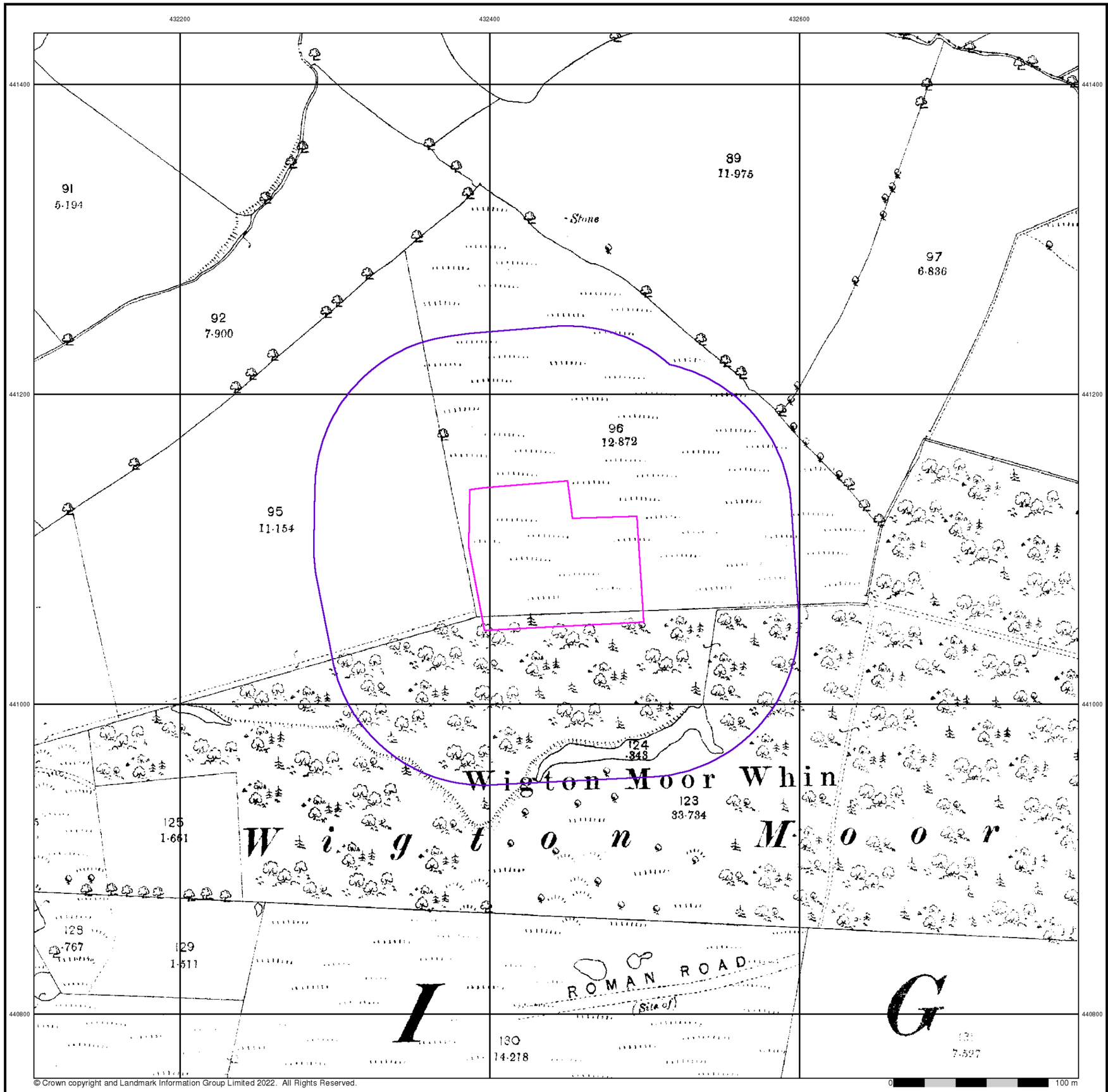
Order Details

Order Number:	293922515_1_1
Customer Ref:	PO19043/JW/4382
National Grid Reference:	432440, 441090
Slice:	A
Site Area (Ha):	0.9
Search Buffer (m):	1000

Site Details

Wigton Heath Farm, Alwoody, LS17 9JD

Landmark INFORMATION GROUP
Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



LITHOS CONSULTING

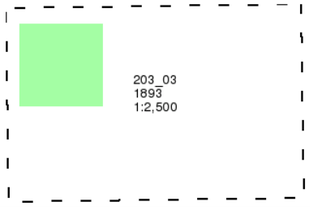
Yorkshire

Published 1893

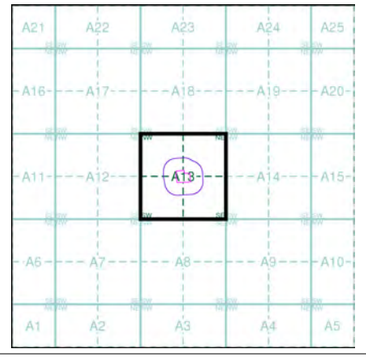
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

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Customer Ref:	PO19043/JW/4382
National Grid Reference:	432440, 441090
Slice:	A
Site Area (Ha):	0.9
Search Buffer (m):	100

Site Details

Wigton Heath Farm, Alwoody, LS17 9JD

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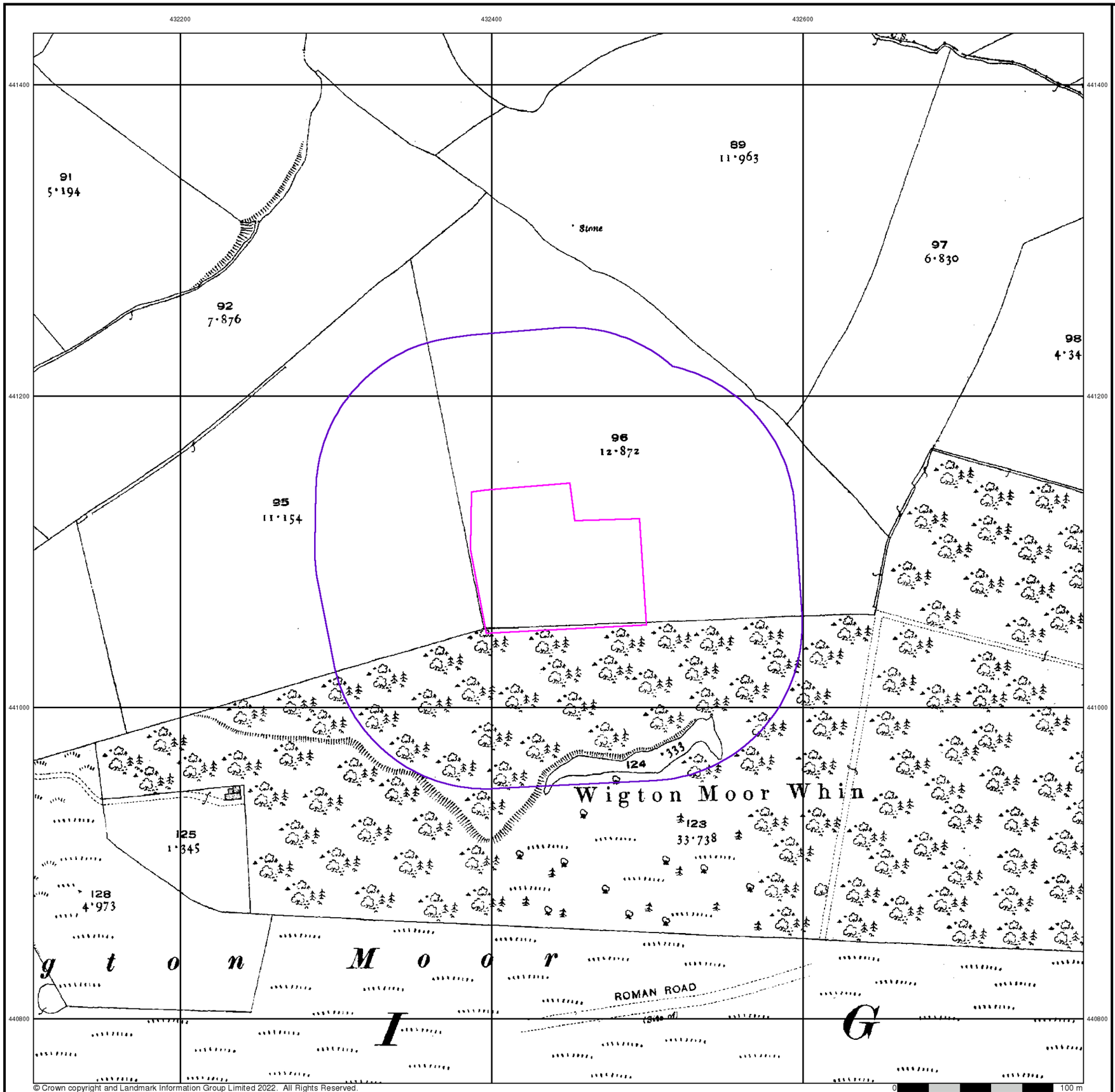


LITHOS CONSULTING

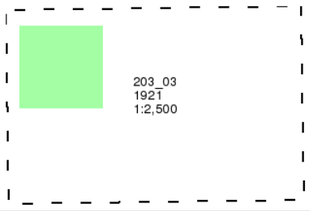
Yorkshire

Published 1921

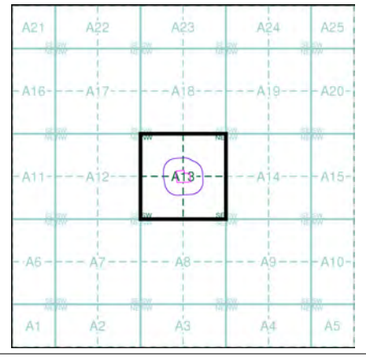
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	293922515_1_1
Customer Ref:	PO19043/JW/4382
National Grid Reference:	432440, 441090
Slice:	A
Site Area (Ha):	0.9
Search Buffer (m):	100

Site Details

Wigton Heath Farm, Alwoody, LS17 9JD

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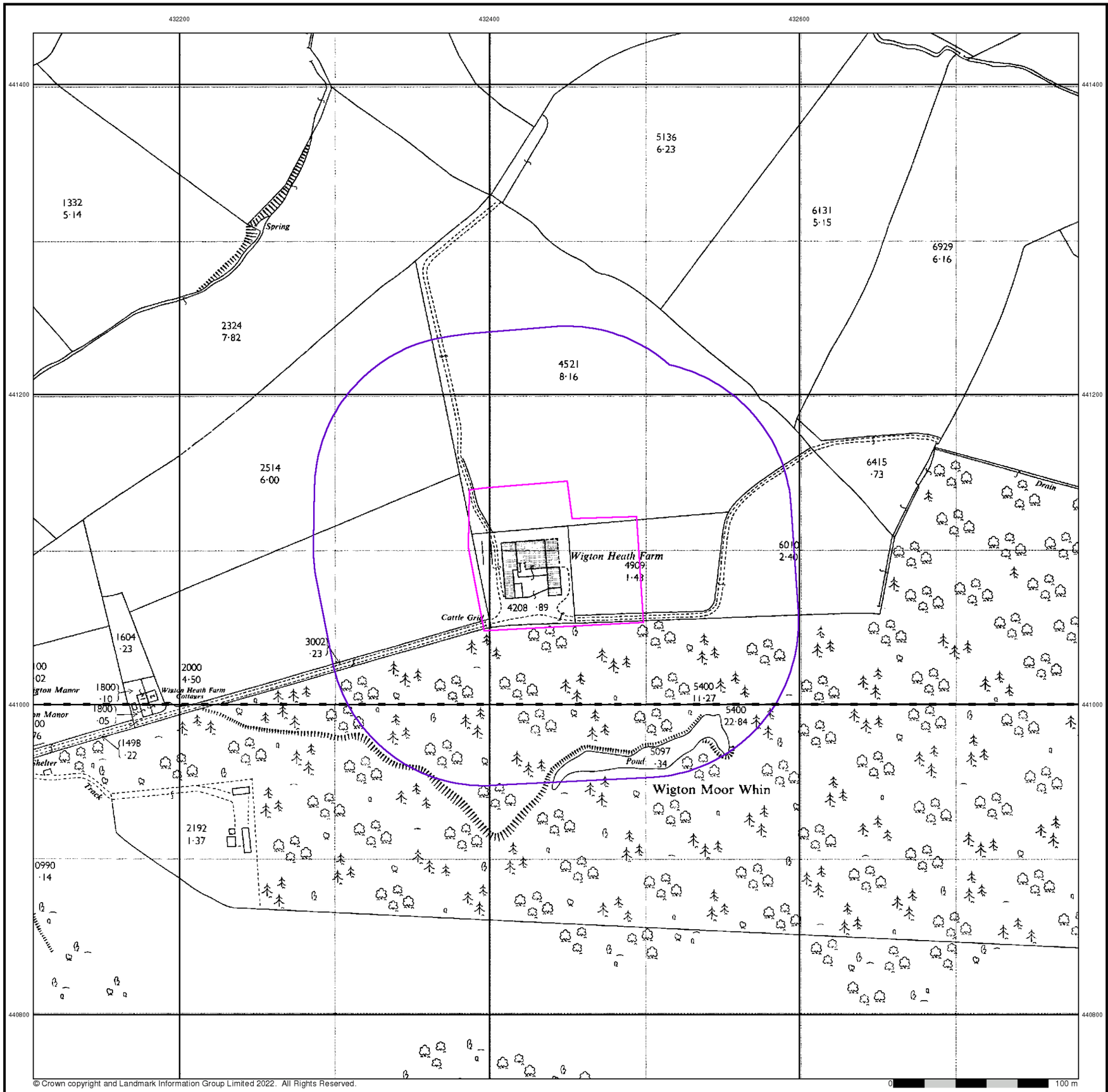
Web: www.envirocheck.co.uk



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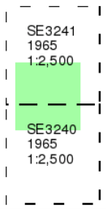
Ordnance Survey Plan

Published 1965

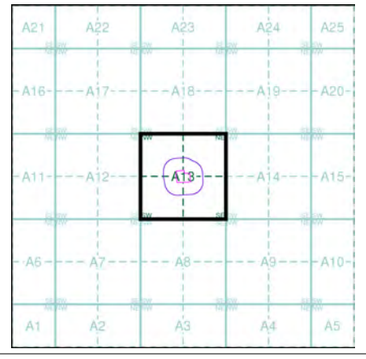
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

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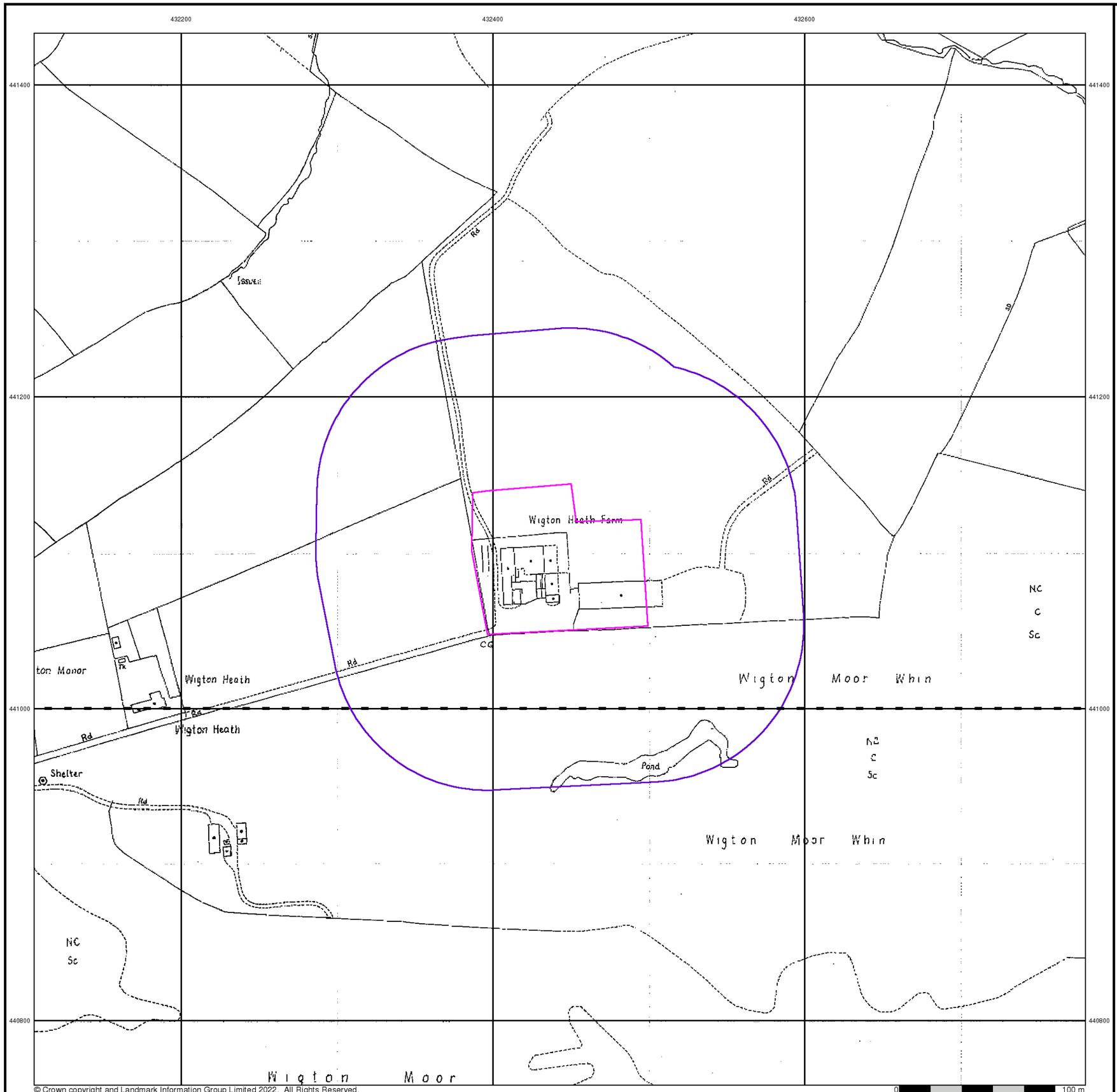
Customer Ref:	PO19043/JW/4382
National Grid Reference:	432440, 441090
Slice:	A
Site Area (Ha):	0.9
Search Buffer (m):	100

Site Details

Wigton Heath Farm, Alwoody, LS17 9JD



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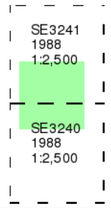
Additional SIMs

Published 1988

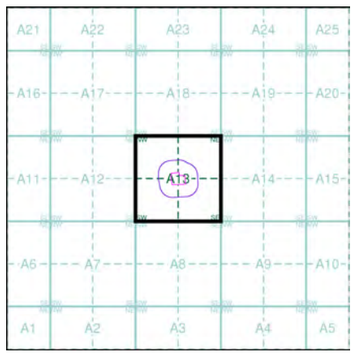
Source map scale - 1:2,500

The SIM cards (Ordnance Survey's `Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



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Search Buffer (m):	100

Site Details

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Appendix E

Search Responses & other Correspondence

Envirocheck® Report:

Datasheet

Order Details:

Order Number:
293922515_1_1

Customer Reference:
PO19043/JW/4382

National Grid Reference:
432440, 441090

Slice:
A

Site Area (Ha):
0.9

Search Buffer (m):
1000

Site Details:

Wigton Heath Farm
Alwoody
LS17 9JD

Client Details:

Mr M Perrin
Lithos Consulting Ltd
Parkhill
Walton Road
Wetherby
LS22 5DZ

Contents

Introduction

The Environment Act 1995 has made site sensitivity a key issue, as the legislation pays as much attention to the pathways by which contamination could spread, and to the vulnerable targets of contamination, as it does the potential sources of contamination.
For this reason, Landmark's Site Sensitivity maps and Datasheet(s) place great emphasis on statutory data provided by the Environment Agency/Natural Resources Wales and the Scottish Environment Protection Agency; it also incorporates data from Natural England (and the Scottish and Welsh equivalents) and Local Authorities; and highlights hydrogeological features required by environmental and geotechnical consultants. It does not include any information concerning past uses of land. The datasheet is produced by querying the Landmark database to a distance defined by the client from a site boundary provided by the client.
In this datasheet the National Grid References (NGRs) are rounded to the nearest 10m in accordance with Landmark's agreements with a number of Data Suppliers.

Report Version v53.0

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Summary

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Agency & Hydrological					
BGS Groundwater Flooding Susceptibility	pg 1	Yes	Yes	Yes	n/a
Contaminated Land Register Entries and Notices					
Discharge Consents	pg 2			2	6
Prosecutions Relating to Controlled Waters			n/a	n/a	n/a
Enforcement and Prohibition Notices					
Integrated Pollution Controls					
Integrated Pollution Prevention And Control					
Local Authority Integrated Pollution Prevention And Control					
Local Authority Pollution Prevention and Controls	pg 4				1
Local Authority Pollution Prevention and Control Enforcements					
Nearest Surface Water Feature	pg 4		Yes		
Pollution Incidents to Controlled Waters	pg 4			2	7
Prosecutions Relating to Authorised Processes					
Registered Radioactive Substances					
River Quality					
River Quality Biology Sampling Points					
River Quality Chemistry Sampling Points					
Substantiated Pollution Incident Register					
Water Abstractions	pg 5			1	3 (*6)
Water Industry Act Referrals					
Groundwater Vulnerability Map	pg 8	Yes	n/a	n/a	n/a
Groundwater Vulnerability - Soluble Rock Risk			n/a	n/a	n/a
Groundwater Vulnerability - Local Information			n/a	n/a	n/a
Bedrock Aquifer Designations	pg 8	Yes	n/a	n/a	n/a
Superficial Aquifer Designations			n/a	n/a	n/a
Source Protection Zones					
Extreme Flooding from Rivers or Sea without Defences				n/a	n/a
Flooding from Rivers or Sea without Defences				n/a	n/a
Areas Benefiting from Flood Defences				n/a	n/a
Flood Water Storage Areas				n/a	n/a
Flood Defences				n/a	n/a
OS Water Network Lines	pg 8		2	18	22

Summary

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Waste					
BGS Recorded Landfill Sites					
Historical Landfill Sites					
Integrated Pollution Control Registered Waste Sites					
Licensed Waste Management Facilities (Landfill Boundaries)					
Licensed Waste Management Facilities (Locations)					
Local Authority Landfill Coverage	pg 14	1	n/a	n/a	n/a
Local Authority Recorded Landfill Sites					
Potentially Infilled Land (Non-Water)	pg 14		1		5
Potentially Infilled Land (Water)	pg 14				5
Registered Landfill Sites					
Registered Waste Transfer Sites					
Registered Waste Treatment or Disposal Sites					
Hazardous Substances					
Control of Major Accident Hazards Sites (COMAH)					
Explosive Sites					
Notification of Installations Handling Hazardous Substances (NIHHS)					
Planning Hazardous Substance Consents					
Planning Hazardous Substance Enforcements					

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Summary

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Geological					
BGS 1:625,000 Solid Geology	pg 15	Yes	n/a	n/a	n/a
BGS Estimated Soil Chemistry	pg 15	Yes		Yes	Yes
BGS Recorded Mineral Sites	pg 18		3		5
BGS Urban Soil Chemistry					
BGS Urban Soil Chemistry Averages					
CBSCB Compensation District			n/a	n/a	n/a
Coal Mining Affected Areas			n/a	n/a	n/a
Mining Instability			n/a	n/a	n/a
Man-Made Mining Cavities					
Natural Cavities					
Non Coal Mining Areas of Great Britain	pg 19	Yes		n/a	n/a
Potential for Collapsible Ground Stability Hazards	pg 19	Yes		n/a	n/a
Potential for Compressible Ground Stability Hazards				n/a	n/a
Potential for Ground Dissolution Stability Hazards				n/a	n/a
Potential for Landslide Ground Stability Hazards	pg 19	Yes	Yes	n/a	n/a
Potential for Running Sand Ground Stability Hazards				n/a	n/a
Potential for Shrinking or Swelling Clay Ground Stability Hazards	pg 20		Yes	n/a	n/a
Radon Potential - Radon Affected Areas			n/a	n/a	n/a
Radon Potential - Radon Protection Measures			n/a	n/a	n/a
Industrial Land Use					
Contemporary Trade Directory Entries	pg 21				6
Fuel Station Entries					
Points of Interest - Commercial Services	pg 21				2
Points of Interest - Education and Health					
Points of Interest - Manufacturing and Production	pg 21		1		
Points of Interest - Public Infrastructure	pg 21				3
Points of Interest - Recreational and Environmental					
Gas Pipelines					
Underground Electrical Cables					

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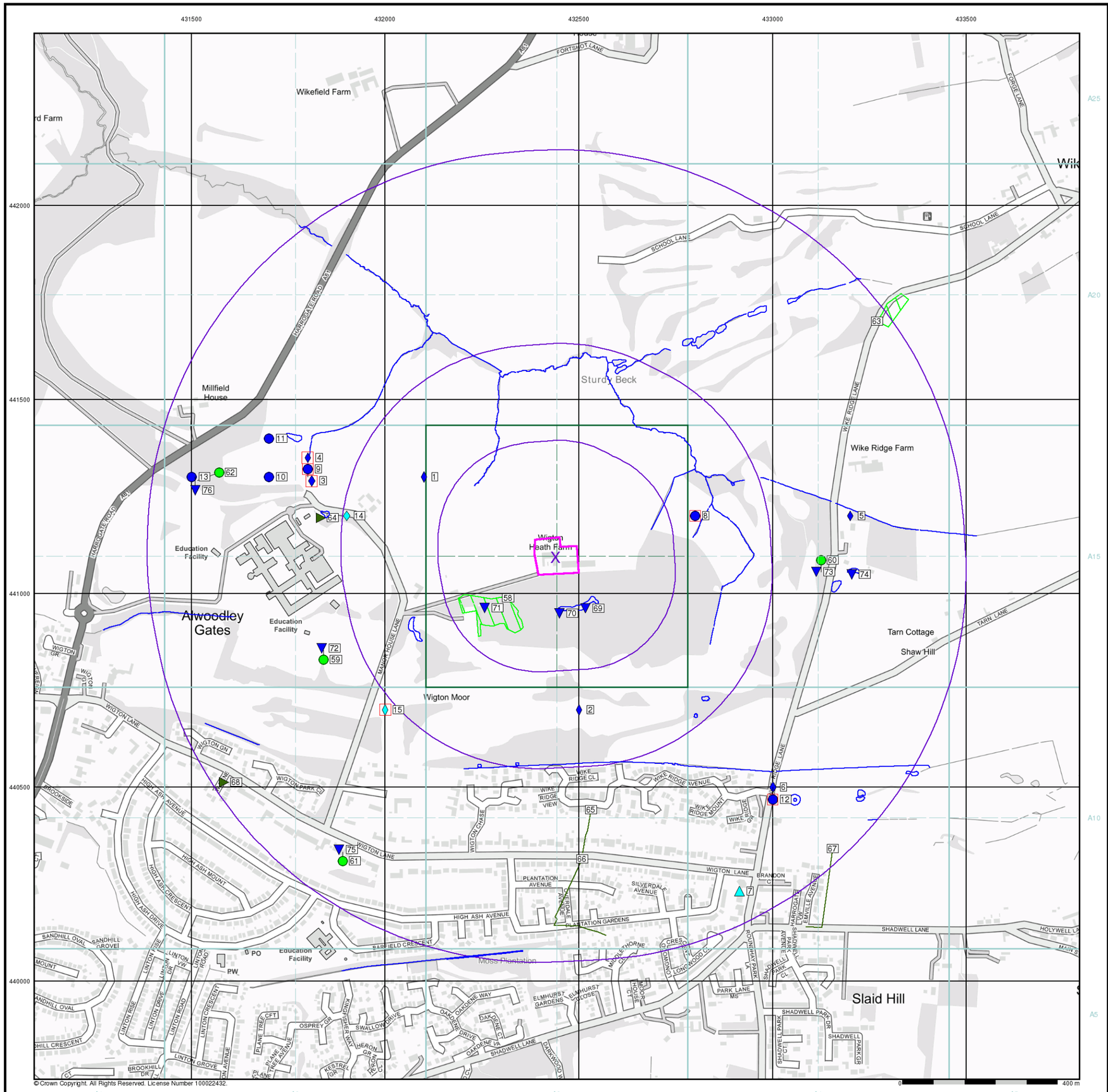
Summary

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Sensitive Land Use					
Ancient Woodland					
Areas of Adopted Green Belt	pg 22	1			
Areas of Unadopted Green Belt					
Areas of Outstanding Natural Beauty					
Environmentally Sensitive Areas					
Forest Parks					
Local Nature Reserves					
Marine Nature Reserves					
National Nature Reserves					
National Parks					
Nitrate Sensitive Areas					
Nitrate Vulnerable Zones	pg 22		1		
Ramsar Sites					
Sites of Special Scientific Interest					
Special Areas of Conservation					
Special Protection Areas					
World Heritage Sites					



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General

Specified Site
Specified Buffer(s)
Bearing Reference Point
Map ID
Several of Type at Location

Agency and Hydrological

- Contaminated Land Register Entry or Notice (Location)
- Contaminated Land Register Entry or Notice
- Discharge Consent
- Enforcement or Prohibition Notice
- Integrated Pollution Control
- Integrated Pollution Prevention Control
- Local Authority Integrated Pollution Prevention and Control
- Local Authority Pollution Prevention and Control
- Local Authority Pollution Prevention and Control Enforcement
- Pollution Incident to Controlled Waters
- Prosecution Relating to Authorised Processes
- Prosecution Relating to Controlled Waters
- Registered Radioactive Substance
- River Network or Water Feature
- River Quality Sampling Point
- Substantiated Pollution Incident Register
- Water Abstraction
- Water Industry Act Referral

Hazardous Substances

- COMAH Site
- Explosive Site
- NIHHS Site
- Planning Hazardous Substance Consent
- Planning Hazardous Substance Enforcement

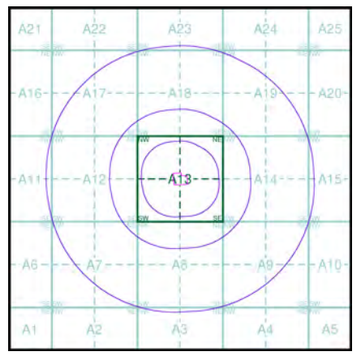
Geological

- BGS Recorded Mineral Site

Waste

- BGS Recorded Landfill Site (Location)
- BGS Recorded Landfill Site
- EA Historic Landfill (Buffered Point)
- EA Historic Landfill (Polygon)
- Integrated Pollution Control Registered Waste Site
- Licensed Waste Management Facility (Landfill Boundary)
- Licensed Waste Management Facility (Location)
- Local Authority Recorded Landfill Site (Location)
- Local Authority Recorded Landfill Site
- Potentially Infilled Land (Non-water)
- Potentially Infilled Land (Non-water)
- Potentially Infilled Land (Non-water)
- Potentially Infilled Land (Water)
- Potentially Infilled Land (Water)
- Potentially Infilled Land (Water)
- Registered Landfill Site
- Registered Landfill Site (Location)
- Registered Landfill Site (Point Buffered to 100m)
- Registered Landfill Site (Point Buffered to 250m)
- Registered Waste Transfer Site (Location)
- Registered Waste Transfer Site
- Registered Waste Treatment or Disposal Site (Location)
- Registered Waste Treatment or Disposal Site

Site Sensitivity Map - Slice A



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Customer Ref:	PO19043/JW/4382
National Grid Reference:	432440, 441090
Slice:	A
Site Area (Ha):	0.9
Search Buffer (m):	1000

Site Details

Wigton Heath Farm, Alwoody, LS17 9JD

Landmark INFORMATION GROUP
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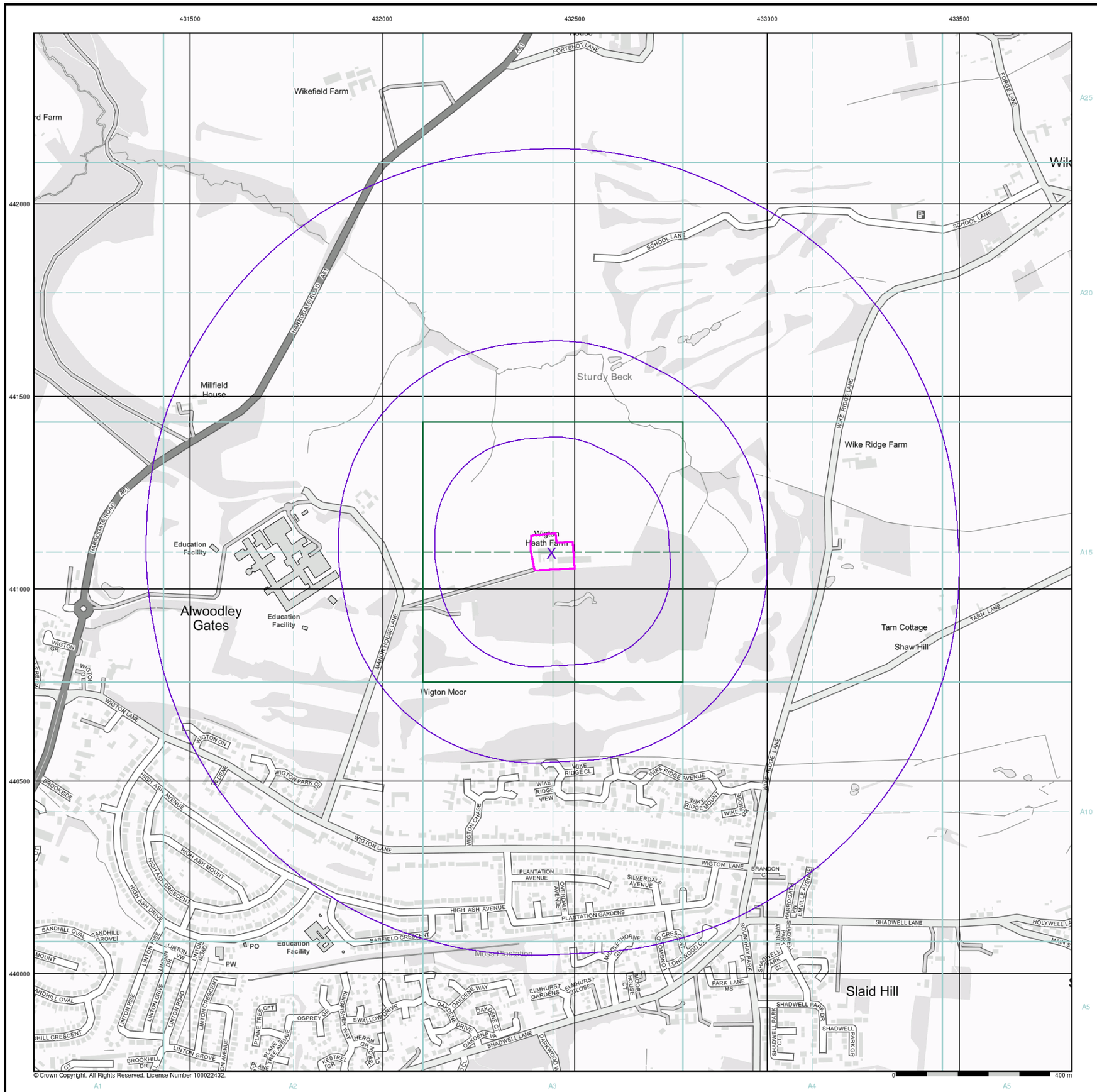

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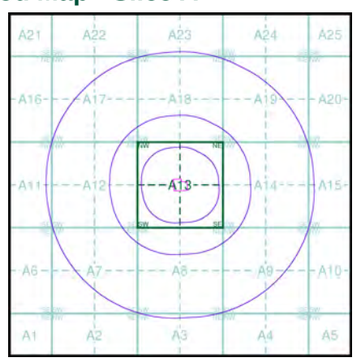
General

- Specified Site
- Specified Buffer(s)
- X Bearing Reference Point

Agency and Hydrological (Flood)

- Extreme Flooding from Rivers or Sea without Defences (Zone 2)
- Flooding from Rivers or Sea without Defences (Zone 3)
- Area Benefiting from Flood Defence
- Flood Water Storage Areas
- Flood Defence

Flood Map - Slice A



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General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point

OS Water Network Data

- Canal
- Reservoir
- Foreshore
- Marsh
- Tidal River
- Inland River
- Drain
- Other
- Lake
- Transfer
- Lock Or Flight Of Locks
- Sea

Contours (height in meters)

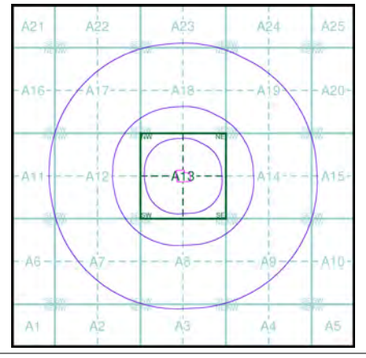
Standard Contour 105 100 95

Master Contour

Spot Height 167.3

- MLW Mean Low Water
- MHW Mean High Water

OS Water Network Map - Slice A



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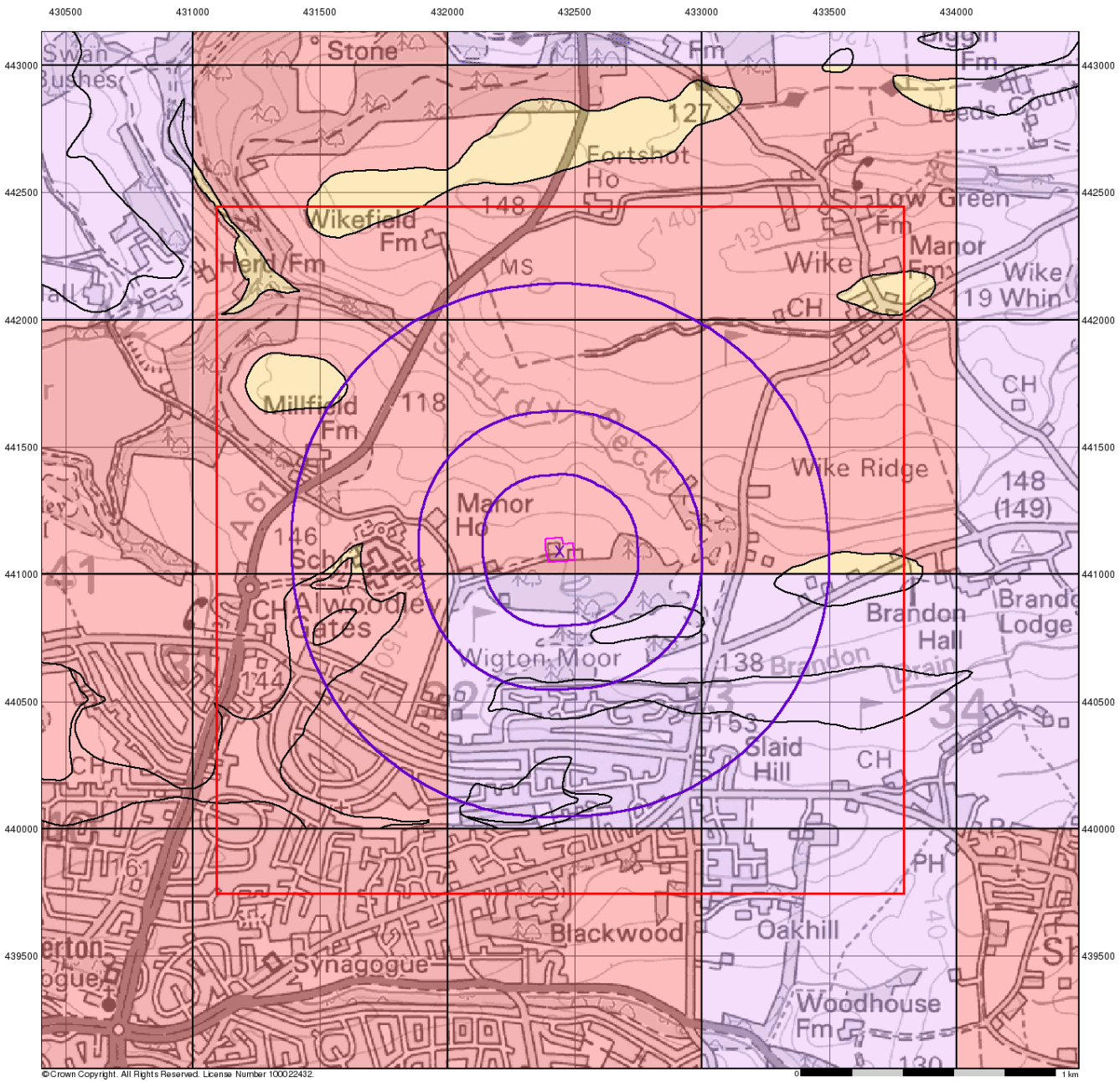

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Groundwater Vulnerability

General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

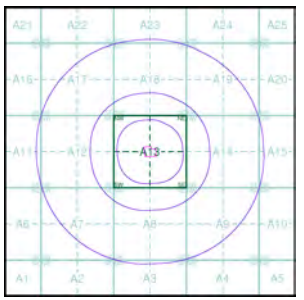
Agency and Hydrological

Bedrock Aquifers	Superficial Aquifers
High Vulnerability, Principal Aquifer	High Vulnerability, Principal Aquifer
High Vulnerability, Secondary Aquifer	High Vulnerability, Secondary Aquifer
Medium Vulnerability, Principal Aquifer	Medium Vulnerability, Principal Aquifer
Medium Vulnerability, Secondary Aquifer	Medium Vulnerability, Secondary Aquifer
Low Vulnerability, Principal Aquifer	Low Vulnerability, Principal Aquifer
Low Vulnerability, Secondary Aquifer	Low Vulnerability, Secondary Aquifer

Unproductive Aquifer

Soluble Rock

Site Sensitivity Context Map - Slice A



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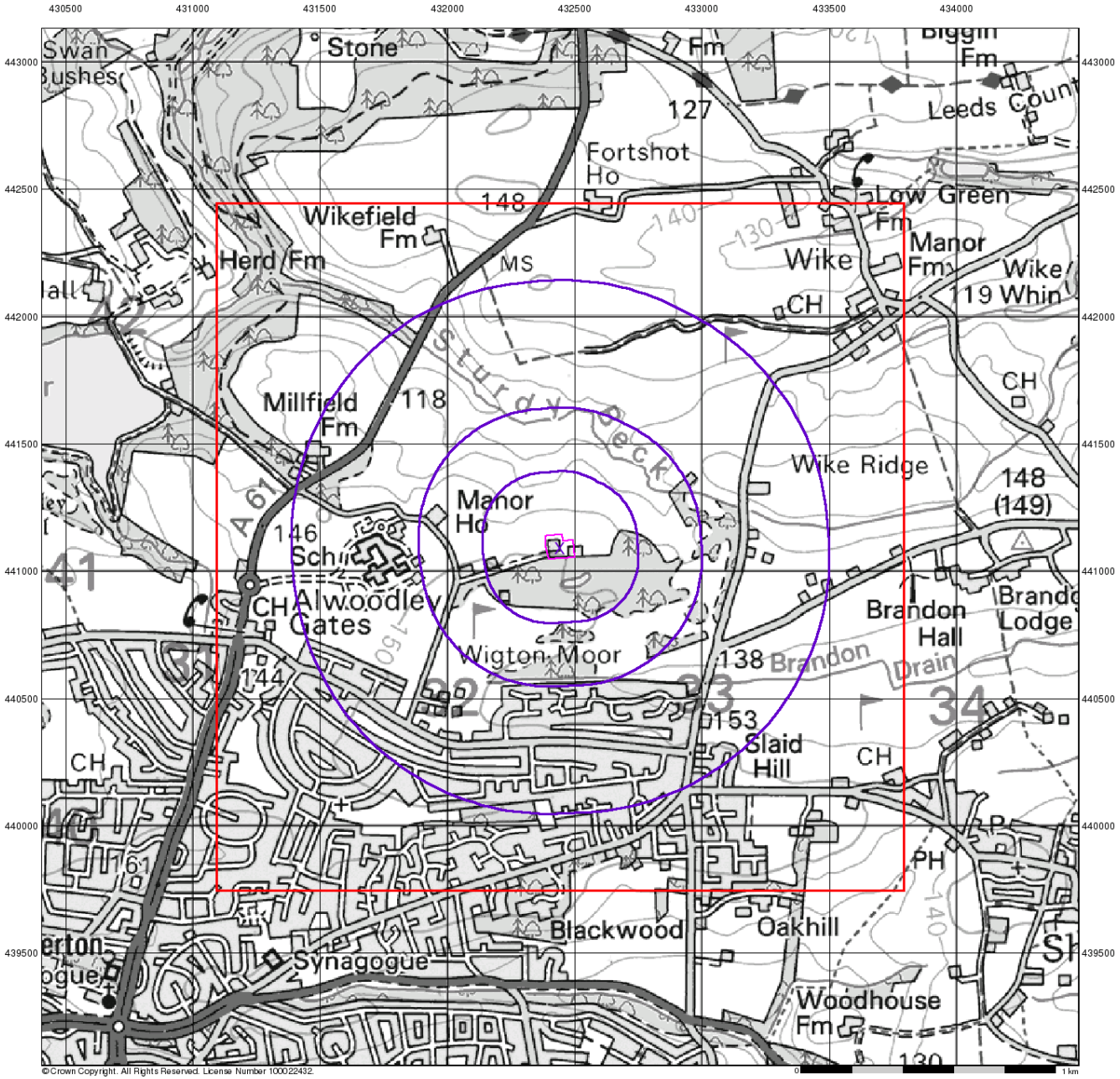

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Source Protection Zones

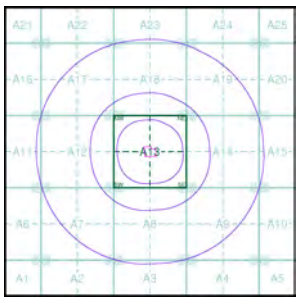
General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

Agency and Hydrological

- Inner zone (Zone 1)
- Inner zone - subsurface activity only (Zone 1c)
- Outer zone (Zone 2)
- Outer zone - subsurface activity only (Zone 2c)
- Total catchment (Zone 3)
- Total catchment - subsurface activity only (Zone 3c)
- Special interest (Zone 4)

Site Sensitivity Context Map - Slice A



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