Sirius Geotechnical

GEOENVIRONMENTAL APPRAISAL REPORT

Jack Lawson Terrace, Wheatley Hill

For Gleeson Regeneration Ltd

Date: **August 2023**

Report reference: C9843

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APPENDIX A FIGURES AND DRAWINGS

Drawing No.	Title	Scale
2215.03.01	Sketch Housing La)	1:500@A1
C9843/01	Site Location Plan	1:25,000
C9843/02	Site Features Plan	1:1000
C9843/03	Preliminary Conceptual Site Model	NTS
C9843/04	Exploratory Hole Location and Constraints Plan	1:1000
C9843/05	Revised Conceptual Site Model	NTS
C9843/06	Indicative Foundation Zoning Plan	1:1000

Executive Summary

Proposed Development	Sirius Geotechnical Ltd was commissioned by Gleeson Regeneration Ltd to undertake a geoenvironmental appraisal of two parcels of land at Jack Lawson Terrace, Wheatley Hill. It is understood that consideration is being given to development of the site with low-rise 1 to 3 storey residential houses/bungalows and associated infrastructure.
The Site	The site is split into two parcels (eastern and western parcels), with a combined area of approximately 2.7ha, nested within an existing housing estate. The two areas are irregular to rectangular in shape and comprise flat lying grassed public open space that were formerly occupied by housing and industrial units/depots.
Ground & Groundwater Conditions	The investigation has identified made ground, locally overlain by reworked topsoil, to depths typically ranging between 0.15m and 0.65m, but locally up to 2.4m bgl in the south west of the eastern parcel, overlying predominantly stiff and very stiff high strength slightly sandy slightly gravelly clay (glacial till). Limestone (dolostone) bedrock was encountered at shallow depth in some locations in the north and south of the site, at depths ranging from 1.25m to 2.8m bgl. In the central area of the site, bedrock was not encountered within exploratory holes and rockhead is anticipated to be in excess of circa 3m bgl. Groundwater was not encountered during the investigation.
Ground Stability	All soils should be assumed to be unstable in the short term within all excavations to any depth, and appropriate support should be provided to all excavations.
Foundations and Floor Slabs	Traditional shallow strip foundations are considered suitable across most of the site, placed at a minimum depth of 0.9m, although deepened locally to mitigate the effects of trees. Increased depths should be expected particularly around the site perimeter where trees are present. Some localised deepening of foundations may be required where made ground is potentially up to 2.4m thick below plot footprints. Ground bearing floor slabs may be suitable across most of the site, subject to made ground thicknesses on completion for example as a consequence of any site reprofiling, and where soils are affected by trees. Suspended floor slabs will be required where made ground thicknesses exceed 600mm.
Sulphate Class	Cohesive made ground: DS-1 and AC-2z Topsoil, granular made ground and natural superficial soils: DS-1 and AC-1
Contamination	Elevated concentrations of aromatic hydrocarbons (C16-C35 fractions) were detected towards the base of the made ground soils in the south west of the eastern parcel, in the vicinity of TP26. The most significant impacts were observed to be associated with gravel bedding surrounding a relict drain encountered in TP26E.
Asbestos	ACMs (chrysotile cement product fragments) and chrysotile and amosite asbestos fibres have been detected within shallow granular made ground soils, and locally on the ground surface.

Outline Remedial Requirements	Remedial action is required for the potentially site wide asbestos impacted made ground soils and localised hydrocarbon impacted soils. Asbestos Impacted Soils: CAT B engineer to hand pick visible ACM fragments on ground surface. Excavation and removal of impacted soils off site to a suitable disposal facility; or Provision of a suitable cover soil system and geotextile membrane or hard dig layer where impacted soils remain within areas of gardens and landscaping. Hydrocarbon Impacted Soils: Excavation and removal of impacted soils off site to a suitable disposal facility and validation of surrounding and underlying soils.
Soakaway Testing	Based on the results of soakaway testing during the investigation, soakaway drainage is considered non-viable at the site within glacial till strata.
Ground Gas	Based on the ground gas conceptual site model, the site is considered to be representative of Characteristic Situation 1 (CS1) conditions. No gas protection measures are required for the construction of new dwellings or extensions. No radon protective measures are required.
Invasive and Protected Species	No evidence of any invasive or protected species was observed during the investigation, however it is recommended that the absence or otherwise of invasive species is confirmed by a qualified ecological consultant.

The executive summary is an overview of the key findings and conclusions of the report. There may be other information contained in the body of the report which puts into context the findings of the executive summary. No reliance should be placed on the executive summary in isolation, particularly when deriving design detail/abnormal costs.

1. Introduction

1.1 Authorisation

Sirius Geotechnical Ltd (Sirius) was commissioned by Gleeson Regeneration Ltd (Gleeson) to undertake a geoenvironmental appraisal of two parcels of land at Jack Lawson Terrace, Wheatley Hill (the "site"). It is understood that consideration is being given to development for a residential with private gardens end use.

1.2 Development Plans

Proposals for the site include the construction of low rise 2 to 3 storey semi-detached and detached residential units and 1 storey bungalows with private gardens, garages and drives. A proposed development layout plan (Drawing No. 2215.03.01 Rev A) has been provided by Gleeson, and is included within Appendix A for reference. The investigation boundary is shown in Figure 1.1, extracted from Drawing No. C9843/02 enclosed within Appendix A.

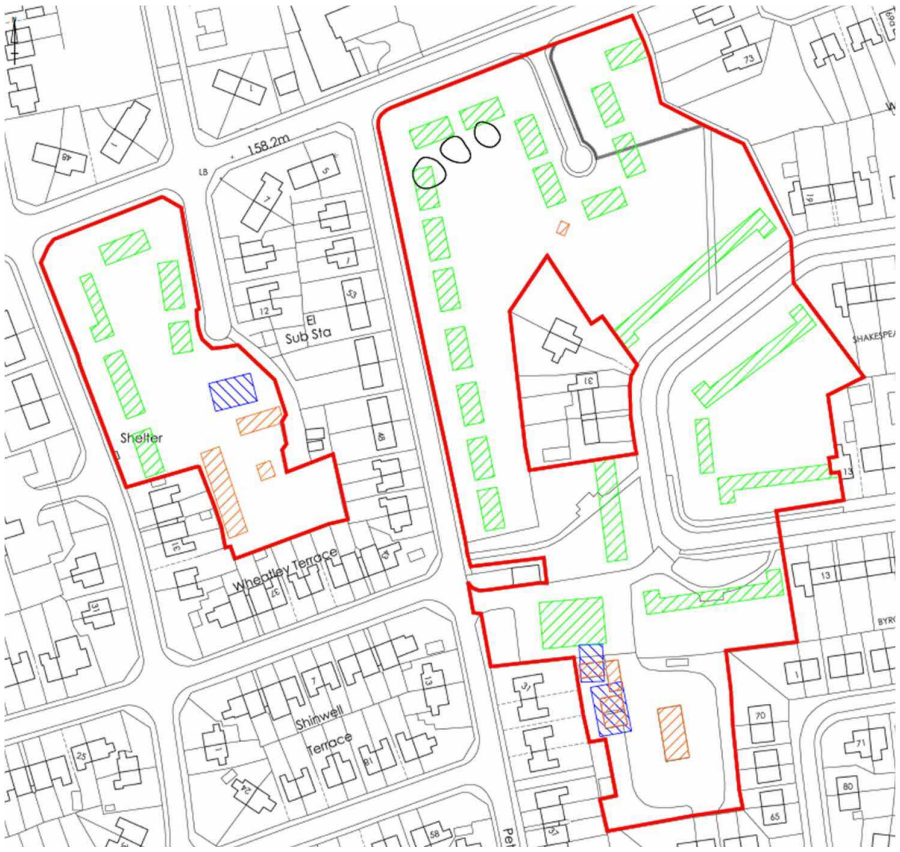

Figure 1.1 Site Boundary Plan

1.3 Objectives

The objectives of this appraisal were to:

- Review of purchased and publicly available geological, environmental, waste, pollution, hydrological, hydrogeological and mining data. Review of purchased historical and environmental sensitivity mapping.
- Preparation of a Preliminary Contaminated Land Risk Assessment and Conceptual Site Model based on the above information.
- Intrusive investigation of soil, rock and groundwater conditions.
- Provision of exploratory hole logs.
- Completion of a Generic Quantitative Risk Assessment (GQRA) and Revised Conceptual Site Model.
- Determine the potential risks posed by any ground contamination and provide recommendations on remedial measures to manage such risks.
- Provide outline advice relating to geotechnical issues associated with the site.
- Provide outline foundation and other built environment considerations and recommendations.

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

1.4 Limitations

It is assumed that ground levels will not change significantly from those described in this report. If this is not the case, then amendments to the recommendations made in this report may be required.

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

The comments and opinions presented in this report are based on the findings of the desk study, ground conditions encountered during intrusive investigation works performed by Sirius and the results of tests carried out within one or more laboratories. There may be other conditions prevailing on the site which have not been revealed by this investigation and which have not been taken into account by this report. Responsibility cannot be accepted for any ground conditions/risks not revealed by this investigation. Any diagram or opinion on the possible configuration of strata, contamination or other spatially variable features between or beyond investigation positions is conjectured and given for guidance only. Confirmation of ground conditions between exploratory holes should be undertaken if deemed necessary. Evaluation of groundwater is based on observations made at the time of the investigation only. It should be noted that groundwater levels and quality may vary due to seasonal and other effects.

All marked site features (including historical features, mining features (i.e. opencast boundaries and mineshafts), potential contaminant constraints, and any other potential constraint or feature of note) shown on the appended drawings are given for indicative purposes only. Enclosed drawings should not be underlaid in isolation to determine proposed development layouts. Reference should be made to the text enclosed within this report for commentary on the potential location of these features including coordinates if available and any further works required to locate features.

Please note that this investigation has not been designed to classify waste soils. It is likely that further testing will be required once waste soils have been identified or generated. Any mention of waste classification within this report is indicative only.

No information pertaining to the potential flood risk of the site is included as part of this appraisal. It is recommended that a detailed flood risk assessment for the site is undertaken by an appropriate flood risk consultant.

Potential risk to site construction/maintenance workers have not been considered within this appraisal on the basis that any risks to workers would be dealt with under the Health and Safety at Work Act (1974) and regulations made under the Act. It is recommended that the relevant findings of this report are made available to site construction/maintenance workers to enable appropriate risk assessment to be undertaken to mitigate the risk to site construction/maintenance workers from potential contaminants identified within the site.

This report has been prepared for the sole use of Gleeson Regeneration Ltd. No other third party may rely upon or reproduce the contents of this report without the written approval of Sirius. If any unauthorised third party comes into possession of this report, they rely on it entirely at their own risk and the authors do not owe them any Duty of Care or Skill.

1.5 Sources of Information

Table 1 details the sources of information which have been used to prepare this report. They are referred to by the reference number provided. Standard terms of reference for guidance and legislation are included in Appendix H and have been used for general reference to compile this report.

Table 1.1 Sources of Information

Ref	References
A	Envirocheck Report Ref. 312801561_1_1, 15 June 2023, enclosed within Appendix B
B	Coal Authority CON29M Report Ref. 51003361205001, 15 June 2023, enclosed within Appendix B
C	BGS 1:10,560 scale geological map (Durham, NZ 33 NE, 1964)
D	BGS GeoIndex
E	Coal Authority online interactive map viewer
F	BGS Lexicon of Named Rock Units
G	EA Catchment Data Explorer
H	UK radon online mapping
I	Zetica UXO online risk maps
J	Durham County Council, County Durham Minerals Local Plan, Adopted Plan, December 2000
K	Durham County Council, The County Durham Plan, Technical Consultation Report “Safeguarding Mineral Resources for the Future”, November 2010
L	DEFRA Magic Map Application

2. Desk Study

2.1 Introduction

The following section summarises the pertinent information reviewed to inform the Desk Study part of this appraisal using the sources outlined within Table 1.1 in Section 1.5.

2.2 Site Details

A summary of the pertinent site details as shown on site plans, and from a walkover undertaken by a Sirius Engineer on 7th June 2023, is summarised in Table 2.1, below.

Table 2.1 Site Details

Location	A site location plan is provided as Drawing No. C9843/01 within Appendix A. The site is located in the centre of Wheatley Hill village, located approximately 10km south east of Durham city.
Site Area (ha)	The site is split into two areas with a combined area of approximately 2.7ha.
National Grid Ref.	437420, 538690
Site Boundaries	The investigation boundary is limited to the area denoted by the red line boundary shown on Drawing No. C9843/02, enclosed within Appendix A. The site boundaries are defined by the following features: North: Wooden post and rail fence East: Wooden post and rail fence, timber back garden fences South: Timber back garden fences West: Wooden post and rail fence, timber back garden fences
Site Description	The site comprises two parcels of land located to the south of Wordsworth Avenue/Luke Terrace, east of Jack Lawson Terrace, and centred on Wheatley Terrace. The westernmost parcel covers approximately 0.5ha and comprises grassed public open space with sporadic flower beds and immature trees. The easternmost parcel covers approximately 2.2ha and also mostly comprises of grassed public open space and immature trees. Ground levels are relatively flat or slope gently to the south. The site also incorporates the western crescent of Shakespeare Street, including the adopted pavements. A small area of existing residential properties form an 'island' within the boundary of the site (in the eastern parcel), but do not constitute part of the site.
Evidence of Fly-Tipping on Site?	None recorded.
Current Land U	Public open space (former housing land).
Site Surroundings	North: Residential housing (western parcel) and a school (eastern parcel), beyond Wordsworth Avenue. East: Residential housing. South: Residential housing. West: Residential housing, and a children's centre/nursery to the west of the western parcel, beyond Jack Lawson Terrace. A single storey fast food outlet is present immediately adjacent to the western boundary of the eastern parcel.

2.3 Site History

Table 2.2 presents a summary of the site history from 1857 to date, using historical maps presented in the Envirocheck Report obtained for the site (ref. A) and aerial imagery. It is not the intention of this report to describe in detail all of the changes that have occurred on or adjacent to the site, only those pertinent to the proposed development.

Table 2.2 Site History

Map Dates	On-Site Features	Pertinent Off-Site Features (within 500m of the site boundary)
1857 - 1861	The site is agricultural with a number of fields.	Surrounding land is predominantly agricultural. A limestone quarry named "Marl Hole Quarry" is located circa 200m north west of the site. A row of residential buildings is located circa 250m south west of the site. An unnamed quarry is located circa 300m south of the site.
1897 - 1898	No significant change.	The unnamed quarry is noted as old quarry. A row of residential buildings and a school are located 500m north east of the site.
1919 - 1920	No significant change.	Wheatley Hill Cemetery is located circa 200m east of the site. The row of residential buildings extends into an estate to circa 250m north east of the site.
1923	No significant change.	A limestone quarry named "Wingate Quarry" is located circa 500m south of the site.
1939	The site is developed with residential properties and associated public open spaces. One larger unit sits within the south of site's eastern parcel.	Residential buildings and associated public open spaces surround the site. A school is located circa 20m north of the site's eastern parcel. Marl Hole Quarry and the unnamed old quarry are no longer noted.
1951 - 1952	No significant change.	"Wingate Quarry" is noted as disused.

Map Dates	On-Site Features	Pertinent Off-Site Features (within 500m of the site boundary)
1958 - 1972	The larger unit in the south of the eastern parcel is extended and is labelled an "ambulance station". An additional unit with a ramp is present to the south. A circular feature is depicted adjacent to the units. Recent aerial photographs suggest this feature is hardstanding (possibly a turning circle for ambulance vehicles).	Further housing is shown to the south east of the site. A small unit is shown immediately adjacent to the western boundary of the eastern parcel (commensurate to the present day fast food outlet).
1977 - 1990	The ambulance station, the smaller unit to the south and the associated circular hardstand area are no longer present. A row of houses east of the units is also no longer present. Four additional small industrial units sit within the south of the eastern parcel, within an area labelled as "depot"	No significant change.
1991 - 1993	No significant change.	Wingate Quarry is no longer present.
1996 - 2000	A further row of houses towards the centre of the eastern parcel is no longer present and a footpath now traverses this area. A medium sized industrial unit is present within the depot area in the south of the eastern parcel.	No significant change.
2001 (Google Earth Aerial Image)	All houses within the western parcel and the houses in the eastern section of the eastern parcel are no longer present.	No significant change.
2008 (Google Earth Aerial Image)	The majority of houses along the northern and western boundaries of the eastern parcel are no longer present. Few houses now remain in the north of the eastern parcel.	No significant change.
2014	No houses remain on the site. the industrial units in the depot area of the site are no longer present, however the hardstanding area remains present.	No significant change.

Map Dates	On-Site Features	Pertinent Off-Site Features (within 500m of the site boundary)
2021 - present	The hardstanding area is no longer present and the site is all grassed landscaping, footpaths and public roads.	No significant change.

2.4 Geological Setting

A summary of geological information reviewed in this assessment is provided in Table 2.3.

Table 2.3 Geological Summary

Information Sources	A, C, D, F, J, K
Made Ground	Made ground is not recorded on published geological mapping. Thin made ground and/or reworked soils are however anticipated across the majority of the site, associated with the construction and demolition of previous residential and industrial developments on the site.
Superficial Deposits	The BGS 1:10,560 scale geology map records the entirety of the site to be underlain by Glacial Till. Four publicly available BGS borehole records are located outside of the site boundary. Two records, located approximately 250m south west of the site (NZ33NE183, NZ33NE184), record superficial deposits of firm to stiff mottled brown and grey clay containing fragments of dolomite, to a depth of at least 3m below ground level (bgl). The other two records, located approximately 400m north east of the site (NZ33NE170, NZ33NE171), record superficial deposits of soft to firm light brown clay with limestone fragments (overlain by ashy and rubble made ground), to depths of up to 1.7m bgl, terminating on rockhead.
Solid Geology	The site is conjectured by the BGS to be underlain by dolostone of the Permian Ford Formation (formerly Magnesian Limestone, with marl at base), in turn underlain by Basal Permian Sands and, at depth, by Carboniferous Pennine Middle Coal Measures strata. The depth to rockhead is not indicated on geological mapping in the immediate vicinity of the site. Based on BGS borehole strata discussed above, bedrock is potentially at shallow depth in parts of the region. This is further evident by the identification of limestone quarries on historical maps in the local area. No geological faults are recorded by the BGS to traverse the site.
Stability	The potential for ground stability hazards, associated with shrinking or swelling of clay, compressible ground, dissolution and collapsible ground/running sands, are reported as very low or no hazard.

2.5 Mining and Quarrying

A summary of mining and quarrying information reviewed in this assessment is provided in Table 2.4.

Table 2.4 Mining and Quarrying

Information Sources	A, B, C, D, E, F
Coal Seams	No coal seams are conjectured by the BGS to subcrop within the boundary of the site, in Coal Measures strata at depth below the site.
Recorded Coal Mining	The Coal Authority mining report indicates that the site is in an area that could be affected by underground mining in 6 seams of coal at 180m to 350m depth, last worked in 1964. Any movement in the ground associated with these workings should have stopped by now. Based on the generalised vertical geological section, as presented on the 1:10,560 scale geological map, together with a review of the plan area of recorded workings and seam codes as shown on the Coal Authority's interactive map, the shallowest worked seam is conjectured to be the Five-Quarter coal (up to circa 1.3m thick in the region). Given the depth of the shallowest worked seam, and the presence of dolostone rock overlying Coal Measures strata, the risk to the development associated with these recorded workings is considered negligible.
Unrecorded Coal Mining	No coal seams are present at shallow depth beneath the site and, therefore, there is considered to be no risk from unrecorded coal mining.
Other Mining	No other records of mining have been identified.
Mine Entries	None recorded on the site, or within 20m of the boundary.
Quarrying/ Opencast Mining	The site does not lie within the boundary of an opencast coal site. No evidence of quarrying has been identified on the site from a review of available historical maps and aerial images. However, quarrying operations have been carried out in the surrounding area for the extraction of dolomite limestone. The nearest quarries to the site are Marl Hole Quarry, circa 210m north west of the site, closed before 1939, and Wingate [Lane] Quarry, circa 304m south of the site, closed before 1951.
Mineral Safe-Guarding	The site is not indicated to lie within a Mineral Safeguarding Area in either the Durham County Adopted Minerals Local Plan or the Technical Consultation Report for safeguarding mineral resources.

2.6 Environmental Setting

A summary of relevant available information pertaining to the environmental setting of the site is provided in Table 2.5.

Table 2.5 Environmental Summary

Category	Data Source	Summary
Landfilling and Waste	A	**Recorded Landfills (within 500m)** Multiple entries for historic landfilling are recorded within the former Wingate Quarry, and within the fields immediately surrounding the quarry, beyond circa 385m south of the site. One landfill entry specifies the landfilled waste as commercial waste and liquid sludge. The waste types are unknown/not specified for other landfill entries. **Other Active Licensed Waste Management Facilities (within 500m)** None recorded. **Other Evidence of Waste Disposal on or within 250m of Site** None recorded.
Hydrology	A, G	**Classified Watercourses (within 500m)** The easterly flowing Castle Eden Burn, the source of which is indicated to be a tributary stream which lies approximately 265m north east of the site, was historically classified by the Environment Agency in 2000, with a GQA Grade 'C', indicative of 'fair' water quality. The watercourse is currently designated under Water Framework Directive (WFD) catchment management system from its source to the North Sea. The most recent monitoring data is from 2022, for which the water quality was assessed as 'Bad' for both ecological and biological status, and 'Good' for physico-chemical quality status. Metals, including copper, iron, manganese and zinc, were recorded to be high and the chemical status for the following contaminants failed: benzo(g,h,i)perylene, mercury and its compounds, and PBDE. The main reasons listed for failures are poor soil management (agriculture), although the source of some pollutants are unknown and under investigation. **Unclassified Watercourses (within 500m)** An unnamed watercourse is recorded to the east of site, which flows north eastwards into Castle Eden Burn at a distance >500m from the site boundary. Six OS water network lines entries are recorded within 500m, all of which relate to Castle Eden Burn and its tributary streams. All entries are listed as inland rivers. **Licensed Surface Water Abstractions (within 1000m)** None recorded. **Other Surface Water Features (Canals, Ponds, Lakes, etc.) (within 250m)** None recorded.
Hydrogeology	A, G, L	**Licensed Groundwater Abstractions (within 1000m)** None recorded.

Category	Data Source	Summary
		Source Protection Zones (within 500m) The site is recorded to fall within a Zone III Source Protection Zone (total catchment), associated with a pump positioned at Castle Eden, circa 3.2km east of the site. **Springs** None recorded. **Aquifer status** Superficial Deposits (Glacial Till) –Secondary Aquifer - Undifferentiated. Bedrock (Ford Formation) –Principal Aquifer. **Groundwater Vulnerability** The superficial deposits across the site are considered to be of low vulnerability, likely due to their low permeability/infiltration characteristics.
Ecology		No evidence of any invasive plants or protected species was observed during the investigation, nor has Sirius been made aware of the presence of such species within the site. It is recommended that the absence or otherwise of invasive species is confirmed by a qualified ecological consultant.
Radon	A, H	The site is within a Lower probability radon area (less than 1% of homes are estimated to be at or above the Action Level) and based on current building regulations, no radon protective measures are necessary in the construction of new dwellings or extensions.
UXO	I	The site is considered by Zetica to be at low risk from unexploded ordnance.
Ground Gas Risk Assessment Required?	No	The site is considered to be very low risk. No significant sources of potentially hazardous ground gases have been identified on the site, or within the immediately surrounding area. Historical landfill sites are located >250m from the site boundary and, with consideration to the recorded superficial geology beneath the site and surrounding area (low permeability glacial till), the potential for landfill gas migrating into the site is very low. Should areas of deep made ground (generally >3m average thickness) or fill containing degradable materials be encountered during intrusive investigation works, a reassessment of the gas risk should be carried out.

2.7 Other Potentially Contaminative Activities

Nitrate Vulnerable Zones for both surface water and groundwater are recorded to the immediate south-west, the boundaries of which encroach into the south-western margins of the site.

No other potentially contaminative activities or environmental constraints, which are considered to potentially impact the site, are recorded within approximately 250m of the site, or within approximately 1km of the site for COMAH facilities.

2.8 Previous Investigation Findings

No previous desk study or site investigation reports relating to this site have been made available to Sirius.

3. Preliminary Risk Assessment

3.1 Preliminary Conceptual Site Model

Based on the desk study information, a combined preliminary conceptual site model (PCSM) has been developed for the proposed future land use (residential with gardens). This summarises the current understanding of surface and sub-surface features and the potential contaminant sources, transport pathways and receptors present to identify potential contaminant linkages.

A qualitative risk assessment has also been made of each identified contaminant linkage following the methodology described in Appendix C.

The schematic and tabulated PCSM is included as Drawing No. C9843/03 in Appendix A.

Site construction/maintenance workers have not been considered in the PCSM on the basis that any risks to workers would be dealt with under the Health and Safety at Work Act (1974) and regulations made under the Act.

3.2 Potential Sources of Contamination

A review of the site's history, current condition and environmental setting has identified a number of potential contaminant sources for the site and surrounding area, as summarised in Table 3.1.

Table 3.1 Contaminant Sources

Source	Potential Contaminants	Location
Made ground associated with the demolition of the houses, industrial units and hardstanding areas throughout the site.	Heavy metals, polycyclic aromatic hydrocarbons (PAHs), petroleum hydrocarbons (TPHs), pH, sulphate, asbestos.	On site

3.3 Potential Receptors and Exposure Pathways

The potential receptors and associated pathways that have been identified through this desk-based assessment are summarised in Table 3.2.

Table 3.2 Contaminant Pathways

Receptor	Pathway
Future site users (residents, workers)	Dermal contact, direct and indirect ingestion and inhalation of dusts, vapours and fibres. Permeation of underground water supply pipes.
Adjacent land users (residents, workers)	Inhalation of dusts, vapours and fibres.
Future property (buildings and buried services, including drinking water supply pipes)	Chemical attack of buried concrete. Chemical degradation of underground services including water supply pipes.

Receptor	Pathway
Adjacent property (buildings and services, crops and animals)	Transport of contaminated soil within surface runoff.

3.4 Potential Contaminant Linkage Risk Assessment

The above potential contaminant sources and pathways have been assessed to determine the likelihood of a linkage between the contaminant source and the receptor. The risk assessment is detailed in a table included with a schematic drawing of the PCSM (Drawing No. C9843/03) in Appendix A.

In summary, the PCSM has identified the following potential pollutant linkages which could result in an unacceptable risk to the proposed end-use, denoted as moderate or higher risk in the table included on Drawing C9843/03 in Appendix A:

- Direct contact, ingestion and inhalation of dust/particles/vapours by future site users (residents and workers) with heavy metals, organic and inorganic compounds present in potential made ground material from the demolition of former houses and industrial units. The risk has been assessed as Moderate.
- Inhalation of airborne asbestos fibres by future site users (residents) and adjacent land users (residents, farmers, business owners/workers, etc.) present in potential made ground material from demolition of former houses and industrial units. The risk has been assessed as Moderate to High. Direct contact of contaminated made ground with future construction materials e.g. buried concrete and plastic service supply pipes has been assessed as a Moderate risk.

3.5 Assumptions and Data Gaps

In the production of the PCSM the following significant assumptions have been made:

- Historical use of the site has unlikely to have resulted in widespread significant contamination.
- Any residual hydrocarbon contamination is likely to be localised and limited to the former industrial units/depots in the south of the eastern parcel.
- With exception to the former industrial area, no significant change in land use is proposed. The site was mostly former housing and is to be regenerated with a newer housing development.

The following significant uncertainties with the model have been identified which cannot be ascertained from desk based information:

- The presence of basements below demolished houses and industrial units, potentially resulting in localised areas of deeper made ground/fill.
- The thickness and nature of made ground materials across the site, which could influence or create sources of potentially hazardous ground gases and/or gas flow pathways.

4. Fieldwork

4.1 Scope of Investigation

The information contained in this report is limited to areas of land accessible during the investigation within the site boundary. An exploratory hole location plan is presented as Drawing No. C9843/04 in Appendix A.

The investigation, which was supervised by a Sirius Engineer, took place between 20th June and 12th July 2023 and comprised:

- Excavation of 38 No. machine-excavated trial pits (TP01 to TP32 and TP26A to TP26F) to a maximum depth of 3.1m bgl;
- Excavation and construction of 4 No. machine-excavated soakaway test pits (SA01 to SA04) to a maximum depth of 2.0m bgl.
- Soakaway testing within the 4 No. test pits, carried out in general accordance with BRE Digest 365.

4.2 Exploratory Hole Locations

The exploratory hole locations were selected using the findings of the PCSM in order to achieve general site coverage, target specific areas of interest and resolve key uncertainties. The principles given in Ref 21, Appendix H were followed when determining exploratory hole locations.

Table 4.1 Exploratory Hole Position Rationale

Exploratory Hole	Rationale
TP01 to TP25	Trial pits excavated to expose any relict building slabs/foundations and for general site coverage within the former residential area.
TP26 to TP32	Trial pits excavated to expose any relict building slabs/foundations and for general site coverage within the former industrial area.
TP26A to TP26F	Trial pits excavated to further investigate and attempt to delineate the presence of identified hydrocarbon contamination in the vicinity of TP26.
SA01 to SA04	Soakaway test pits excavated and constructed to achieve a general site coverage to ascertain soil infiltration rates.

4.3 Strata Description

Strata descriptions were logged in accordance with Ref 4, Ref 5 and Ref 6, Appendix H. Detailed descriptions of strata and groundwater observations made during investigation works, together with samples recovered and the results of all in-situ field testing, are presented on the Engineer's records in Appendix D. The depths of strata on the record sheets are recorded from current ground levels at each location, unless indicated otherwise.

4.4 Geotechnical Testing

Geotechnical laboratory testing on selected samples was carried out under subcontract by PSL, a UKAS-accredited laboratory.

Geotechnical test results are included within Appendix E of this report.

4.5 Chemical Testing

Selected samples of the made ground and natural soils were tested for a range of potential contaminants under subcontract with Derwentside Environmental Testing Services (DETS), a UKAS and MCERTS-accredited laboratory.

The potential contaminants of concern identified by the preliminary risk assessment and outlined in Section 6 were selected as the analytes for the samples recovered from the site. The results of the chemical analysis, as received from the laboratory, are presented in Appendix F of this report.

5. Ground Conditions

5.1 Ground Model Summary

The following information is based on the records of exploratory holes completed as part of this investigation. Descriptions and strata depths for superficial deposits are derived from trial pits.

Table 5.1 Ground Model Summary

Stratum	Depth Range (m bgl) (Thickness Range m)	Description
Made Ground and Reworked Topsoil		
Reworked Topsoil	Ground level (0.1 –0.4)	Soft dark brown slightly sandy slightly gravelly CLAY, mostly overlain onto made ground. Identified sporadically across the site in only five trial pits; TP02, TP04, TP07, TP22 and TP24.
Made Ground	Ground level –0.15 (0.15 –0.65*) *locally up to 2.4m bgl within the vicinity of TP26	Granular made ground ranges from gravelly sand, to sandy gravel, and, locally, sand and gravel. The majority of granular material includes sandstone, dolomite, brick and concrete. Black granular strata includes coal and clinker. Bricks and broken remnants of brick walls and concrete foundations were occasionally noted. Fragments of glass and degraded plastic were observed locally. Cohesive made ground was occasionally encountered below granular made ground and comprised stiff desiccated gravelly clay with coal, dolomite, brick and concrete.
Natural Superficial Deposits		
Glacial Till	0.15 –2.4 (0.75 –>2.85)	Generally firm or stiff medium and high strength slightly sandy slightly gravelly clay, overlying stiff and very stiff high strength slightly gravelly clay with a low content of cobbles and rare boulders.
Weathering Profile and Solid Geology		
Ford Formation Dolostone	1.25 –>3.3 (>0.5)	Very weak cream limestone, highly weathered. Maximum excavation into the weathered limestone was 0.45m before the ground became too hard to excavate.

5.2 Material Properties

5.2.1 Reworked Topsoil

Owing to the shallow nature of reworked topsoil, and its assumed inherent unsuitability for use as an engineering material, no geotechnical testing has been carried out on this stratum.

5.2.2 Made Ground

No geotechnical testing has been carried out on made ground materials.

5.2.3 Superficial Deposits

Cohesive Deposits (Glacial Till)

The results of in situ hand shear vane values and laboratory testing are summarised in Table 5.2.

Table 5.2 Strata Summary –Glacial Till

Test / Parameter	No. of Tests	Range of Results				Commentary
In Situ Tests						
Hand Shear Vane Results, kPa[A]		Min.	Max.	Median	Average	Indicative undrained shear strength (kN/m2)
0 –1m bgl	132	52	150	89	88	High strength
1.01 –2m bgl	99	50	150	100	102	High strength
>2.01 bgl	81	60	150	128	123	High strength
Laboratory Tests						
		Min.		Max.		
Natural Moisture Content (NMC) (%)	20	15		33		
Liquid Limit (%)	20	38		75		
Plastic Limit (%)	20	20		31		
Plasticity Index (PI) (%)	20	18		44		Calculation of the modified Plasticity Index (PI), in accordance with NHBC standards, indicates these soils to have a predominantly medium, occasionally low, volume change potential. One sample (TP15, 0.7m) is indicated to be of high volume change potential.
Consistency Index (Ic)	20	0.87		1.32		The Consistency Index (Ic) values for the samples tested indicate the material to be of stiff and very stiff consistency.

[A] Results of 150kPa reached the maximum value of the equipment used.

Cohesive Deposits (Graphical Summary)

Fig 5.1 and 5.2 below summarise the in situ data and lab testing for cohesive soils within the site.

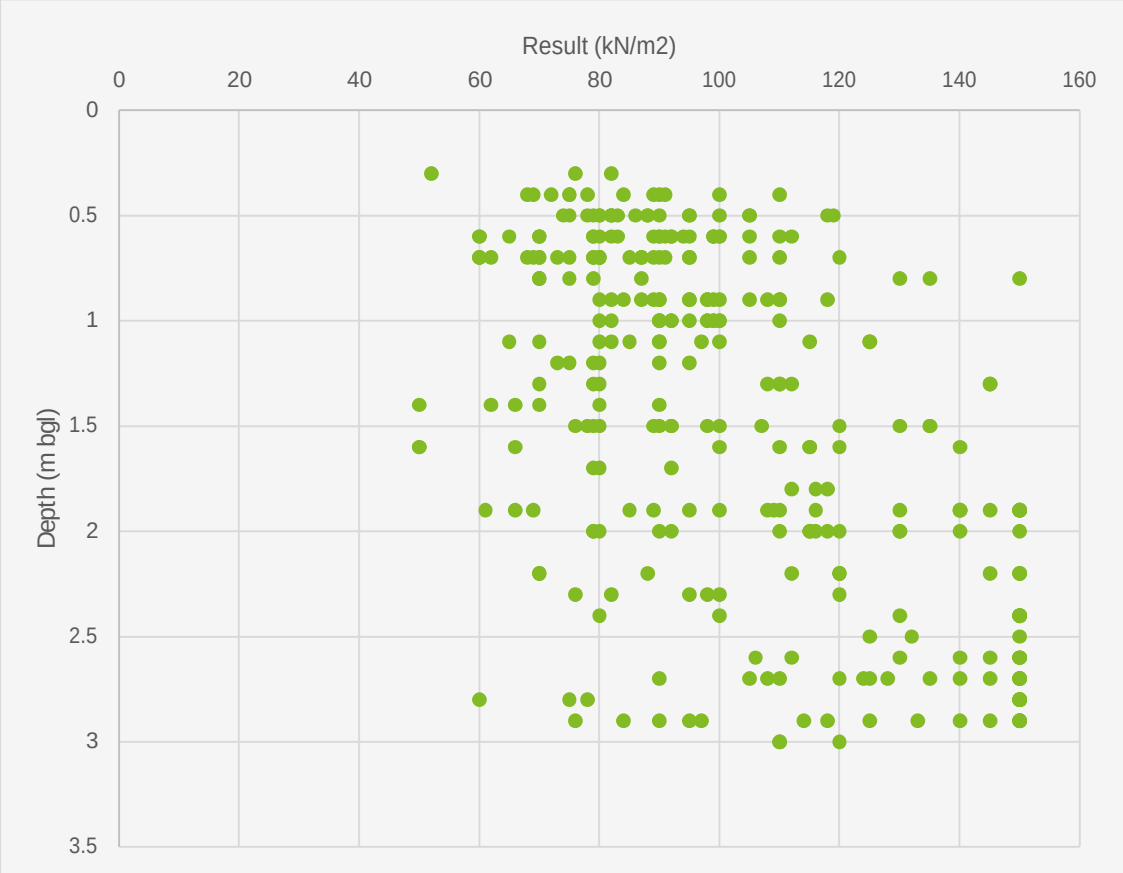

Figure 5.1 Plot of HSV with Depth

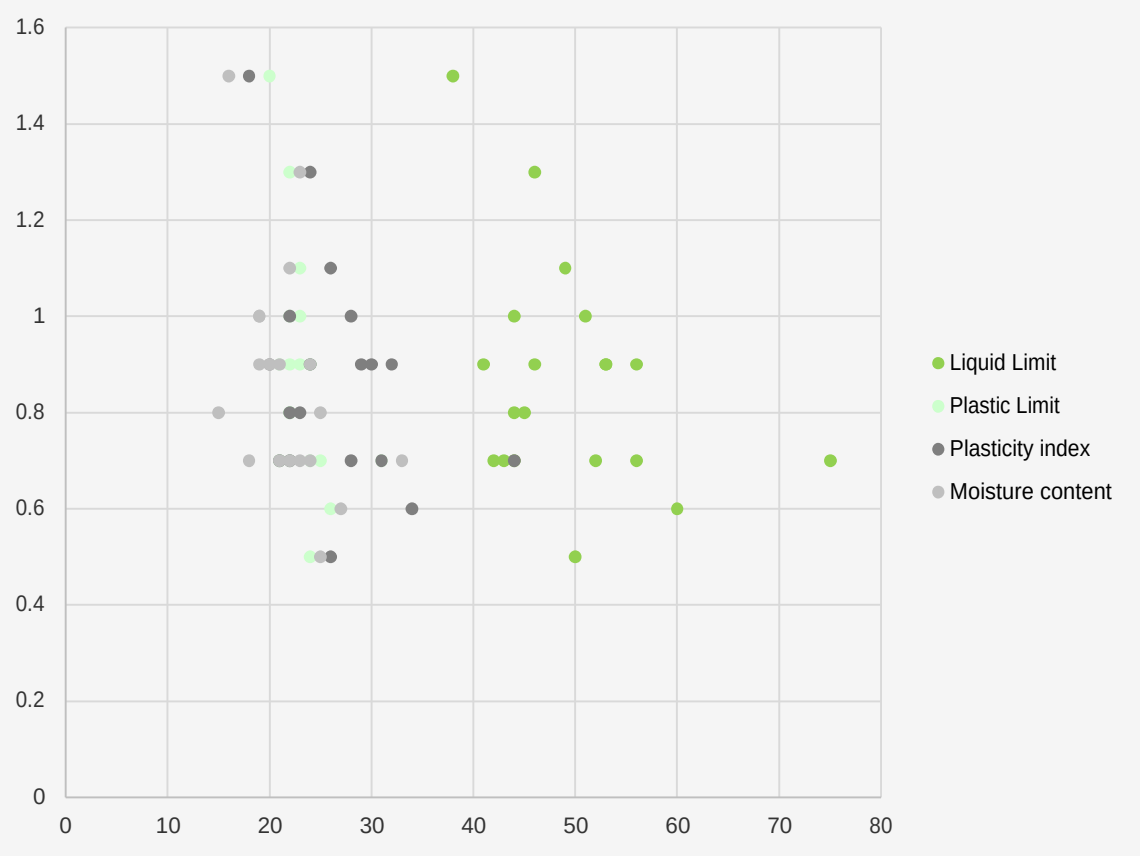

Figure 5.2 Atterberg Limit Results

5.2.4 Geochemical Analysis

The results of water soluble sulphate (SO4) and pH analyses performed on soil samples are presented in Table 5.3, below, along with the Design Sulphate Class and ACEC Class for buried concrete structures in contact with the referenced strata in accordance with BRE SD1 based on the samples tested.

Table 5.3 Water Soluble Sulphate (SO4) and pH Analysis Results

Soil Type	No. of Tests	Range of Results		Concrete Classification*	
		Water Soluble Sulphate (mg/l)	pH	Design Sulphate Class	ACEC Class
Topsoil and Reworked Topsoil	3	13 –23	7.5 –7.8	DS-1	AC-1
Cohesive Made Ground	10	10 –220	6.2 –8	DS-1	AC-2z
Granular Made Ground	22	13 –400	6.8 –10.3	DS-1	AC-1

Soil Type	No. of Tests	Range of Results		Concrete Classification*	
		Water Soluble Sulphate (mg/l)	pH	Design Sulphate Class	ACEC Class
Cohesive Natural Strata (Glacial Till)	20	12 –97	7.9 –8.5	DS-1	AC-1

*In accordance with BRE SD1, mobile groundwater for brownfield locations, including an assessment of the characteristic values of pH and SO4 as outlined in BRE SD1.

5.3 Obstructions

A summary of the sub-surface obstructions/features encountered within exploratory holes during the investigation, is detailed in Table 5.4 below.

Table 5.4 Obstructions Encountered

Hole ID	Depth (m)	Comments
TP20	0.3 –0.45	Partially intact relict concrete slab and foundations in eastern wall of trial pit. This feature was further investigated by undertaking a soil strip in the vicinity of TP20. This exercise uncovered an in-situ relict concrete floor slab with associated brick foundations, with maximum dimensions of 3m by 5m.

5.4 Shallow Ground Stability

Trial pits were recorded to be stable throughout during excavation.

5.5 Groundwater

Groundwater was not encountered in trial pit excavations during the investigation.

5.6 Evidence of Contamination

Olfactory evidence of hydrocarbon contamination was noted, as a slight hydrocarbon odour only, in TP26 at 0.5m bgl (at the interface between made ground and natural strata) during the investigation. No corresponding visual evidence of hydrocarbons e.g. free product or staining of soils was observed.

Additional trial pits, TP26A to TP26F, were excavated around TP26 in an attempt to delineate the area of hydrocarbon contamination. Further olfactory evidence (moderate odours), together with visual evidence of hydrocarbon contamination (black stained soils and a sheen to the surface) was found in granular made ground materials in TP26B, from 2.0m to 2.4m bgl, and in TP26E, from 0.8m to 1.15m. The source of the hydrocarbon contamination was traced to a north –south orientated buried ceramic pipe (potentially old drainage associated with former industrial depot), positioned approximately 2m to the west of TP26. The most significant hydrocarbon impacts were identified within the gravel bedding surrounding the pipe, which may be acting as a preferential pathway for migration from the original unknown source. The northern and southern extents of the drainage pipe and surrounding hydrocarbon impacted granular soils could not be determined on site due to the

presence of low height overhead cables which restricted access for the excavator. The hydrocarbon contamination was however delineated in an east –west orientation to the area between TP26D and TP26F.

Visible fragments of suspected asbestos containing cement sheet were noted during the intrusive works, on the ground surface local to TP06 and within the shallow made ground materials in TP29, at 0.5m bgl.

5.7 Infiltration Testing

Soakaway tests were undertaken as far as practical in accordance with the test method specified in BRE Digest 365 –Soakaway Design.

Owing to the expected prolonged periods of testing, soakaway test pits were constructed by forming mechanically excavated trial pits into the superficial soils. The trial pits were subsequently backfilled with non-calcareous pea gravel to a desired level, incorporating two vertical, perforated observation tubes extending to the full depth of the test pit. The dimensions and depth to the base of each soakaway pit were recorded prior to filling.

Water was continuously added to the test pits via one observation tube, with the water level in the pit monitored via the other tube. Water was added to a level considered likely to reflect the invert level of drainage into full-sized soakaways within the development. The water level and time in minutes from filling the excavation to the desired level was recorded. Water levels within the test pits were continually monitored using a dip meter at appropriate time intervals, for a period of at least 4 hours.

Full depth tests, in which water levels are required to fall to at least 25% of the start level, as required by BRE Digest 365, could not be achieved in all four test locations, and the observed rate of discharge was negligible so as to preclude calculation of a soil infiltration rate. Consequently, only one test was carried out at each location and the shallow clay soils in these areas are considered to be of very low permeability.

The results of the soakaway tests are included in Appendix D.

6. Generic Quantitative Risk Assessment

6.1 Assessment Methodology

6.1.1 Soil Data

The laboratory test data for the relevant soil strata and averaging area were reviewed for completeness and consistency.

For this site, it can be demonstrated that the use of benzo(a)pyrene as a surrogate marker for other PAHs is appropriate.

For each potential contaminant of concern, analytical data were evaluated against the relevant Generic Assessment Criterion (GAC), taking account of the soil organic matter (SOM) content. For this site, measured values were compared to GACs derived for a residential with gardens end use. Source data for all GACs are provided in Appendix G.

If any samples recorded contaminant concentrations that exceeded that GAC, then consideration was given to the applicability of statistical data evaluation in line with the methods described in CL:AIRE, 2020 [Ref 20]. A statistical approach is only adopted where a sufficient number of analytical results are available and the results of such an approach is useful to assist the decision-making process.

Soil samples were tested for the below test suites as outlined in Table 6.1 below:

- **Sirius Soil Suite**: metals (arsenic, cadmium, chromium III and VI, copper, lead, mercury, selenium, nickel and zinc), phenol, pH and water soluble sulphate, Total Organic Carbon (TOC) and speciated PAHs.
- **Asbestos ID**, with quantifications undertaken on samples which returned a positive identification of asbestos fibres.
- **Hydrocarbon Suite:** Aliphatic and aromatic TPHCWG bands, MTBE, benzene, toluene, ethylbenzene and xylene.

6.2 Averaging Areas

The assessment of contaminated land risk undertaken in this report seeks to consider uncertainty via the interpretation of average values rather than on single measurements. As such the risk assessment classification decisions are based on the following averaging areas. A summary of the testing undertaken for each averaging area is provided in Table 6.1.

Table 6.1 Summary of Averaging Areas

Averaging Area	Description	Analytical Testing	No. of Samples
Former housing, gardens and public open spaces	Samples of reworked topsoil obtained from central and northern areas of the site, TP01 – TP25	Sirius Soil Suite	3
		Asbestos ID	3
		Sirius Soil Suite	23

Averaging Area	Description	Analytical Testing	No. of Samples
	Samples of made ground (cohesive and granular materials) obtained from the central and northern areas of the site, TP01 – TP25	Asbestos ID	23
Former industrial units and associated yard area	Samples of made ground (cohesive and granular materials) and natural ground obtained from the southern area of the site, TP26 –TP32	Sirius Soil Suite	8
		Asbestos ID	8
		Hydrocarbon Suite	5
TP26 hydrocarbon delineation	Samples of made ground and natural soils obtained from the area surrounding TP26	Hydrocarbon Suite	7

6.3 Soil Analysis

The following section presents a summary of the analytical results highlighting where exceedances of the relevant GAC have been recorded only. The full data set and screening output is included in Appendix F. Commentary on the assessment of risk is provided in Section 7.2 below.

No samples returned concentrations of TOC exceeding the GAC. TOC is a measure of organic carbon within the material and is not a determinand that directly poses a risk to human health. These results are used primarily to determine the classification of material for removal from site to a licensed disposal facility, if required. The TOC is also used to derive the relevant SOM for the soils, necessary to derive an appropriate GAC for some organic determinands. TOC is therefore not considered further in respect of human health risk assessment.

Some samples have returned pH values above the upper threshold of the adopted GAC. These criteria are primarily derived for establishing (in combination with water soluble sulphate) the most appropriate concrete specification required to protect concrete building products from potential chemical attack, and are not considered indicative of a potential significant risk to human health.

6.3.1 Reworked Topsoil

No results returned on samples of topsoil exceeded the applicable GAC.

6.3.2 Made Ground (Former Housing Area)

Results returned on samples of made ground for determinands which exceed the applicable GAC are summarised in Table 6.2 below.

Table 6.2 Summary of Soil Analysis –Made Ground (Former Housing Area) GAC Exceedances

Analyte	No. of Samples Tested	Range of Results (mg/kg unless specified)	GAC (1% SOM) (mg/kg unless specified)	No. of Samples >GAC	Samples Exceeding GAC (location and depth)
Metals and Metalloids					
Arsenic	23	5.5 –38	37	1	TP09 –0.1m
Organics - Polycyclic Aromatic Hydrocarbons					
Benzo(a)pyrene	23	<0.03 –4.8	2.1	3	TP06 –0.1m TP06 –0.3m TP18 –0.3m

Table based on a Residential with Gardens end use. GAC –generic assessment criterion; NA –not applicable; NAD –No asbestos detected.

Asbestos

No asbestos has been identified within the made ground samples analysed.

6.3.3 Made Ground (Former Industrial Area)

Results returned on samples of made ground for determinands which exceed the applicable GAC are summarised in Table 6.3 below.

Table 6.3 Summary of Soil Analysis –Made Ground (Former Industrial Area) GAC Exceedances

Analyte	No. of Samples Tested	Range of Results (mg/kg unless specified)	GAC (1% SOM) (mg/kg unless specified)	No. of Samples >GAC	Samples Exceeding GAC (location and depth)
Asbestos					
Free Fibres	23	NAD – Free fibres of Chrysotile and Amosite	Fibres present	2	TP29 –0.5m TP30 –0.1m

Table based on a Residential with Gardens end use. GAC - generic assessment criterion; NA - not applicable; NAD –No asbestos detected.

Asbestos

Two samples of made ground have returned positive identifications for the presence of asbestos, as listed below:

- Chrysotile, present as free fibres and cement fragments, detected in granular made ground (sandy gravel), at 0.5m in TP29 (2.207% total mass). This corroborates with the field observation of suspected ACMs being present within this stratum.
- Amosite, present as free fibres, detected in granular made ground (gravelly sand), at 0.1m in TP30 (0.001% total mass).

6.3.4 TP26 Hydrocarbon Delineation (Former Industrial Area)

Results returned on samples of made ground and natural soils for determinands which exceed the applicable GAC are summarised in Table 6.4 below.

Table 6.4 Summary of Soil Analysis –Hydrocarbon Delineation GAC Exceedances

Analyte	No. of Samples Tested	Range of Results (mg/kg unless specified)	GAC (1% SOM) (mg/kg unless specified)	No. of Samples >GAC	Samples Exceeding GAC (location and depth)
Organics –Petroleum Hydrocarbons					
Aromatic C16-C21	7	<0.6 –500	260	2	TP26B –1.1m TP26E –1.1m
Aromatic C21-C35	7	<1.4 –1500	1100	1	TP26B –1.1m

Table based on a Residential with Gardens end use. GAC –generic assessment criterion; NA –not applicable; NAD –No asbestos detected.

7. Conclusions and Recommendations

7.1 Geotechnical

7.1.1 Foundations

The following discussion is given on the understanding that the site is to be developed with standard house types designed by Gleeson, in which structural loads are understood to be relatively light i.e. in the order of 100kN/m run. In addition, the following comments are based on the assumption that ground levels and ground conditions (as a result of earthworks or other remedial and preparatory measures) will not change significantly prior to development.

This investigation has generally identified a thin veneer of reworked topsoil and/or made ground, to depths typically up to 0.65m bgl, overlying natural soils typically comprising stiff and very stiff, predominantly high strength, sandy gravelly clay. Firm, medium strength clays were locally encountered. Dolomite limestone ('dolostone') bedrock was encountered at shallow depth at some locations in the north of the site, at depths of between 2.0m and 2.8m bgl; and also in the south of the site, at depths of between 1.25m and 2.8m bgl. Deeper made ground, reaching a depth of up to 2.4m bgl, was identified very locally in the south west area of the eastern parcel, in the vicinity of TP26. This made ground is possibly associated with the historical buildings/depots and a relict ceramic drainage pipe that was identified in TP26E within this area of the site. The drain was observed to be orientated approximately north –south, so there may be a linear zone of deeper made ground associated with this service.

The reworked topsoil and made ground soils are unsuitable as bearing strata for structural loads due to the potential for excessive total and differential settlements. Based on these typical conditions, it is considered that the most suitable foundation solution across the majority of the site is likely to comprise conventional spread foundations (i.e. a strip), taken down through reworked topsoil or made ground to bear upon underlying natural ground of adequate bearing resistance. Alternative foundations may be required in the south west of the eastern parcel. This area of the site is discussed in further detail below.

The cohesive soils on this site have been found to be of predominantly medium, occasionally low, volume change potential as defined in NHBC Standards, Chapter 4.2. Foundations placed into natural clay deposits soils should be a minimum of 900mm deep (below finished or original ground levels, whichever is the lower). It is however acknowledged that clay soils of high volume potential have been identified at one location on the site, in TP15 between 0.6m and 1.2m bgl. Allowance should be made for slightly deeper foundations (minimum of 1000mm deep) for plots local to the area of TP15 i.e. Plots 51 –53.

Trees may affect the moisture content of clays to greater depths and as such, foundations may be required to extend to greater depths to penetrate to a moisture stable level within the area of influence of existing or proposed trees. A tree survey was not included in the scope of this investigation, but should be carried out prior to the production of a detailed plot-specific foundation schedule and the presence of existing and proposed trees should be taken into account during detailed foundation design.

MAJORITY OF THE SITE AREA (EXCLUDING THE SOUTH WEST AREA OF THE EASTERN PARCEL) – SHALLOW SPREAD FOUNDATIONS

The natural clay soils are considered to have a characteristic undrained shear strength (Cu) of at least 80 kN/m^2 at typical minimum founding depth of 0.9m below existing ground levels.

By way of example, based on Eurocode 7 compliant calculations, a 600mm wide strip foundation a depth of 0.9m bgl bearing on the natural clay with a characteristic undrained shear strength of at least 80kN/m^2, could support a line load of up to 120kN/m run. The application of such a line load is expected to induce settlement of 25mm or less.

SOUTH WEST AREA OF THE EASTERN PARCEL –ALTERNATIVE FOUNDATION SOLUTIONS

Within the south western area of the eastern parcel (local to TP26), made ground (and associated hydrocarbon impacted soils) were encountered to depths of up to 2.4m bgl. The made ground soils are considered to have an insufficient bearing capacity to support the proposed development and the application of foundation stresses may result in excessive settlement within these soils. It is anticipated that the hydrocarbon impacted made ground soils and any relict drainage/development infrastructure will be removed during site preparatory works. Based on current development proposals, it is anticipated that Plots 16 to 19 may require alternative foundations, however this is dependent on where individual plot footprints fall in relation to the identified deeper made ground in TP26E. At this stage, alternative foundation solutions, such as deepened trench fill foundations, may be considered suitable for these plots. However, the most appropriate foundation solution for plots within this area of the site should be further assessed once the hydrocarbon impacted soils and any residual drainage infrastructure have been removed, and the precise thickness of made ground/fill, the structure and loading arrangement of the houses, and other factors such as influence of trees on foundation depth for the proposed development, are known.

ADDITIONAL COMMENTS

Drawing No. C9843/06 within Appendix A shows areas which are considered likely, based on the findings of this investigation, to require strip foundations or alternative foundations. However, this plan should be considered as indicative and, owing to the local variability of made ground thicknesses, excavations for foundations to plots should be inspected and where necessary tested, on a plot by plot basis by an appropriately experienced engineer, to confirm adequate bearing capacity for the foundation type proposed. In addition, the influence of tree effects has not been taken into account during the production of the indicative foundation zoning plan.

The above calculations are based on theoretical foundations. Settlements of foundations upon cohesive materials are dependent on foundation loading and dimensions. It is therefore recommended that foundation settlements are reviewed once final loading arrangements and foundation sizes are known.

In some areas of the site, competent rockhead is to be expected at depths as shallow as 1.25m. Subject to requirements for extending foundations in depth to mitigate the effects of trees, rockhead may be at or above the scheduled founding elevation for part of some plots.

If foundation excavations encounter bedrock, then it is recommended that all of the foundation bears upon rock and thus limits the potential for unacceptable differential settlements. Foundations bearing solely onto competent rockhead may have similar dimensions and load bearing capacity to those designed for the overlying soils without further design calculations.

If a higher bearing capacity is required in such circumstances, then further design will be required.

It is recommended that a plot specific foundation schedule is prepared, to enable detailed design of individual foundations for the exact line loads, ground conditions, and effects of trees, on each plot.

Foundations should be taken below a line drawn up at 45° from the base of any existing or proposed services. The layout of foundations should also consider any relict foundations, substructures or other potential obstructions on site.

It should be noted that any groundwater encountered may have an adverse effect on foundation construction and performance (such as softening/loosening of founding materials, instability of excavation walls, etc.), particularly in wet weather. This should be considered when designing foundations.

7.1.2 Floors

Based on proven ground conditions and in accordance with current NHBC Standards, it is considered that ground bearing floor slabs could be utilised across most of the site, subject to made ground thicknesses on completion, for example, as a consequence of any removal of buried relict structures and site reprofiling, and swelling potential of clays due to trees.

Suspended floor slabs may be required where soil swelling could occur, as a consequence of the influence of trees, or where made ground will be in excess of 600mm thick. At this stage, it is anticipated that suspended floor slabs are likely to be required in the area of TP26 due to the thicknesses of made ground present in that area of the site.

7.1.3 Coal Mining Risk Assessment

UNDERGROUND MINING

Based on the findings of this investigation, the risk of surface instability resulting from potential shallow unrecorded and recorded mineworkings beneath the site is considered to be very low.

SURFACE MINING (OPENCAST)

Inspection of historical plans and Coal Authority data has not revealed any evidence of quarrying or opencast workings beneath the site.

MINE ENTRIES

No Coal Authority mine entries are recorded to be on site or within 20m of the site boundary. However, the possibility of encountering unrecorded mine entries should not be discounted. If a mine entry is suspected, advice should be sought immediately from a suitably qualified engineer.

7.1.4 Other Resource Extraction

No other resource extraction activities (quarrying etc.) are recorded to be on site or immediately adjacent to the site. It is noted however that limestone quarrying activities have taken place historically in the wider area.

7.1.5 Mineral Safeguarding

The site is not known to be located within a mineral safeguarding area for Coal Measures strata or other aggregate or mineral resources, such that the potential for sterilisation of these resources arising from the proposed development has not been considered further.

7.1.6 Concrete Risk to Chemical Attack

Based on the samples tested, the below Design Sulphate Class and ACEC Class should be used for buried concrete structures in contact with the below strata:

Table 7.1 Summary of Design Sulphate and ACEC Classes

Stratum	DS Class	ACEC Class
Reworked Topsoil	DS-1	AC-1
Cohesive Made Ground	DS-1	AC-2z
Granular Made Ground	DS-1	AC-1
Natural Strata (Glacial Till)	DS-1	AC-1

7.1.7 Groundworks, Excavation Stability and Groundwater

It is expected that some earthworks/enabling works, albeit minimal, will be required to create a suitable and safe development platform for the proposed residential development, and remove obstructions to future foundations. Such works are expected to include excavation and processing of the made ground in order to mitigate potential contamination pathways and remove physical obstructions to development, such as the relict floor slab and foundations identified in TP20 and relict drainage near TP26, in addition to any other relict subsurface features that are encountered that have not been identified during this investigation.

Breaking out and excavation of existing relict foundations is likely to require the use of mechanical/hydraulic breakers. It may be feasible and sustainable to crush such structures on site, to form a granular fill material complying with a suitable earthworks specification. This would be subject to appropriate licences being in place, and reference should also be made to the section of this report discussing the re-use of site won materials.

It is recommended that an evaluation of proposed site levels and development of a cut/fill balance model for the site is undertaken and the extent of earthworks assessed in more detail and well before any excavation of the soils. Re-use of soils should be undertaken in accordance with the Definition of Waste Code of Practice (DoWCoP) or an appropriate Environmental Permit or Waste Exemption.

It is recommended that an Earthworks Strategy is undertaken for the site, alongside a Material Management Plan (MMP), where recovered materials are being considered for re-use on site. The MMP should be in place before works commence.

Excavations into the soils present across the site should be assumed to be unstable, even in the short term, and it is recommended that allowance is made for provision of support to all excavations including for drainage and foundation construction.

No personnel entry into unsupported excavations shall be allowed without an appropriate risk assessment. Reference to Ref 11 and Ref 12 within Appendix H, should be made to establish suitable means of support or battering of excavation sides.

Shallow rock is unlikely to be problematic for construction of foundations, which may bear directly onto the surface of competent rock, or for shallow domestic service connections. Deep excavations, for example deep drainage or attenuation tanks may however require the use of hydraulic breakers to penetrate through more competent bedrock.

Based on the results of this investigation, significant groundwater seepages or inflows within shallow (<3.0m) excavations are considered unlikely. It should be possible to deal with seepages through normal site pumping practices for any shallow excavations open for short periods of time. Disposal/discharge of water will require appropriate treatment/consent.

It is recommended that an adequate drainage system for surface water be installed by a competent contractor in order to prevent surface water ponding or collecting both during and post construction, as this may lead to deterioration of the founding stratum.

It is recommended that, in order to reduce the possibility of softening or swelling of cohesive soils at the base of foundation trenches as a result of exposure to rain or groundwater, these should be suitably blinded with concrete in the event foundation concrete is not poured immediately following excavation of the foundation trench.

7.1.8 Pavements and Highways

On the basis of the recorded Atterberg Limit determinations for fine grained soils, using Ref 30 and Table C1, a CBR value of 4 to 5% may also be considered appropriate for highways design, assuming construction in “average” conditions and assuming a ‘thin’ layered construction.

Assessment of Subgrade Surface Modulus (SSM) is established from CBR. The following values of SSM are determined from the above CBR values using Equation 2.4 of CD225. For derived CBR values of 4-5% the equivalent surface modulus values of 43MPa to 49MPa are calculated for a subgrade comprising natural clays. For made ground soil a surface modulus value of <30MPa should be assumed based on an assumed CBR of <2.5%.

Where SSM values fall below 30MPa the subgrade is considered unsuitable to support pavement construction. Note 2 of CD225 indicates remedial solutions for when the SSM of <30MPa, can comprise the following:

- Excavation and replacement of between 500mm and 1000mm of soft subgrade with granular fill.
- Use of mechanical stabilisation (geotextiles and geogrids)
- Soil stabilisation.

All road design should be discussed with the relevant local authority if highways are to be subject to a Section 38 agreement.

7.1.9 Infiltration Testing

Based on the ground conditions encountered during the site investigation and results of the soakaway testing, soakaway drainage is considered unlikely to be viable at the site within glacial till strata. No significant infiltration was observed during the soakaway tests undertaken within glacial till, and these soils are considered to be of very low permeability.

7.2 Contamination and Ground Gas

7.2.1 Introduction

The results of the chemical testing indicates that potentially unacceptable contaminant linkages exist for future site users and adjacent site users. Contaminant linkages assessed as a Low or Negligible risk are not considered significant or requiring remedial action and are not discussed further.

Further discussion of the potential contaminants of concern is given in Section 7.2.2 below. The revised conceptual site model (RCSM) showing the residual contaminant linkages is presented within Section 8.0 and on Drawing No. C9843/05, enclosed within Appendix A.

7.2.2 Human Health Risk Assessment

The following contaminants were detected within soils on the site above the applicable GACs. Further discussion on the potential risk to human health is given below. Outline remedial measures are given in Section 9.

Table 7.2 Summary of Elevated Contaminants above the Applicable GACs

Contaminant	Impacted Soil/ Material Type	Location	Considered to Pose a Potential Risk to Human Health?*
Asbestos fibres and ACMs	Granular Made Ground (Former Industrial Area)	South of eastern parcel, former industrial units and associated yard area (vicinity of TP29 and TP30)	Yes
	Ground surface (Former Housing Area)	South of the western parcel (vicinity of TP06)	Yes
Heavy metals (Arsenic)	Granular Made Ground (Former Housing Area)	North east of eastern parcel (vicinity of TP09)	No and not considered further. Discussion is given below.

Contaminant	Impacted Soil/ Material Type	Location	Considered to Pose a Potential Risk to Human Health?*
Organic (PAHs)	Cohesive and Granular Made Ground (Former Housing Area)	South of the western parcel (vicinity of TP06) and along the western margin of the eastern parcel (vicinity of TP18)	No and not considered further. Discussion is given below.
Aromatic hydrocarbons (C16-C35)	Made Ground	Limited to the south west of the eastern parcel (vicinity of TP26)	Yes

*Defined as greater than low risk

Quantifiable concentrations of chrysotile (2.207%) and amosite (0.001%) asbestos, in the form of free microscopic fibres and/or fragments of cement sheet, have been identified in two samples (out of a total of 23) of granular made ground; TP29 at 0.50m bgl and TP30 at 0.1m bgl. Both positive asbestos identifications were found in granular material containing a proportion of demolition derived materials, such as brick and concrete. Texturally similar demolition impacted granular made ground (notably that in which the amosite fibres have been identified in TP30) is present at the ground surface across much of the site. This material is likely to have been placed following the demolition of former residential and industrial buildings and its origin is unknown, but possibly associated with the historical buildings on the site. On the basis of the data available, and with consideration given to the nature and constituents of the made ground soils found at shallow depth across the site, treating these sole detections as isolated hotspots would be inappropriate unless a sufficiently robust dataset was available. It could reasonably be anticipated that dispersed, microscopic quantities of asbestos fibres and ACM products may be present (albeit at fairly low levels) throughout the granular made ground soils on the site.

A marginally elevated concentration of arsenic has been identified within the surface demolition impacted granular made ground locally within the north east of the site. Based upon the range of results throughout the site, the solitary nature of the result and the minor exceedance above the GAC, together with a 95% upper confidence level that is lower than the GAC, this result is not considered to pose a potential significant risk to end users.

Elevated concentrations of benzo(a)pyrene were detected within three samples of made ground, obtained from TP06 at 0.1m and 0.3m (both samples of demolition impacted granular soils) and TP18 at 0.3m (cohesive made ground with coal and demolition derived fragments). When an appraisal of the full dataset for benzo(a)pyrene (made ground soils from the former housing area only) is made the distribution of concentrations conforms reasonably well with a fat tailed distribution. The upper confidence level at both the 80% and 95% level fall below the GAC. As such, it is likely that benzo(a)pyrene concentrations within the made ground soils do not present a significant risk to human health. Furthermore, based on the results of a source signature double ratio plot (comparison of the ratios of two pairs of PAHs; benzo(a)anthracene to chrysene, and fluoranthene to pyrene), the most likely source of the detected benzo(a)pyrene within the cohesive soil sample is unburnt coal. Coal derived PAHs are generally accepted to be less mobile and less of concern to human health than other sources i.e. petroleum hydrocarbons.

Two samples in which visual and olfactory evidence of hydrocarbon contamination was observed within the soil locally during the investigation, recorded exceedances of the GAC for the aromatic petroleum hydrocarbon fraction ranges, C16-C21 and C21-C35 (generally indicative of diesel and motor or lubricating oils). No evidence of hydrocarbon contamination has been identified elsewhere within the site soils and it is therefore considered that the impacted soils are likely to represent a localised hydrocarbon contamination hotspot. The hydrocarbon contamination was traced to relict drainage identified in TP26E with the most significant impacts identified within the gravel bedding surrounding the drain and towards the base of the made ground soils. Based on these observations it is likely that the hydrocarbon contamination is perched and ponded within the drainage

excavation. The original source of the hydrocarbon contamination is unknown, but given is recorded location it is possible it could be from historical fuel/oil leaks from the former depot in that area.

In summary, the granular made ground soils are not considered suitable to remain at shallow depth within residential gardens or areas of landscaping and remedial action will be required to break potential pollutant linkages. Similarly, hydrocarbon impacted soils are not considered suitable to remain at shallow depth within residential gardens/areas of landscaping or below plots due to the potential vapour risk/nuisance. Made ground soils are also considered texturally unsuitable to remain at shallow depth within garden areas.

ASBESTOS CONTAINING MATERIALS (ACM)

Fragments of suspected asbestos cement were identified at the ground surface in the vicinity of TP06 and within granular made ground in TP29, the latter of which was confirmed by laboratory analysis as chrysotile cement sheet. The surface ACMs in the vicinity of TP06 appear relatively recently deposited as they were loose to the surface, and nearby trial pit TP06 uncovered no visible buried ACMs. These ACMs may originate from unrecorded fly tipping or as waste from asbestos removal in a residential property bordering the site.

ACMs present within the made ground of TP29 are possibly associated with the demolition of the former industrial/depot units. If any ACMs are encountered during construction works, advice should be sought from an appropriately qualified asbestos specialist and an appropriate strategy developed for the safe removal and disposal of the material. Further comments are given in Section 9 below.

7.2.3 Phytotoxic Risk Assessment

No concentrations of contaminants considered to present phytotoxic risk to plants have been identified.

7.2.4 Controlled Waters Risk Assessment

No existing surface watercourses or water features are present on or within 250m of the site that could be impacted by contaminants identified within the site.

It is acknowledged that the site has been proven to be underlain immediately below made ground by generally unproductive cohesive soils, which may be considered to be of very low permeability. However, there are areas where the cohesive soils have a reduced thickness below the site, and are therefore potentially unlikely to afford adequate protection to the underlying Principal Aquifer (and therefore the groundwater SPZ3) from possible soluble/mobile contaminants within the overlying made ground.

Notwithstanding the above, the contaminants of concern identified within the made ground soils within the site are not considered to be particularly soluble or mobile, and the most appropriate remediation recommendation for the identified hydrocarbon contamination in the vicinity of TP26 will likely result in the removal of the impacted soils. On this basis, the risk to the Principal Aquifer is considered to be very low.

7.2.5 Utilities Risk Assessment

A formal water pipeline assessment (in accordance with UKWIR) has not been undertaken as part of this investigation.

It is recommended that the results of the chemical testing and details of the proposed remedial works are provided to the appropriate utility companies to determine the necessity for service protection. If hydrocarbon impacted soils are not removed this may necessitate the use of barrier pipe across parts of the site.

7.2.6 Construction and Maintenance Workers Risk Assessment

Contamination may pose a short-term (acute) or long-term (chronic) risk to workers during construction and maintenance. The potential risks must be specifically assessed as part of the health and safety evaluation for the works to be performed in accordance with prevailing legislation. Site practices must conform to the specific legislative requirements and follow appropriate guidance (e.g., HSE, 1991; CIRIA, 1996).

Assessment of the risks to construction and maintenance workers has not been undertaken as part of this report. Notwithstanding, it is noted that elevated concentrations of contaminants as outlined in Table 7.2 above may pose a potentially unacceptable risk to construction and maintenance workers.

It is considered that, subject to appropriate risk assessment to be carried out by the construction or maintenance contractor the risks can be mitigated by appropriate PPE and hygiene precautions and good working and soil management practices. It is recommended that procedures outlined in the HSE document "Protection of Workers and the General Public during Remediation of Contaminated Land" be followed. There will be a requirement to comply with the COSHH (Control of Substances Hazardous to Health) Regulations and the CDM (Construction Design and Management 2015) Regulations during any works.

This report should be forwarded to any contractors undertaking groundworks or maintenance personnel in order for them to assess the risk to their personnel.

Suitable precautions should also be taken to protect workers entering and/or working in confined spaces, including any below ground excavations even where open to the atmosphere, to mitigate the potential risk from ground gas which may be present. This could include gas monitoring of all excavations and/or underground spaces, carried out prior to personnel entry, with continuous monitoring throughout the period of working. Gas monitoring by way of example should include as a minimum: methane, carbon dioxide, carbon monoxide, and oxygen. Gas monitor(s) should emit both audible and visual warnings. Alarm levels should be set with due regard to the relevant Occupational Exposure Limits given in HSE EH40/2005, and for low oxygen concentrations. If any anomalous or significantly elevated/depleted gas concentrations are detected then all personnel should immediately evacuate the area and the advice of an appropriate specialist be obtained before work continues.

7.2.7 Preliminary Ground Gas Risk Assessment

The CSM for permanent ground gases currently suggests the risk to the proposed development is negligible. No plausible sources or pathways for permanent ground gases to impact on the future development on the site have been identified in the CSM. This is based on the following observations:

- The made ground encountered on the site during the investigation was found to be thin (typically <0.65m bgl, locally up to 2.4m) with an average thickness of <3m.
- No significant organic/degradable component was observed in the made ground soils, or indicated within laboratory testing undertaken on samples of made ground, which could significantly influence soil gas composition.
- No landfills are recorded within 250m of the boundary of the site. Nevertheless, the site and surrounding area is underlain by cohesive glacial till of very low permeability which is likely to limit gas migration into the site from off-site sources.
- Coal Measures strata (and any workings therein) are present at significant depth below a mantle of dolostone bedrock (and overlying cohesive superificial soils) which will limit upward migration of any mine gas.
- No mineshafts are recorded on, or within the immediate vicinity, of the site that could act as a preferential pathway for the upward migration of deep mine gas.
- Proposed remediation measures to address the localised hydrocarbon contamination identified in the vicinity of TP26 will likely involve the excavation and removal of impacted materials, and validation of the excavation faces and base to ensure that residual concentrations are below GAC for a residential end use. Following these works, it is anticipated that there will be no requirement for the incorporation of hydrocarbon resistant membranes to plots within this area of the site.

With consideration to the above, the site is considered to fall within the classification 'CS1' in accordance with BS 8485:2019. No specific ground gas protection measures are required in the construction of new dwellings or extensions.

Basic radon protection measures are not required for the proposed development on this site.

Should hydrocarbon impacted soils remain on site consideration of VOC risk/odour nuisance will need to be made. It is recommended that hydrocarbon impacted soils, localised in the south west of the site's eastern parcel, are removed from site.

7.2.8 Potential Influence of the Proposed Development on the Ground Gas Regime

Preparatory or remedial works for proposed developments, including but not limited to foundation solutions and earthwork proposals (cut/fill), have the potential to influence the ground gas regime for the site, which may require reconsideration following these preparatory or remedial works for the site.

On the basis of the proposed foundation solutions and remedial works outlined in this report, it is not considered that the proposed development will influence the ground gas regime for the site.

8. Revised Conceptual Site Model

8.1 Summary of Residual Contaminant Linkages

The preliminary combined conceptual site model and conceptual exposure model, developed from the desk study information and presented in Section 3, has been revised in light of the ground investigation, chemical analysis and generic quantitative risk assessment presented above.

A RCSM has been developed for the proposed future land use (residential with private gardens). This summarises the understanding of surface and sub-surface features, the potential contaminant sources, transport pathways and receptors, prior to the implementation of any remedial measures for the site.

The qualitative risk assessment of identified contaminant linkages has also been revised, following the methodology described in Appendix C.

The RCSM is presented in schematic form on Drawing No. C9843/05 in Appendix A.

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

- Inhalation of chrysotile and amosite asbestos fibres and ACMs detected within granular made ground (potentially widespread across the site), presenting a potential High risk to site end users and adjacent site users.
- Ingestion, inhalation of vapours and dermal contact with locally elevated concentrations of aromatic hydrocarbons (C16-C35 fractions) in made ground within the south west of the eastern parcel of the site (in the vicinity of TP26), presenting a potential Moderate risk to site end users.
- Direct contact of plastic construction materials with aromatic hydrocarbons (C16-C35 fractions) within made ground within the south west of the eastern parcel of the site (in the vicinity of TP26), presenting a potential Moderate risk to site end users via permeation of organic contaminants through plastic pipes into potable water supply.

9. Outline Remediation Requirements

With cognisance to the history of the site, the distribution of the contamination identified and the texturally poor quality of the made ground soils, it is considered that the made ground beneath the entirety of the site area is not considered suitable to remain at shallow depth in areas of proposed landscaping or residential gardens. A full discussion of the remediation requirements and options is given in the following paragraphs, however the outline remedial measures are shown within Table 7.3 below. The actual remedial measures proposed to be undertaken within the site is subject to preparation of a Remediation Strategy and further discussion with the client, and regulatory bodies if required, on the preferred remedial options.

Table 7.3 Summary of Outline Remedial Measures

Site Area	Impacted Soil/ Material Type	Outline Remedial Measures Summary
Site wide	Granular Made Ground (with demolition derived materials, e.g. brick, concrete, etc.) containing asbestos	Excavation and off-site removal of all impacted material. OR Provision of an appropriate thickness of clean capping soils with a geotextile marker where impacted soils remain. Validation of placed cover soils in gardens and landscaping areas.
South of the western parcel of site	Surface asbestos containing cement fragments	Removal and disposal by an appropriately qualified and competent asbestos specialist.
South west of the eastern parcel of the site	Hydrocarbon impacted soils local to TP26	Excavation and off-site removal of the affected material. Validation of adjacent and underlying soils.

GRANULAR MADE GROUND THROUGHOUT SITE

Due to the relatively limited thickness and textural unsuitability of the granular made ground materials, excavation and disposal off-site may be considered as an appropriate solution for this material. If this solution were adopted it is recommended that the impacted made ground materials are excavated and removed from site (to an appropriately licenced waste receiving facility) early in the construction phase to avoid cross contamination with other materials. This work would need to be validated as part of the overall remedial strategy for the site.

Alternatively, if such made ground was to be retained on site, and with cognisance to the presence of visible ACMs and asbestos fibres, then the use of a clean cover soil capping layer of **minimum** 600mm thickness, with a geotextile marker or no dig layer at the base, would be required to break pollutant linkages to end users. This solution would also require very careful soil management practices to ensure no further disturbance of the soils during development or subsequent works, for example by service excavations, and to ensure no cross contamination of other soils occurs during the works. A series of validation visits would subsequently be required for validation of cover soils in garden areas.

It is also acknowledged that the construction of a clean cover soil capping layer solution could require site levels to be raised to an unacceptable elevation to accommodate the capping layer soil. Given this, then excavation and removal of all of the affected made ground from site to an appropriately licenced disposal facility is considered more appropriate as discussed above. Removal and subsequent validation of the removal of the made ground in its entirety would also remove any further requirements for validation of cover soils in garden areas for example.

SURFACE CEMENT ACMS IN THE SOUTH OF THE WESTERN PARCEL OF SITE

It is recommended that the removal of ACMs at surface should take place prior to any other preparatory works or vehicle movements on site, to minimise the potential to spread the ACMs and cross contaminate other soils on the site. Any visible asbestos fragments identified at the ground surface should be carefully handpicked by a Category B trained operative and removed from site.

It is recommended that all groundworkers maintain a 'watching brief' for the possible presence of asbestos or ACMs during site works. If further ACMs, e.g. asbestos sheeting, used as shuttering, and/or fragments of asbestos-containing materials within made ground or shallow natural soils are encountered, advice should be sought from an appropriately qualified asbestos specialist and an appropriate strategy developed for the safe removal and disposal of the material.

HYDROCARBON IMPACTED SOILS IN THE SOUTH WEST OF THE EASTERN PARCEL OF SITE (LOCAL TO TP26)

With regard to identified area of hydrocarbon contamination we consider that, due to the relatively limited extent of the impacted made ground, excavation and disposal off-site may be considered as an appropriate solution for this material. If this solution were adopted it is recommended that the localised hydrocarbon impacted made ground (and any underlying impacted natural soils) in the vicinity of TP26 is excavated and removed from site (to an appropriately licenced waste receiving facility) early in the construction phase to avoid cross contamination with other materials. Following excavation and disposal of hydrocarbon impacted made ground, and excavation of any surrounding hydrocarbon impacted natural soils, if present, validation of the resulting excavation faces, and bases should be undertaken on a nominal 5m grid to confirm any residual concentrations do not pose a potential risk to human health. The resultant void may then be filled with clean inert fill to the required level. This work would need to be validated as part of the overall remedial strategy for the site. Removal of hydrocarbon impacted soils would also remove the associated potential volatile vapour risk and requirement for the installation and independent verification of hydrocarbon vapour resistant membranes.

Removal of the hydrocarbon impacted soils will negate any further requirement for careful soil management, construction and validation of cover soils, and installation and verification of hydrocarbon vapour resistant membranes in plots in the vicinity, although an element of validation of the adjacent and underlying residual soils will be required.

GENERAL COMMENTS

Residual concrete slabs and below ground relict foundations have been encountered locally on the site, in the vicinity of TP20, and would require processing. It is therefore anticipated that some site clearance, including removal/re-use of residual subsurface structures/foundations, etc. will be required. Such works should be detailed in a regulatory approved Remediation Strategy report and Earthworks Specification and it should be ensured that remedial earthworks do not give rise to further ground contamination.

It is recommended that a Remediation Strategy is prepared for the site for submission to the Local Planning Authority.

For the areas of the site not underlain by made ground, it is recommended that a minimum thickness of 100mm of topsoil is placed in areas of private gardens and landscaping, to provide a suitable growth media for vegetation, in accordance with NHBC Standards.

At this stage, based on the laboratory test results, it is considered that reworked topsoil encountered locally on the site, may be suitable for re-use within gardens and landscaped areas in the development, subject to regulatory approval. It is recommended that any site won topsoil, which is to be used within the cover soil system, is stockpiled and further chemically tested and visually assessed/screened for suitability, as part of the enabling works, before being approved for re-use. Similarly, the underlying natural soils are also considered suitable for re-use within a residential development, where required. However, it is recommended that any site won topsoil and subsoil is stockpiled and further chemically tested and visually assessed/screened for suitability, as part of the enabling works, before being approved for re-use.

It is recommended that signage confirming imported or excavated stockpiled topsoil or subsoil is 'clean' and suitable for use within garden and soft landscaping areas is erected following confirmation of its chemical suitability, and the stockpile fenced off to minimise potential mixing with unsuitable soils or construction materials intended for disposal. Material arising from different source areas within the development should be stockpiled separately and not intermixed within the same stockpile. It is recommended to maintain records showing the area of the development the stockpiled soils were excavated from.

9.1 Unexpected Contamination

Should unexpected or more widespread contamination be noted during the construction phase, further assessment may be required and should be undertaken by a suitably experienced geoenvironmental consultant to reappraise the potential risks.

9.2 Invasive and Protected Species

An ecological assessment is outwith the scope of this report. Notwithstanding, no evidence of invasive or protected species was observed during the investigation and Sirius has not been made aware of the presence of such within the site. However, it is recommended that advice is sought from a suitably qualified ecologist. The treatment of any invasive plant species, if identified, should be undertaken prior to construction.

9.3 Waste and Soil Resource Management

9.3.1 Soils Re-use

Article 4 of the revised EU Waste Framework Directive (Directive 2008/98/EC) sets out five steps for dealing with waste, ranked according to environmental impact –the 'waste hierarchy'. The five steps are prevention, preparing for re-use, recycling, other recovery and as a final option disposal. All site won, imported and exported soils are classified as a waste material unless demonstrated otherwise.

With reference to the Waste Hierarchy, where possible to do so, it is recommended that site won soils should be retained and re-used on site as far as practicable. If re-use is an option, it must be demonstrated by the waste producer that the soils are not a waste and there is certainty of use. This should be done using a MMP in accordance with the DoWCoP. Any surplus natural, uncontaminated soils have the potential to be transferred to other development sites subject to meeting the requirements of the DoWCoP. Contaminated soils and made ground can only be re-used on the site of origin if suitable for use. Where soils are re-used under an MMP a Verification Plan and subsequent Verification Report will be required. It is recommended that consideration of re-use of soil is undertaken as early as possible in the planning process to ensure that the most cost efficient and sustainable options for soil re-use can be explored.

It is noted that alternatives to an MMP are available, such as an Environmental Permit, however an MMP is typically the most suitable option for a residential development.

9.3.2 Topsoil Re-use

Based on the three samples obtained during this investigation and subsequent contaminated land risk assessment it is considered that site won reworked topsoil, where encountered on the site, will be suitable for re-use within a residential setting (in private gardens and landscaped areas). Whilst the soils may be considered suitable for this use in this context it does not remove the requirement to comply with the DoWCoP as detailed in Section 9.3.1.

9.3.3 Surplus Soils

If any surplus soils or materials are generated during construction which cannot be re-used they will be regarded as a waste and should be disposed of in accordance with current UK waste legislation to a suitably licenced facility under appropriate Duty of Care. It is the waste producers responsibility to adequately classify the waste, which should be undertaken in accordance with Guidance on the classification and assessment of waste (Ref. 28, Appendix H). Please note that this ground investigation is unlikely to be sufficient to provide a detailed classification of any waste generated on site.

It is recommended that a detailed cut/fill balance is produced for the site in advance of the development to confirm whether surplus soils will be produced.

10. Further Works

It is considered that the following further works are required for the site:

- Production of a Remedial Strategy confirming the remedial proposals to mitigate the risks from elevated contaminants within the site.
- Cut/fill balance for the site to confirm any volumes of material likely required to be disposed off-site.
- Production of an MMP for the site to cover the re-use of soils within the site.
- Tree survey by specialist consultant.
- Preparation of detailed Foundation Schedule.

11. Regulatory Approvals

The conclusions and recommendations presented above are considered reasonable based on the findings of the site investigation. However, these cannot be guaranteed to gain regulatory approval and, therefore, the report should be passed to the appropriate regulatory authorities and/or other relevant organisations for their comment and approval prior to undertaking any works on site.

APPENDICES

APPENDIX A
Drawings

JACK LAWSON TERRACE WHEATLEY HILL

sketch housing layout

1. Do not scale off drawing
2. All dimensions to be checked on site
3. Any discrepancy between drawn and specified information to be notified immediately
4. If in doubt - ASK

Layout based on OS information provided by client and is subject to Topographical Site Survey. Existing tree and hedgerow are digitised from satelite imagery and are therefore indicative only. All external boundaries to be checked against the Land Registry title plan prior to commencement on site and any discrepancies to be notified to ACER Architectural Limited.

All materials, landscape details and boundary treatments are subject to approval by the Local Planning Authority.

gleeson

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HOUSE TYPE SCHEDULE

* 254	Moy	2 bed bungalow	8
* 250	Greystones	2 bed semi-det	9
* 350	Glin	3 bed semi-det	16
355	Neale	3 bed semi-det	5
353	Limerick	3 bed detached	3
354	Strade	3 bed detached	2
359	Clifden	3 bed corner det	8
* 360	Milford	3 bed detached	10
450	Dalkey	4 bed detached	8
* 454	Blessington	4 bed detached	9
			78

* Denotes 67% M4(2) compliant house types: 57% Houses plus 10% Bungalows.

100% House types NDSS compliant.

Existing trees and hedgerow

Existing trees and hedgerow, dead, felled or to be removed

Indicative planting only

Gross Site Area = 6.64 Acres (2.69 Hectares)
Net Developable Area = 5.93 Acres (2.69 Hectares)

0 5m 10m 20m 50m

A 10.02.23 Plots 47-49 omitted. (DLM)

revisions

ACER architectural
Design & Planning Services

client

Gleeson

project

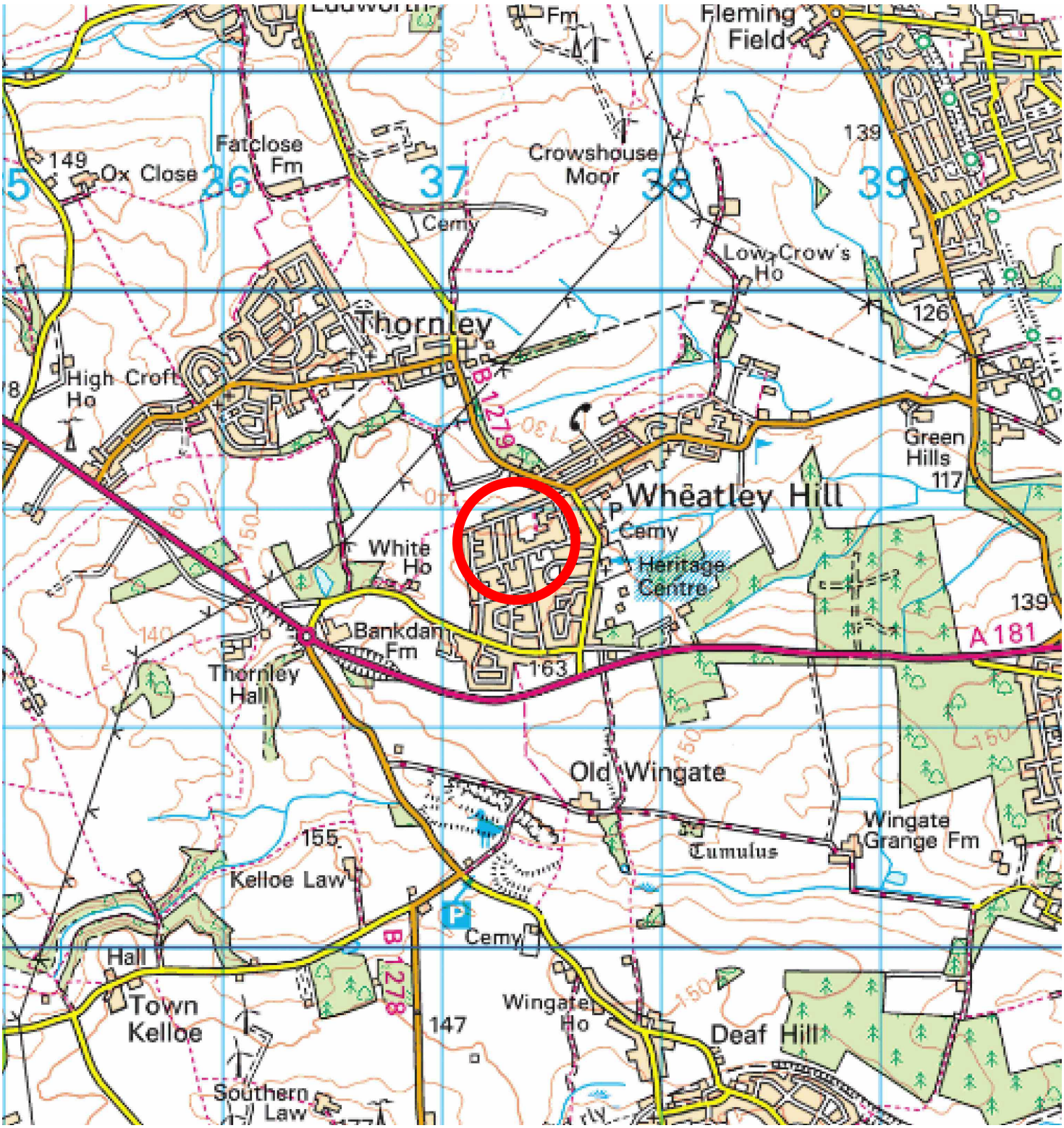
Land at
Jack Lawson Terrace
Wheatley Hill, Co. Durham

drawing title

SKETCH HOUSING LAYOUT

drg. no.	scale
2215.03.01 rev A	1:500 @ A1
date: July 2022	drawn by: DLM / checked by: DLM

The Well Garden, Branton C
Great Ouseburn, North Yorks, YO26 9RT
Tel: 01423 579105
Email: Mail@ACERarchitectural.co.uk



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NOTES

○ Site Location

REVISION	
0	For Information
A	>>
B	>>
C	>>
D	>>

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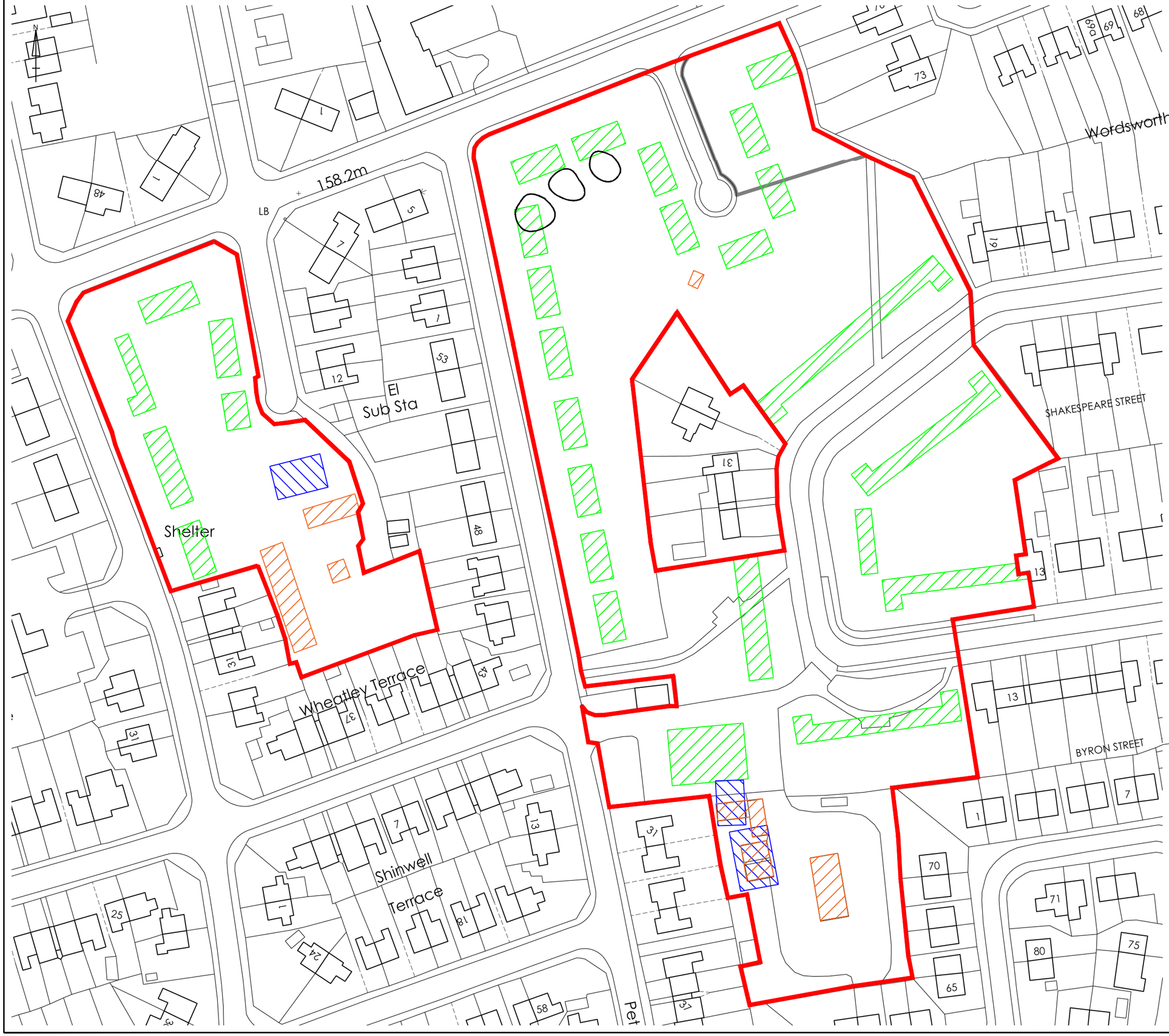
CLIENT: Gleeson	DRAWING NO.: C9843/01	REVISION NO.: 0	
SITE: Jack Lawson Terrace, Wheatley Hill, County Durham	DRAWN BY: MF	APPROVED BY: APC	
DRAWING TITLE: Site Location Plan	DATE: June 2023	SCALE: 1:25,000	A4



NOTES

- Site Boundary
- 1939 Structures
- 1959 Structures
- 1996 Structures
- Area of Wild Flower Beds

Notes

1. This drawing should not be viewed in isolation from the accompanying report.
2. All exploratory hole locations are approximate and based on handheld GPS coordinates unless stated otherwise on the exploratory hole logs.
3. The locations of services shown on this drawing are approximate and are based on utility plans provided by the client. Locations of services are given for the purposes of indicating constraints to the site investigation only. Reference should be made to original utility plans and HSG47 for locating of services within the site.
4. All marked site features (including historical features, mining features (ie, opencast boundaries and mineshafts), potential contaminant constraints, and any other potential constraint or feature of note) shown on this drawing are given for indicative purposes only. This drawing should not be underlaid in isolation to determine proposed development layouts. Reference should be made to the accompanying report for commentary on the potential location of these features including coordinates if available and any further works required to locate features if required.

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CLIENT

Gleeson Regeneration Ltd

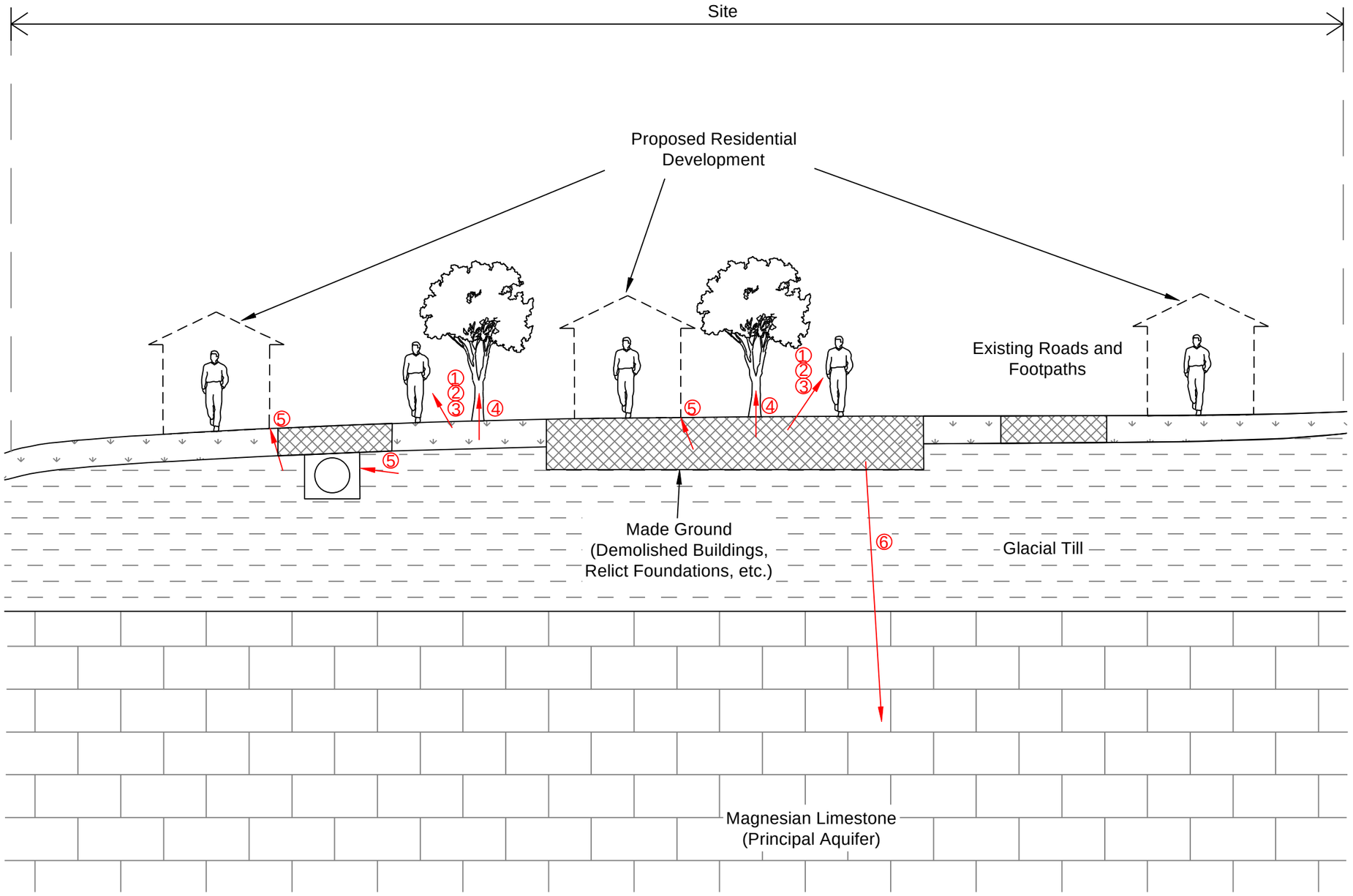
SITE

Jack Lawson Terrace, Wheatley Hill, County Durham

DRAWING TITLE

Site Features Plan

DRAWING NO.	REVISION NO.
C9843/04	0
DRAWN BY	APPROVED BY
MF	MG
DATE	SCALE	PAPER SIZE
August 2023	1:1000	A3



Contamination Sources	Contamination Pathway	Potential Receptors	Risk
Metal, organic and inorganic contaminants in shallow disturbed topsoil/ made ground associated with demolished residential and industrial units	1. Direct and indirect ingestion 2. Inhalation of contaminant particles/dust/vapours 3. Dermal contact	End users	Moderate
	4. Plant uptake	Gardens and landscaping (phytotoxic effect)	Low
	5. Direct contact with construction materials	Construction products incl. buried concrete and plastics (chemical attack/degradation)	Moderate
	6. Leaching	Controlled waters	Low
Asbestos fibres and ACMs in shallow disturbed topsoil/ made ground associated with demolished residential and industrial units	2. Inhalation of contaminant particles/dust/fibres	End users Adjacent site users	High

NOTES

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CLIENT

Gleeson Regeneration Ltd

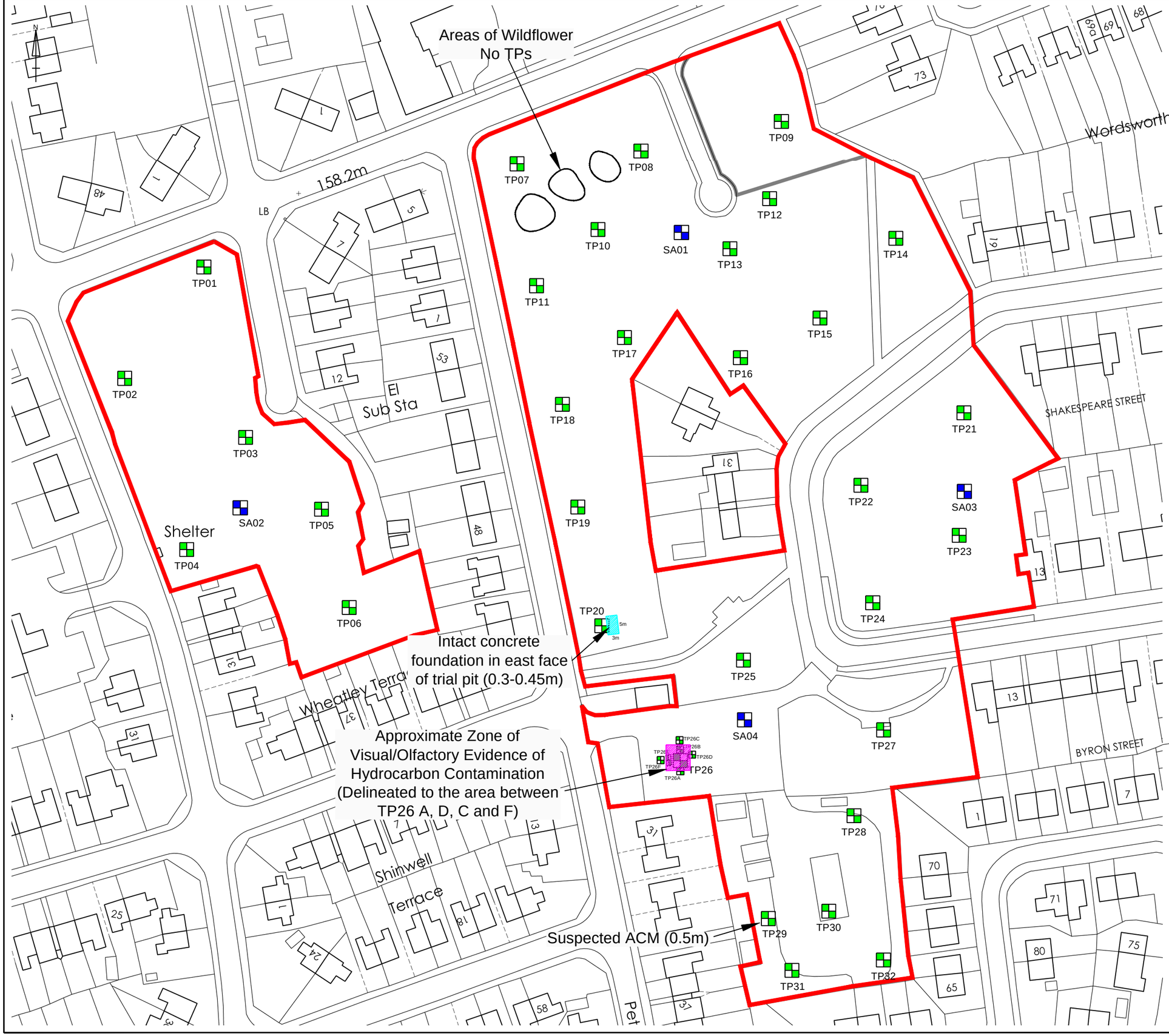
SITE

Jack Lawson Terrace, Wheatley Hill

DRAWING TITLE

Preliminary Conceptual Site Model

DRAWING NO.	REVISION NO.
C9843/03	0
DRAWN BY: MF	APPROVED BY: APC
DATE: June 2023	SCALE: NTS	PAPER SIZE: A3



NOTES

Site Boundary

Trial Pit

Soakaway Test Pit

Notes

1. This drawing should not be viewed in isolation from the accompanying report.
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3. The locations of services shown on this drawing are approximate and are based on utility plans provided by the client. Locations of services are given for the purposes of indicating constraints to the site investigation only. Reference should be made to original utility plans and HSG47 for locating of services within the site.
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A	>>	>>	>>
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GEOTECHNICAL LTD
Russel House,
Mill Road,
Langley Moor,
Durham DH7 8HJ
www.thesiriusgroup.com
TEL: 0191 378 9972
FAX: 0191 378 1537

CLIENT

Gleeson Regeneration Ltd

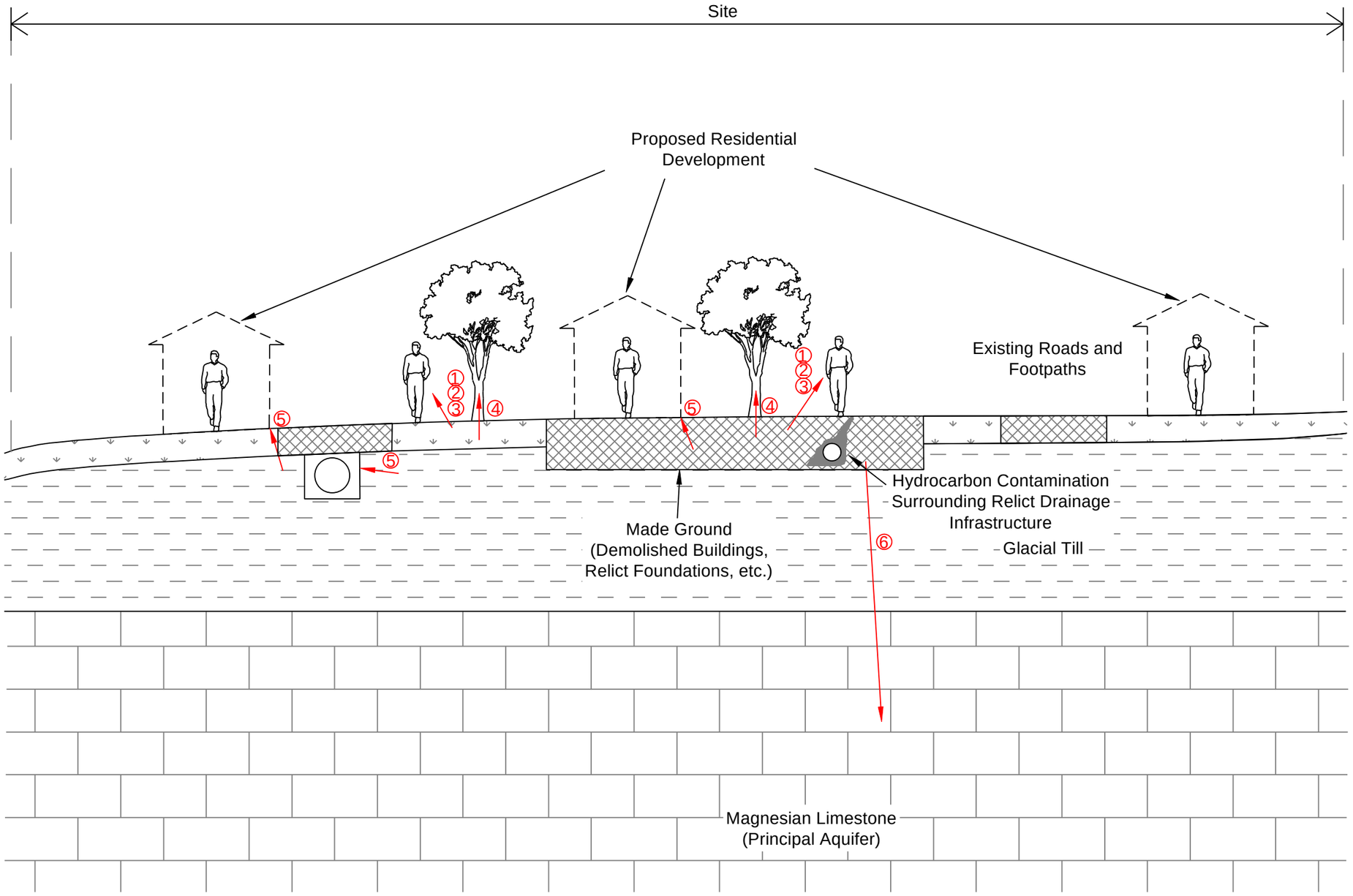
SITE

Jack Lawson Terrace, Wheatley Hill, County Durham

DRAWING TITLE

Exploratory Hole Location and Constraints Plan

DRAWING NO.	REVISION NO.
C9843/04	0
DRAWN BY	APPROVED BY
MG	JWM
DATE	SCALE	PAPER SIZE
July 2023	1:1000	A3



Contamination Sources	Contamination Pathway	Potential Receptors	Risk
Hydrocarbon contamination (aromatic C16-C35 fractions) in made ground local to TP26, linked to relict drainage infrastructure below former industrial units	1. Direct and indirect ingestion 2. Inhalation of contaminant particles/dust/vapours 3. Dermal contact	End users	Moderate
	4. Plant uptake	Gardens and landscaping (phytotoxic effect)	Low
	5. Direct contact with construction materials	Construction products incl. buried concrete and plastics (chemical attack/degradation)	Moderate
	6. Leaching	Controlled waters	Low
Asbestos fibres and ACMs in granular made ground associated with demolished residential and industrial units	2. Inhalation of contaminant particles/dust/fibres	End users Adjacent site users	High

NOTES

REVISION		BY	DATE
0	For Information	MG	31/08/23
A	>>	>>	>>
B	>>	>>	>>
C	>>	>>	>>
D	>>	>>	>>

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SITE

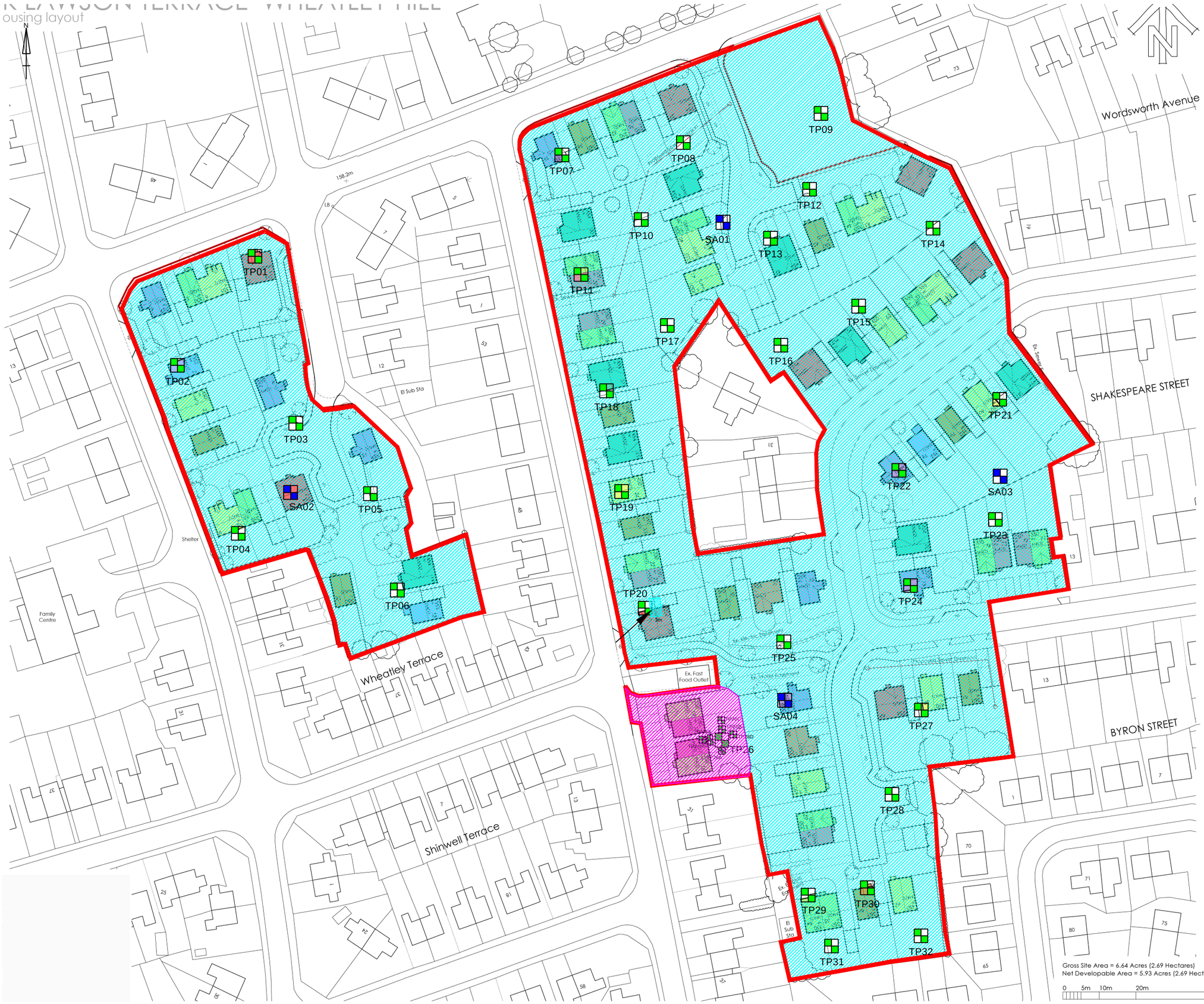
Jack Lawson Terrace, Wheatley Hill

DRAWING TITLE

Revised Conceptual Site Model

DRAWING NO.	REVISION NO.
C9843/05	0
DRAWN BY	APPROVED BY
MG	JPM
DATE	SCALE	PAPER SIZE
August 2023	NTS	A3

ousing layout



NOTES

- Site Boundary
- Trial Pit
- Soakaway Test Pit
- Strip Foundations Anticipated
- Possible Alternative (Trench Fill) Foundations Required

Notes

1. This drawing should not be viewed in isolation from the accompanying report.
2. All exploratory hole locations are approximate and based on handheld GPS coordinates unless stated otherwise on the exploratory hole logs.
3. The locations of services shown on this drawing are approximate and are based on utility plans provided by the client. Locations of services are given for the purposes of indicating constraints to the site investigation only. Reference should be made to original utility plans and HSG47 for locating of services within the site.
4. All marked site features (including historical features, mining features (ie, opencast boundaries and mineshafts), potential contaminant constraints, and any other potential constraint or feature of note) shown on this drawing are given for indicative purposes only. This drawing should not be underlaid in isolation to determine proposed development layouts. Reference should be made to the accompanying report for commentary on the potential location of these features including coordinates if available and any further works required to locate features if required.

REVISION		BY	DATE
0	For information	MG	31/08/23
A	>>	>>	>>
B	>>	>>	>>
C	>>	>>	>>
D	>>	>>	>>

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SITE

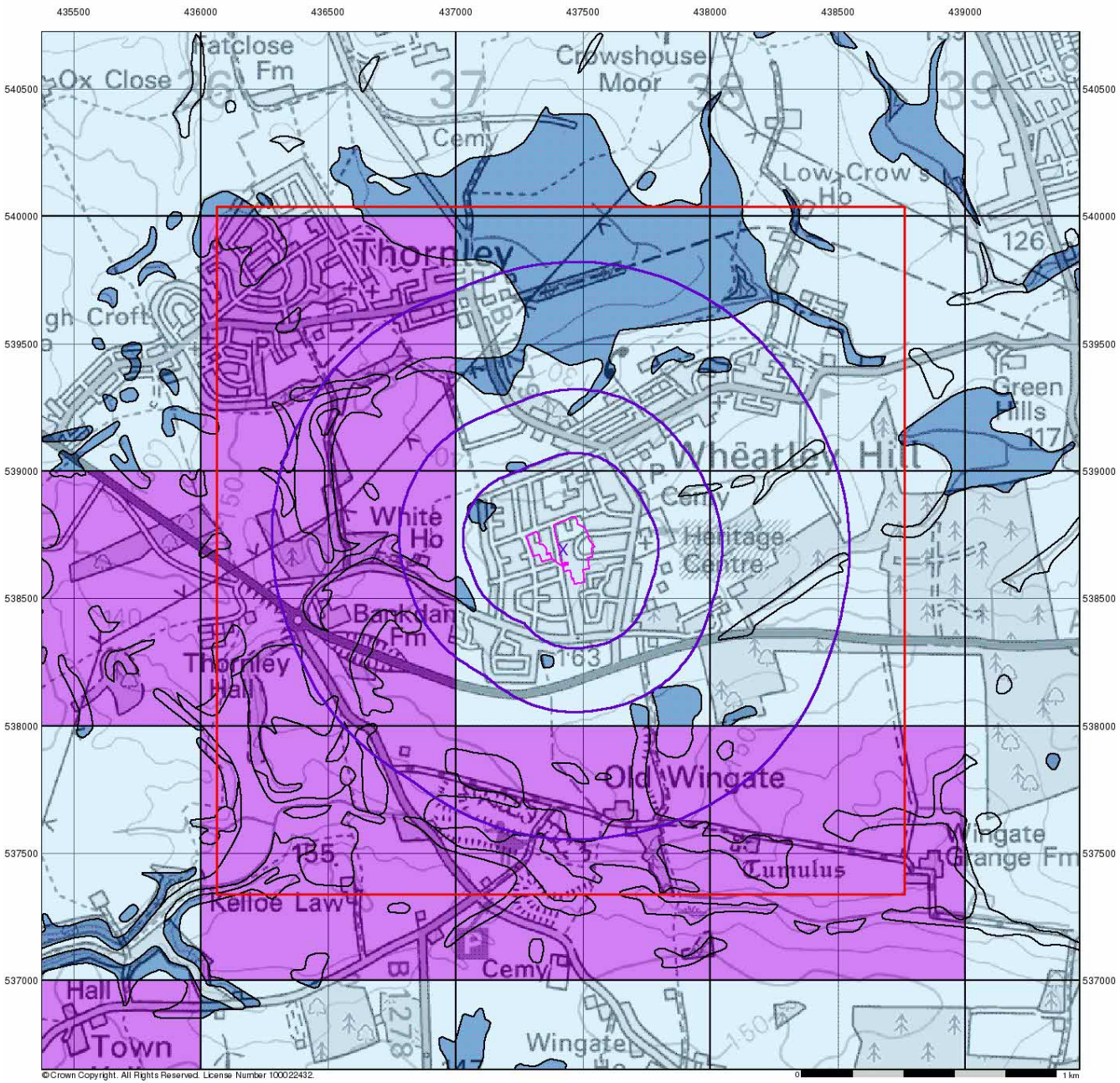
Jack Lawson Terrace, Wheatley Hill, County Durham

DRAWING TITLE

Indicative Foundation Zoning Plan

DRAWING NO.	REVISION NO.
C9843/06	0
DRAWN BY	APPROVED BY
MG	JPM
DATE	SCALE	PAPER SIZE
August 2023	1:1000	A3

APPENDIX B
Desk Study Information



Groundwater Vulnerability

General

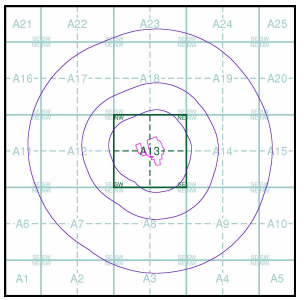
Specified Site | Specified Buffer(s) | Bearing Reference Point
Slice | Map ID

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



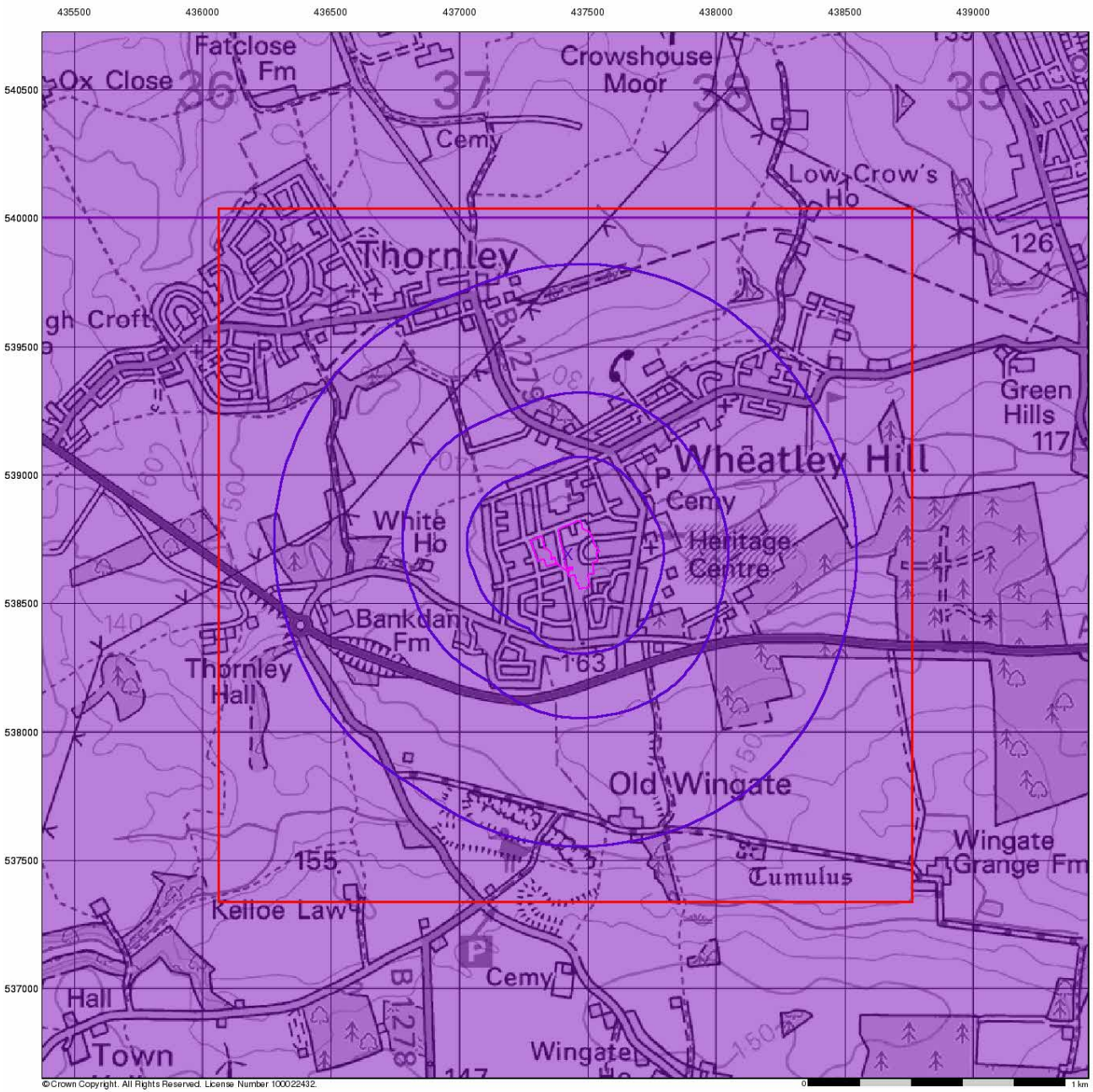
Order Details

Order Number:	312801561_1_1
Customer Ref:	C9843 - Jack Lawson Terrace - JWM
National Grid Reference:	437420, 538690
Slice:	A
Site Area (Ha):	3.08
Search Buffer (m):	1000

Site Details

Jack Lawson Terrace, WHEATLEY HILL, DH6 3RH

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



Bedrock Aquifer Designation

General

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

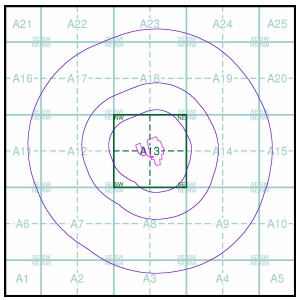
Slice | Map ID

Agency and Hydrological

Geological Classes

- Principal Aquifer
- Secondary A Aquifer
- Secondary B Aquifer
- Secondary Undifferentiated
- Unproductive Strata
- Unknown
- Unknown (Lakes and Landslip)

Site Sensitivity Context Map - Slice A



Order Details

Order Number:	312801561_1_1
Customer Ref:	C9843 - Jack Lawson Terrace - JWM
National Grid Reference:	437420, 538690
Slice:	A
Site Area (Ha):	3.08
Search Buffer (m):	1000

Site Details

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Landmark INFORMATION GROUP

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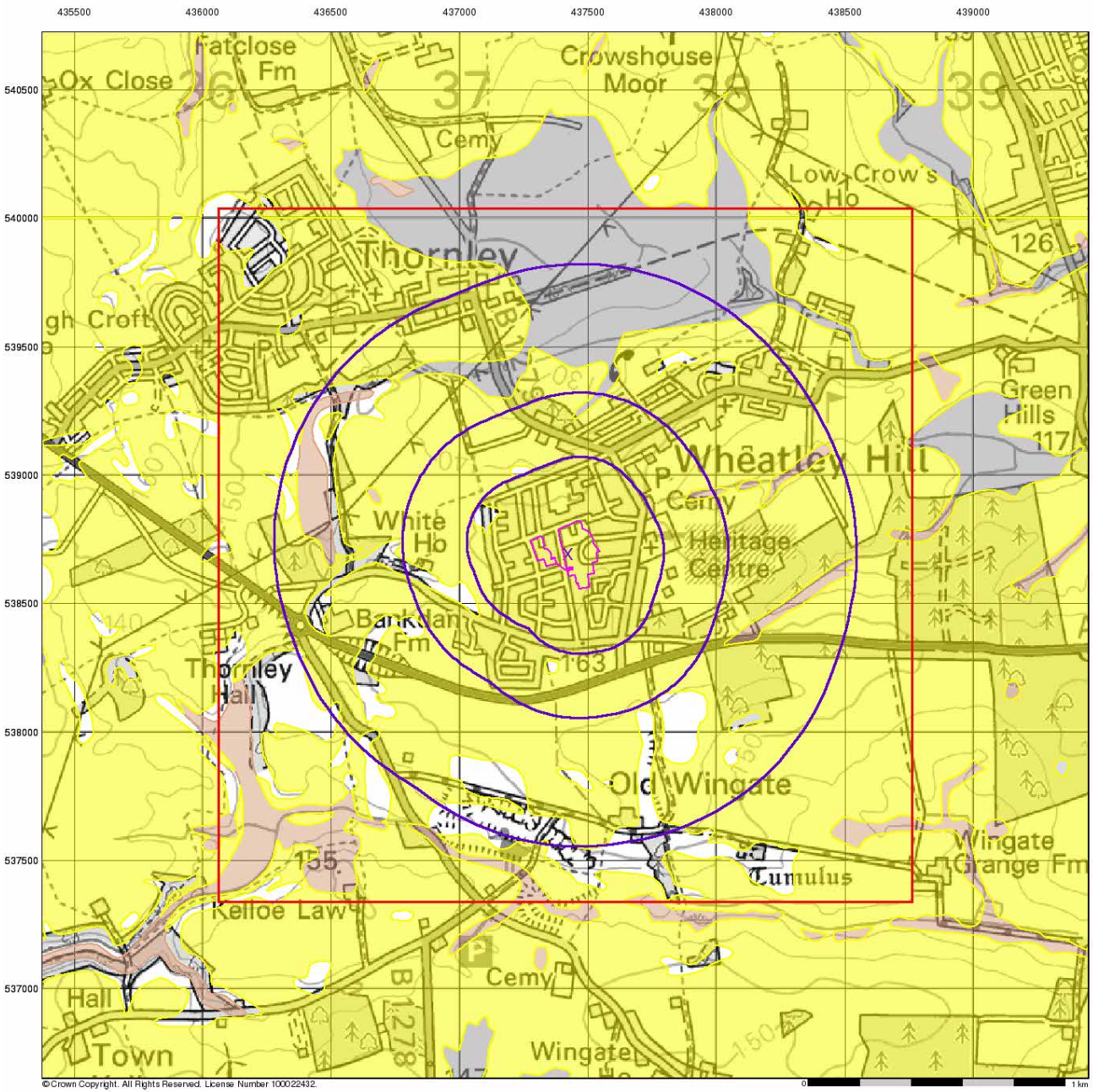
Web: www.envirocheck.co.uk



Superficial Aquifer Designation

General

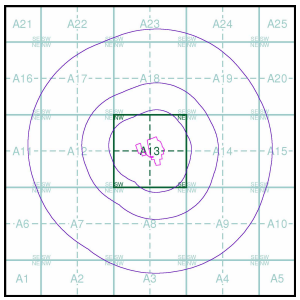
Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

Agency and Hydrological

Geological Classes

- Principal Aquifer
- Secondary A Aquifer
- Secondary B Aquifer
- Secondary Undifferentiated
- Unproductive Strata
- Unknown
- Unknown (Lakes and Landslip)

Site Sensitivity Context Map - Slice A



Order Details

Order Number:	312801561_1_1
Customer Ref:	C9843 - Jack Lawson Terrace - JWM
National Grid Reference:	437420, 538690
Slice:	A
Site Area (Ha):	3.08
Search Buffer (m):	1000

Site Details

Jack Lawson Terrace, WHEATLEY HILL, DH6 3RH

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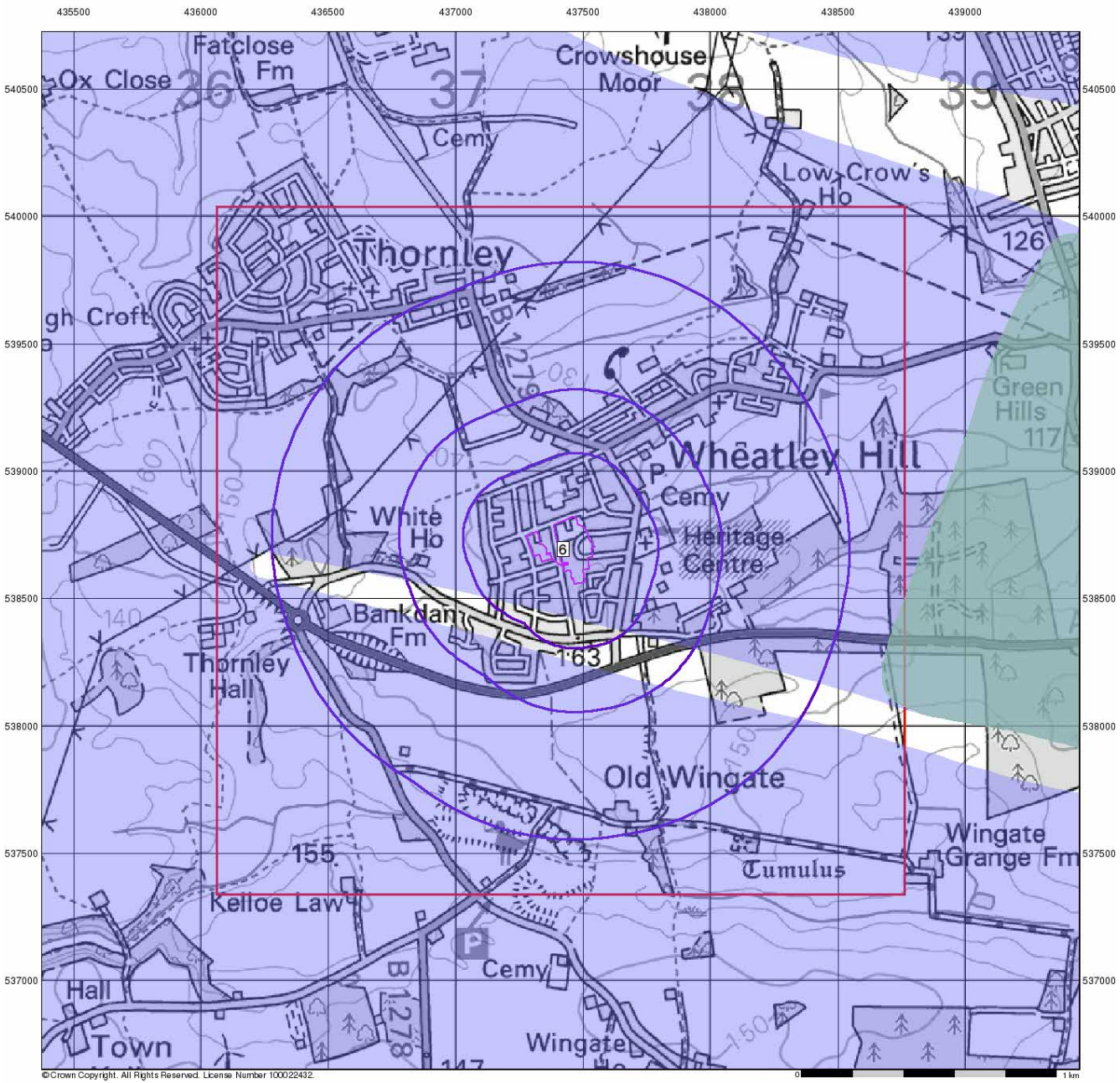
Web: www.envirocheck.co.uk



Source Protection Zones

General

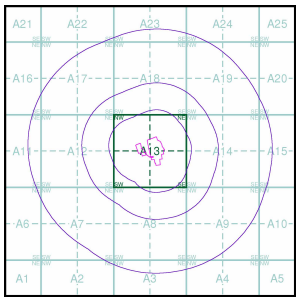
Specified Site | Specified Buffer(s) | Bearing Reference Point

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



Order Details

Order Number:	312801561_1_1
Customer Ref:	C9843 - Jack Lawson Terrace - JWM
National Grid Reference:	437420, 538690
Slice:	A
Site Area (Ha):	3.08
Search Buffer (m):	1000

Site Details

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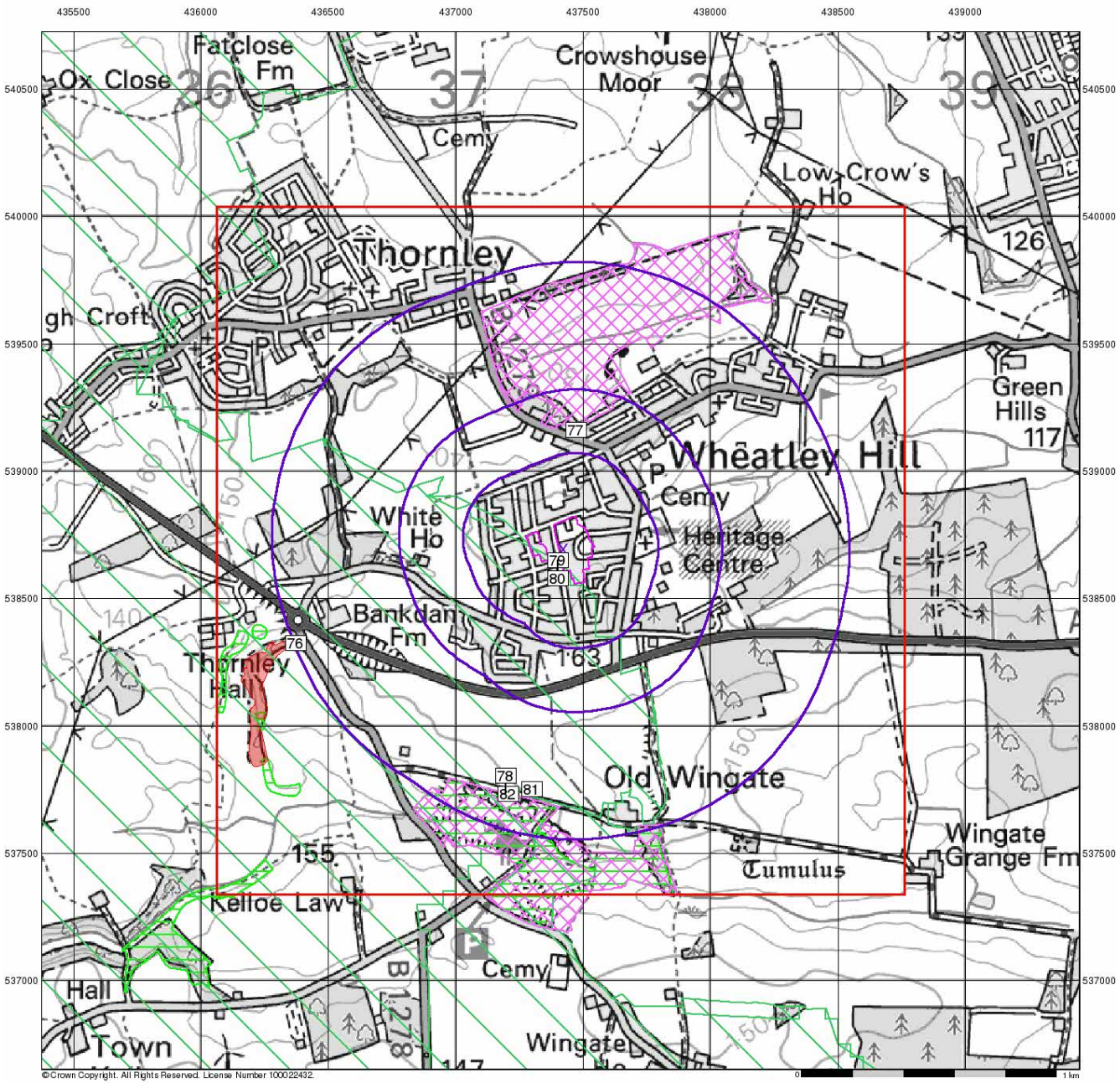


Sensitive Land Uses

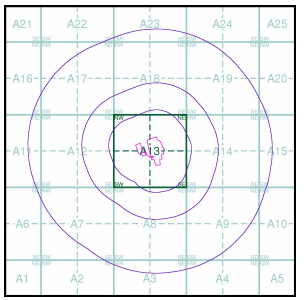
General

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

Sensitive Land Uses

- Ancient Woodland
- Area of Adopted Green Belt
- Area of Unadopted Green Belt
- Area of Outstanding Natural Beauty
- Environmentally Sensitive Area
- Forest Park
- Local Nature Reserve
- Marine Nature Reserve
- National Nature Reserve
- National Park
- Nitrate Sensitive Area
- Nitrate Vulnerable Zone
- Ramsar Site
- Site of Special Scientific Interest
- Special Area of Conservation
- Special Protection Area
- World Heritage Sites

Site Sensitivity Context Map - Slice A



Order Details

Order Number:	312801561_1_1
Customer Ref:	C9843 - Jack Lawson Terrace - JWM
National Grid Reference:	437420, 538690
Slice:	A
Site Area (Ha):	3.08
Search Buffer (m):	1000

Site Details

Jack Lawson Terrace, WHEATLEY HILL, DH6 3RH

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Tel: 0844 844 9952
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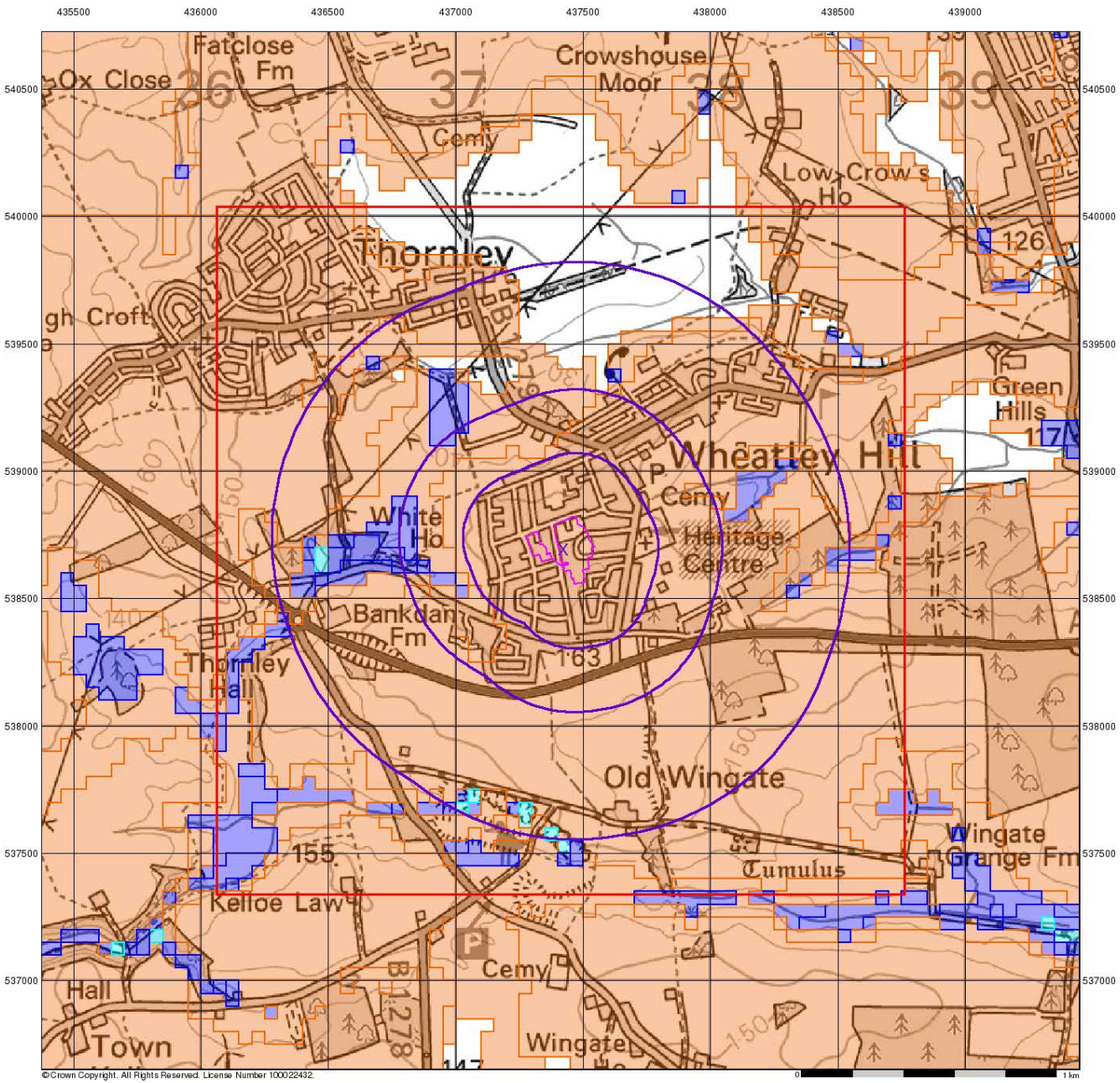


BGS Flood GFS Data

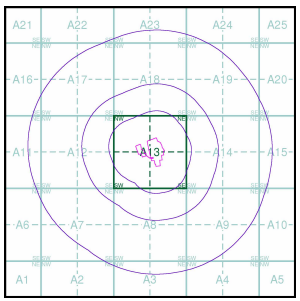
General

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

Agency and Hydrological (Flood)

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

Site Sensitivity Context Map - Slice A



Order Details

Order Number:	312801561_1_1
Customer Ref:	C9843 - Jack Lawson Terrace - JWM
National Grid Reference:	437420, 538690
Slice:	A
Site Area (Ha):	3.08
Search Buffer (m):	1000

Site Details

Jack Lawson Terrace, WHEATLEY HILL, DH6 3RH

Envirocheck® Report:

Datasheet

Order Details:

Order Number:
312801561_1_1

Customer Reference:
C9843 - Jack Lawson Terrace - JWM

National Grid Reference:
437420, 538690

Slice:
A

Site Area (Ha):
3.08

Search Buffer (m):
1000

Site Details:

Jack Lawson Terrace
WHEATLEY HILL
DH6 3RH

Client Details:

Ms S Howson
Sirius Geotechnical Ltd
4245 Park Approach
Thorpe Park
Leeds
LS15 8GB

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

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 1		1	2	
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 2			1	
Local Authority Pollution Prevention and Control Enforcements					
Nearest Surface Water Feature	pg 2			Yes	
Pollution Incidents to Controlled Waters	pg 2		1		2
Prosecutions Relating to Authorised Processes					
Registered Radioactive Substances					
River Quality	pg 3			1	
River Quality Biology Sampling Points					
River Quality Chemistry Sampling Points					
Substantiated Pollution Incident Register					
Water Abstractions					
Water Industry Act Referrals					
Groundwater Vulnerability Map	pg 3	Yes	n/a	n/a	n/a
Groundwater Vulnerability - Soluble Rock Risk	pg 3	1	n/a	n/a	n/a
Bedrock Aquifer Designations	pg 3	Yes	n/a	n/a	n/a
Superficial Aquifer Designations	pg 3	Yes	n/a	n/a	n/a
Source Protection Zones	pg 3	1			
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 3			6	23

Summary

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Waste					
BGS Recorded Landfill Sites	pg 8				1
Historical Landfill Sites	pg 8			1	4
Integrated Pollution Control Registered Waste Sites					
Licensed Waste Management Facilities (Landfill Boundaries)	pg 9				1
Licensed Waste Management Facilities (Locations)	pg 9			1	1
Local Authority Landfill Coverage	pg 9	2	n/a	n/a	n/a
Local Authority Recorded Landfill Sites	pg 9			1	3
Registered Landfill Sites	pg 10				1
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					
Geological					
BGS 1:625,000 Solid Geology	pg 11	Yes	n/a	n/a	n/a
BGS Recorded Mineral Sites	pg 11		1	1	14
CBSCB Compensation District			n/a	n/a	n/a
Coal Mining Affected Areas	pg 13	Yes	n/a	n/a	n/a
Mining Instability	pg 13	Yes	n/a	n/a	n/a
Man-Made Mining Cavities					
Natural Cavities					
Non Coal Mining Areas of Great Britain				n/a	n/a
Potential for Collapsible Ground Stability Hazards	pg 14	Yes		n/a	n/a
Potential for Compressible Ground Stability Hazards				n/a	n/a
Potential for Ground Dissolution Stability Hazards	pg 14	Yes		n/a	n/a
Potential for Landslide Ground Stability Hazards	pg 14	Yes		n/a	n/a
Potential for Running Sand Ground Stability Hazards	pg 14	Yes		n/a	n/a
Potential for Shrinking or Swelling Clay Ground Stability Hazards	pg 14	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

Summary

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Industrial Land Use					
Contemporary Trade Directory Entries	pg 15			6	9
Fuel Station Entries	pg 16			1	
Gas Pipelines					
Underground Electrical Cables					
Sensitive Land Use					
Ancient Woodland	pg 17				1
Areas of Adopted Green Belt					
Areas of Unadopted Green Belt					
Areas of Outstanding Natural Beauty					
Environmentally Sensitive Areas					
Forest Parks					
Local Nature Reserves	pg 17			1	1
Marine Nature Reserves					
National Nature Reserves					
National Parks					
Nitrate Sensitive Areas					
Nitrate Vulnerable Zones	pg 17	2			1
Ramsar Sites					
Sites of Special Scientific Interest	pg 17				1
Special Areas of Conservation					
Special Protection Areas					
World Heritage Sites					

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A13NE (SW)	0	1	437424 538692
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A13SW (SW)	228	1	437150 538500
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A18SW (N)	256	1	437350 539050
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A12SE (W)	263	1	437050 538600
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A12SE (W)	281	1	437050 538550
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A12SE (W)	310	1	437000 538600
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A12SE (W)	327	1	437000 538550
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A12SE (W)	389	1	436900 538650
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A12SE (W)	403	1	436900 538600
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A14NW (NE)	407	1	437900 538900
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A12NE (W)	428	1	436850 538692
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A12SE (W)	437	1	436850 538650
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A17SE (NW)	452	1	437000 539100
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A14NW (E)	458	1	438000 538750
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A18SE (N)	496	1	437600 539300
1	**Discharge Consents** Operator: Northumbrian Water Ltd Property Type: Not Given Location: WHEATLEY HILL Authority: Environment Agency, North East Region Catchment Area: Not Given Reference: 255/1057 Permit Version: Not Supplied Effective Date: Not Supplied Issued Date: 7th July 1992 Revocation Date: Not Supplied Discharge Type: Sewage Effluent Discharge-Storm Effluent Discharge Environment: Freshwater Stream/River Receiving Water: Edderacres Burn **Status: Not Supplied** Positional Accuracy: Located by supplier to within 100m	A13NE (NE)	249	2	437740 538865

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
1	**Discharge Consents** Operator: Northumbrian Water Limited Property Type: STORM TANK/CSO ON SEWERAGE NETWORK (WATER COMPANY) Location: Cemetery Road Cso06-, Near 21 Woodlands Avenue, Wheatley Hill, Durham, Dh6 3jy Authority: Environment Agency, North East Region Catchment Area: Durham Coastal Streams Reference: 255/1057 Permit Version: 1 Effective Date: 7th July 1992 Issued Date: 7th July 1992 Revocation Date: 5th April 2022 Discharge Type: Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: Edderacres Burn **Status: New Consent, by Application (Water Resources Act 1991, Section 88)** Positional Accuracy: Located by supplier to within 10m	A14NW (NE)	262	2	437750 538875
1	**Discharge Consents** Operator: Northumbrian Water Limited Property Type: STORM TANK/CSO ON SEWERAGE NETWORK (WATER COMPANY) Location: Cemetery Road Cso06-, Near 21 Woodlands Avenue, Wheatley Hill, Durham, Dh6 3jy Authority: Environment Agency, North East Region Catchment Area: Not Supplied Reference: 255/1057 Permit Version: 2 Effective Date: 6th April 2022 Issued Date: 6th April 2022 Revocation Date: Not Supplied Discharge Type: Sewage Discharges - Stw Storm Overflow/Storm Tank - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: Trib Of Edderacres Burn **Status: Varied under EPR 2010** Positional Accuracy: Located by supplier to within 10m	A14NW (NE)	264	2	437750 538879
2	**Local Authority Pollution Prevention and Controls** Name: Wheatley Hill Service StationKenworth Ltd Location: Durham Road, Wheatley Hill, DURHAM, County Durham, DH6 3LJ Authority: Durham County Council (Unitary), Environmental Health Department Permit Reference: EPA/PVR/008 Dated: 15th April 1999 Process Type: Local Authority Air Pollution Control Description: PG1/14 Petrol filling station **Status: Authorised** Positional Accuracy: Automatically positioned to the address	A9NW (SE)	370	3	437777 538311
	Nearest Surface Water Feature	A14NW (NE)	264	-	437751 538878
3	**Pollution Incidents to Controlled Waters** Property Type: Road Location: WHEATLEY HILL Authority: Environment Agency, North East Region Pollutant: Oils - Waste Oil Note: No Fish Killed Incident Date: 14th June 1995 Incident Reference: NW950111 Catchment Area: Coastal Receiving Water: Freshwater Stream/River Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A13SE (S)	159	2	437500 538400
4	**Pollution Incidents to Controlled Waters** Property Type: Surface Water Sewers Location: Swan Castle Farm Authority: Environment Agency, North East Region Pollutant: Not Given Note: Gore Burn Incident Date: 10th November 1990 Incident Reference: 255/001323 Catchment Area: Not Given Receiving Water: Freshwater Stream/River Cause of Incident: Other Oil Incident Severity: Category 2 - Significant Incident Positional Accuracy: Located by supplier to within 100m	A18NE (N)	717	2	437700 539500

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
5	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: WHEATLEY HILL Authority: Environment Agency, North East Region Pollutant: Not Given Note: Gore Burn Incident Date: 28th May 1992 Incident Reference: 255/002502 Catchment Area: Not Given Receiving Water: Freshwater Stream/River Cause of Incident: Sewage - Other Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A19NW (NE)	862	2	438000 539500
	River Quality Name: Castle_Eden_Burn GQA Grade: River Quality C Reach: Source_Gore_Bur Estimated Distance (km): 2.6 Flow Rate: Flow less than 0.31 cumecs Flow Type: River Year: 2000	A14NW (NE)	402	2	437882 538925
	Groundwater Vulnerability Map Combined Classification: Secondary Superficial Aquifer - Low Vulnerability Combined Vulnerability: Low Combined Aquifer: Productive Bedrock Aquifer, Productive Superficial Aquifer Pollutant Speed: Low Bedrock Flow: Well Connected Fractures Dilution: 300-550 mm/year Baseflow Index: <40% Superficial Patchiness: >90% Superficial Thickness: 3-10m Superficial Recharge: Low	A13NE (SW)	0	4	437424 538692
	Groundwater Vulnerability - Soluble Rock Risk Classification: Significant Risk - Problems Unlikely	A13NE (SW)	0	4	437424 538692
	Bedrock Aquifer Designations Aquifer Designation: Principal Aquifer	A13NE (SW)	0	4	437424 538692
	Superficial Aquifer Designations Aquifer Designation: Secondary Aquifer - Undifferentiated	A13NE (SW)	0	4	437424 538692
6	**Source Protection Zones** Name: Not Supplied Source: Environment Agency, Head Office Reference: Not Supplied Type: Zone III (Total Catchment): The total area needed to support the discharge from the protected groundwater source.	A13NE (SW)	0	2	437424 538692
	Extreme Flooding from Rivers or Sea without Defences None				
	Flooding from Rivers or Sea without Defences None				
	Areas Benefiting from Flood Defences None				
	Flood Water Storage Areas None				
	Flood Defences None				
7	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 398.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Wear Primacy: 1	A14NW (NE)	264	5	437751 538878

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
8	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 69.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Wear Primacy: 1	A14NW (E)	322	5	437866 538716
9	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 5.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Wear Primacy: 1	A14NW (E)	384	5	437928 538731
10	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 5.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Wear Primacy: 1	A14NW (E)	389	5	437933 538732
11	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 107.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Wear Primacy: 1	A14NW (E)	392	5	437936 538728
12	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 258.5 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Wear Primacy: 1	A14NW (E)	394	5	437938 538733
13	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 93.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Wear Primacy: 1	A14SW (SE)	568	5	438036 538359
14	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 609.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Wear Primacy: 1	A14SE (SE)	632	5	438118 538403
15	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 5.2 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Wear Primacy: 1	A14NE (E)	632	5	438122 538960
16	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 89.2 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Wear Primacy: 1	A14NE (E)	636	5	438161 538857

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
17	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 159.0 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Wear Primacy: 1	A14NE (E)	636	5	438161 538857
18	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 36.9 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Wear Primacy: 1	A14NE (E)	637	5	438127 538961
19	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 1.5 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Wear Primacy: 1	A14SE (SE)	649	5	438126 538375
20	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 6.9 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Wear Primacy: 1	A14SE (SE)	649	5	438126 538375
21	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 1144.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Gore Burn Catchment Name: Wear Primacy: 1	A18NW (N)	657	5	437250 539441
22	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 57.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Wear Primacy: 1	A18NE (N)	670	5	437596 539479
23	**OS Water Network Lines** Watercourse Form: Lake Watercourse Length: 98.2 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Wear Primacy: 1	A14NE (E)	674	5	438163 538971
24	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 11.0 Watercourse Level: On ground surface Permanent: True Watercourse Name: Gore Burn Catchment Name: Wear Primacy: 1	A18NE (N)	718	5	437568 539533
25	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 672.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Gore Burn Catchment Name: Wear Primacy: 1	A18NE (N)	721	5	437579 539534

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
26	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 29.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Wear Primacy: 1	A12SW (W)	724	5	436558 538666
27	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 123.0 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Wear Primacy: 1	A12SW (W)	751	5	436530 538661
28	**OS Water Network Lines** Watercourse Form: Lake Watercourse Length: 15.9 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Wear Primacy: 1	A14NE (E)	752	5	438244 538979
29	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 4.5 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Wear Primacy: 1	A12SW (W)	753	5	436530 538661
30	**OS Water Network Lines** Watercourse Form: Lake Watercourse Length: 51.9 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Wear Primacy: 1	A14NE (E)	767	5	438257 538987
31	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 84.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Edderacres Burn Catchment Name: Wear Primacy: 1	A14NE (E)	819	5	438302 539013
32	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 66.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Wear Primacy: 1	A15NW (E)	890	5	438433 538771
33	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 359.9 Watercourse Level: On ground surface Permanent: True Watercourse Name: Edderacres Burn Catchment Name: Wear Primacy: 1	A19SE (E)	899	5	438368 539064
34	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 137.2 Watercourse Level: Not Supplied Permanent: True Watercourse Name: Not Supplied Catchment Name: Wear Primacy: 1	A15NW (E)	951	5	438494 538759

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
35	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 265.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Wear Primacy: 1	A23SW (N)	987	5	437348 539801

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
36	**BGS Recorded Landfill Sites** Site Name: Wingate Quarry Location: WHEATLEY HILL, Co Durham Authority: British Geological Survey, National Geoscience Information Service Ground Water: Threat to ground water Surface Water: No threat to surface water Geology: N/A Positional Accuracy: Positioned by the supplier Boundary Accuracy: Moderate	A8NE (S)	542	-	437595 538027
37	**Historical Landfill Sites** Licence Holder: Not Supplied Location: Easington, County Durham Name: Area E Wingate Quarry Operator Location: Not Supplied Boundary Accuracy: As Supplied Provider Reference: EAHLD06602 First Input Date: 18th December 1969 Last Input Date: Not Supplied Specified Waste Type: Deposited Waste included Commercial Waste and Liquid Sludge EA Waste Ref: 0 Regis Ref: Not Supplied WRC Ref: 1300/0220 BGS Ref: 2513 Other Ref: ES 008, 1300//022, P1/8/5/8	A8NE (S)	484	2	437600 538085
38	**Historical Landfill Sites** Licence Holder: Not Supplied Location: Easington, County Durham Name: Area F Wingate Quarry Operator Location: Not Supplied Boundary Accuracy: As Supplied Provider Reference: EAHLD06517 First Input Date: Not Supplied Last Input Date: Not Supplied Specified Waste Type: Not Supplied EA Waste Ref: 0 Regis Ref: Not Supplied WRC Ref: 1300/0221 BGS Ref: Not Supplied Other Ref: ES 009, P1/8/5/9	A9NW (SE)	585	2	437886 538118
39	**Historical Landfill Sites** Licence Holder: Director of Environment, Durham County Council Location: Near Wheatley Hill,Wingate, County Durham Name: Old Wingate Quarry Waste Dispo Operator Location: Not Supplied Boundary Accuracy: As Supplied Provider Reference: EAHLD06825 First Input Date: 1st April 1976 Last Input Date: 30th June 1988 Specified Waste Type: Deposited Waste included Inert, Industrial, Commercial and Household Waste EA Waste Ref: 67023 Regis Ref: DUR/L/DCC009 WRC Ref: 1300/0078 BGS Ref: Not Supplied Other Ref: DUR/020C	A8SW (S)	701	2	437158 537924
40	**Historical Landfill Sites** Licence Holder: Durham County Waste Management Company Limited Location: Wingate Quarry South, Wingate, County Durham Name: Wingate Quarry South Waste Dis Operator Location: Not Supplied Boundary Accuracy: As Supplied Provider Reference: EAHLD05991 First Input Date: 31st December 1990 Last Input Date: Not Supplied Specified Waste Type: Deposited Waste included Industrial, Commercial and Household Waste, and Liquid Sludge EA Waste Ref: 67158 Regis Ref: DUR/L/DCW014 WRC Ref: 1300/0044 BGS Ref: Not Supplied Other Ref: DUR/182D	A3NW (S)	944	2	437341 537621

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
41	**Historical Landfill Sites** Licence Holder: Not Supplied Location: Easington, County Durham Name: Area J East of Coopers Close Operator Location: Not Supplied Boundary Accuracy: As Supplied Provider Reference: EAHLD05987 First Input Date: Not Supplied Last Input Date: Not Supplied Specified Waste Type: Not Supplied EA Waste Ref: 0 Regis Ref: Not Supplied WRC Ref: Not Supplied BGS Ref: Not Supplied Other Ref: ES 018	A23SW (N)	968	2	437304 539775
42	**Licensed Waste Management Facilities (Landfill Boundaries)** Name: Wingate Quarry South Waste Disposal Site Licence Number: 67158 Location: Wingate, County Durham Licence Holder: Durham County Waste Management Co Ltd Authority: Environment Agency - North East Region, Northumbria Area Site Category: Landfills Taking Non-biodegradeable Wastes (Not Construction) Max Input Rate: Small (Less than 25,000 tonnes per year) **Licence Status:** **Inactive** Issued: 19th December 1990 Positional Accuracy: Positioned by the supplier Boundary Accuracy: As Supplied	A3NW (S)	944	2	437340 537621
43	**Licensed Waste Management Facilities (Locations)** Licence Number: 403719 Location: Front Street, Wheatley Hill, County Durham, DH6 3QZ Operator Name: Reay Kieran Operator Location: Not Supplied Authority: Environment Agency - North East Region, North East Area Site Category: Vehicle depollution facility **Licence Status:** **Surrendered** Issued: 8th March 2017 Last Modified: Not Supplied Expires: Not Supplied Suspended: Not Supplied Revoked: Not Supplied Surrendered: 7th June 2019 IPPC Reference: Not Supplied Positional Accuracy: Located by supplier to within 10m	A19SW (NE)	476	2	437750 539206
44	**Licensed Waste Management Facilities (Locations)** Licence Number: 67023 Location: Nr Wheatley Hill, Wingate, County Durham Operator Name: Director Of Environment Operator Location: Not Supplied Authority: Environment Agency - North East Region, North East Area Site Category: Household, Commercial And Industrial Waste Landfills **Licence Status:** **Surrendered** Issued: 11th May 1977 Last Modified: Not Supplied Expires: Not Supplied Suspended: Not Supplied Revoked: Not Supplied Surrendered: 23rd February 1993 IPPC Reference: Not Supplied Positional Accuracy: Located by supplier to within 100m	A8SW (S)	802	2	437200 537800
	Local Authority Landfill Coverage Name: Easington District Council - Has supplied landfill data		0	6	437424 538692
	Local Authority Landfill Coverage Name: Durham County Council - Has supplied landfill data		0	7	437424 538692
45	**Local Authority Recorded Landfill Sites** Location: Field Adjacent To Durham Road, South Side Of Durham Road, Wheatley Hill, Easington Reference: Wheatley Hill Authority: Easington District Council (now part of Durham County Council), Environmental Health Department **Last Reported Status:** **Closed** Types of Waste: Not Known Date of Closure: Not Known Positional Accuracy: Manually positioned within the geographical locality Boundary Quality: Moderate	A8NE (S)	384	6	437601 538188

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
46	**Local Authority Recorded Landfill Sites** Location: Old Wingate Quarry W D Site Reference: WD/5/13 Authority: Durham County Council, Economic Development and Planning Department **Last Reported Status:** **Unknown** Types of Waste: Not Supplied Date of Closure: Not Supplied Positional Accuracy: Positioned by the supplier Boundary Quality: Moderate	A8SW (S)	700	7	437163 537924
47	**Local Authority Recorded Landfill Sites** Location: Wingate Quarry South Reference: WD/5/12 Authority: Durham County Council, Economic Development and Planning Department **Last Reported Status:** **Unknown** Types of Waste: Not Supplied Date of Closure: Not Supplied Positional Accuracy: Positioned by the supplier Boundary Quality: Moderate	A8SW (S)	863	7	437188 537737
48	**Local Authority Recorded Landfill Sites** Location: Land East Of Parish Football Field, Thornley Reference: Not Supplied Authority: Easington District Council (now part of Durham County Council), Environmental Health Department **Last Reported Status:** **Closed** Types of Waste: Not Known Date of Closure: Not Supplied Positional Accuracy: Manually positioned within the geographical locality Boundary Quality: Not Applicable	A23SW (N)	981	6	437400 539800
49	**Registered Landfill Sites** Licence Holder: Durham C.C. Licence Reference: DUR 20/75 C.C Site Location: Old Wingate Quarry Waste Disposal Site, Wheatley Hill, Durham, County Durham Licence Easting: 437200 Licence Northing: 537800 Operator Location: County Hall, DURHAM, County Durham, DH1 5UQ Authority: Environment Agency - North East Region, Northumbria Area Site Category: Landfill - with civic amenity Max Input Rate: Large (Equal to or greater than 75,000 and less than 250,000 tonnes per year) Waste Source Restrictions: No known restriction on source of waste Status: Licence known to be surrenderedSurrendered Dated: 11th May 1977 Preceded By Licence: Not Given Superseded By Licence: Not Given Positional Accuracy: Manually positioned to the address or location Boundary Accuracy: Not Applicable Authorised Waste Construction And Demolition Wastes House. + Com. Untreated Waste Ind. Non-Haz. Potentially Combustible	A8SW (S)	802	2	437200 537800

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS 1:625,000 Solid Geology Description: Zechstein Group	A13NE (SW)	0	1	437424 538692
50	**BGS Recorded Mineral Sites** Site Name: Marl Hole Quarry Location: Wheatley Hill, Durham, Co. Durham Source: British Geological Survey, National Geoscience Information Service Reference: 107131 Type: Opencast **Status: Ceased** Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Permian Geology: Ford Formation (Middle Magnesian Limestone) Commodity: Dolomite Positional Accuracy: Located by supplier to within 10m	A13NW (NW)	210	1	437094 538841
51	**BGS Recorded Mineral Sites** Site Name: Wingate Lane Location: Wheatley Hill, Durham, Co. Durham Source: British Geological Survey, National Geoscience Information Service Reference: 107137 Type: Opencast **Status: Ceased** Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Permian Geology: Ford Formation (Middle Magnesian Limestone) Commodity: Dolomite Positional Accuracy: Located by supplier to within 10m	A8NW (S)	304	1	437348 538276
52	**BGS Recorded Mineral Sites** Site Name: Thornley Hall Location: Wheatley Hill, Durham, Co. Durham Source: British Geological Survey, National Geoscience Information Service Reference: 107133 Type: Opencast **Status: Ceased** Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Permian Geology: Ford Formation (Middle Magnesian Limestone) Commodity: Dolomite Positional Accuracy: Located by supplier to within 10m	A12SE (SW)	549	1	436817 538416
53	**BGS Recorded Mineral Sites** Site Name: Wingate Quarries Location: Wingate, Wheatley Hill, Durham, Co. Durham Source: British Geological Survey, National Geoscience Information Service Reference: 11753 Type: Opencast **Status: Ceased** Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Permian Geology: Zechstein Group (Lower Magnesian Limestone) Commodity: Dolomite Positional Accuracy: Located by supplier to within 10m	A9NW (SE)	590	1	437845 538080
54	**BGS Recorded Mineral Sites** Site Name: Foxhole Wood Location: Wheatley Hill, Durham, Co. Durham Source: British Geological Survey, National Geoscience Information Service Reference: 107138 Type: Opencast **Status: Ceased** Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Permian Geology: Ford Formation (Middle Magnesian Limestone) Commodity: Dolomite Positional Accuracy: Located by supplier to within 10m	A9NW (SE)	651	1	438040 538191

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
55	**BGS Recorded Mineral Sites** Site Name: Foxhole Wood Location: Wheatley Hill, Durham, Co. Durham Source: British Geological Survey, National Geoscience Information Service Reference: 107139 Type: Opencast **Status: Ceased** Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Permian Geology: Ford Formation (Middle Magnesian Limestone) Commodity: Dolomite Positional Accuracy: Located by supplier to within 10m	A9NE (SE)	782	1	438107 538062
56	**BGS Recorded Mineral Sites** Site Name: Wheatley Hill Location: Wheatley Hill, Durham, Co. Durham Source: British Geological Survey, National Geoscience Information Service Reference: 107156 Type: Opencast **Status: Ceased** Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Permian Geology: Ford Formation (Middle Magnesian Limestone) Commodity: Dolomite Positional Accuracy: Located by supplier to within 10m	A19NW (NE)	810	1	438027 539409
57	**BGS Recorded Mineral Sites** Site Name: Thornley Hall Location: Wheatley Hill, Durham, Co. Durham Source: British Geological Survey, National Geoscience Information Service Reference: 107134 Type: Opencast **Status: Ceased** Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Permian Geology: Ford Formation (Middle Magnesian Limestone) Commodity: Dolomite Positional Accuracy: Located by supplier to within 10m	A7NW (SW)	812	1	436615 538240
58	**BGS Recorded Mineral Sites** Site Name: Wingate Quarries Location: Wingate, Wheatley Hill, Durham, Co. Durham Source: British Geological Survey, National Geoscience Information Service Reference: 11751 Type: Opencast **Status: Ceased** Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Permian Geology: Zechstein Group (Lower Magnesian Limestone) Commodity: Dolomite Positional Accuracy: Located by supplier to within 10m	A8SW (S)	827	1	437120 537805
59	**BGS Recorded Mineral Sites** Site Name: Wingate Quarry Location: Wingate, Wheatley Hill, Durham, Co. Durham Source: British Geological Survey, National Geoscience Information Service Reference: 11749 Type: Opencast **Status: Ceased** Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Permian Geology: Ford Formation (Middle Magnesian Limestone) Commodity: Dolomite Positional Accuracy: Located by supplier to within 10m	A8SE (S)	834	1	437735 537760
60	**BGS Recorded Mineral Sites** Site Name: Thornley Hall Location: Wheatley Hill, Durham, Co. Durham Source: British Geological Survey, National Geoscience Information Service Reference: 107135 Type: Opencast **Status: Ceased** Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Permian Geology: Ford Formation (Middle Magnesian Limestone) Commodity: Dolomite Positional Accuracy: Located by supplier to within 10m	A7NW (SW)	858	1	436548 538263

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
61	**BGS Recorded Mineral Sites** Site Name: Thornley Hall Location: Wheatley Hill, Durham, Co. Durham Source: British Geological Survey, National Geoscience Information Service Reference: 107136 Type: Opencast **Status: Ceased** Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Permian Geology: Ford Formation (Middle Magnesian Limestone) Commodity: Dolomite Positional Accuracy: Located by supplier to within 10m	A7NW (SW)	858	1	436616 538157
62	**BGS Recorded Mineral Sites** Site Name: Thornley Hall Location: Wheatley Hill, Durham, Co. Durham Source: British Geological Survey, National Geoscience Information Service Reference: 107132 Type: Opencast **Status: Ceased** Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Permian Geology: Ford Formation (Middle Magnesian Limestone) Commodity: Dolomite Positional Accuracy: Located by supplier to within 10m	A12SW (W)	905	1	436418 538458
63	**BGS Recorded Mineral Sites** Site Name: Old Wingate Location: Old Wingate, Wingate, Co. Durham Source: British Geological Survey, National Geoscience Information Service Reference: 107755 Type: Opencast **Status: Ceased** Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Permian Geology: Ford Formation (Middle Magnesian Limestone) Commodity: Dolomite Positional Accuracy: Located by supplier to within 10m	A3NW (S)	957	1	437284 537617
64	**BGS Recorded Mineral Sites** Site Name: New Thornley Colliery Location: Thornley, Durham, Co. Durham Source: British Geological Survey, National Geoscience Information Service Reference: 107126 Type: Underground **Status: Ceased** Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Pennine Middle Coal Measures Formation Commodity: Coal - Deep Positional Accuracy: Located by supplier to within 10m	A17NW (NW)	960	1	436642 539462
65	**BGS Recorded Mineral Sites** Site Name: Wingate Quarries Location: Wingate, Wheatley Hill, Durham, Co. Durham Source: British Geological Survey, National Geoscience Information Service Reference: 11752 Type: Opencast **Status: Ceased** Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Permian Geology: Zechstein Group (Lower Magnesian Limestone) Commodity: Dolomite Positional Accuracy: Located by supplier to within 10m	A2NE (S)	979	1	437050 537670
	Coal Mining Affected Areas Description: In an area which may be affected by coal mining activity. It is recommended that a coal mining report is obtained from the Coal Authority. Contact details are included in the Useful Contacts section of this report.	A13NE (SW)	0	8	437424 538692
	Mining Instability Mining Evidence: Inconclusive Coal Mining Source: Ove Arup & Partners Boundary Quality: As Supplied	A13NE (SW)	0	-	437424 538692
	Non Coal Mining Areas of Great Britain No Hazard				

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Potential for Collapsible Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13NE (SW)	0	1	437424 538692
	Potential for Compressible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13NE (SW)	0	1	437424 538692
	Potential for Ground Dissolution Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13NE (SW)	0	1	437424 538692
	Potential for Landslide Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13NE (SW)	0	1	437424 538692
	Potential for Running Sand Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13NE (SW)	0	1	437424 538692
	Potential for Running Sand Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13NW (NW)	160	1	437156 538844
	Potential for Running Sand Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13NW (NW)	243	1	437271 539003
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13NE (SW)	0	1	437424 538692
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13NW (NW)	160	1	437156 538844
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13NW (NW)	243	1	437271 539003
	Radon Potential - Radon Affected Areas Affected Area: The property is in a Lower probability radon area (less than 1% of homes are estimated to be at or above the Action Level). Source: British Geological Survey, National Geoscience Information Service	A13NE (SW)	0	1	437424 538692
	Radon Potential - Radon Protection Measures Protection Measure: No radon protective measures are necessary in the construction of new dwellings or extensions Source: British Geological Survey, National Geoscience Information Service	A13NE (SW)	0	1	437424 538692

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
66	**Contemporary Trade Directory Entries** Name: P G H Location: THE STABLE YARD, THE AVENUE, WHEATLEY HILL, DH6 3NT Classification: Road Haulage Services **Status: Active** Positional Accuracy: Automatically positioned to the address	A18SE (N)	267	-	437484 539088
66	**Contemporary Trade Directory Entries** Name: Wheatley Hill Dental Laboratory Location: 6, The Avenue, Wheatley Hill, Durham, DH6 3NT Classification: Medical & Dental Laboratories **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A18SE (N)	305	-	437458 539126
67	**Contemporary Trade Directory Entries** Name: Wheatley Hill Community Regeneration Partnership Location: Branch Library, The Knoll, 30, Granville Terrace, Wheatley Hill, Durham, County Durham, DH6 3JQ Classification: Laboratories **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A18SE (NE)	309	-	437636 539082
68	**Contemporary Trade Directory Entries** Name: Wheatley Hill Service Station Location: Durham Road, Wheatley Hill, DURHAM, DH6 3LJ Classification: Petrol Filling Stations **Status: Active** Positional Accuracy: Automatically positioned to the address	A9NW (SE)	370	-	437777 538311
69	**Contemporary Trade Directory Entries** Name: Granville Motors Location: Back Granville Terrace, Wheatley Hill, Durham, DH6 3JG Classification: Garage Services **Status: Active** Positional Accuracy: Automatically positioned to the address	A19SW (NE)	447	-	437784 539138
70	**Contemporary Trade Directory Entries** Name: Kenneth Johnson Location: 10, Front Street Industrial Estate, Front Street, Wheatley Hill, Durham, DH6 3QZ Classification: Garage Services **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A19SW (NE)	474	-	437752 539202
70	**Contemporary Trade Directory Entries** Name: M D L Autos Location: 8, Front Street Industrial Estate, Front Street, Wheatley Hill, Durham, DH6 3QZ Classification: Garage Services **Status: Inactive** Positional Accuracy: Automatically positioned in the proximity of the address	A19SW (NE)	507	-	437786 539217
70	**Contemporary Trade Directory Entries** Name: M B Ltd Location: 6, Front Street Industrial Estate, Front Street, Wheatley Hill, Durham, DH6 3QZ Classification: Meat Product Manufacturers & Wholesalers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A19SW (NE)	510	-	437783 539223
70	**Contemporary Trade Directory Entries** Name: Auto Paint Services Location: 2, Front Street Industrial Estate, Front Street, Wheatley Hill, Durham, DH6 3QZ Classification: Car Body Repairs **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A19SW (NE)	531	-	437806 539232
70	**Contemporary Trade Directory Entries** Name: Graseph Foods Ltd Location: 1, Front Street Industrial Estate, Front Street, Wheatley Hill, Durham, DH6 3QZ Classification: Food Products - Manufacturers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A19SW (NE)	540	-	437814 539237
71	**Contemporary Trade Directory Entries** Name: Jackson Wholesale Meat Suppliers Ltd Location: Moor View, Wheatley Hill, Durham, DH6 3NQ Classification: Meat - Wholesale **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A19SW (NE)	504	-	437828 539175

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
72	**Contemporary Trade Directory Entries** Name: Tony Carr Location: The Old Forge, Front Street, Wheatley Hill, Durham, DH6 3PS Classification: Joinery Manufacturers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A19SW (NE)	681	-	437972 539281
73	**Contemporary Trade Directory Entries** Name: Shred Direct Ltd Location: 26, Weardale Park, Wheatley Hill, Durham, DH6 3QQ Classification: Recycling Services **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A19SE (NE)	856	-	438245 539211
73	**Contemporary Trade Directory Entries** Name: Shredderman Location: 26, Weardale Park, Wheatley Hill, Durham, DH6 3QQ Classification: Shredding Equipment & Services **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A19SE (NE)	856	-	438245 539211
74	**Contemporary Trade Directory Entries** Name: Northern Ceramics Location: 1, Watson Close, Wheatley Hill, Durham, County Durham, DH6 3QX Classification: Ceramic Manufacturers, Supplies & Services **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A19SE (NE)	871	-	438184 539325
75	**Fuel Station Entries** Name: Wheatley Hill Service Station Location: Durham Road , Wheatly Hill , Durham, County Durham, DH6 3LJ Brand: Jet Premises Type: Petrol Station **Status: Open** Positional Accuracy: Manually positioned to the address or location	A9NW (SE)	370	-	437777 538311

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
76	**Ancient Woodland** Name: Long Wood Reference: 1101640 Area(m²): 32749.85 Type: Ancient and Semi-Natural Woodland	A6NE (W)	995	9	436371 538324
77	**Local Nature Reserves** Name: Gore Burn Multiple Area: N Area (m2): 411084.78 Source: Natural England Designation Date: Not Supplied	A18SE (N)	340	9	437472 539161
78	**Local Nature Reserves** Name: Wingate Quarry Multiple Area: N Area (m2): 266178.6 Source: Natural England Designation Date: 1st January 1980	A8SW (S)	861	9	437196 537736
79	**Nitrate Vulnerable Zones** Name: Durham Description: Groundwater Source: Environment Agency, Head Office	A13SW (SW)	0	4	437400 538650
80	**Nitrate Vulnerable Zones** Name: Croxdale Beck From Source To Wear Nvz Description: Surface Water Source: Environment Agency, Head Office	A13SW (SW)	0	4	437400 538650
81	**Nitrate Vulnerable Zones** Name: Skerne Nvz Description: Surface Water Source: Environment Agency, Head Office	A8SW (S)	829	4	437271 537750
82	**Sites of Special Scientific Interest** Name: Wingate Quarry Multiple Areas: N Total Area (m2): 231254.99 Source: Natural England Reference: 1002959 Designation Details: Local Nature Reserve Designation Date: 14th June 1993 Date Type: Notified Designation Details: Site Of Special Scientific Interest Designation Date: 14th June 1993 Date Type: Notified	A8SW (S)	861	9	437205 537734

Agency & Hydrological	Version	Update Cycle
Contaminated Land Register Entries and Notices		
Sedgefield Borough Council (now part of Durham County Council) - Environmental Health Department	February 2009	Not Applicable
Environment Agency - Head Office	June 2020	Annually
Durham City Council (now part of Durham County Council) - Environmental Health Department	November 2008	
Easington District Council (now part of Durham County Council) - Environmental Health Department	October 2008	
Durham County Council (Unitary) - Environmental Health Department	October 2017	Annually
Sunderland City Metropolitan Borough Council - Environmental Health Department	October 2017	Annually
Discharge Consents		
Environment Agency - North East Region	April 2023	Quarterly
Enforcement and Prohibition Notices		
Environment Agency - North East Region	March 2013	
Integrated Pollution Controls		
Environment Agency - North East Region	January 2009	
Integrated Pollution Prevention And Control		
Environment Agency - North East Region	January 2023	Quarterly
Local Authority Integrated Pollution Prevention And Control		
Durham County Council (Unitary) - Environmental Health Department	April 2015	Variable
Sedgefield Borough Council (now part of Durham County Council) - Environmental Health Department	July 2008	Not Applicable
Durham City Council (now part of Durham County Council) - Environmental Health Department	March 2009	Not Applicable
Sunderland City Metropolitan Borough Council - Environmental Health Department	May 2016	Variable
Easington District Council (now part of Durham County Council) - Environmental Health Department	October 2008	Not Applicable
Local Authority Pollution Prevention and Controls		
Durham County Council (Unitary) - Environmental Health Department	April 2015	Annually
Sedgefield Borough Council (now part of Durham County Council) - Environmental Health Department	July 2008	Not Applicable
Durham City Council (now part of Durham County Council) - Environmental Health Department	March 2009	Not Applicable
Sunderland City Metropolitan Borough Council - Environmental Health Department	May 2016	Annual Rolling Update
Easington District Council (now part of Durham County Council) - Environmental Health Department	October 2008	Not Applicable
Local Authority Pollution Prevention and Control Enforcements		
Durham County Council (Unitary) - Environmental Health Department	April 2015	Variable
Sedgefield Borough Council (now part of Durham County Council) - Environmental Health Department	July 2008	Not Applicable
Durham City Council (now part of Durham County Council) - Environmental Health Department	March 2009	Not Applicable
Sunderland City Metropolitan Borough Council - Environmental Health Department	May 2016	Variable
Easington District Council (now part of Durham County Council) - Environmental Health Department	October 2008	Not Applicable
Nearest Surface Water Feature		
Ordnance Survey	April 2023	
Pollution Incidents to Controlled Waters		
Environment Agency - North East Region	December 1998	
Prosecutions Relating to Authorised Processes		
Environment Agency - North East Region	July 2015	
Prosecutions Relating to Controlled Waters		
Environment Agency - North East Region	March 2013	
Registered Radioactive Substances		
Environment Agency - North East Region	June 2016	As notified

Agency & Hydrological	Version	Update Cycle
River Quality Environment Agency - Head Office	November 2001	Not Applicable
River Quality Biology Sampling Points Environment Agency - Head Office	April 2012	
River Quality Chemistry Sampling Points Environment Agency - Head Office	April 2012	
Substantiated Pollution Incident Register Environment Agency - North East Region - Dales Area Environment Agency - North East Region - North East Area Environment Agency - North East Region - Northumbria Area	 April 2023 April 2023 April 2023	 Quarterly Quarterly Quarterly
Water Abstractions Environment Agency - North East Region	April 2023	Quarterly
Water Industry Act Referrals Environment Agency - North East Region	October 2017	
Groundwater Vulnerability Map Environment Agency - Head Office	June 2018	As notified
Groundwater Vulnerability - Soluble Rock Risk Environment Agency - Head Office	June 2018	As notified
Bedrock Aquifer Designations Environment Agency - Head Office	January 2018	Annually
Superficial Aquifer Designations Environment Agency - Head Office	January 2018	Annually
Source Protection Zones Environment Agency - Head Office	September 2022	Bi-Annually
Extreme Flooding from Rivers or Sea without Defences Environment Agency - Head Office	February 2023	Quarterly
Flooding from Rivers or Sea without Defences Environment Agency - Head Office	February 2023	Quarterly
Areas Benefiting from Flood Defences Environment Agency - Head Office	February 2023	Quarterly
Flood Water Storage Areas Environment Agency - Head Office	February 2023	Quarterly
Flood Defences Environment Agency - Head Office	August 2022	Quarterly
OS Water Network Lines Ordnance Survey	April 2023	Quarterly
BGS Groundwater Flooding Susceptibility British Geological Survey - National Geoscience Information Service	May 2013	As notified

Waste	Version	Update Cycle
BGS Recorded Landfill Sites		
British Geological Survey - National Geoscience Information Service	November 2002	As notified
Historical Landfill Sites		
Environment Agency - Head Office	March 2023	Quarterly
Integrated Pollution Control Registered Waste Sites		
Environment Agency - North East Region	January 2009	Not Applicable
Licensed Waste Management Facilities (Landfill Boundaries)		
Environment Agency - North East Region - Dales Area	January 2023	Quarterly
Environment Agency - North East Region - North East Area	January 2023	Quarterly
Environment Agency - North East Region - Northumbria Area	January 2023	Quarterly
Licensed Waste Management Facilities (Locations)		
Environment Agency - North East Region - Dales Area	January 2023	Quarterly
Environment Agency - North East Region - North East Area	January 2023	Quarterly
Environment Agency - North East Region - Northumbria Area	January 2023	Quarterly
Local Authority Landfill Coverage		
Durham City Council (now part of Durham County Council)	February 2003	Not Applicable
Durham County Council - Economic Development and Planning Department	February 2003	Not Applicable
Easington District Council (now part of Durham County Council) - Environmental Health Department	February 2003	Not Applicable
Sedgefield Borough Council (now part of Durham County Council) - Environmental Health Department	February 2003	Not Applicable
Sunderland City Metropolitan Borough Council - Environmental Health Department	February 2003	Not Applicable
Local Authority Recorded Landfill Sites		
Durham City Council (now part of Durham County Council)	October 2018	
Durham County Council - Economic Development and Planning Department	October 2018	
Easington District Council (now part of Durham County Council) - Environmental Health Department	October 2018	
Sedgefield Borough Council (now part of Durham County Council) - Environmental Health Department	October 2018	
Sunderland City Metropolitan Borough Council - Environmental Health Department	October 2018	
Registered Landfill Sites		
Environment Agency - North East Region - Dales Area	March 2006	Not Applicable
Environment Agency - North East Region - North East Area	March 2006	Not Applicable
Environment Agency - North East Region - Northumbria Area	March 2006	Not Applicable
Registered Waste Transfer Sites		
Environment Agency - North East Region - Dales Area	April 2018	
Environment Agency - North East Region - North East Area	April 2018	
Environment Agency - North East Region - Northumbria Area	April 2018	
Registered Waste Treatment or Disposal Sites		
Environment Agency - North East Region - Dales Area	June 2015	
Environment Agency - North East Region - North East Area	June 2015	
Environment Agency - North East Region - Northumbria Area	June 2015	

Hazardous Substances	Version	Update Cycle
Control of Major Accident Hazards Sites (COMAH)		
Health and Safety Executive	March 2023	Bi-Annually
Explosive Sites		
Health and Safety Executive	March 2017	
Notification of Installations Handling Hazardous Substances (NIHHS)		
Health and Safety Executive	August 2001	
Planning Hazardous Substance Enforcements		
Durham City Council (now part of Durham County Council)	December 2008	Not Applicable
Sedgefield Borough Council (now part of Durham County Council) - Development Control	December 2008	Not Applicable
Durham County Council (Unitary) - Planning Department	February 2016	Variable
Sunderland City Metropolitan Borough Council - Planning	February 2016	Variable
Durham County Council - Economic Development and Planning Department	July 2007	Annual Rolling Update
Easington District Council (now part of Durham County Council)	July 2008	Not Applicable
Planning Hazardous Substance Consents		
Durham City Council (now part of Durham County Council)	December 2008	Not Applicable
Sedgefield Borough Council (now part of Durham County Council) - Development Control	December 2008	Not Applicable
Durham County Council (Unitary) - Planning Department	February 2016	Variable
Sunderland City Metropolitan Borough Council - Planning	February 2016	Variable
Durham County Council - Economic Development and Planning Department	July 2007	Annual Rolling Update
Easington District Council (now part of Durham County Council)	July 2008	Not Applicable

Geological	Version	Update Cycle
BGS 1:625,000 Solid Geology		
British Geological Survey - National Geoscience Information Service	January 2009	As notified
BGS Recorded Mineral Sites		
British Geological Survey - National Geoscience Information Service	November 2022	Bi-Annually
CBSCB Compensation District		
Cheshire Brine Subsidence Compensation Board (CBSCB)	August 2011	
Cheshire Brine Subsidence Compensation Board (CBSCB)	November 2020	As notified
Coal Mining Affected Areas		
The Coal Authority - Property Searches	February 2023	Annual Rolling Update
Mining Instability		
Ove Arup & Partners	June 1998	Not Applicable
Non Coal Mining Areas of Great Britain		
British Geological Survey - National Geoscience Information Service	May 2015	Not Applicable
Potential for Collapsible Ground Stability Hazards		
British Geological Survey - National Geoscience Information Service	April 2020	As notified
Potential for Compressible Ground Stability Hazards		
British Geological Survey - National Geoscience Information Service	January 2019	As notified
Potential for Ground Dissolution Stability Hazards		
British Geological Survey - National Geoscience Information Service	January 2019	As notified
Potential for Landslide Ground Stability Hazards		
British Geological Survey - National Geoscience Information Service	January 2019	As notified
Potential for Running Sand Ground Stability Hazards		
British Geological Survey - National Geoscience Information Service	January 2019	As notified
Potential for Shrinking or Swelling Clay Ground Stability Hazards		
British Geological Survey - National Geoscience Information Service	January 2019	As notified
Radon Potential - Radon Affected Areas		
British Geological Survey - National Geoscience Information Service	September 2022	Annually
Radon Potential - Radon Protection Measures		
British Geological Survey - National Geoscience Information Service	September 2022	Annually

Industrial Land Use	Version	Update Cycle
Contemporary Trade Directory Entries		
Thomson Directories	April 2023	Quarterly
Fuel Station Entries		
Catalist Ltd - Experian	June 2023	Quarterly
Gas Pipelines		
National Grid	October 2021	Bi-Annually
Underground Electrical Cables		
National Grid	February 2023	Bi-Annually
Sensitive Land Use	**Version**	**Update Cycle**
Ancient Woodland		
Natural England	April 2023	Bi-Annually
Areas of Adopted Green Belt		
Durham City Council (now part of Durham County Council)	July 2022	Quarterly
Durham County Council (Unitary) - Planning Department	July 2022	Quarterly
Easington District Council (now part of Durham County Council)	July 2022	Quarterly
Sedgefield Borough Council (now part of Durham County Council) - Development Control	July 2022	Quarterly
Sunderland City Metropolitan Borough Council - Planning	July 2022	Quarterly
Areas of Unadopted Green Belt		
Durham City Council (now part of Durham County Council)	July 2022	Quarterly
Durham County Council (Unitary) - Planning Department	July 2022	Quarterly
Easington District Council (now part of Durham County Council)	July 2022	Quarterly
Sedgefield Borough Council (now part of Durham County Council) - Development Control	July 2022	Quarterly
Sunderland City Metropolitan Borough Council - Planning	July 2022	Quarterly
Areas of Outstanding Natural Beauty		
Natural England	April 2023	Bi-Annually
Environmentally Sensitive Areas		
Natural England	January 2017	
Forest Parks		
Forestry Commission	May 2023	Not Applicable
Local Nature Reserves		
Natural England	March 2023	Bi-Annually
Marine Nature Reserves		
Natural England	April 2023	Bi-Annually
National Nature Reserves		
Natural England	February 2023	Bi-Annually
National Parks		
Natural England	February 2018	Bi-Annually
Nitrate Sensitive Areas		
Natural England	April 2023	Not Applicable
Nitrate Vulnerable Zones		
Department for Environment, Food and Rural Affairs (DEFRA - formerly FRCA)	April 2016	
Environment Agency - Head Office	March 2023	Bi-Annually
Ramsar Sites		
Natural England	March 2023	Bi-Annually
Sites of Special Scientific Interest		
Natural England	March 2023	Bi-Annually
Special Areas of Conservation		
Natural England	April 2023	Bi-Annually
Special Protection Areas		
Natural England	April 2023	Bi-Annually

Data Suppliers

A selection of organisations who provide data within this report

Data Supplier	Data Supplier Logo
Ordnance Survey	
Environment Agency	
Scottish Environment Protection Agency	
The Coal Authority	
British Geological Survey	
Centre for Ecology and Hydrology	
Natural Resources Wales	
Scottish Natural Heritage	
Natural England	
Public Health England	
Ove Arup	
Stantec UK Ltd	

Useful Contacts

Contact	Name and Address	Contact Details
1	**British Geological Survey - Enquiry Service** British Geological Survey, Environmental Science Centre, Keyworth, Nottingham, Nottinghamshire, NG12 5GG	Telephone: 0115 936 3143 Fax: 0115 936 3276 Email: enquiries@bgs.ac.uk Website: www.bgs.ac.uk
2	**Environment Agency - National Customer Contact Centre (NCCC)** PO Box 544, Templeborough, Rotherham, S60 1BY	Telephone: 03708 506 506 Email: enquiries@environment-agency.gov.uk
3	**Durham County Council (Unitary) - Environmental Health Department** Civic Centre, Medomsley Road, Consett, Durham, DH8 5JA	Telephone: 0300 123 7070 Website: www.durham.gov.uk
4	**Environment Agency - Head Office** Rio House, Waterside Drive, Aztec West, Almondsbury, Bristol, Avon, BS32 4UD	Telephone: 01454 624400 Fax: 01454 624409
5	**Ordnance Survey** Adanac Drive, Southampton, Hampshire, SO16 0AS	Telephone: 03456 05 05 05 Email: customerservices@ordnancesurvey.co.uk Website: www.ordnancesurvey.gov.uk
6	**Easington District Council (now part of Durham County Council) - Environmental Health Department** County Hall, Durham, County Durham, DH1 5UL	Telephone: 03000 26 0000 Website: www.durham.gov.uk
7	**Durham County Council - Economic Development and Planning Department** County Hall, Durham, County Durham, DH1 5UL	Telephone: 0191 383 4751 Fax: 0191 383 3657 Website: www.durham.gov.uk
8	**The Coal Authority - Property Searches** 200 Lichfield Lane, Mansfield, Nottinghamshire, NG18 4RG	Telephone: 0345 762 6848 Fax: 01623 637 338 Email: groundstability@coal.gov.uk Website: www2.groundstability.com
9	**Natural England** County Hall, Spetchley Road, Worcester, WR5 2NP	Telephone: 0300 060 3900 Email: enquiries@naturalengland.org.uk Website: www.naturalengland.org.uk
-	**Public Health England - Radon Survey, Centre for Radiation, Chemical and Environmental Hazards** Chilton, Didcot, Oxfordshire, OX11 0RQ	Telephone: 01235 822622 Fax: 01235 833891 Email: radon@phe.gov.uk Website: www.ukradon.org
-	**Landmark Information Group Limited** Imperium, Imperial Way, Reading, Berkshire, RG2 0TD	Telephone: 0844 844 9952 Fax: 0844 844 9951 Email: customerservices@landmarkinfo.co.uk Website: www.landmarkinfo.co.uk

Please note that the Environment Agency / Natural Resources Wales / SEPA have a charging policy in place for enquiries.

Historical Mapping Legends

Ordnance Survey County Series 1:10,560

Gravel Pit
Sand Pit
Other Pits
Quarry
Shingle
Orchard
Osiers
Reeds
Marsh
Mixed Wood
Deciduous
Brushwood
Fir
Furze
Rough Pasture
Arrow denotes flow of water
Trigonometrical Station
Site of Antiquities
Bench Mark
Pump, Guide Post, Signal Post
Well, Spring, Boundary Post
·285 Surface Level
Sketched Contour
Instrumental Contour
Main Roads
Fenced
Un-Fenced
Minor Roads
Fenced
Un-Fenced
Sunken Road
Raised Road
Road over Railway
Railway over River
Railway over Road
Level Crossing
Road over River or Canal
Road over Stream
Road over Stream
County Boundary (Geographical)
County & Civil Parish Boundary
Administrative County & Civil Parish Boundary
Co. Boro. Bdy.
County Borough Boundary (England)
Co. Burgh Bdy.
County Burgh Boundary (Scotland)
R.D. Bdy.
Rural District Boundary
Civil Parish Boundary

Ordnance Survey Plan 1:10,000

Chalk Pit, Clay Pit or Quarry
Gravel Pit
Sand Pit
Disused Pit or Quarry
Refuse or Slag Heap
Lake, Loch or Pond
Dunes
Boulders
Coniferous Trees
Non-Coniferous Trees
Orchard
Scrub
Coppice
Bracken
Heath
Rough Grassland
Marsh
Reeds
Saltings
Building
Direction of Flow of Water
Shingle
Sand
Glasshouse
Pylon
Sloping Masonry
Pylon
Electricity Transmission Line
Pole
Cutting
Embankment
Standard Gauge Multiple Track
Standard Gauge Single Track
Road Under
Road Over
Level Crossing
Foot Bridge
Siding, Tramway or Mineral Line
Narrow Gauge
Geographical County
Administrative County, County Borough or County of City
Municipal Borough, Urban or Rural District, Burgh or District Council
Borough, Burgh or County Constituency
Shown only when not coincident with other boundaries
Civil Parish
Shown alternately when coincidence of boundaries occurs

BP, BS	Boundary Post or Stone	Pol Sta	Police Station
Ch	Church	PO	Post Office
CH	Club House	PC	Public Convenience
F E Sta	Fire Engine Station	PH	Public House
FB	Foot Bridge	SB	Signal Box
Fn	Fountain	Spr	Spring
GP	Guide Post	TCB	Telephone Call Box
MP	Mile Post	TCP	Telephone Call Post
MS	Mile Stone	W	Well

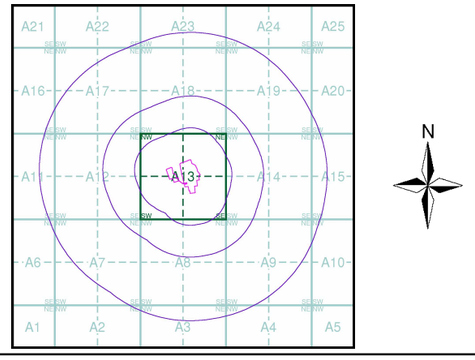
1:10,000 Raster Mapping

Gravel Pit
Refuse tip or slag heap
Rock
Rock (scattered)
Boulders
Boulders (scattered)
Shingle
Mud
Sand
Sand Pit
Slopes
Top of cliff
General detail
Underground detail
Overhead detail
Narrow gauge railway
Multi-track railway
Single track railway
County boundary (England only)
Civil, parish or community boundary
District, Unitary, Metropolitan, London Borough boundary
Constituency boundary
Area of wooded vegetation
Non-coniferous trees
Non-coniferous trees (scattered)
Coniferous trees
Coniferous trees (scattered)
Positioned tree
Orchard
Coppice or Osiers
Rough Grassland
Heath
Scrub
Marsh, Salt Marsh or Reeds
Water feature
Flow arrows
MHW(S) Mean high water (springs)
MLW(S) Mean low water (springs)
Telephone line (where shown)
Electricity transmission line (with poles)
BM 123.45 m Bench mark (where shown)
Triangulation station
Point feature (e.g. Guide Post or Mile Stone)
Pylon, flare stack or lighting tower
Site of (antiquity)
Glasshouse
General Building
Important Building

SiriUS

Historical Mapping & Photography included:

Historical Map - Slice A



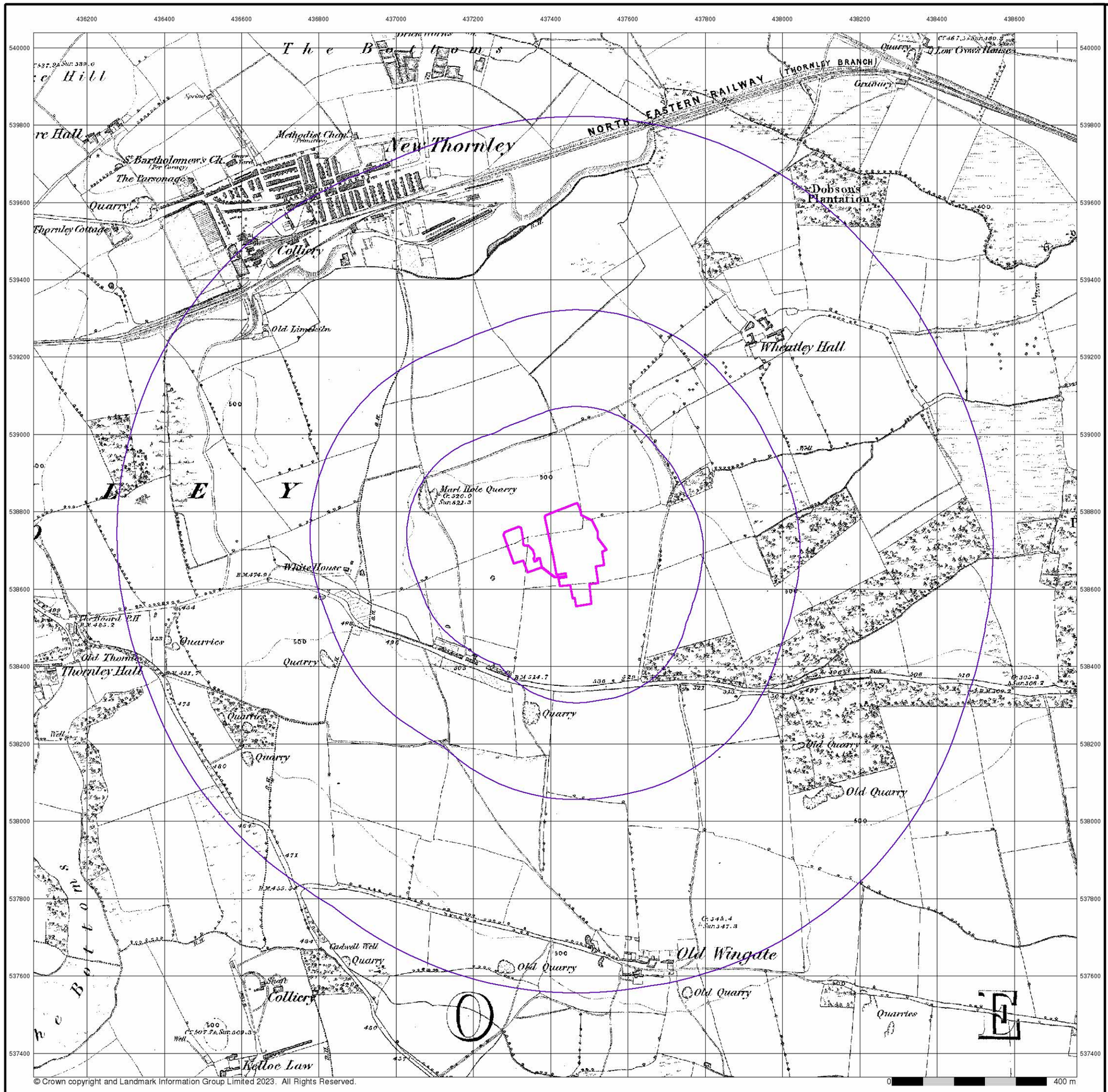
Order Details

Order Number: 312801561_1_1
Customer Ref: C9843 - Jack Lawson Terrace - JWM
National Grid Reference: 437420, 538690
Slice: A
Site Area (Ha): 3.08
Search Buffer (m): 1000

Site Details

Jack Lawson Terrace, WHEATLEY HILL, DH6 3RH

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



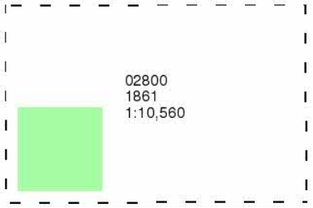
Durham

Published 1861

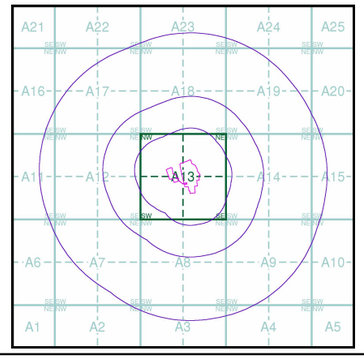
Source map scale - 1:10,560

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



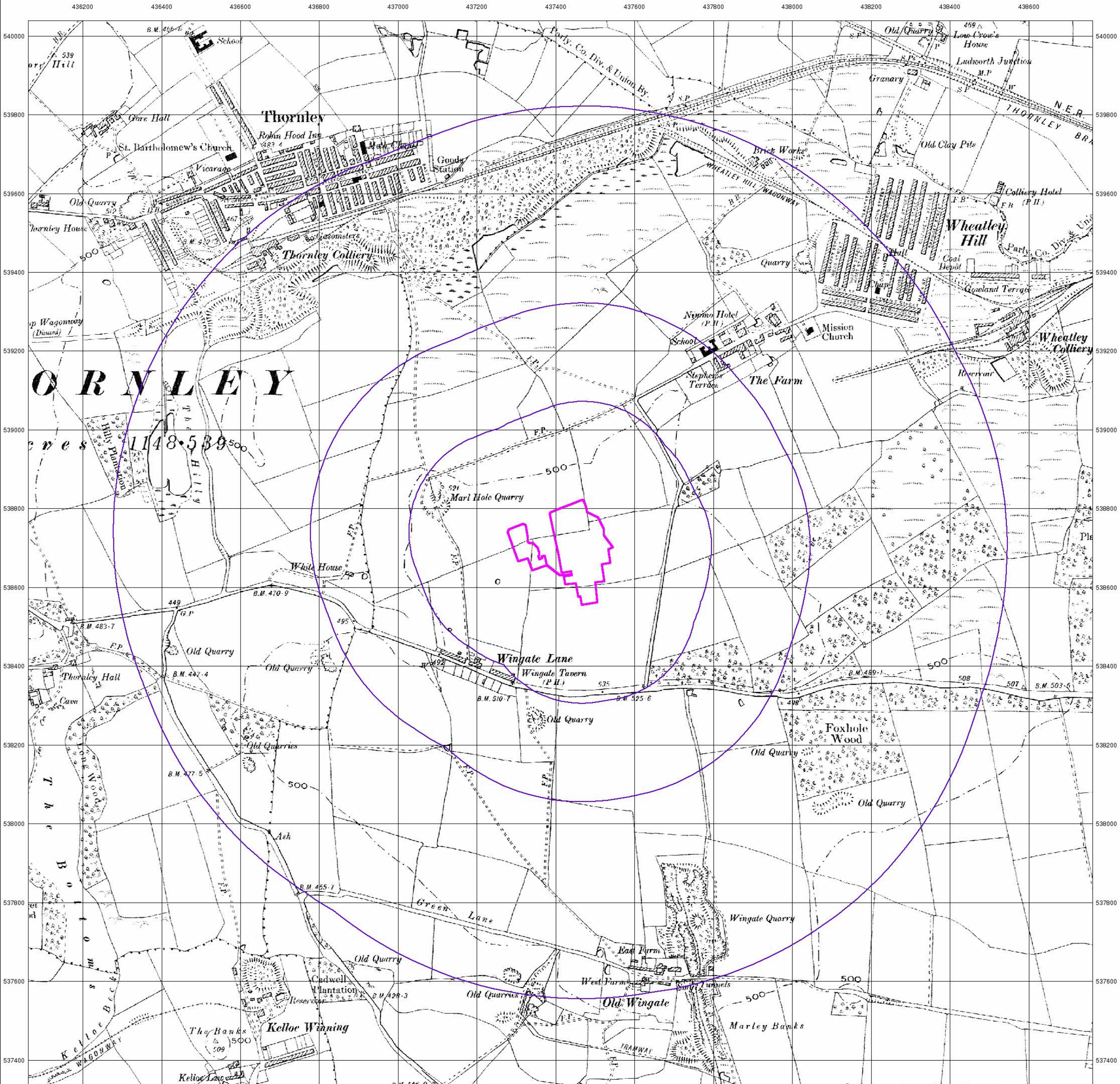
Order Details

Order Number:	312801561_1_1
Customer Ref:	C9843 - Jack Lawson Terrace - JWM
National Grid Reference:	437420, 538690
Slice:	A
Site Area (Ha):	3.08
Search Buffer (m):	1000

Site Details

Jack Lawson Terrace, WHEATLEY HILL, DH6 3RH

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



Durham

Published 1898

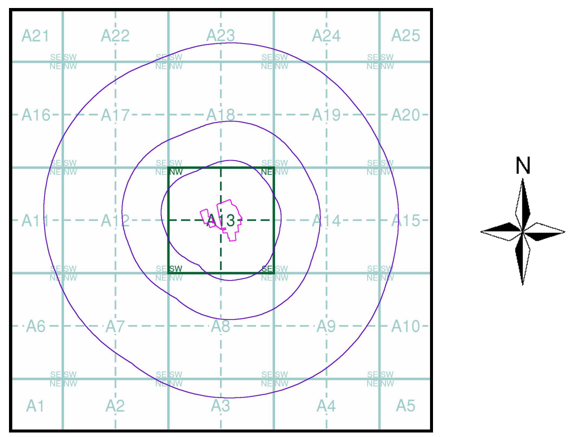
Source map scale - 1:10,560

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)

028SW
1898
1:10,560

Historical Map - Slice A



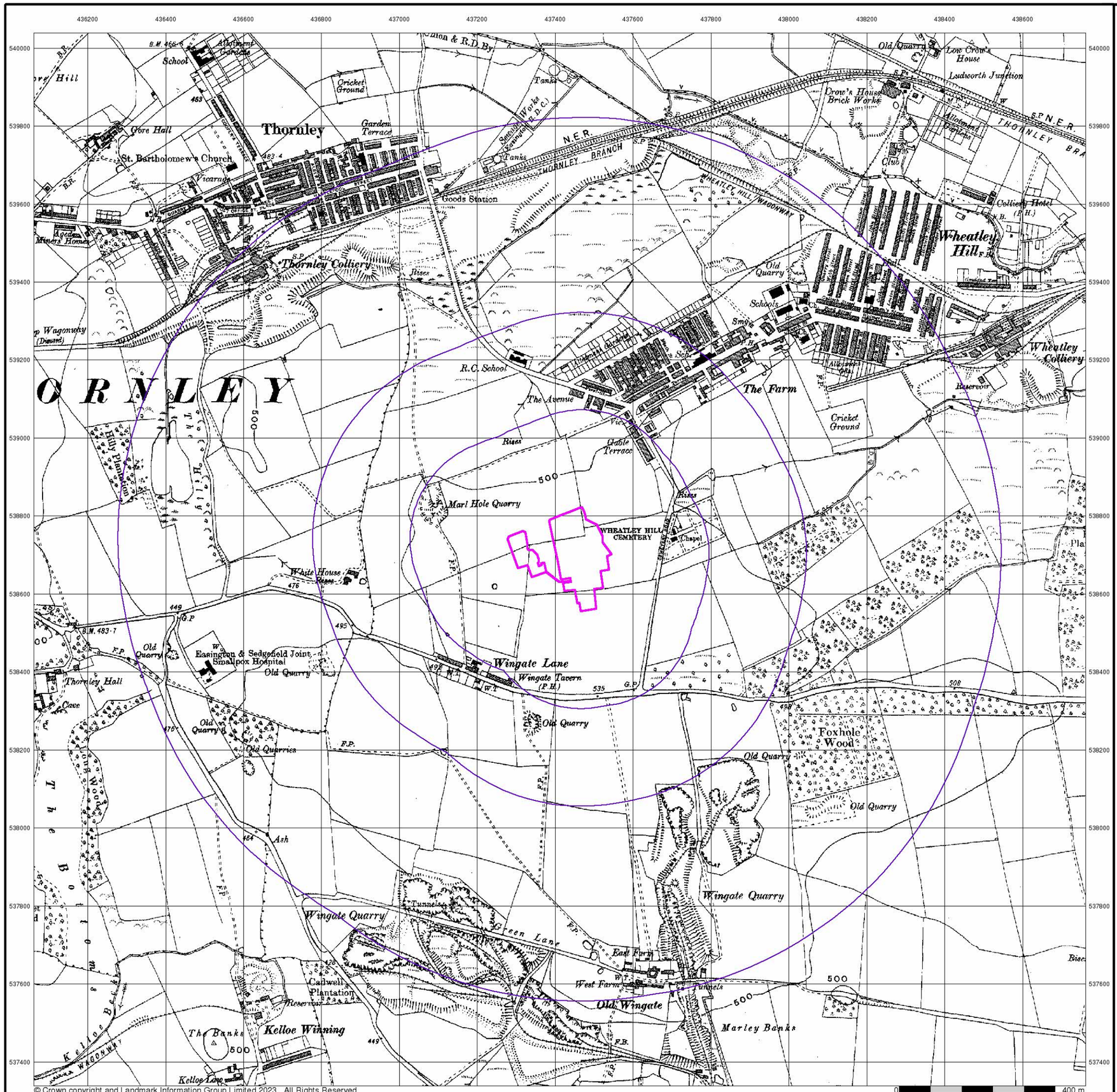
Order Details

Order Number: 312801561_1_1
Customer Ref: C9843 - Jack Lawson Terrace - JWM
National Grid Reference: 437420, 538690
Slice: A
Site Area (Ha): 3.08
Search Buffer (m): 1000

Site Details

Jack Lawson Terrace, WHEATLEY HILL, DH6 3RH

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



Durham

Published 1923

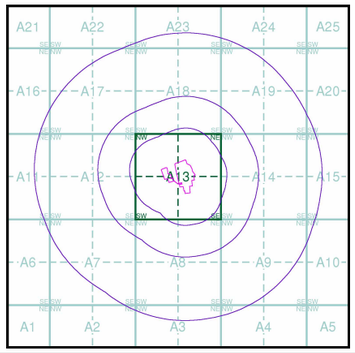
Source map scale - 1:10,560

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)

02800
1923
1:10,560

Historical Map - Slice A



Order Details

Order Number:	312801561_1_1
Customer Ref:	C9843 - Jack Lawson Terrace - JWM
National Grid Reference:	437420, 538690
Slice:	A
Site Area (Ha):	3.08
Search Buffer (m):	1000

Site Details

Jack Lawson Terrace, WHEATLEY HILL, DH6 3RH

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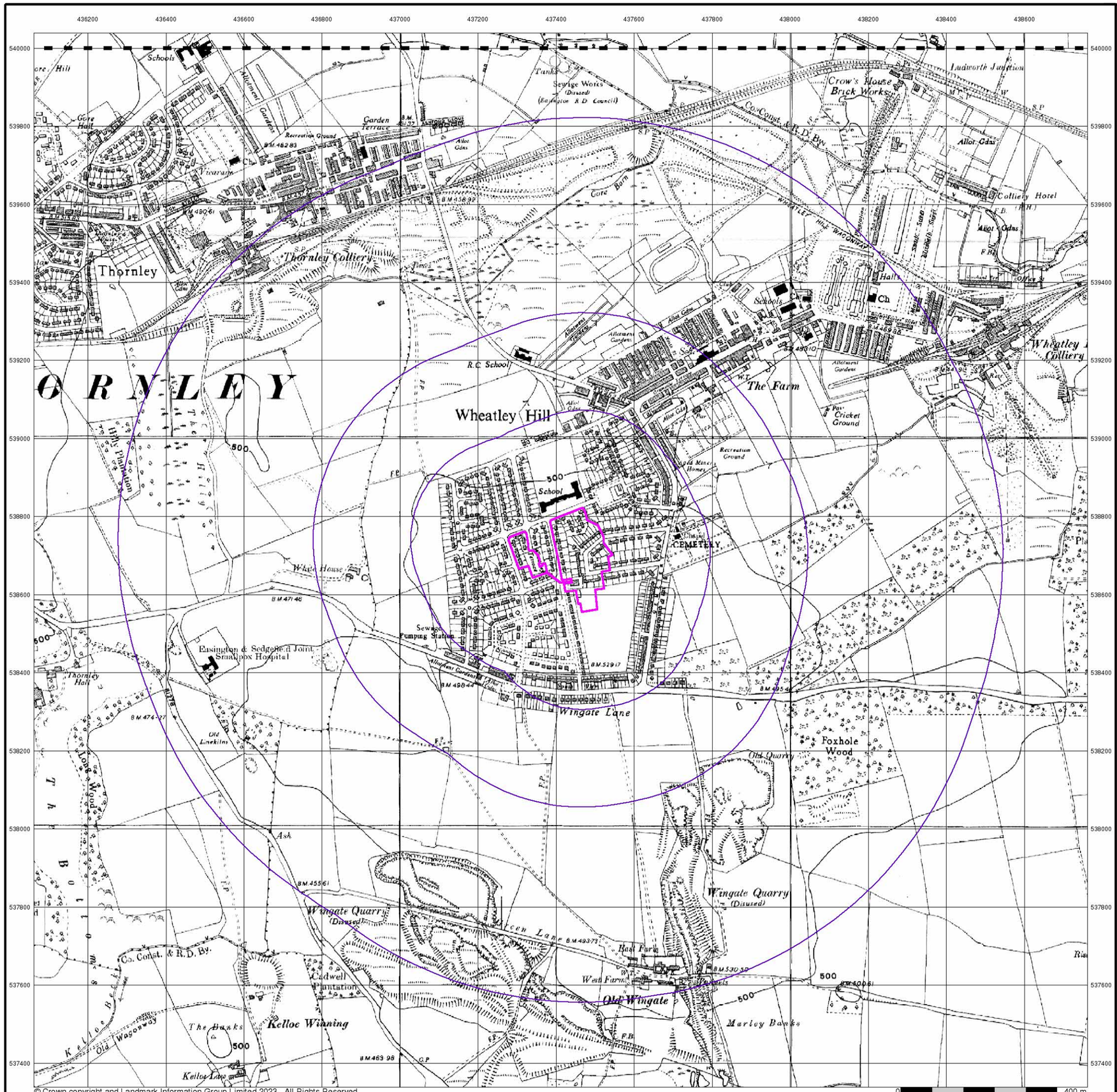


Ordnance Survey Plan

Published 1951 - 1952

Source map scale - 1:10,000

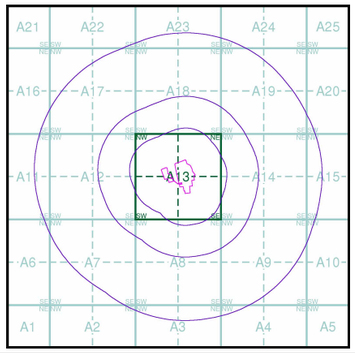
The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some 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)

NZ34SE
1952
1:10,560

NZ33NE
1951
1:10,560

Historical Map - Slice A



Order Details

Order Number:	312801561_1_1
Customer Ref:	C9843 - Jack Lawson Terrace - JWM
National Grid Reference:	437420, 538690
Slice:	A
Site Area (Ha):	3.08
Search Buffer (m):	1000

Site Details

Jack Lawson Terrace, WHEATLEY HILL, DH6 3RH

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

0 400 m

Ordnance Survey Plan

Published 1966 - 1967

Source map scale - 1:10,000

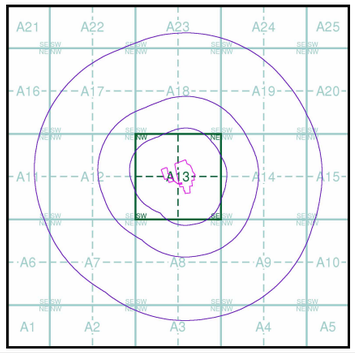
The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some 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)

NZ34SE
1967
1:10,560

NZ33NE
1966
1:10,560

Historical Map - Slice A



Order Details

Order Number:	312801561_1_1
Customer Ref:	C9843 - Jack Lawson Terrace - JWM
National Grid Reference:	437420, 538690
Slice:	A
Site Area (Ha):	3.08
Search Buffer (m):	1000

Site Details

Jack Lawson Terrace, WHEATLEY HILL, DH6 3RH

Landmark INFORMATION GROUP
Tel: 0844 844 9952
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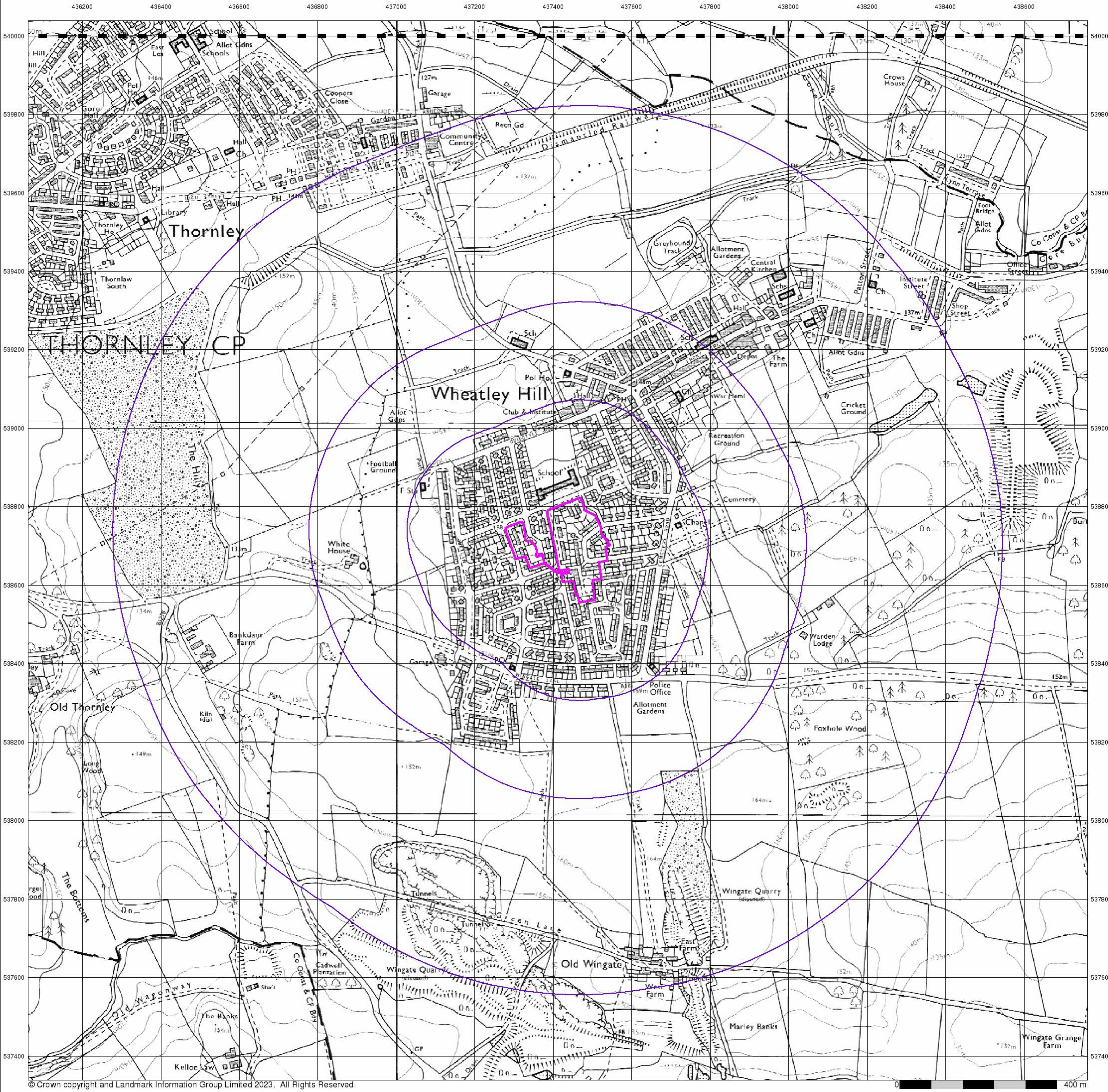


Ordnance Survey Plan

Published 1980 - 1988

Source map scale - 1:10,000

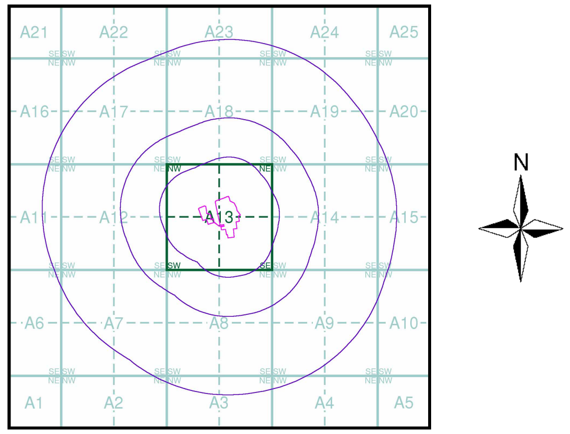
The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some 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)

NZ34SE
1988
1:10,000

NZ33NE
1980
1:10,000

Historical Map - Slice A



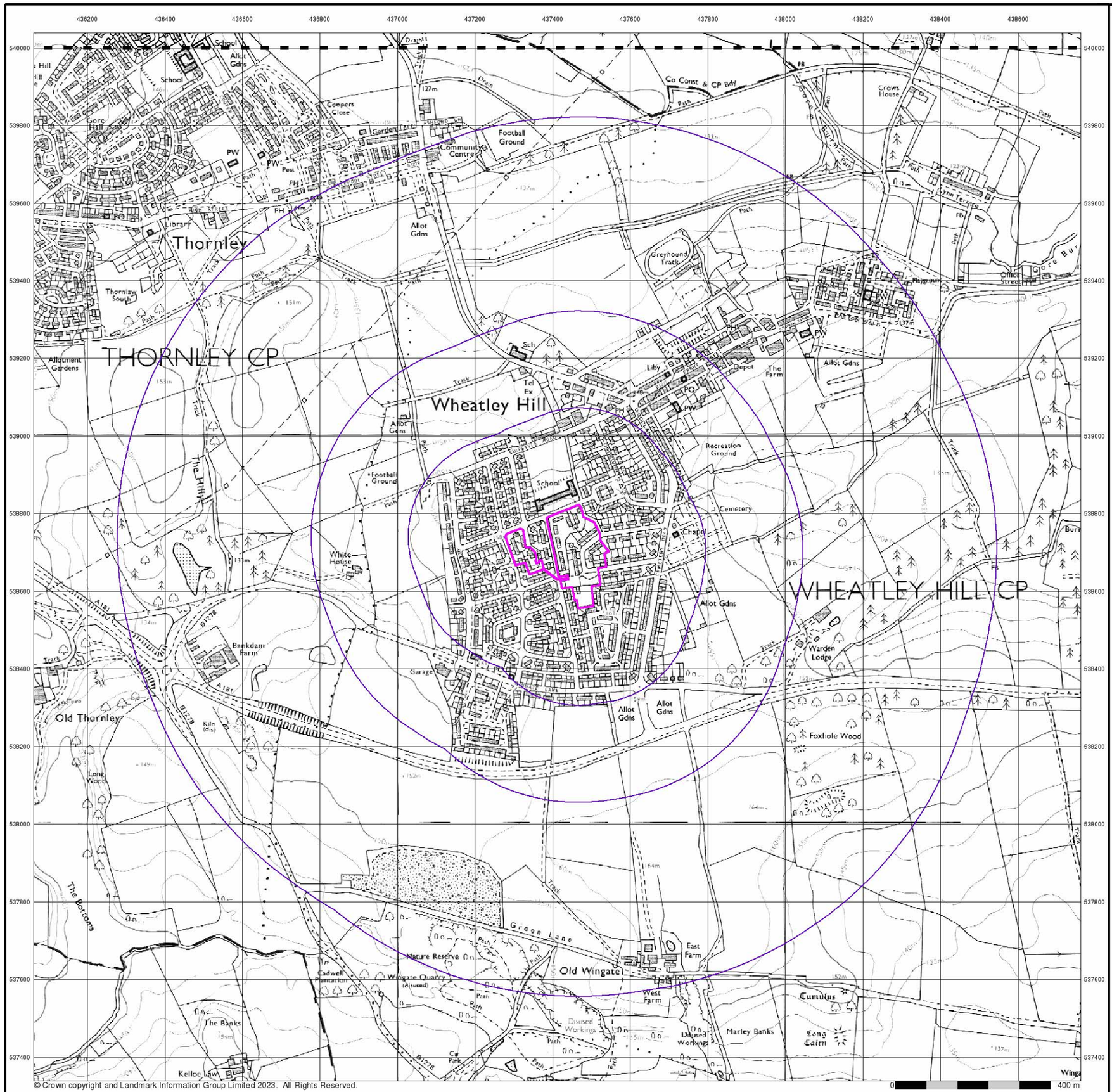
Order Details

Order Number: 312801561_1_1
Customer Ref: C9843 - Jack Lawson Terrace - JWM
National Grid Reference: 437420, 538690
Slice: A
Site Area (Ha): 3.08
Search Buffer (m): 1000

Site Details

Jack Lawson Terrace, WHEATLEY HILL, DH6 3RH

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



Ordnance Survey Plan

Published 1991 - 1993

Source map scale - 1:10,000

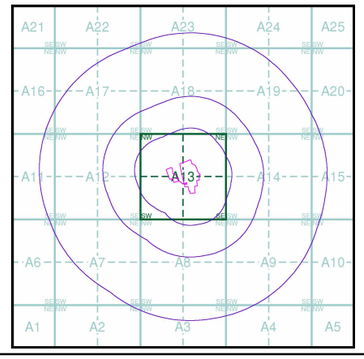
The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some 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)

NZ34SE
1991
1:10,000

NZ33NE
1993
1:10,000

Historical Map - Slice A



Order Details

Order Number:	312801561_1_1
Customer Ref:	C9843 - Jack Lawson Terrace - JWM
National Grid Reference:	437420, 538690
Slice:	A
Site Area (Ha):	3.08
Search Buffer (m):	1000

Site Details

Jack Lawson Terrace, WHEATLEY HILL, DH6 3RH

Landmark INFORMATION GROUP

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

10k Raster Mapping

Published 2000

Source map scale - 1:10,000

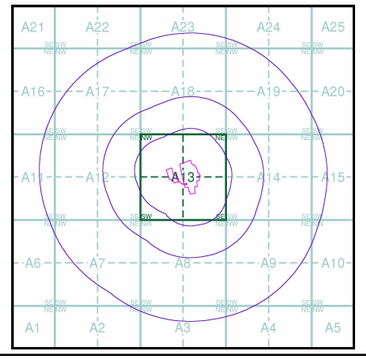
The historical maps shown were produced from the Ordnance Survey`s 1:10,000 colour raster mapping. These maps are derived from Landplan which replaced the old 1:10,000 maps originally published in 1970. The data is highly detailed showing buildings, fences and field boundaries as well as all roads, tracks and paths. Road names are also included together with the relevant road number and classification. Boundary information depiction includes county, unitary authority, district, civil parish and constituency.

Map Name(s) and Date(s)

NZ34SE
2000
1:10,000

NZ33NE
2000
1:10,000

Historical Map - Slice A



Order Details

Order Number:	312801561_1_1
Customer Ref:	C9843 - Jack Lawson Terrace - JWM
National Grid Reference:	437420, 538690
Slice:	A
Site Area (Ha):	3.08
Search Buffer (m):	1000

Site Details

Jack Lawson Terrace, WHEATLEY HILL, DH6 3RH

Landmark INFORMATION GROUP
Tel: 0844 844 9952
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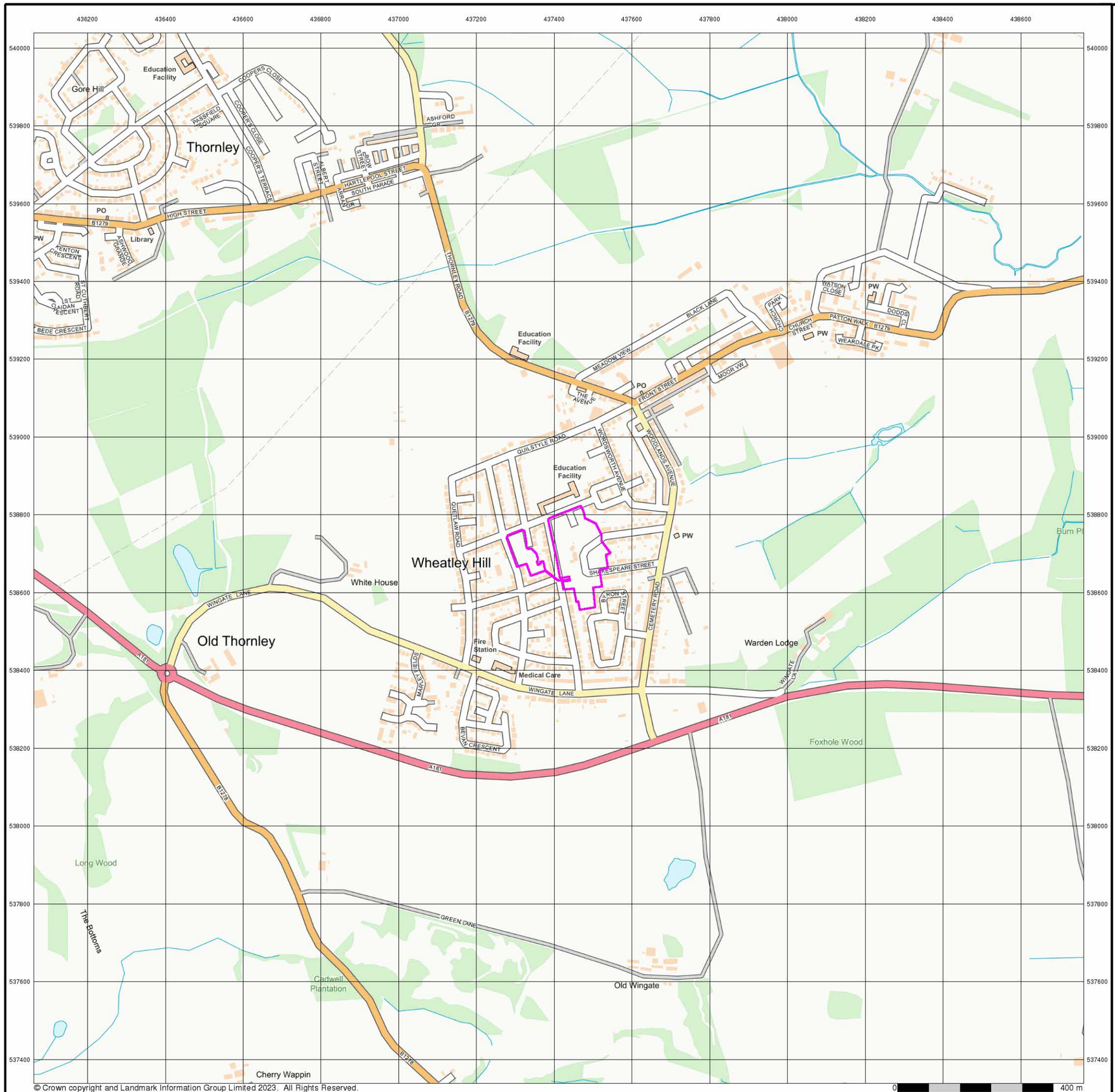


Street View

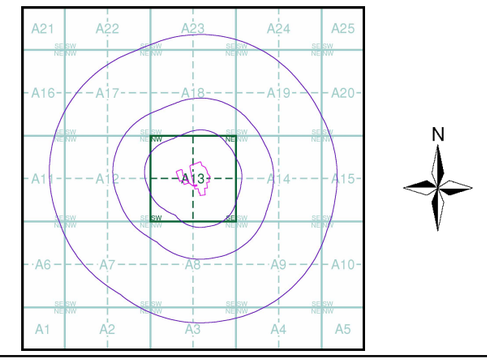
Published 2023

Source map scale - 1:10,000

Street View is a street-level map for the whole of Great Britain produced by the Ordnance Survey. These maps are provided at a nominal scale of 1:10,000

Map Name(s) and Date(s)

Street View Map - Slice A



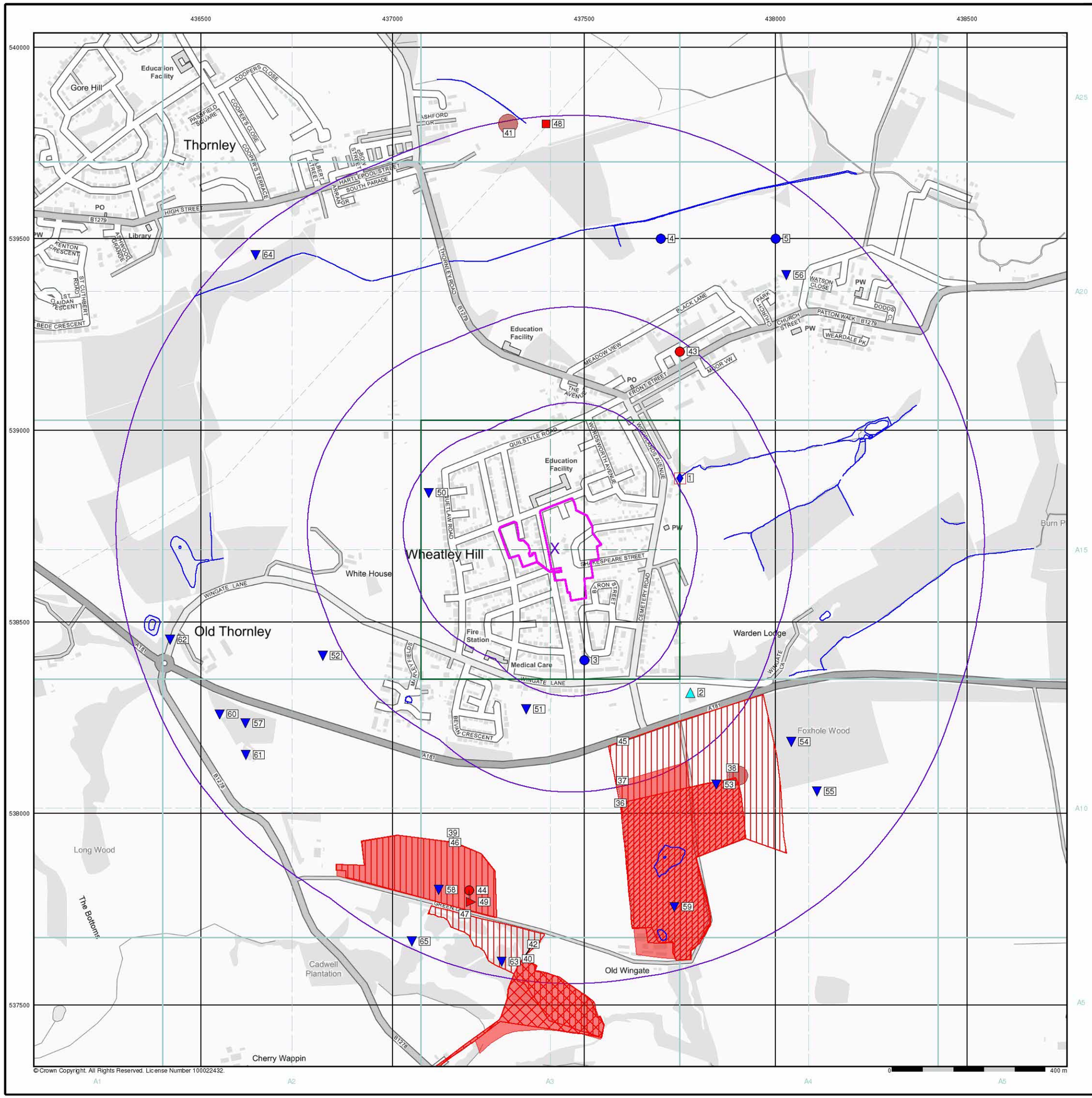
Order Details

Order Number:	312801561_1_1
Customer Ref:	C9843 - Jack Lawson Terrace - JWM
National Grid Reference:	437420, 538690
Slice:	A
Site Area (Ha):	3.08
Search Buffer (m):	1000

Site Details

Jack Lawson Terrace, WHEATLEY HILL, DH6 3RH

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



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

Geological

- BGS Recorded Mineral Site

Industrial Land Use

- Contemporary Trade Directory Entry
- Fuel Station Entry

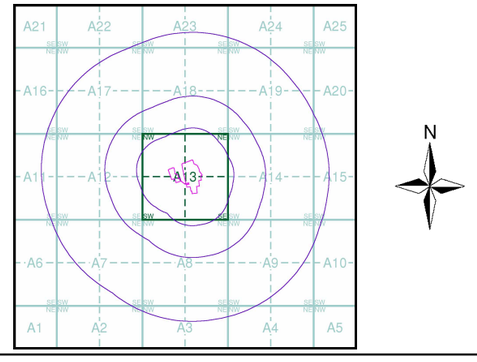
Waste

- 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
- 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

Hazardous Substances

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

Site Sensitivity Map - Slice A



Order Details

Order Number:	312801561_1_1
Customer Ref:	C9843 - Jack Lawson Terrace - JWM
National Grid Reference:	437420, 538690
Slice:	A
Site Area (Ha):	3.08
Search Buffer (m):	1000

Site Details

Jack Lawson Terrace, WHEATLEY HILL, DH6 3RH

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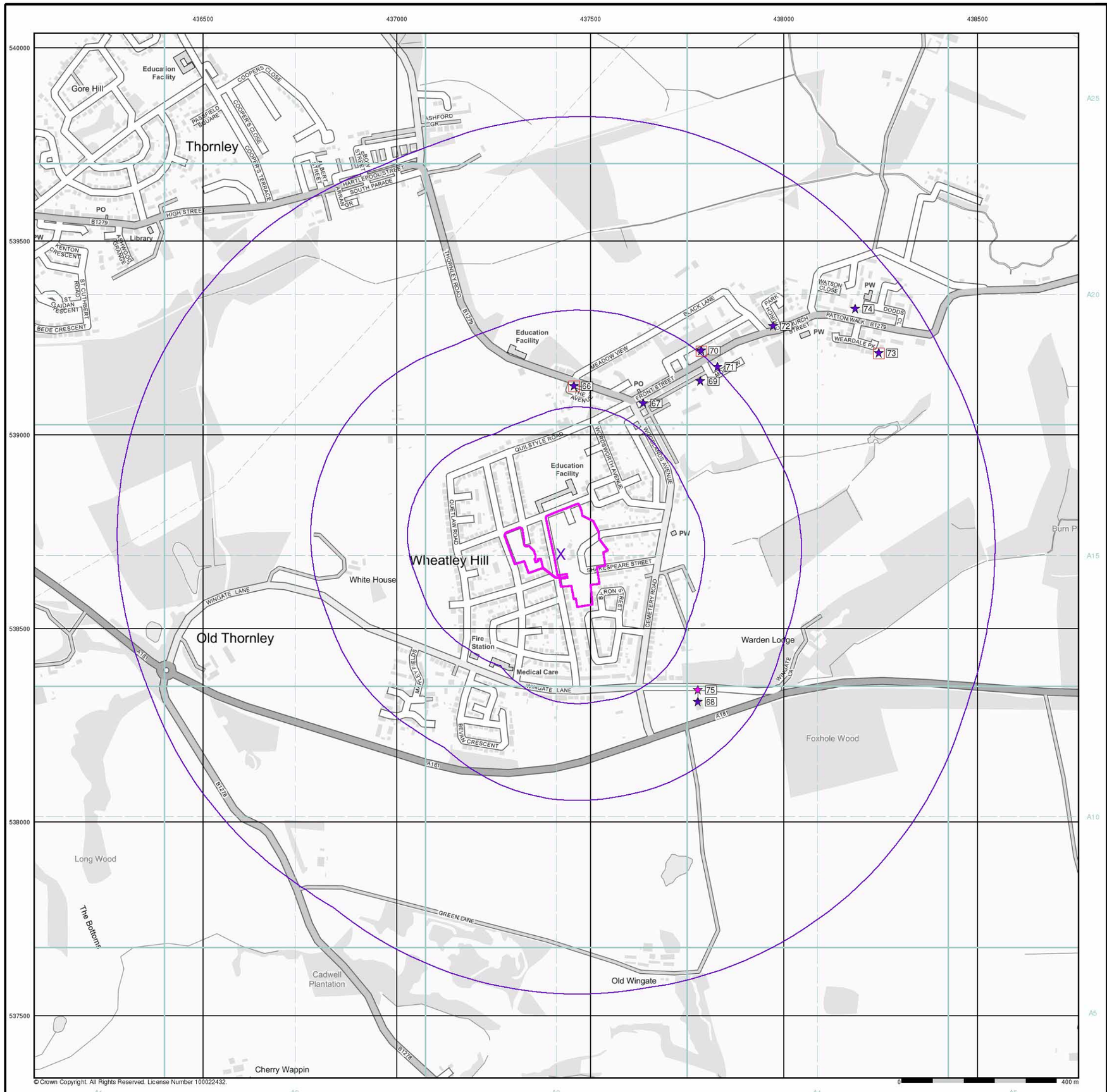


Industrial Land Use Map

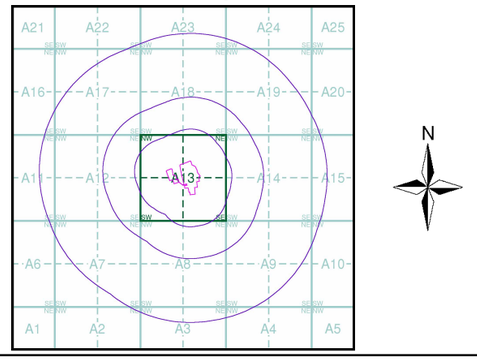
General

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

Industrial Land Use

Contemporary Trade Directory Entry
Fuel Station Entry
Gas Pipeline
Underground Electrical Cables

Industrial Land Use Map - Slice A



Order Details

Order Number:	312801561_1_1
Customer Ref:	C9843 - Jack Lawson Terrace - JWM
National Grid Reference:	437420, 538690
Slice:	A
Site Area (Ha):	3.08
Search Buffer (m):	1000

Site Details

Jack Lawson Terrace, WHEATLEY HILL, DH6 3RH

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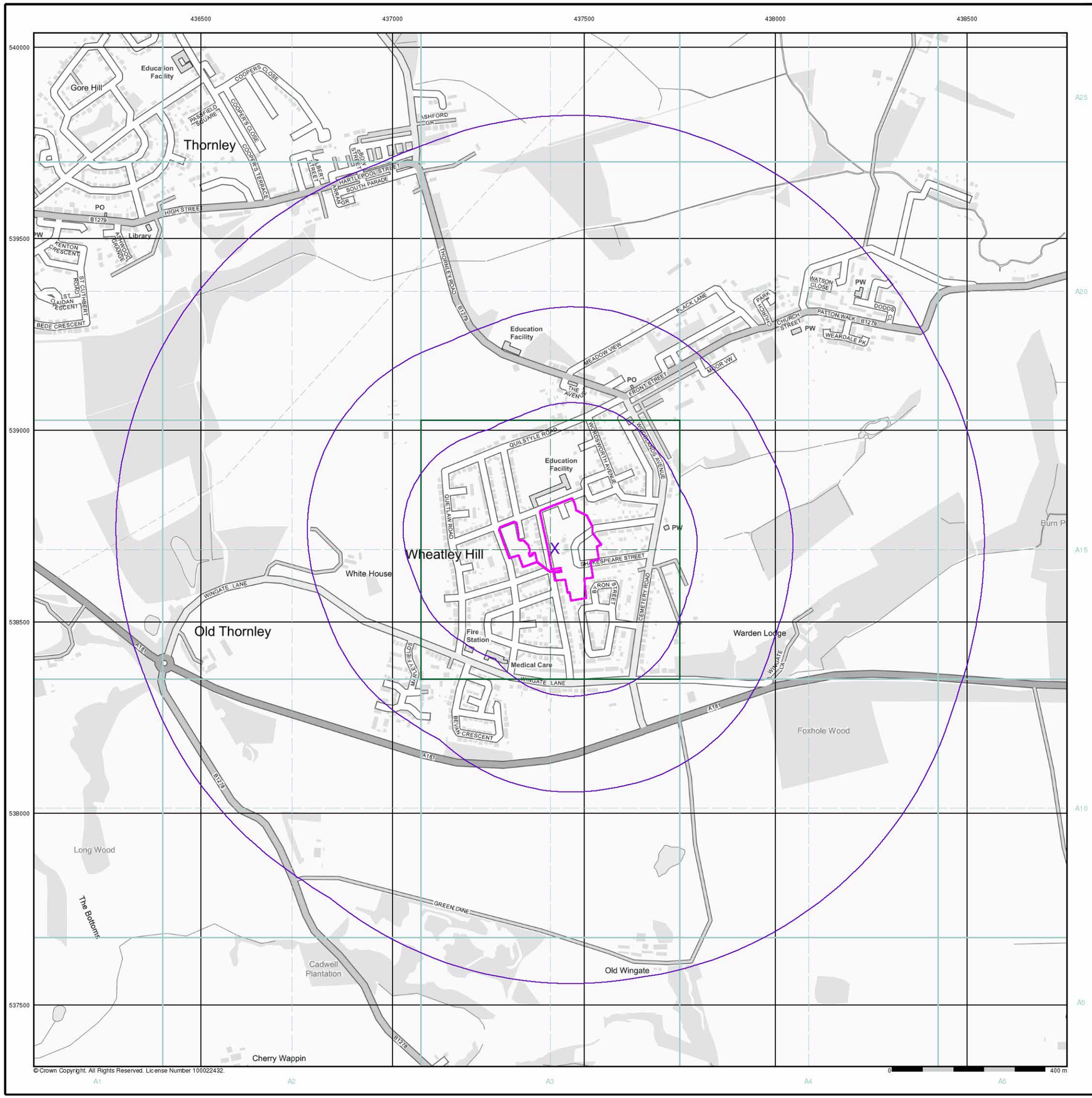


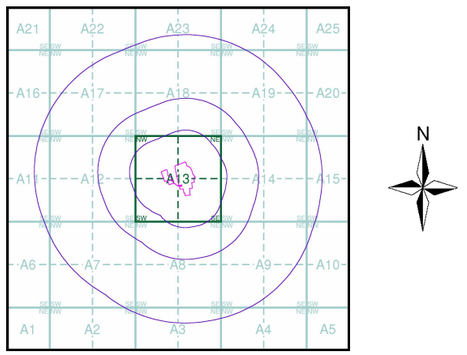
General

- Specified Site
- Specified Buffer(s)
- 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



Order Details

Order Number:	312801561_1_1
Customer Ref:	C9843 - Jack Lawson Terrace - JWM
National Grid Reference:	437420, 538690
Slice:	A
Site Area (Ha):	3.08
Search Buffer (m):	1000

Site Details

Jack Lawson Terrace, WHEATLEY HILL, DH6 3RH

Landmark INFORMATION GROUP
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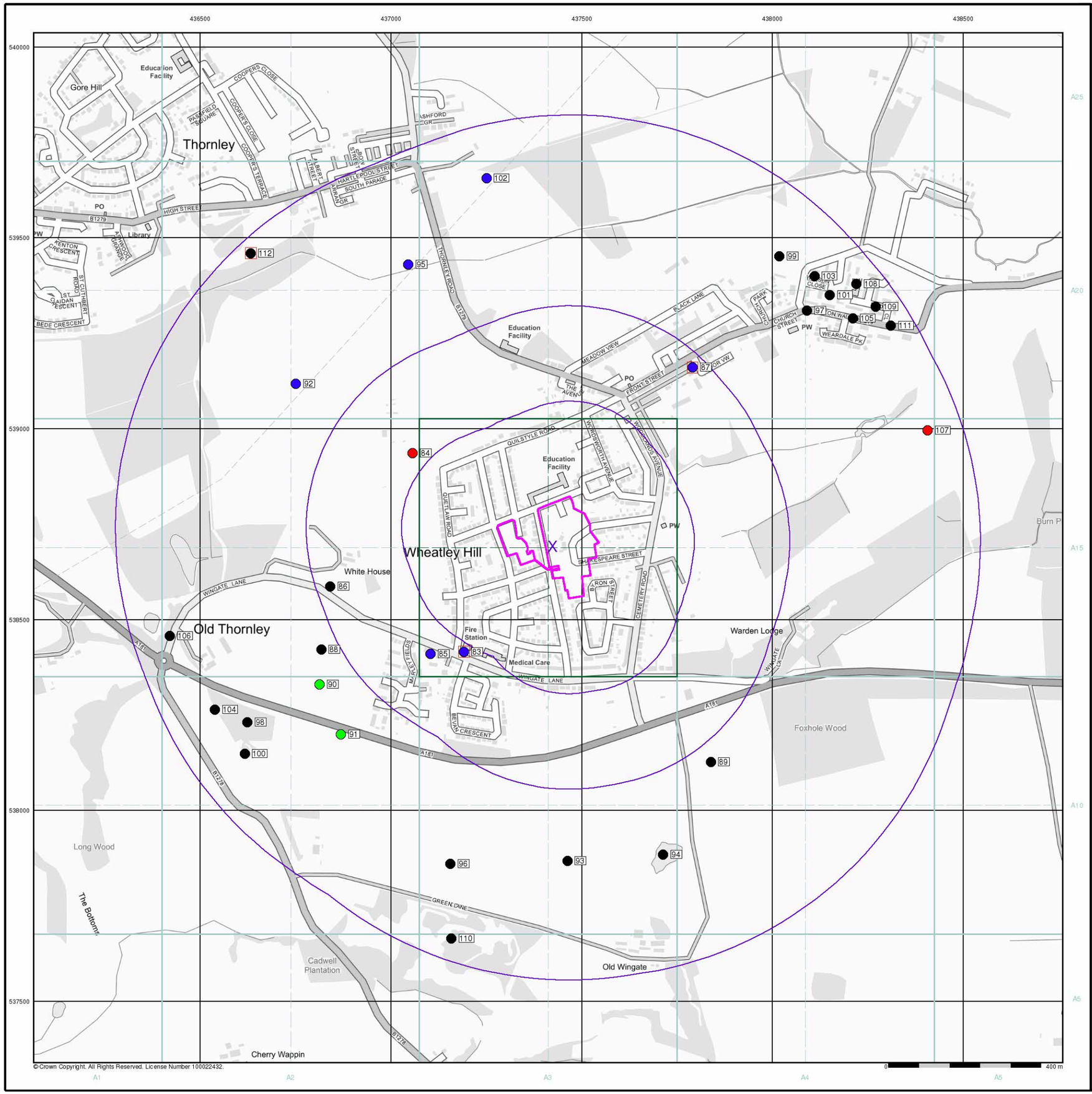


General

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

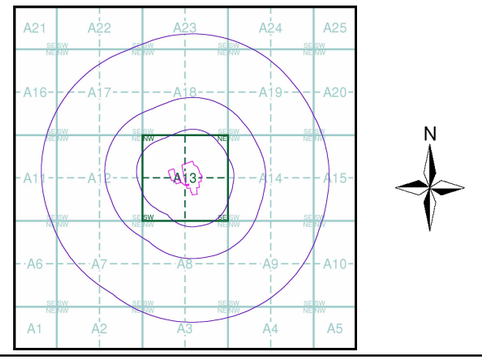
Agency and Hydrological (Boreholes)

- BGS Borehole Depth 0 - 10m
- BGS Borehole Depth 10 - 30m
- BGS Borehole Depth 30m +
- Confidential
- Other

For Borehole information please refer to the Borehole .csv file which accompanied this slice.

A copy of the BGS Borehole Ordering Form is available to download from the Support section of www.envirocheck.co.uk.

Borehole Map - Slice A



Order Details

Order Number:	312801561_1_1
Customer Ref:	C9843 - Jack Lawson Terrace - JWM
National Grid Reference:	437420, 538690
Slice:	A
Site Area (Ha):	3.08
Search Buffer (m):	1000

Site Details

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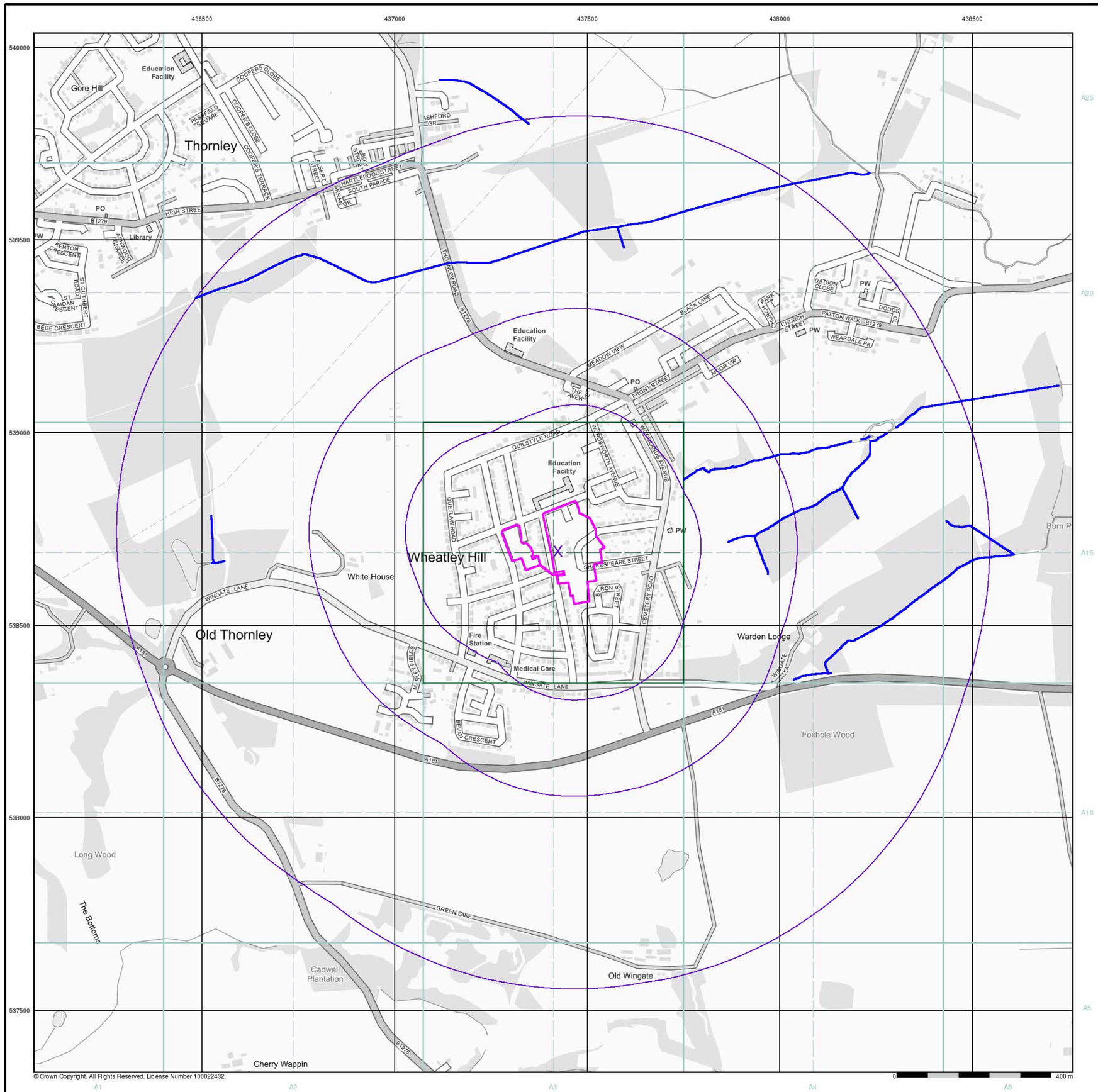


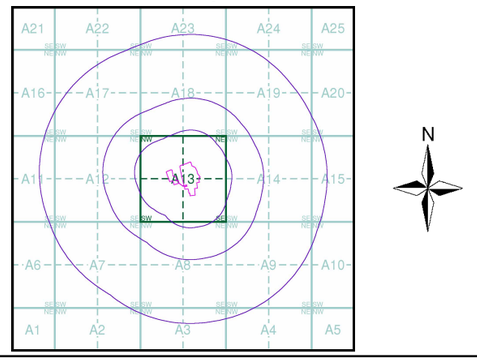
General

- 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

OS Water Network Map - Slice A



Order Details

Order Number:	312801561_1_1
Customer Ref:	C9843 - Jack Lawson Terrace - JWM
National Grid Reference:	437420, 538690
Slice:	A
Site Area (Ha):	3.08
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Site Details

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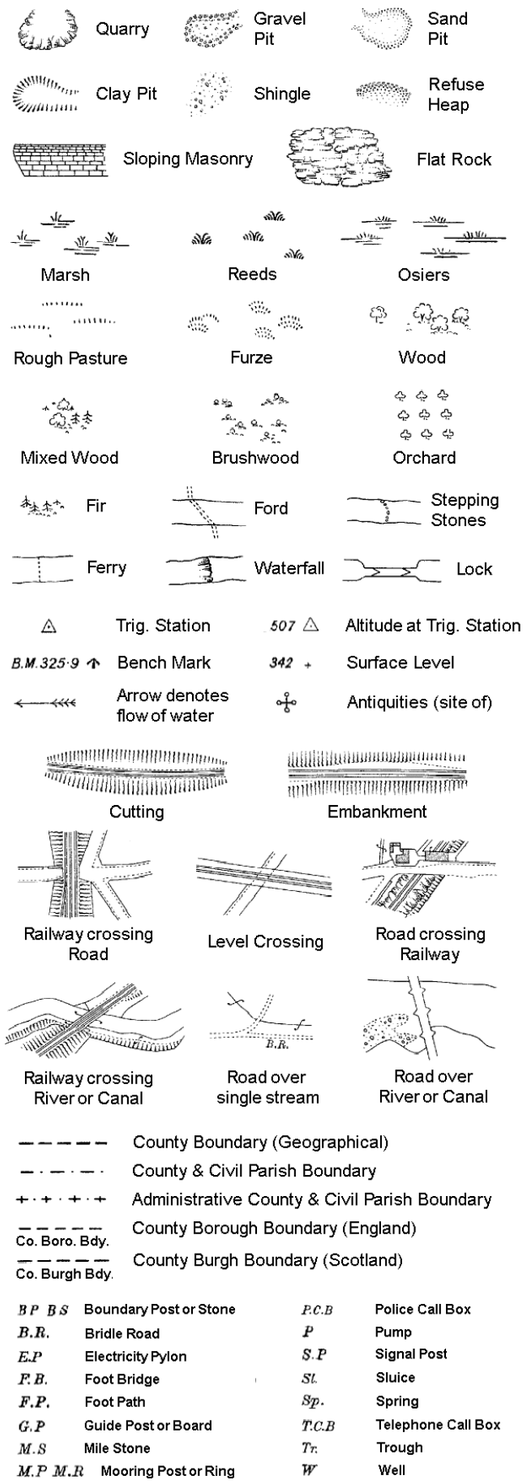
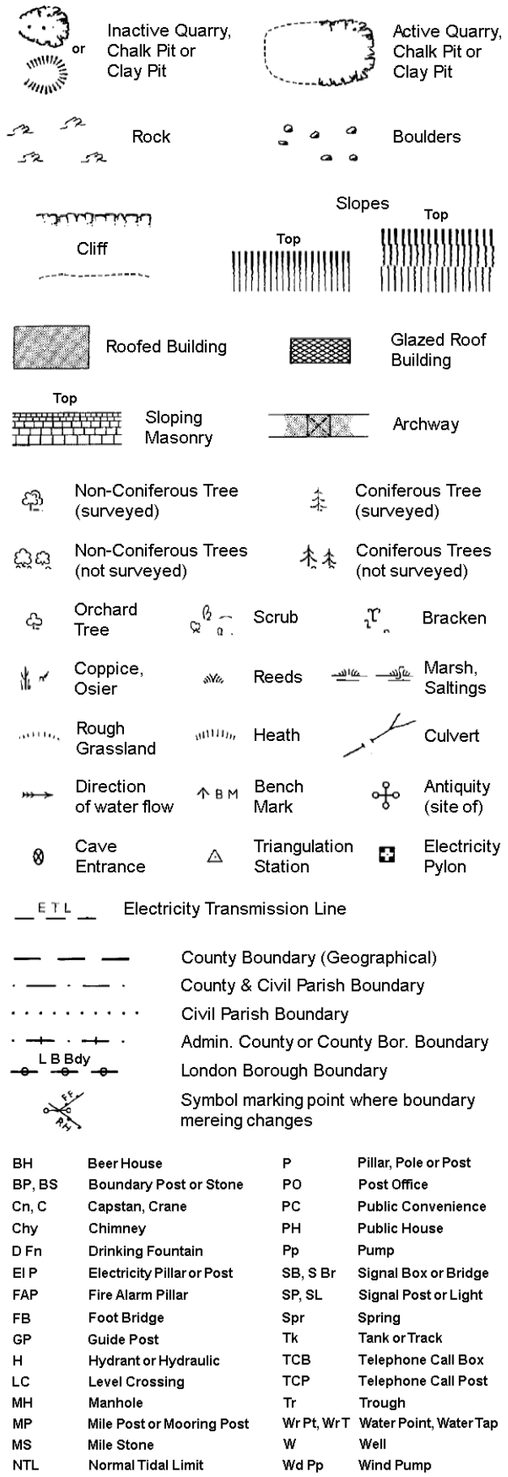
Historical Mapping Legends

Ordnance Survey County Series and Ordnance Survey Plan 1:2,500



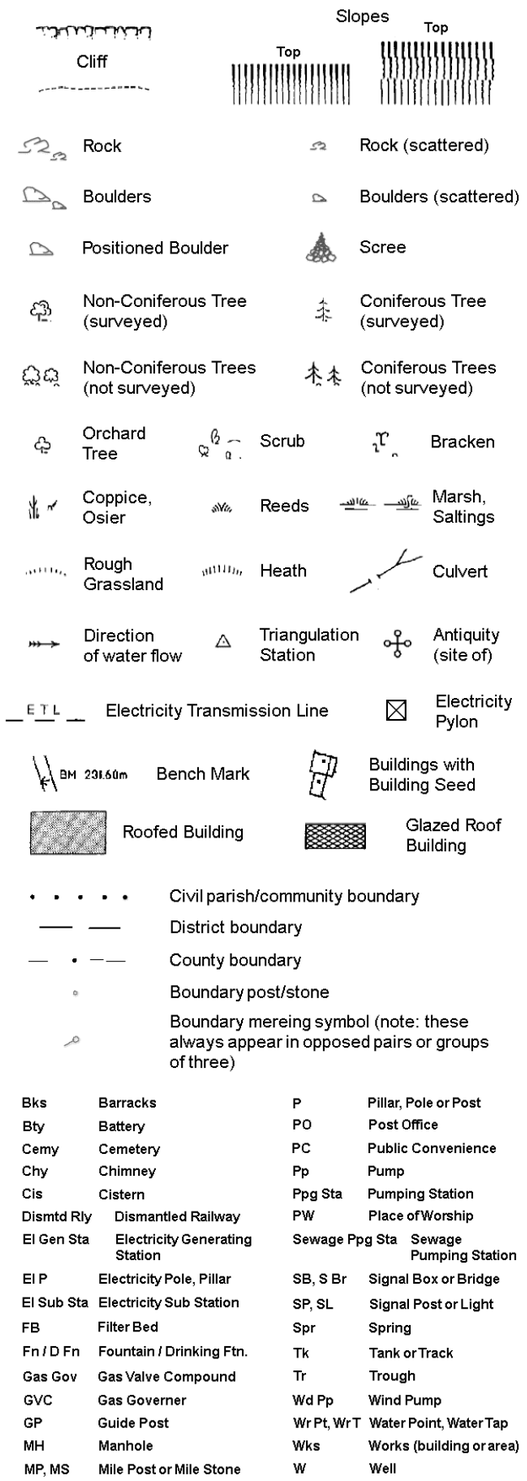
B P B S	Boundary Post or Stone	P.C.B	Police Call Box
B.R.	Bridle Road	P	Pump
E.P	Electricity Pylon	S.P	Signal Post
F.B.	Foot Bridge	St.	Sluice
F.P.	Foot Path	Sp.	Spring
G.P	Guide Post or Board	T.C.B	Telephone Call Box
M.S	Mile Stone	Tr.	Trough
M.P M.R	Mooring Post or Ring	W	Well

Ordnance Survey Plan, Additional SIMs and Supply of Unpublished Survey Information 1:2,500 and 1:1,250



BH	Beer House	P	Pillar, Pole or Post
BP, BS	Boundary Post or Stone	PO	Post Office
Cn, C	Capstan, Crane	PC	Public Convenience
Chy	Chimney	PH	Public House
D Fn	Drinking Fountain	Pp	Pump
El P	Electricity Pillar or Post	SB, S Br	Signal Box or Bridge
FAP	Fire Alarm Pillar	SP, SL	Signal Post or Light
FB	Foot Bridge	Spr	Spring
GP	Guide Post	Tk	Tank or Track
H	Hydrant or Hydraulic	TCB	Telephone Call Box
LC	Level Crossing	TCP	Telephone Call Post
MH	Manhole	Tr	Trough
MP	Mile Post or Mooring Post	Wr Pt, Wr T	Water Point, Water Tap
MS	Mile Stone	W	Well
NTL	Normal Tidal Limit	Wd Pp	Wind Pump

Large-Scale National Grid Data 1:2,500 and 1:1,250



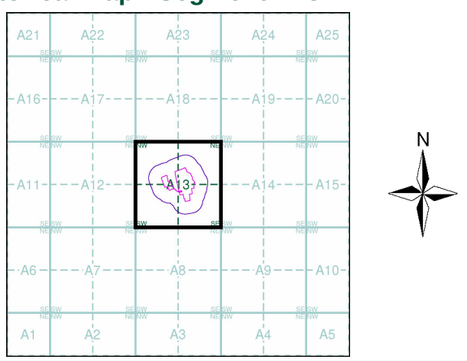
Bks	Barracks	P	Pillar, Pole or Post
Bty	Battery	PO	Post Office
Cemy	Cemetery	PC	Public Convenience
Chy	Chimney	Pp	Pump
Cis	Cistern	Ppg Sta	Pumping Station
Dismtd Rly	Dismantled Railway	PW	Place of Worship
El Gen Sta	Electricity Generating Station	Sewage Ppg Sta	Sewage Pumping Station
El P	Electricity Pole, Pillar	SB, S Br	Signal Box or Bridge
El Sub Sta	Electricity Sub Station	SP, SL	Signal Post or Light
FB	Filter Bed	Spr	Spring
Fn / D Fn	Fountain / Drinking Ftn.	Tk	Tank or Track
Gas Gov	Gas Valve Compound	Tr	Trough
GVC	Gas Governer	Wd Pp	Wind Pump
GP	Guide Post	Wr Pt, Wr T	Water Point, Water Tap
MH	Manhole	Wks	Works (building or area)
MP, MS	Mile Post or Mile Stone	W	Well

SiriUS

Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Durham	1:2,500	1857	2
Durham	1:2,500	1895	3
Durham	1:2,500	1897	4
Durham	1:2,500	1919 - 1920	5
Durham	1:2,500	1939	6
Ordnance Survey Plan	1:2,500	1958 - 1959	7
Ordnance Survey Plan	1:2,500	1972	8
Additional SIMs	1:2,500	1977 - 1990	9
Additional SIMs	1:2,500	1982 - 1992	10
Ordnance Survey Plan	1:2,500	1985	11
Additional SIMs	1:2,500	1985	12
Large-Scale National Grid Data	1:2,500	1993	13
Large-Scale National Grid Data	1:2,500	1996	14

Historical Map - Segment A13

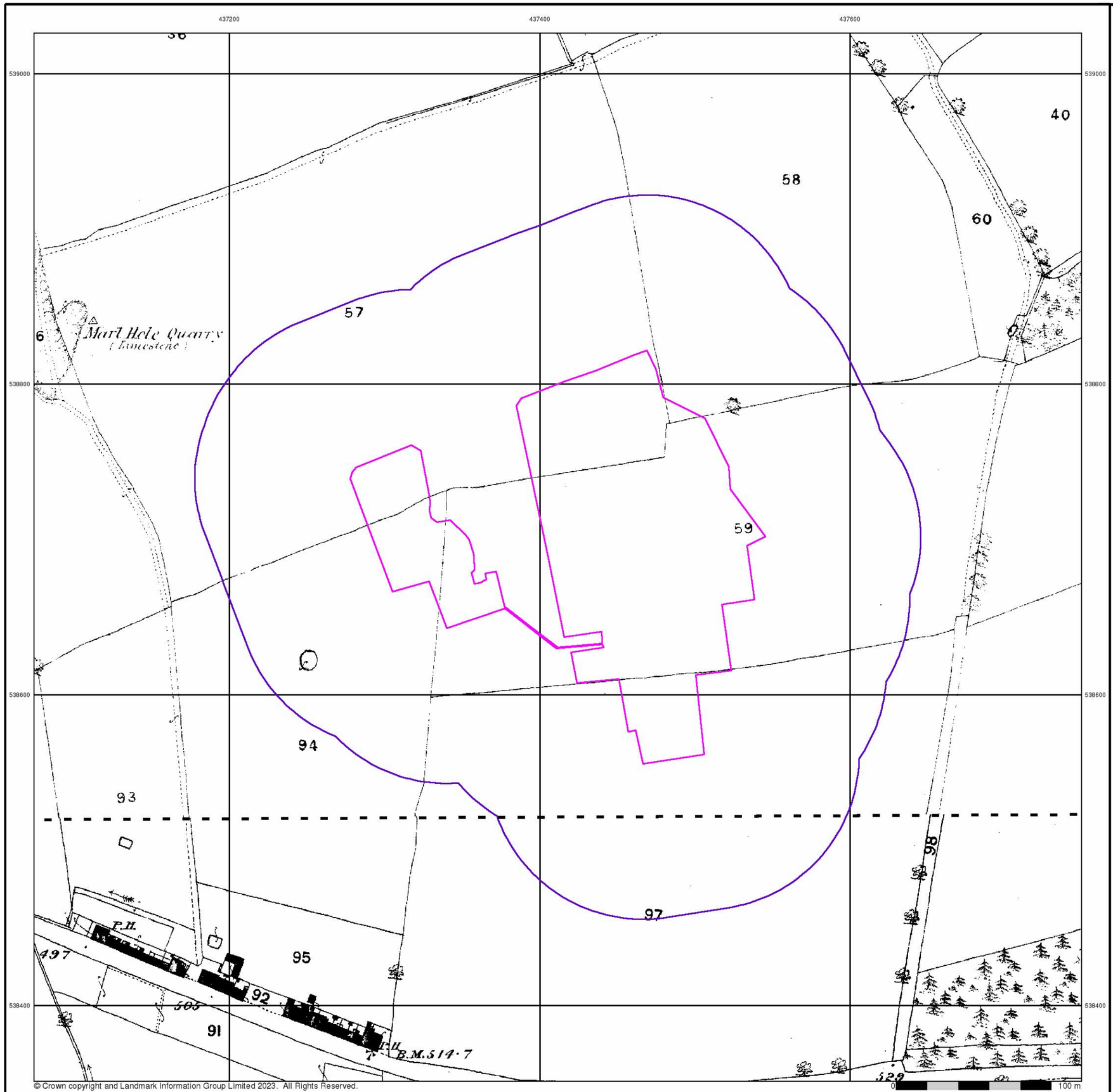


Order Details

Order Number:	312801561_1_1
Customer Ref:	C9843 - Jack Lawson Terrace - JWM
National Grid Reference:	437420, 538690
Slice:	A
Site Area (Ha):	3.08
Search Buffer (m):	100

Site Details

Jack Lawson Terrace, WHEATLEY HILL, DH6 3RH



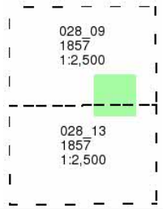
Durham

Published 1857

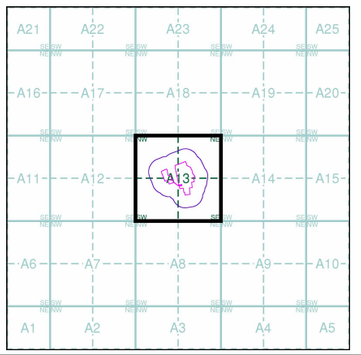
Source map scale - 1:2,500

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:	312801561_1_1
Customer Ref:	C9843 - Jack Lawson Terrace - JWM
National Grid Reference:	437420, 538690
Slice:	A
Site Area (Ha):	3.08
Search Buffer (m):	100

Site Details

Jack Lawson Terrace, WHEATLEY HILL, DH6 3RH

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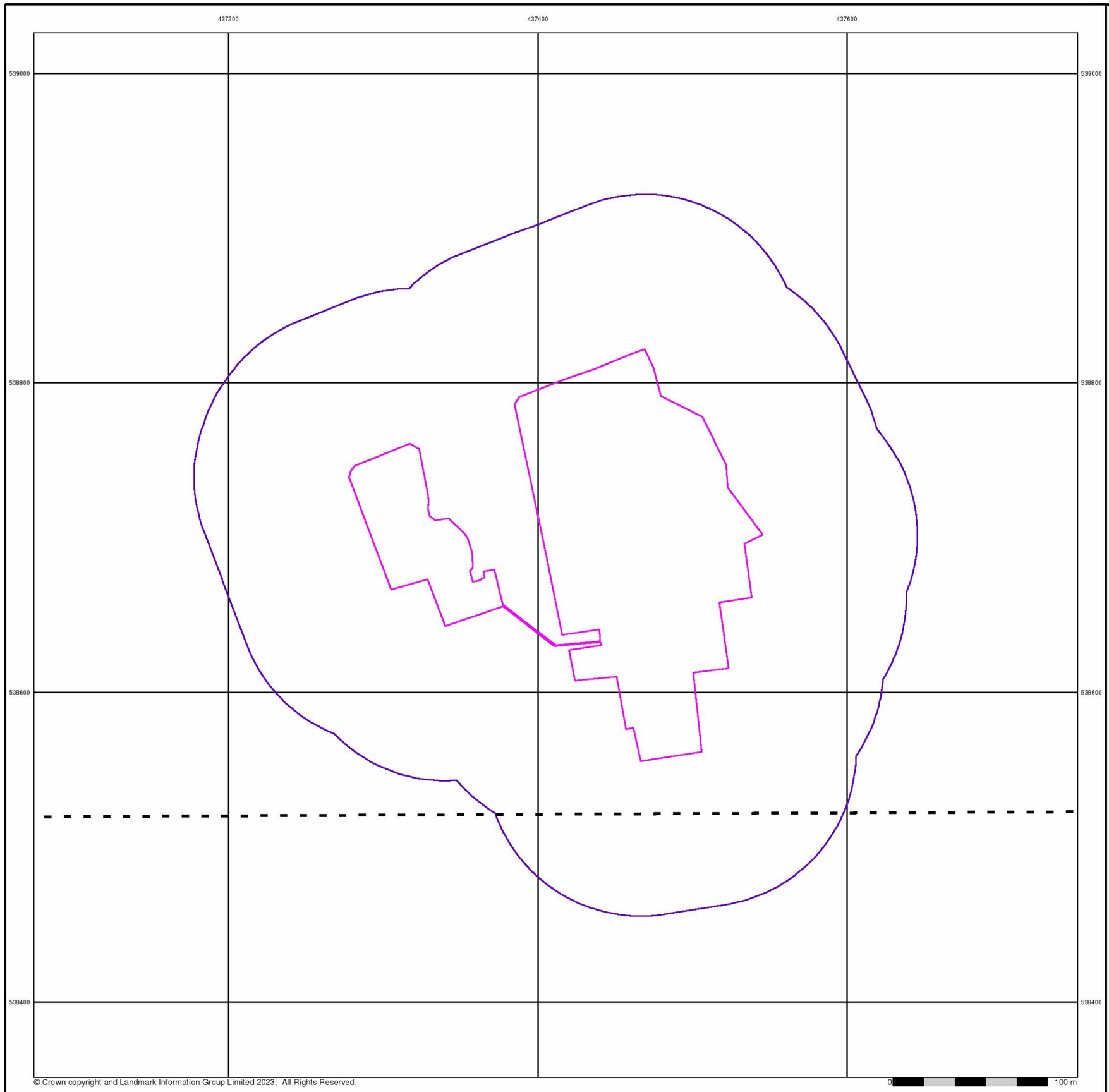
Web: www.envirocheck.co.uk



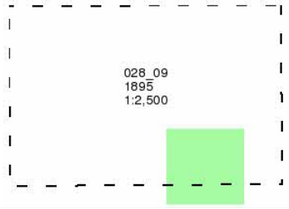
Durham

Published 1895

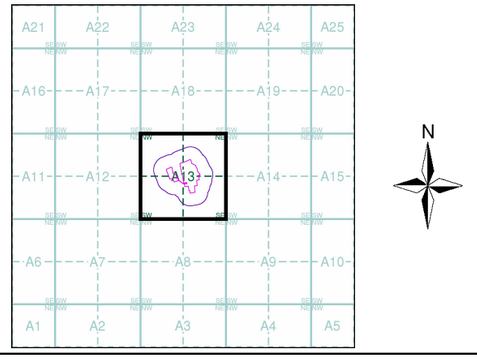
Source map scale - 1:2,500

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:	312801561_1_1
Customer Ref:	C9843 - Jack Lawson Terrace - JWM
National Grid Reference:	437420, 538690
Slice:	A
Site Area (Ha):	3.08
Search Buffer (m):	100

Site Details

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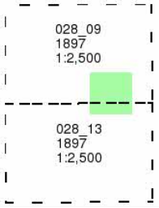
Durham

Published 1897

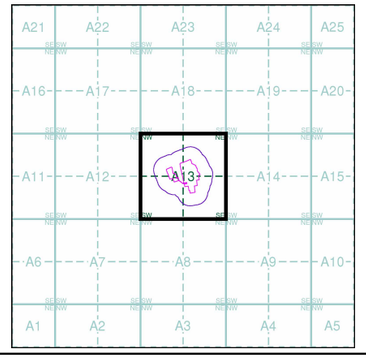
Source map scale - 1:2,500

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:	312801561_1_1
Customer Ref:	C9843 - Jack Lawson Terrace - JWM
National Grid Reference:	437420, 538690
Slice:	A
Site Area (Ha):	3.08
Search Buffer (m):	100

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Durham

Published 1919 - 1920

Source map scale - 1:2,500

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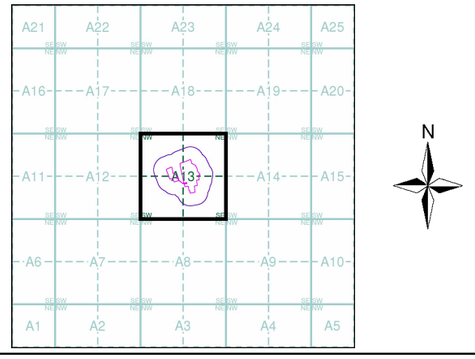
Map Name(s) and Date(s)

028_09
1919
1:2,500

028_13
1920
1:2,500

Historical Map - Segment A13



Order Details

Order Number:	312801561_1_1
Customer Ref:	C9843 - Jack Lawson Terrace - JWM
National Grid Reference:	437420, 538690
Slice:	A
Site Area (Ha):	3.08
Search Buffer (m):	100

Site Details

Jack Lawson Terrace, WHEATLEY HILL, DH6 3RH

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Durham

Published 1939

Source map scale - 1:2,500

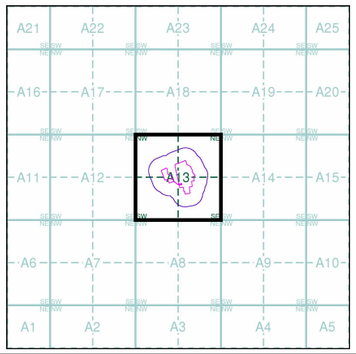
The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. 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)

028_09
1939
1:2,500

028_13
1939
1:2,500

Historical Map - Segment A13



Order Details

Order Number:	312801561_1_1
Customer Ref:	C9843 - Jack Lawson Terrace - JWM
National Grid Reference:	437420, 538690
Slice:	A
Site Area (Ha):	3.08
Search Buffer (m):	100

Site Details

Jack Lawson Terrace, WHEATLEY HILL, DH6 3RH

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Ordnance Survey Plan

Published 1958 - 1959

Source map scale - 1:2,500

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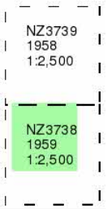
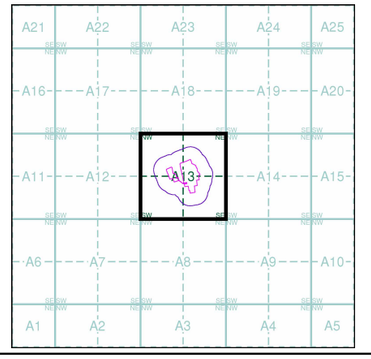
Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	312801561_1_1
Customer Ref:	C9843 - Jack Lawson Terrace - JWM
National Grid Reference:	437420, 538690
Slice:	A
Site Area (Ha):	3.08
Search Buffer (m):	100

Site Details

Jack Lawson Terrace, WHEATLEY HILL, DH6 3RH

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Ordnance Survey Plan

Published 1972

Source map scale - 1:2,500

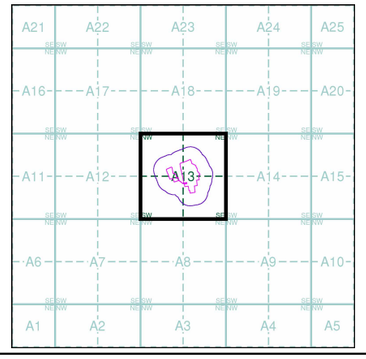
The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. 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)

NZ3739
1972
1:2,500

NZ3738
1972
1:2,500

Historical Map - Segment A13



Order Details

Order Number:	312801561_1_1
Customer Ref:	C9843 - Jack Lawson Terrace - JWM
National Grid Reference:	437420, 538690
Slice:	A
Site Area (Ha):	3.08
Search Buffer (m):	100

Site Details

Jack Lawson Terrace, WHEATLEY HILL, DH6 3RH

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Tel: 0844 844 9952
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Web: www.envirocheck.co.uk

Additional SIMs

Published 1977 - 1990

Source map scale - 1:2,500

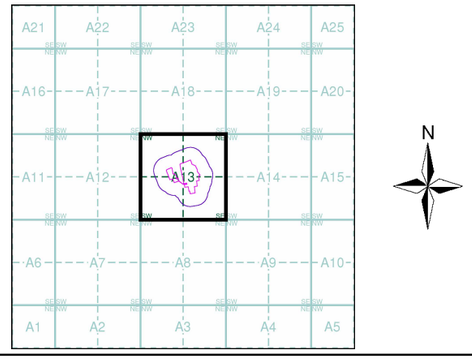
The SIM cards (Ordnance Survey's `Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps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

Map Name(s) and Date(s)

NZ3739
1977
1:2,500

NZ3738
1990
1:2,500

Historical Map - Segment A13



Order Details

Order Number:	312801561_1_1
Customer Ref:	C9843 - Jack Lawson Terrace - JWM
National Grid Reference:	437420, 538690
Slice:	A
Site Area (Ha):	3.08
Search Buffer (m):	100

Site Details

Jack Lawson Terrace, WHEATLEY HILL, DH6 3RH

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Tel: 0844 844 9952
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Web: www.envirocheck.co.uk

Additional SIMs

Published 1982 - 1992

Source map scale - 1:2,500

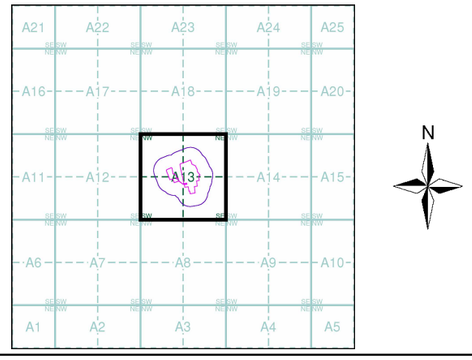
The SIM cards (Ordnance Survey's `Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps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

Map Name(s) and Date(s)

NZ3739
1982
1:2,500

NZ3738
1992
1:2,500

Historical Map - Segment A13



Order Details

Order Number:	312801561_1_1
Customer Ref:	C9843 - Jack Lawson Terrace - JWM
National Grid Reference:	437420, 538690
Slice:	A
Site Area (Ha):	3.08
Search Buffer (m):	100

Site Details

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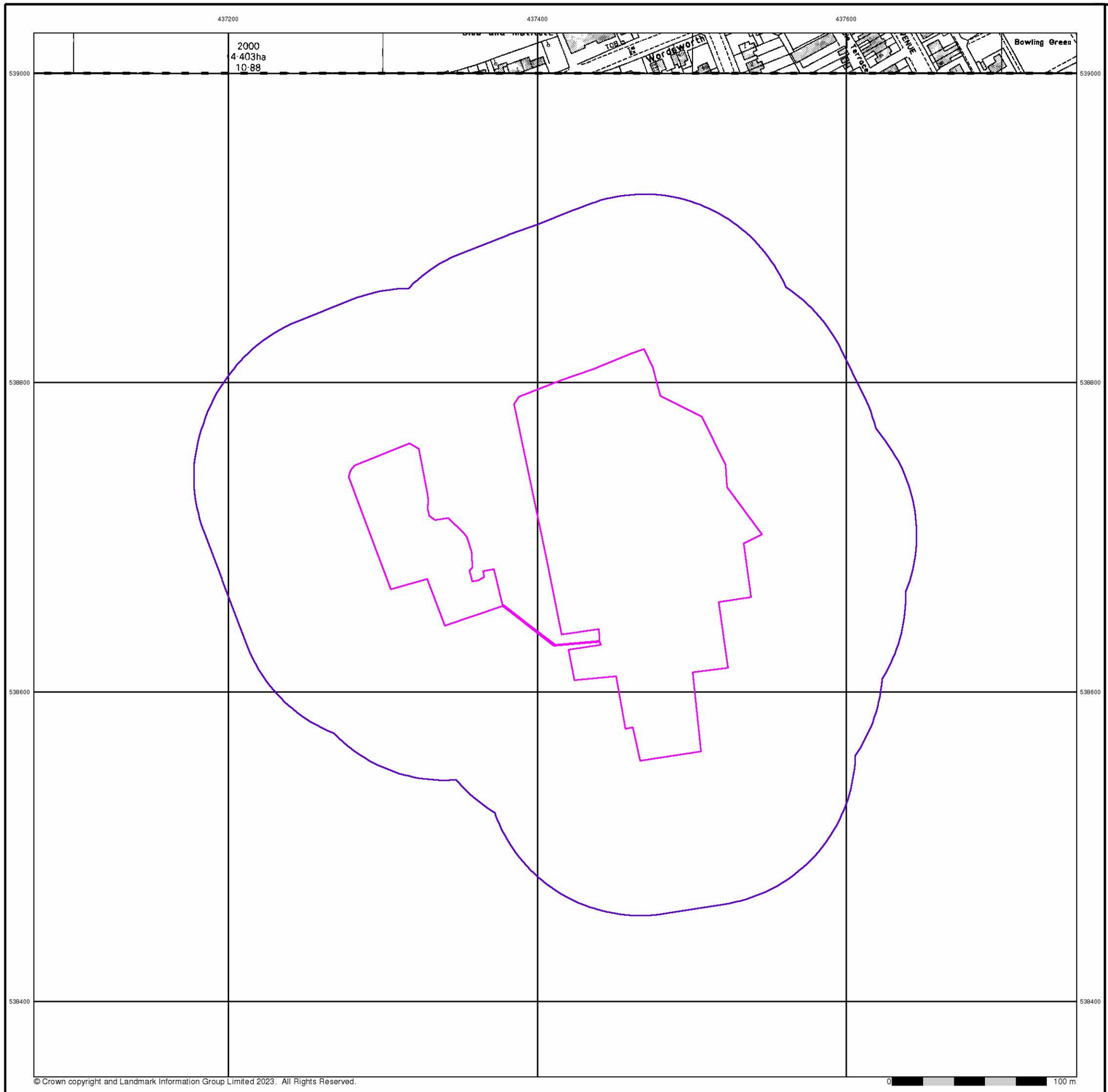


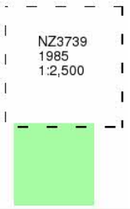
Ordnance Survey Plan

Published 1985

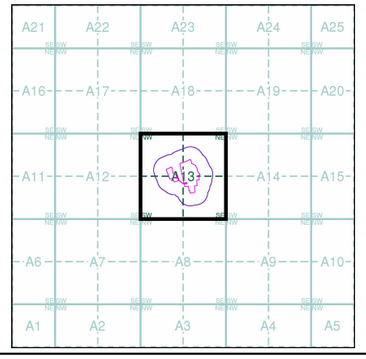
Source map scale - 1:2,500

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:	312801561_1_1
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National Grid Reference:	437420, 538690
Slice:	A
Site Area (Ha):	3.08
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Site Details

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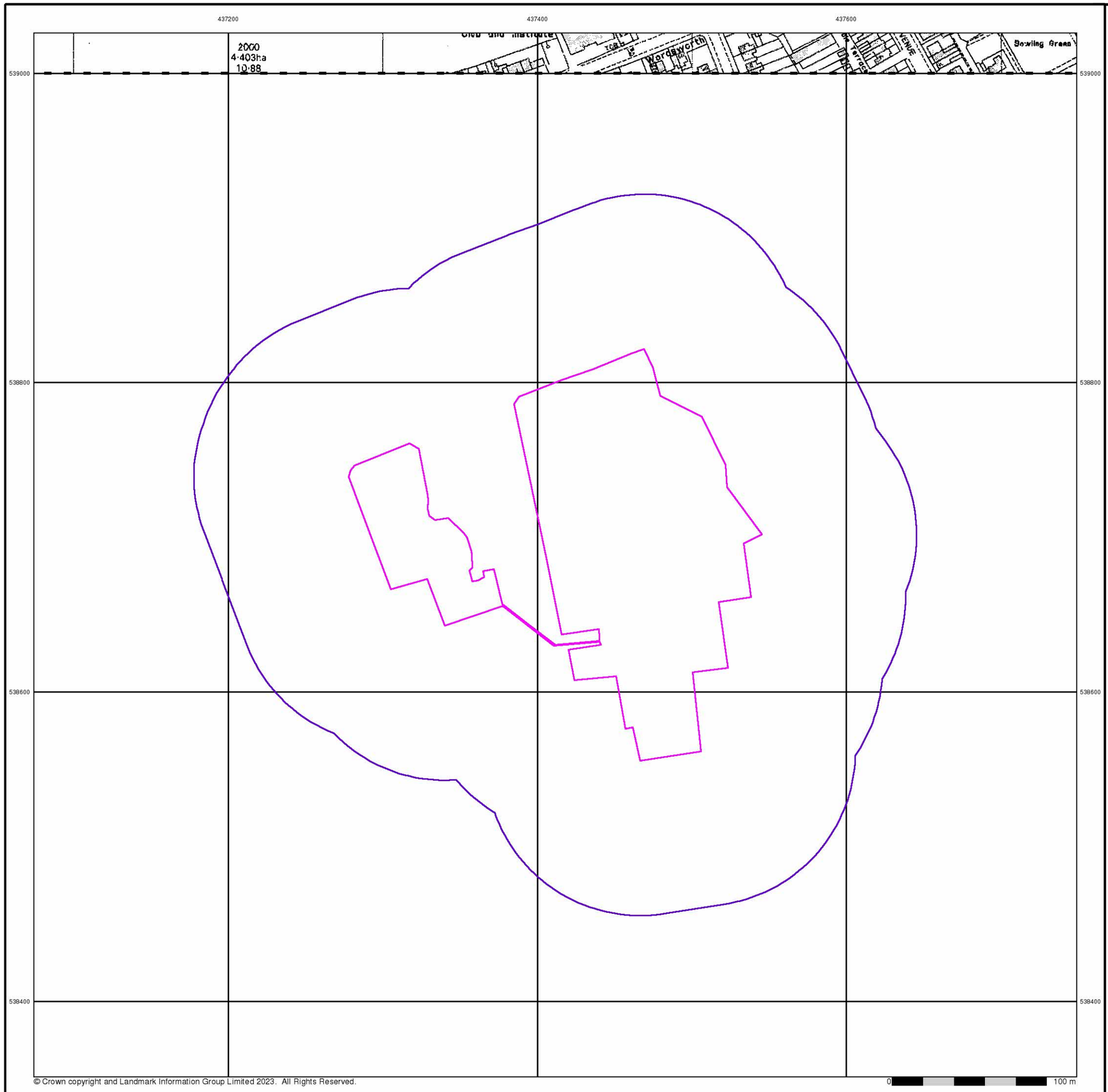


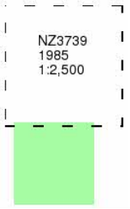
Additional SIMs

Published 1985

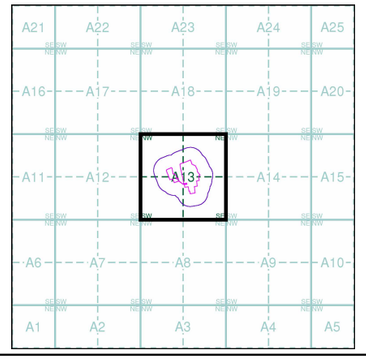
Source map scale - 1:2,500

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



Order Details

Order Number:	312801561_1_1
Customer Ref:	C9843 - Jack Lawson Terrace - JWM
National Grid Reference:	437420, 538690
Slice:	A
Site Area (Ha):	3.08
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Site Details

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Large-Scale National Grid Data

Published 1993

Source map scale - 1:2,500

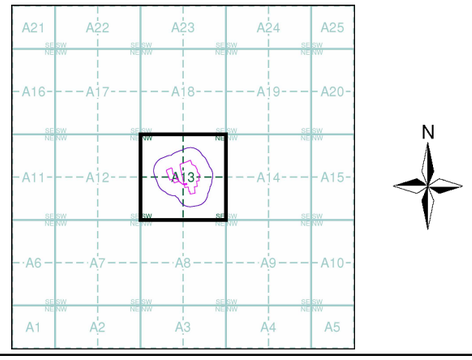
'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

NZ3739 1993 1:2,500

NZ3738 1993 1:2,500

Historical Map - Segment A13



Order Details

Order Number:	312801561_1_1
Customer Ref:	C9843 - Jack Lawson Terrace - JWM
National Grid Reference:	437420, 538690
Slice:	A
Site Area (Ha):	3.08
Search Buffer (m):	100

Site Details

Jack Lawson Terrace, WHEATLEY HILL, DH6 3RH

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Web: www.envirocheck.co.uk

Large-Scale National Grid Data

Published 1996

Source map scale - 1:2,500

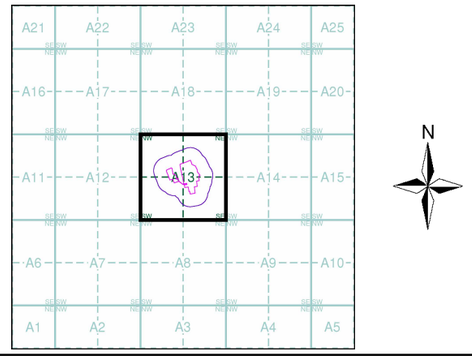
'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

NZ3739
1996
1:2,500

NZ3738
1996
1:2,500

Historical Map - Segment A13



Order Details

Order Number:	312801561_1_1
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National Grid Reference:	437420, 538690
Slice:	A
Site Area (Ha):	3.08
Search Buffer (m):	100

Site Details

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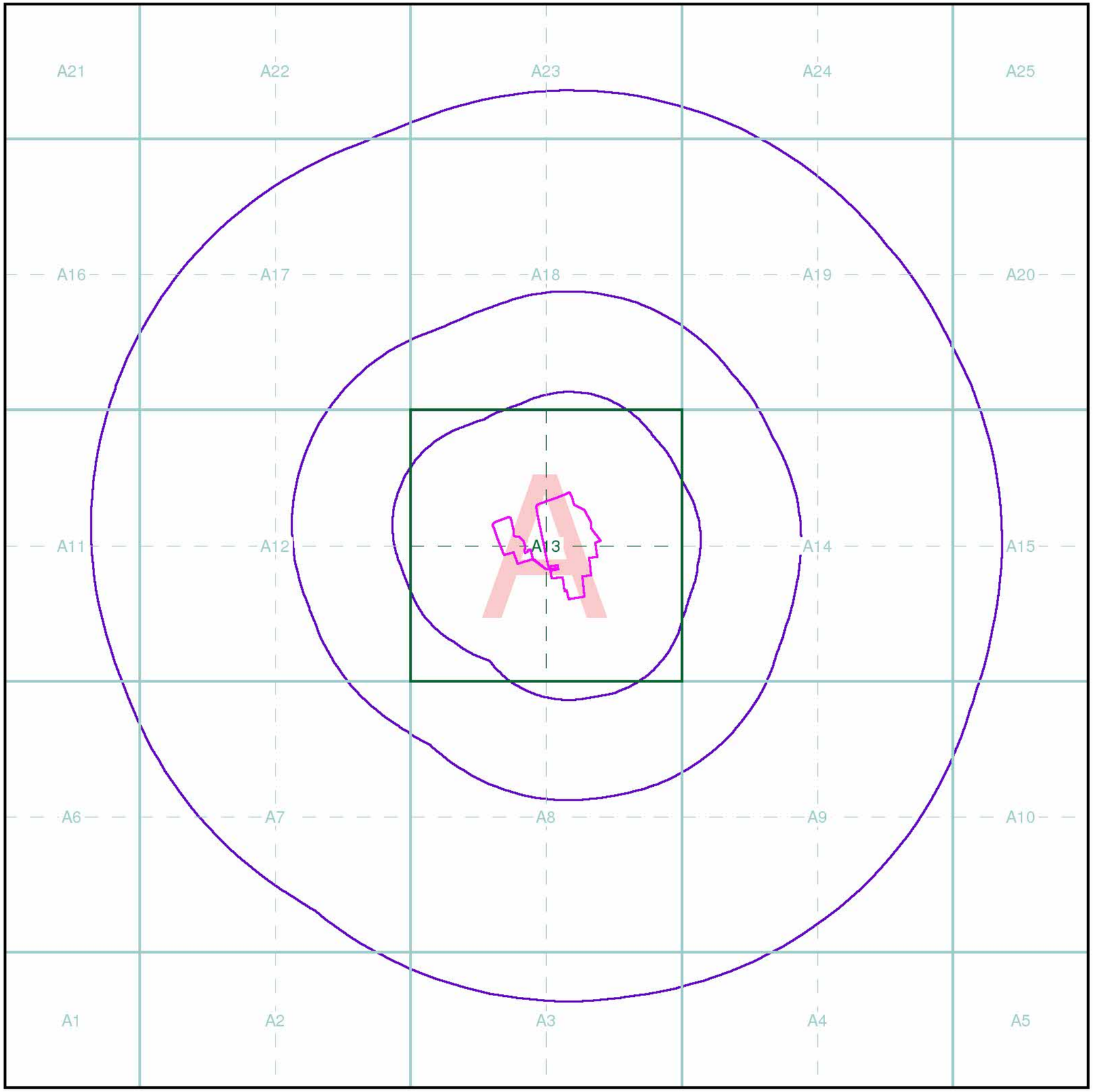


Index Map

For ease of identification, your site and buffer have been split into Slices, Segments and Quadrants. These are illustrated on the Index Map opposite and explained further below.

Slice
Each slice represents a 1:10,000 plot area (2.7km x 2.7km) for your site and buffer. A large site and buffer may be made up of several slices (represented by a red outline), that are referenced by letters of the alphabet, starting from the bottom left corner of the slice "grid". This grid does not relate to National Grid lines but is designed to give best fit over the site and buffer.

Segment
A segment represents a 1:2,500 plot area. Segments that have plot files associated with them are shown in dark green, others in light blue. These are numbered from the bottom left hand corner within each slice.

Quadrant
A quadrant is a quarter of a segment. These are labelled as NW, NE, SW, SE and are referenced in the datasheet to allow features to be quickly located on plots. Therefore a feature that has a quadrant reference of A7NW will be in Slice A, Segment 7 and the NW Quadrant.

A selection of organisations who provide data within this report:

Envirocheck reports are compiled from 136 different sources of data.

Client Details

Ms S Howson, Sirius Geotechnical Ltd, 4245 Park Approach, Thorpe Park, Leeds, LS15 8GB

Order Details

Order Number:	312801561_1_1
Customer Ref:	C9843 - Jack Lawson Terrace - JWM
National Grid Reference:	437440, 538700
Site Area (Ha):	3.08
Search Buffer (m):	1000

Site Details

Jack Lawson Terrace, WHEATLEY HILL, DH6 3RH

Full Terms and Conditions can be found on the following link:
http://www.landmarkinfo.co.uk/Terms/Show/515

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

The Coal Authority

CON29M
coal mining report

JACK LAWSON TERRACE, WHEATLEY HILL, DURHAM, DH6 3RH

Known or potential coal mining risks

Further action

No further reports from the Coal Authority are required. Further information on any next steps can be found in our Professional opinion.

For more information on our reports please visit www.groundstability.com

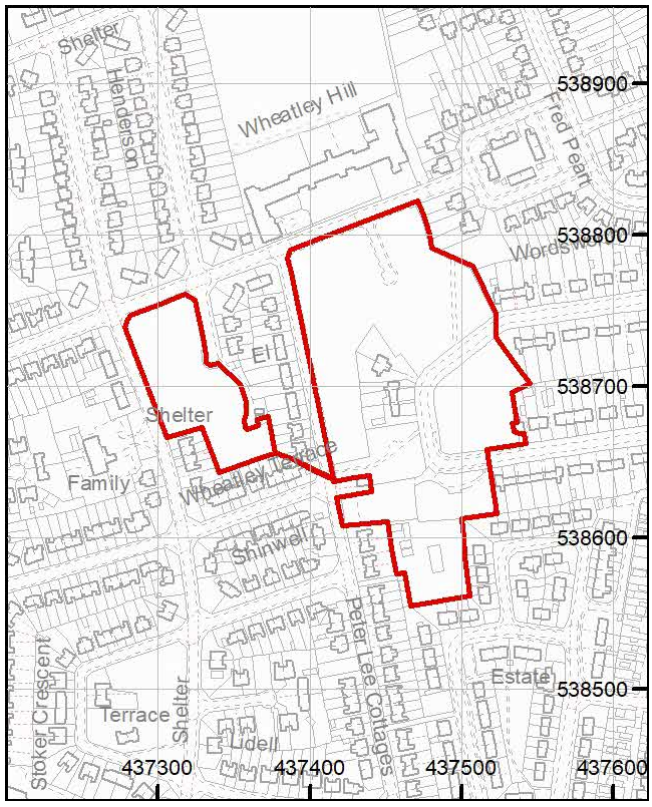
Professional opinion

According to the official mining information records held by the Coal Authority at the time of this search, evidence of, or the potential for, coal mining related features have been identified. It is unlikely that these features will impact on the stability of the enquiry boundary.

Enquiry boundary

Key

Approximate position of enquiry boundary shown



We can confirm that the location is on the coalfield

Map data

This report is prepared in accordance with the latest Law Society's Guidance Notes 2018, the User Guide 2018 and the Coal Authority's Terms and Conditions applicable at the time the report was produced.

Accessibility

If you would like this information in an alternative format, please contact our communications team on 0345 762 6848 or email communications@coal.gov.uk.

Professional opinion

Future development

If development proposals are being considered, technical advice relating to both the investigation of coal and former coal mines and their treatment should be obtained before beginning work on site. All proposals should apply specialist engineering practice required for former mining areas. No development should be undertaken that intersects, disturbs or interferes with any coal or coal mines without first obtaining the permission of the Coal Authority.

MINE GAS: Please note, if there are no recorded instances of mine gas within the enquiry boundary, this does not mean that mine gas is not present within the vicinity. The Coal Authority Mine Gas data is limited to only those sites where a Mine Gas incident has been recorded. Developers should be aware that the investigation of coal seams, mine workings or mine entries may have the potential to generate and/or displace underground gases. Associated risks both to the development site and any neighbouring land or properties should be fully considered when undertaking any ground works. The need for effective measures to prevent gases migrating onto any land or into any properties, either during investigation or remediation work, or after development must also be assessed and properly addressed. In these instances, the Coal Authority recommends that a more detailed Gas Risk Assessment is undertaken by a competent assessor.

If you are looking to develop, or undertake works, within a coal mining development high risk area your Local Authority planning department may require a Coal Mining Risk Assessment to be undertaken by a qualified mining geologist or engineer. Should you require any additional information then please contact the Coal Authority on 0345 762 6848 or email cmra@coal.gov.uk.

Detailed findings

Information provided by the Coal Authority in this report is compiled in response to the Law Society's CON29M Coal Mining enquiries. The said enquiries are protected by copyright owned by the Law Society of 113 Chancery Lane, London WC2A 1PL.

The Coal Authority owns the copyright in this report and the information used to produce this report is protected by our database rights. All rights are reserved and unauthorised use is prohibited. If we provide a report for you, this does not mean that copyright and any other rights will pass to you. However, you can use the report for your own purposes.

1 Past underground coal mining

The property is in a surface area that could be affected by underground mining in 6 seams of coal at 180m to 350m depth, and last worked in 1964.

Any movement in the ground due to coal mining activity associated with these workings should have stopped by now.

2 Present underground coal mining

The property is not within a surface area that could be affected by present underground mining.

3 Future underground coal mining

The property is not in an area where the Coal Authority has received an application for, and is currently considering whether to grant a licence to remove or work coal by underground methods.

The property is not in an area where a licence has been granted to remove or otherwise work coal using underground methods.

The property is not in an area likely to be affected from any planned future underground coal mining.

However, reserves of coal exist in the local area which could be worked at some time in the future.

No notices have been given, under section 46 of the Coal Mining Subsidence Act 1991, stating that the land is at risk of subsidence.

4 Mine entries

There are no recorded coal mine entries known to the Coal Authority within, or within 20 metres, of the boundary of the property.

5 Coal mining geology

The Coal Authority is not aware of any damage due to geological faults or other lines of weakness that have been affected by coal mining.

6 Past opencast coal mining

The property is not within the boundary of an opencast site from which coal has been removed by opencast methods.

7 Present opencast coal mining

The property does not lie within 200 metres of the boundary of an opencast site from which coal is being removed by opencast methods.

8 Future opencast coal mining

There are no licence requests outstanding to remove coal by opencast methods within 800 metres of the boundary.

The property is not within 800 metres of the boundary of an opencast site for which a licence to remove coal by opencast methods has been granted.

9 Coal mining subsidence

The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50 metres of the enquiry boundary, since 31 October 1994.

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

The Coal Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.

10 Mine gas

The Coal Authority has no record of a mine gas emission requiring action.

11 Hazards related to coal mining

The property has not been subject to remedial works, by or on behalf of the Coal Authority, under its Emergency Surface Hazard Call Out procedures.

12 Withdrawal of support

The property is not in an area where a notice to withdraw support has been given.

The property is not in an area where a notice has been given under section 41 of the Coal Industry Act 1994, cancelling the entitlement to withdraw support.

13 Working facilities order

The property is not in an area where an order has been made, under the provisions of the Mines (Working Facilities and Support) Acts 1923 and 1966 or any statutory modification or amendment thereof.

14 Payments to owners of former copyhold land

The property is not in an area where a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

Statutory cover

Coal mining subsidence

In the unlikely event of any coal mining related subsidence damage, the Coal Authority or the mine operator has a duty to take remedial action in respect of subsidence caused by the withdrawal of support from land or property in connection with lawful coal mining operations.

When the works are the responsibility of the Coal Authority, our dedicated public safety and subsidence team will manage the claim. The house or land owner (“the owner”) is covered for these works under the terms of the Coal Mining Subsidence Act 1991 (as amended by the Coal Industry Act 1994). Please note, this Act does not apply where coal was worked or gotten by virtue of the grant of a gale in the Forest of Dean, or any other part of the Hundred of St. Briavels in the county of Gloucester.

If you believe your land or property is suffering from coal mining subsidence damage and you need more information on what to do next, please use the following link to our website which sets out what your rights are and what you need to consider before making a claim.
www.gov.uk/government/publications/coal-mining-subsidence-damage-notice-form

Coal mining hazards

Our public safety and subsidence team provide a 24 hour a day, 7 days a week hazard reporting service, to help protect the public from hazards caused by past coal workings, such as a mine shaft or shallow working collapse. To report any hazards please call 0800 288 4242. Further information can be found on our website: www.gov.uk/coalauthority .

Glossary

Key terms

adit - horizontal or sloped entrance to a mine

coal mining subsidence - ground movement caused by the removal of coal by underground mining

Coal Mining Subsidence Act 1991 - the Act setting out the duties of the Coal Authority to repair damage caused by coal mining subsidence

coal mining subsidence damage - damage to land, buildings or structures caused by the removal of coal by underground mining

coal seams - bed of coal of varying thickness

future opencast coal mining - a licence granted, or licence application received, by the Coal Authority to excavate coal from the surface

future underground coal mining - a licence granted, or licence application received, by the Coal Authority to excavate coal underground. Although it is unlikely, remaining coal reserves could create a possibility for future mining, which would be licensed by the Coal Authority

mine entries - collective name for shafts and adits

mine gas - reports of alleged mine gas emissions received by the Coal Authority within the enquiry boundary that subsequently required investigation and action by the Coal Authority to mitigate the effects of the mine gas emission. Please note, if there are no recorded instances of mine gas reported, this does not mean that mine gas is not present within the vicinity. The Coal Authority Mine Gas data is limited to only those sites where a Mine Gas incident has been recorded

payments to owners of former copyhold land - historically, copyhold land gave rights to coal to the copyholder. Legislation was set up to allow others to work this coal, but they had to issue a notice and pay compensation if a copyholder came forward

shaft - vertical entry into a mine

site investigation - investigations of coal mining risks carried out with the Coal Authority's permission

stop notice - a delay to repairs because further coal mining subsidence damage may occur and it would be unwise to carry out permanent repairs

subsidence claim - a formal notice of subsidence damage to the Coal Authority since it was established on 31 October 1994

withdrawal of support - a historic notice informing landowners that the coal beneath their property was going to be worked

working facilities orders - a court order which gave permission, restricted or prevented coal mine workings

APPENDIX C
Risk Assessment Methodology

Qualitative Risk Assessment Methodology

The approach adopted by Sirius for the qualitative assessment of risk is based upon that given in Annex 4 of NHBC-Environment Agency-CIEH "Guidance for the Safe Development of Housing on Land Affected by Contamination" (2008) and is consistent with other current guidance.

The risk posed by viable contaminant linkages is based upon the consideration of both:

a) the magnitude of the potential consequence (i.e. its severity); and,

b) the probability (likelihood) of that consequence being realised.

The classifications used in this report for consequence and probability are given in Tables 1 and 2, respectively. The derived risk classifications are defined in Table 3.

Where there is no viable contaminant linkage there is no potential risk.

Table 1. Classification of Consequence

Classification	Definition
Severe	Contaminant concentrations at the receptor that are likely to result in "significant harm" to human health (as defined in Part 2A of the Environmental Protection Act 1990). Major pollution of controlled waters that could have persistent and/or extensive effects on water quality, for example fish kills, closure of an abstraction, or substantial deterioration in quality of the receiving water body. Major impact on receptor amenity value or major damage to agriculture or commerce. Major damage to an ecosystem that is likely to result in a substantial adverse change in its functioning or harm to a species of special interest that endangers the long-term maintenance of the population. Catastrophic damage to crops, buildings or property.
Medium	Elevated concentrations at the receptor that might result in "significant harm" to human health (as defined in Part 2A of the Environmental Protection Act 1990). A pollution incident that has significant effect on water quality or abstraction potential. An incident that has a marked effect on receptor amenity value, agriculture or commerce. Damage to an ecosystem that may result in a substantial adverse change in its functioning or harm to a species of special interest that may endanger the long-term maintenance of the population. Significant damage to crops, buildings or property.

Classification	Definition
Mild	Potential human health impact at the receptor point but unlikely to be classified as "significant harm" (as defined in Part 2A of the Environmental Protection Act 1990). Pollution of water that will have a small or short-lived effect on water quality and marginal effects on its amenity or resource value or its use in agriculture or commerce. Minor or short-lived damage to ecosystems, which is unlikely to result in a substantial adverse change Minor damage to crops, buildings or property
Minor	No potential measurable detrimental human health impacts at the receptor point. Impact on water that will have no or minimal effect on water quality or use. No or minor and easily repairable effects on buildings, structures and services.

Table 2. Classification of Probability

Classification	Definition
High	An impact is already occurring or is very likely in the short-term and almost inevitable over the long-term.
Medium	It is probable that an event would occur. This is not inevitable but possible in the short-term and likely over the long-term.
Low	Circumstances are possible under which an event could occur. However, it is by no means certain that an event will take place, even over the long-term.
Unlikely	Circumstances are such that it is improbable that an event would occur even over the very long-term.

Table 3. Risk Classification

	Consequence			
Probability	Severe	Medium	Mild	Minor
High	Very High	High	Moderate	Low
Medium	High	Moderate	Low to Moderate	Low
Low	Moderate	Low to Moderate	Low	Very Low
Unlikely	Low to Moderate	Low	Very Low	Negligible

Table 4 provides a context for interpretation of the risk classification categories. The definitions provided are based on those given in CIRIA (2001) "Contaminated Land Risk Assessment. A Guide to Good Practice", Report C552.

Table 4. Interpretation of Risk Classification Categories

Risk Classification	Definition
Very High	There is a high probability that severe harm to one or more identified receptors could occur or there is evidence that this is already happening. This risk is likely to result in a substantial liability. Urgent investigation and remediation are likely to be required.
High	Harm is likely to be caused to one or more identified receptors. Realisation of the risk is likely to present a substantial liability. Urgent investigation is required and remedial works may be necessary in the short-term and are likely over the longer term.
Moderate	It is possible that harm could be caused to one or more identified receptors. However, it is relatively unlikely that such harm would be severe. Investigation is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer term.
Low	It is possible that harm could be caused to one or more identified receptors but it is likely that this harm, if realised, would normally be mild. No further investigation is considered necessary to assess risk or environmental liability but investigations could be undertaken if desired to confirm 'baseline' conditions for the purposes of liability management. Remedial works are unlikely to be required.
Very Low	There is a low probability that harm could be caused to one or more identified receptors. In the event of such harm being realised, it is likely to be mild, at worst. No further investigation is considered necessary to assess risk or environmental liability but investigations could be undertaken if desired to confirm 'baseline' conditions for the purposes of liability management. Remedial works are very unlikely to be required.
Negligible	It is unlikely that harm could be caused to one or more identified receptors. In the event of harm being realised, it is likely to be minor. No further investigation is considered necessary to assess risk or environmental liability. Remedial works are not expected.

APPENDIX D
Fieldwork Information

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Descripeon	Depth (m)	Level (m AOD)	Legend
				MADE GROUND: Brown slightly gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse subangular sandstone, dolomite, brick and concrete. Includes occasional roots.	0.15		
				MADE GROUND: Soft desiccated greyish brown slightly gravelly CLAY. Gravel is fine to coarse subangular coal, dolomite, brick and concrete.	0.50		
				Firm medium strength orangish brown slightly sandy slightly gravelly CLAY of medium plasecity (field assessment). Sand is fine to medium. Gravel is fine subangular coal, mudstone, sandstone and limestone.	0.95		
			1	Very soft high strength brown bluish grey mosled slightly gravelly CLAY of intermediate plasecity. Low cobble content. Gravel is fine to coarse subangular to subrounded coal, mudstone, sandstone and limestone. Cobbles are subrounded limestone.	1.40		
			2	Very soft greyish brown slightly gravelly CLAY of medium plasecity (field assessment). Gravel is fine to medium subangular to subrounded mudstone, sandstone and limestone.	2.45		
				Very weak cream LIMESTONE. Highly weathered.	2.70		
				End of trial pit at 2.70m			
			3				
			4				
			5				

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Descripeon	Depth (m)	Level (m AOD)	Legend
				MADE GROUND: SoÕ dark brown slightly sandy slightly gravelly CLAY. Sand is ¡ ne to coarse. Gravel is ¡ ne subangular to subrounded coal and mudstone. Includes numerous roots. (Reworked Topsoil)	0.15		
				MADE GROUND: Brown gravelly SAND. Sand is ¡ ne to coarse. Gravel is ¡ ne to coarse subangular sandstone, dolomite, brick and concrete. Includes broken remnants of brick walls and concrete foundaeons.	0.65		
			1	Very seï high strength orangish brown slightly sandy slightly gravelly CLAY of intermediate plaseicity. Sand is ¡ ne to medium. Gravel is ¡ ne subangular coal, mudstone, sandstone and limestone.	1.10		
			2	Seï high strength brown bluish grey moΣ led slightly gravelly CLAY of high plaseicity (¡ eld assessment). Low cobble content. Gravel is ¡ ne to coarse subangular to subrounded coal, mudstone, sandstone and limestone. Cobbles are subrounded limestone.	2.30		
			3	Very seï high strength greyish brown slightly gravelly CLAY of medium plaseicity (¡ eld assessment). Gravel is ¡ ne to medium subangular to subrounded mudstone, sandstone and limestone.	3.10		
				End of trial pit at 3.10m			
			4				
			5				

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Descripeon	Depth (m)	Level (m AOD)	Legend
				MADE GROUND: Brown slightly gravelly SAND. Sand is ł ne to coarse. Gravel is ł ne to coarse subangular sandstone, dolomite, brick and concrete. Includes occasional roots.	0.15		
				MADE GROUND: Brown gravelly SAND. Sand is ł ne to coarse. Gravel is ł ne to coarse subangular sandstone, dolomite, brick and concrete.	0.50		
			1	Firm medium strength orangish brown slightly sandy slightly gravelly CLAY of medium plaseecity (ł eld assessment). Sand is ł ne to medium. Gravel is ł ne subangular coal, mudstone, sandstone and limestone.	1.30		
			2	Seei medium strength brown bluish grey moΣ led slightly gravelly CLAY of high plaseecity (ł eld assessment). Low cobble content. Gravel is ł ne to coarse subangular to subrounded coal, mudstone, sandstone and limestone. Cobbles are subrounded limestone.	2.60		
			3	Very seei high to very high strength greyish brown slightly gravelly CLAY of medium plaseecity (ł eld assessment). Gravel is ł ne to medium subangular to subrounded mudstone, sandstone and limestone.	3.00		
				End of trial pit at 3.00m			
			4				
			5				

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend
				MADE GROUND: Soft dark brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is fine subangular to subrounded coal and mudstone. Includes numerous roots. (Reworked Topsoil)	0.15		
				MADE GROUND: Stiff desiccated orangish brown slightly sandy slightly gravelly CLAY. Low cobble content. Sand is fine to coarse. Gravel is fine to coarse subangular dolomite and brick. Cobbles are brick. Includes occasional roots.	0.60		
			1	Stiff medium strength occasionally high strength brown bluish grey mottled slightly gravelly CLAY of intermediate plasticity. Low cobble content. Gravel is fine to coarse subangular to subrounded coal, mudstone, sandstone and limestone. Cobbles are subrounded limestone.			
				At 1.45m - Becomes high strength.			
			2				
				Very stiff high strength greyish brown slightly gravelly CLAY of medium plasticity (field assessment). Gravel is fine to medium subangular to subrounded mudstone, sandstone and limestone.	2.40		
			3	End of trial pit at 3.00m	3.00		
			4				
			5				

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend
				MADE GROUND: Brown slightly gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse subangular sandstone, dolomite, brick and concrete. Includes occasional roots.	0.15		
				MADE GROUND: Soft desiccated greyish brown slightly gravelly CLAY. Gravel is fine to coarse subangular coal, dolomite, brick and concrete.	0.40		
				Firm orangish brown slightly sandy slightly gravelly CLAY of medium plasticity (field assessment). Sand is fine to medium. Gravel is fine subangular coal, mudstone, sandstone and limestone.	0.80		
			1	Stiff high strength brown bluish grey mottled slightly gravelly CLAY of high plasticity (field assessment). Low cobble content. Gravel is fine to coarse subangular to subrounded coal, mudstone, sandstone and limestone. Cobbles are subrounded limestone.			
				At 1.9m - Becomes medium strength.			
			2				
				Very stiff high strength greyish brown slightly gravelly CLAY of medium plasticity (field assessment). Gravel is fine to medium subangular to subrounded mudstone, sandstone and limestone.	2.60		
			3	End of trial pit at 3.00m	3.00		
			4				
			5				

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend
				MADE GROUND: Brown slightly gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse subangular sandstone, dolomite, brick and concrete. Includes occasional roots.	0.15		
				MADE GROUND: Brown gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse subangular sandstone, dolomite, brick and concrete.	0.40		
				Stiff medium strength occasionally high strength orangish brown slightly sandy slightly gravelly CLAY of intermediate plasticity. Sand is fine to medium. Gravel is fine subangular limestone.	0.95		
			1	Stiff high strength occasionally medium strength brown bluish grey mottled slightly gravelly CLAY of high plasticity (field assessment). Low cobble content. Gravel is fine to coarse subangular to subrounded coal, mudstone, sandstone and limestone. Cobbles are subrounded limestone.			
			2				
				Very stiff high strength greyish brown slightly gravelly CLAY of medium plasticity (field assessment). Gravel is fine to medium subangular to subrounded mudstone, sandstone and limestone.	2.80		
			3	End of trial pit at 3.10m	3.10		
			4				
			5				

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend
				MADE GROUND: Soft dark brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is fine subangular to subrounded coal and mudstone. Includes numerous roots. (Reworked Topsoil)	0.15		
				MADE GROUND: Stiff desiccated greyish brown slightly gravelly CLAY. Gravel is fine to coarse subangular coal, dolomite, brick and concrete.	0.50		
				Stiff high strength orangish brown slightly sandy slightly gravelly CLAY of medium plasticity (field assessment). Sand is fine to medium. Gravel is fine subangular coal, mudstone, sandstone and limestone.	0.80		
			1	Very stiff high strength brown bluish grey mottled slightly gravelly CLAY of high plasticity. Low cobble content. Gravel is fine to coarse subangular to subrounded coal, mudstone, sandstone and limestone. Cobbles are subrounded limestone.			
			2	Very weak cream LIMESTONE. Highly weathered.	2.00		
				End of trial pit at 2.20m	2.20		
			3				
			4				
			5				

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend
				MADE GROUND: Brown slightly gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse subangular sandstone, dolomite, brick and concrete. Includes occasional roots.	0.15		
				MADE GROUND: Stiff desiccated orangish brown slightly gravelly CLAY. Gravel is fine to coarse subangular coal, dolomite, brick and concrete. Includes bricks.	0.40		
				Stiff high strength orangish brown mottled grey slightly sandy slightly gravelly CLAY of medium plasticity (field assessment). Sand is fine to medium. Gravel is fine subangular coal, mudstone, sandstone and limestone.	0.95		
			1	Very stiff high strength brown bluish grey mottled slightly gravelly CLAY of high plasticity. Low cobble content. Gravel is fine to coarse subangular to subrounded coal, mudstone, sandstone and limestone. Cobbles are subrounded limestone.			
			2				
				Very weak cream LIMESTONE. Highly weathered.	2.25		
				End of trial pit at 2.50m	2.50		
			3				
			4				
			5				

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend
				MADE GROUND: Brown slightly gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse subangular sandstone, dolomite, brick and concrete. Includes occasional roots.	0.15		
				MADE GROUND: Soft desiccated greyish brown slightly gravelly CLAY. Gravel is fine to coarse subangular coal, dolomite, brick and concrete.	0.50		
				Firm to stiff high strength occasionally medium strength orangish brown slightly sandy slightly gravelly CLAY of medium plasticity (field assessment). Sand is fine to medium. Gravel is fine subangular coal, mudstone, sandstone and limestone.	0.95		
			1	Stiff high strength brown bluish grey mottled slightly gravelly CLAY of high plasticity (field assessment). Low cobble content. Gravel is fine to coarse subangular to subrounded coal, mudstone, sandstone and limestone. Cobbles are subrounded limestone.			
			2				
			3	End of trial pit at 3.00m	3.00		
			4				
			5				

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Descripeon	Depth (m)	Level (m AOD)	Legend
				MADE GROUND: Brown slightly gravelly SAND. Sand is ¡ ne to coarse. Gravel is ¡ ne to coarse subangular sandstone, dolomite, brick and concrete. Includes occasional roots and remnants of concrete foundaeons.			
					0.45		
				Sei high strength occasionally medium strength orangish brown moΣ led grey slightly sandy slightly gravelly CLAY of medium plasecity (¡ eld assessment). Sand is ¡ ne to medium. Gravel is ¡ ne subangular coal, mudstone, sandstone and limestone.			
					0.90		
			1	Sei high strength brown bluish grey moΣ led slightly gravelly CLAY of high plasecity (¡ eld assessment). Low cobble content. Gravel is ¡ ne to coarse subangular to subrounded coal, mudstone, sandstone and limestone. Cobbles are subrounded limestone.			
			2				
			3	End of trial pit at 3.00m	3.00		
			4				
			5				

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend
				MADE GROUND: Brown slightly gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse subangular sandstone, dolomite, brick and concrete. Includes occasional roots.	0.15		
				MADE GROUND: Soft desiccated orangish brown slightly gravelly CLAY. Gravel is fine to coarse subangular coal, dolomite, brick and concrete. Includes bricks.	0.30		
				Firm to stiff medium strength orangish brown slightly sandy slightly gravelly CLAY of medium plasticity (field assessment). Sand is fine to medium. Gravel is fine subangular coal, mudstone, sandstone and limestone.	0.80		
			1	Stiff high strength brown bluish grey mottled slightly gravelly CLAY of intermediate plasticity. Low cobble content. Gravel is fine to coarse subangular to subrounded coal, mudstone, sandstone and limestone. Cobbles are subrounded limestone.			
			2				
				Very weak cream LIMESTONE. Highly weathered.	2.80		
				End of trial pit at 2.90m	2.90		
			3				
			4				
			5				

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend
				MADE GROUND: Brown slightly gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse subangular sandstone, dolomite, brick and concrete. Includes occasional roots.	0.15		
				MADE GROUND: Grey SAND AND GRAVEL. Sand is fine to coarse. Gravel is fine to coarse angular concrete, brick and glass. Includes degraded plastic.	0.30		
				Firm to stiff high strength occasionally medium strength orangish brown slightly sandy slightly gravelly CLAY of medium plasticity (field assessment). Sand is fine to medium. Gravel is fine subangular coal, mudstone, sandstone and limestone.	0.95		
			1	Stiff high strength brown bluish grey mottled slightly gravelly CLAY of high plasticity (field assessment). Low cobble content. Gravel is fine to coarse subangular to subrounded coal, mudstone, sandstone and limestone. Cobbles are subrounded limestone.			
			2				
			3	End of trial pit at 3.00m	3.00		
			4				
			5				

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Descripeon	Depth (m)	Level (m AOD)	Legend
				MADE GROUND: Brown slightly gravelly SAND. Sand is ¦ ne to coarse. Gravel is ¦ ne to coarse subangular sandstone, dolomite, brick and concrete. Includes occasional roots.	0.15		
				MADE GROUND: Grey SAND AND GRAVEL. Sand is ¦ ne to coarse. Gravel is ¦ ne to coarse angular concrete, brick and glass. Includes degraded plaseec. Includes remnants of brick walls and concrete foundaeons.	0.40		
				Seī high strength orangish brown slightly sandy slightly gravelly CLAY of medium plaseecity (¦ eld assessment). Sand is ¦ ne to medium. Gravel is ¦ ne subangular coal, mudstone, sandstone and limestone.	0.75		
			1	Very seī high strength brown bluish grey moΣ led slightly gravelly CLAY of high plaseecity. Low cobble content. Gravel is ¦ ne to coarse subangular to subrounded coal, mudstone, sandstone and limestone. Cobbles are subrounded limestone.			
			2				
				Very weak cream LIMESTONE. Highly weathered.	2.70		
				End of trial pit at 2.90m	2.90		
			3				
			4				
			5				

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Descripeon	Depth (m)	Level (m AOD)	Legend
				MADE GROUND: Brown slightly gravelly SAND. Sand is ¡ ne to coarse. Gravel is ¡ ne to coarse subangular sandstone, dolomite, brick and concrete. Includes occasional roots.			
				Firm to seī orangish brown slightly sandy slightly gravelly CLAY of medium plasecity (¡ eld assessment). Sand is ¡ ne to medium. Gravel is ¡ ne subangular coal, mudstone, sandstone and limestone.	0.35		
				Seī brown bluish grey moΣ led slightly gravelly CLAY of high plasecity. Low cobble content. Gravel is ¡ ne to coarse subangular to subrounded coal, mudstone, sandstone and limestone. Cobbles are subrounded limestone.	0.80		
			1				
			2				
			3	End of trial pit at 3.00m	3.00		
			4				
			5				

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Descripeon	Depth (m)	Level (m AOD)	Legend
				MADE GROUND: Brown slightly gravelly SAND. Sand is ¡ ne to coarse. Gravel is ¡ ne to coarse subangular sandstone, dolomite, brick and concrete. Includes occasional roots.			
					0.60		
				Seī high strength occasionally medium strength orangish brown slightly sandy slightly gravelly CLAY of very high plaseecity. Sand is ¡ ne to medium. Gravel is ¡ ne subangular coal, mudstone, sandstone and limestone.			
			1				
					1.20		
				Seī high strength occasionally medium strength brown bluish grey moΣ led slightly gravelly CLAY of high plaseecity (¡ eld assessment). Low cobble content. Gravel is ¡ ne to coarse subangular to subrounded coal, mudstone, sandstone and limestone. Cobbles are subrounded limestone.			
			2		2.00		
				Very seī high to very high strength greyish brown slightly gravelly CLAY of medium plaseecity (¡ eld assessment). Gravel is ¡ ne to medium subangular to subrounded mudstone, sandstone and limestone.			
					2.90		
				End of trial pit at 2.90m			
			3				
			4				
			5				

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend
				MADE GROUND: Brown slightly gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse subangular sandstone, dolomite and glass. Includes occasional roots.	0.15		
				Stiff high strength orangish brown slightly sandy slightly gravelly CLAY of medium plasticity (field assessment). Sand is fine to medium. Gravel is fine subangular coal, mudstone, sandstone and limestone.			
			1				
				Firm medium strength brown bluish grey mottled slightly gravelly CLAY of high plasticity (field assessment). Low cobble content. Gravel is fine to coarse subangular to subrounded coal, mudstone, sandstone and limestone. Cobbles are subrounded limestone.	1.50		
			2				
				From 2.2m - Occasionally high strength.			
			3	End of trial pit at 3.00m	3.00		
			4				
			5				

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend
				MADE GROUND: Brown slightly gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse subangular sandstone, dolomite and glass. Includes occasional roots.	0.25		
				Firm to stiff high strength occasionally medium strength orangish brown slightly sandy slightly gravelly CLAY of medium plasticity (field assessment). Sand is fine to medium. Gravel is fine subangular coal, mudstone, sandstone and limestone.	0.80		
			1	Stiff high strength brown bluish grey mottled slightly gravelly CLAY of high plasticity (field assessment). Low cobble content. Gravel is fine to coarse subangular to subrounded coal, mudstone, sandstone and limestone. Cobbles are subrounded limestone.			
			2				
				Very weak cream LIMESTONE. Highly weathered.	2.75		
				End of trial pit at 2.85m	2.85		
			3				
			4				
			5				

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Descripeon	Depth (m)	Level (m AOD)	Legend
				MADE GROUND: Brown slightly gravelly SAND. Sand is ¦ ne to coarse. Gravel is ¦ ne to coarse subangular sandstone, dolomite, brick and concrete. Includes occasional roots.	0.15		
				MADE GROUND: Seī desiccated greyish brown slightly gravelly CLAY. Gravel is ¦ ne to coarse subangular coal, dolomite, brick and concrete. Includes remnants of brick walls.	0.40		
				Very seī high strength brown bluish grey moΣled slightly gravelly CLAY of intermediate plaseicity. Low cobble content. Gravel is ¦ ne to coarse subangular to subrounded coal, mudstone, sandstone and limestone. Cobbles are subrounded limestone.			
			1				
				At 1.4m - Occasionally medium strength.			
			2				
			3	End of trial pit at 3.00m	3.00		
			4				
			5				

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend
				MADE GROUND: Brown slightly gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse subangular sandstone, dolomite, brick and concrete. Includes occasional roots.	0.15		
				MADE GROUND: Soft desiccated orangish brown slightly gravelly CLAY. Gravel is fine to coarse subangular coal, dolomite, brick and concrete. Includes bricks.	0.50		
			1	Soft high strength brown bluish grey mottled slightly gravelly CLAY of high plasticity (field assessment). Low cobble content. Gravel is fine to coarse subangular to subrounded coal, mudstone, sandstone and limestone. Cobbles are subrounded limestone.			
			2				
				End of trial pit at 2.50m	2.50		
			3				
			4				
			5				

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend
				MADE GROUND: Brown slightly gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse subangular sandstone, dolomite, brick and concrete. Includes occasional roots, bricks plastic and rotting timber.	0.15		
				MADE GROUND: Stiff desiccated orangish brown slightly gravelly CLAY. Gravel is fine to coarse subangular coal, dolomite, brick and concrete. Includes bricks.	0.30		
				Stiff high strength orangish brown mottled grey slightly sandy slightly gravelly CLAY of medium plasticity (field assessment). Sand is fine to medium. Gravel is fine subangular coal, mudstone, sandstone and limestone.	0.60		
				From 0.3m to 0.45m - Intact concrete foundation within eastern wall of trial pit			
			1	Very stiff high strength brown bluish grey mottled slightly gravelly CLAY of intermediate plasticity. Low cobble content. Gravel is fine to coarse subangular to subrounded coal, mudstone, sandstone and limestone. Cobbles are subrounded limestone.			
			2				
				End of trial pit at 2.50m	2.50		
			3				
			4				
			5				

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Descripeon	Depth (m)	Level (m AOD)	Legend
				MADE GROUND: Brown slightly gravelly SAND. Sand is ¦ ne to coarse. Gravel is ¦ ne to coarse subangular sandstone, dolomite and glass. Includes occasional roots.			
					0.40		
				Seī high strength occasionally medium strength orangish brown slightly sandy slightly gravelly CLAY of intermediate plaseȣcity. Sand is ¦ ne to medium. Gravel is ¦ ne subangular coal, mudstone, sandstone and limestone.			
			1				
					1.10		
				Seī high strength brown bluish grey moΣ led slightly gravelly CLAY of high plaseȣcity (¦ eld assessment). Low cobble content. Gravel is ¦ ne to coarse subangular to subrounded coal, mudstone, sandstone and limestone. Cobbles are subrounded limestone.			
			2				
			3	End of trial pit at 3.00m	3.00		
			4				
			5				

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend
				MADE GROUND: Soft dark brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is fine subangular to subrounded coal and mudstone. Includes numerous roots. (Reworked Topsoil)	0.10		
				MADE GROUND: Firm desiccated greyish brown slightly gravelly CLAY. Gravel is fine to coarse subangular coal, dolomite, brick and concrete. Includes remnants of brick walls and concrete foundations.	0.50		
				Firm high strength occasionally medium strength brown bluish grey mottled slightly gravelly CLAY of high plasticity. Low cobble content. Gravel is fine to coarse subangular to subrounded coal, mudstone, sandstone and limestone. Cobbles are subrounded limestone.			
			1				
				At 1.6m - Becomes high strength.			
			2				
				End of trial pit at 2.90m	2.90		
			3				
			4				
			5				

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend
				MADE GROUND: Brown slightly gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse subangular sandstone, dolomite and glass. Includes occasional roots.			
				Stiff high strength orangish brown mottled grey slightly sandy slightly gravelly CLAY of medium plasticity (field assessment). Sand is fine to medium. Gravel is fine subangular coal, mudstone, sandstone and limestone.	0.40		
				Stiff high strength brown bluish grey mottled slightly gravelly CLAY of high plasticity (field assessment). Low cobble content. Gravel is fine to coarse subangular to subrounded coal, mudstone, sandstone and limestone. Cobbles are subrounded limestone.	0.90		
			1				
			2				
				Very stiff high strength greyish brown slightly gravelly CLAY of medium plasticity (field assessment). Gravel is fine to medium subangular to subrounded mudstone, sandstone and limestone.	2.70		
			3	End of trial pit at 3.00m	3.00		
			4				
			5				

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Descripeon	Depth (m)	Level (m AOD)	Legend
				MADE GROUND: SoŌ dark brown slightly sandy slightly gravelly CLAY. Sand is ļ ne to coarse. Gravel is ļ ne subangular to subrounded coal and mudstone. Includes numerous roots. (Reworked Topsoil)			
				Firm medium strength orangish brown slightly sandy slightly gravelly CLAY of medium plaseȣcity (ļ eld assessment). Sand is ļ ne to medium. Gravel is ļ ne subangular coal, mudstone, sandstone and limestone.	0.40		
			1	Very seī high strength brown bluish grey moΣ led slightly gravelly CLAY of intermediate plaseȣcity. Low cobble content. Gravel is ļ ne to coarse subangular to subrounded coal, mudstone, sandstone and limestone. Cobbles are subrounded limestone.	0.90		
			2				
				End of trial pit at 2.40m	2.40		
			3				
			4				
			5				

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend
				MADE GROUND: Brown slightly gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse subangular sandstone, dolomite brick and concrete. Includes occasional roots.	0.20		
				Stiff high strength orangish brown mottled grey slightly sandy slightly gravelly CLAY of medium plasticity (field assessment). Sand is fine to medium. Gravel is fine subangular coal, mudstone, sandstone and limestone.	0.70		
			1	Very stiff high strength brown bluish grey mottled slightly gravelly CLAY of intermediate plasticity. Low cobble content. Gravel is fine to coarse subangular to subrounded coal, mudstone, sandstone and limestone. Cobbles are subrounded limestone.			
			2				
				Very weak cream LIMESTONE. Highly weathered.	2.80		
			3	End of trial pit at 3.00m	3.00		
			4				
			5				

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend
				MADE GROUND: Brown slightly gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse subangular sandstone, dolomite brick and concrete. Includes occasional roots.	0.15		
				MADE GROUND: Stiff desiccated greyish brown slightly gravelly CLAY. Gravel is fine to coarse subangular coal, dolomite, brick and concrete.	0.50		
				Stiff high strength orangish brown slightly sandy slightly gravelly CLAY of medium plasticity (field assessment). Sand is fine to medium. Gravel is fine subangular coal, mudstone, sandstone and limestone.	0.80		
				At 0.5m - Slight hydrocarbon odour with no visual evidence			
			1	Very stiff high strength brown bluish grey mottled slightly gravelly CLAY of intermediate plasticity. Low cobble content. Gravel is fine to coarse subangular to subrounded coal, mudstone, sandstone and limestone. Cobbles are subrounded limestone.			
			2				
				End of trial pit at 2.50m	2.50		
			3				
			4				
			5				

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend
				MADE GROUND: Brown slightly gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse subangular sandstone, dolomite, brick and concrete. Includes occasional roots.	0.15		
				MADE GROUND: Soft desiccated greyish brown slightly gravelly CLAY. Gravel is fine to coarse subangular coal, dolomite, brick and concrete.	0.50		
				Firm brown slightly sandy CLAY of high plasticity (field assessment). Sand is fine to medium.			
			1	End of trial pit at 1.00m	1.00		
			2				
			3				
			4				
			5				

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Descripeon	Depth (m)	Level (m AOD)	Legend
				MADE GROUND: Brown slightly gravelly SAND. Sand is ļ ne to coarse. Gravel is ļ ne to coarse subangular sandstone, dolomite, brick and concrete. Includes occasional roots.	0.15		
				MADE GROUND: SoŌ to ļ rm brown gravelly CLAY of high plaseċity (ļ eld assessment). Gravel is ļ ne to coarse angular coal, mudstone, sandstone and limestone. Includes degraded plaseċ.			
			1	MADE GROUND: SoŌ to ļ rm brown gravelly CLAY of high plaseċity (ļ eld assessment). Gravel is ļ ne to coarse angular coal, mudstone, sandstone and limestone. Includes degraded plaseċ and bands of black sandy gravel.	1.00		
			2	*From 2.0m to 2.4m - Bands of black sandy gravel contain hydrocarbons. Concrete foundation remnants.*			
				Very seī high to very high strength greyish brown slightly gravelly CLAY of medium plaseċity (ļ eld assessment). Gravel is ļ ne to medium subangular to subrounded mudstone, sandstone and limestone.	2.40		
			3	End of trial pit at 3.30m	3.30		
			4				
			5				

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Descripeon	Depth (m)	Level (m AOD)	Legend
				MADE GROUND: Brown slightly gravelly SAND. Sand is ¡ ne to coarse. Gravel is ¡ ne to coarse subangular sandstone, dolomite, brick and concrete. Includes occasional roots.	0.15		
				MADE GROUND: Seri desiccated greyish brown slightly gravelly CLAY. Gravel is ¡ ne to coarse subangular coal, dolomite, brick and concrete.	0.60		
			1	Seri high strength occasionally medium strength brown bluish grey moΣ led slightly gravelly CLAY of high plaseocity (¡ eld assessment). Low cobble content. Gravel is ¡ ne to coarse subangular to subrounded coal, mudstone, sandstone and limestone. Cobbles are subrounded limestone.	1.10		
				End of trial pit at 1.10m			
			2				
			3				
			4				
			5				

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Descripeon	Depth (m)	Level (m AOD)	Legend
				MADE GROUND: Brown slightly gravelly SAND. Sand is ¦ ne to coarse. Gravel is ¦ ne to coarse subangular sandstone, dolomite, brick and concrete. Includes occasional roots.	0.10		
				MADE GROUND: Seī desiccated greyish brown slightly gravelly CLAY. Gravel is ¦ ne to coarse subangular coal, dolomite, brick and concrete.	0.50		
			1	Seī high strength occasionally medium strength brown bluish grey moΣ led slightly gravelly CLAY of high plaseθcity (¦ eld assessment). Low cobble content. Gravel is ¦ ne to coarse subangular to subrounded coal, mudstone, sandstone and limestone. Cobbles are subrounded limestone.			
				End of trial pit at 1.20m	1.20		
			2				
			3				
			4				
			5				

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Descripeon	Depth (m)	Level (m AOD)	Legend
				MADE GROUND: Brown slightly gravelly SAND. Sand is ¦ ne to coarse. Gravel is ¦ ne to coarse subangular sandstone, dolomite, brick and concrete. Includes occasional roots.	0.15		
				MADE GROUND: Seī desiccated greyish brown slightly gravelly CLAY. Gravel is ¦ ne to coarse subangular coal, dolomite, brick and concrete.	0.40		
				MADE GROUND: Black sandy GRAVEL. Sand is ¦ ne to coarse. Gravel is ¦ ne to coarse angular clinker and coal.	0.45		
				MADE GROUND: SoŌ orangish brown slightly sandy slightly gravelly CLAY of medium plaseċity (¦ eld assessment). Sand is ¦ ne to medium. Gravel is ¦ ne subangular coal, mudstone, sandstone and limestone.	0.80		
			1	MADE GROUND: Black sandy GRAVEL. Sand is ¦ ne to coarse. Gravel is ¦ ne to coarse angular mudstone, sandstone and whinstone. Includes moderate odour and visual evidence of hydrocarbons.	1.15		
				Seī brown bluish grey moΣ led slightly gravelly CLAY of high plaseċity (¦ eld assessment). Low cobble content. Gravel is ¦ ne to coarse subangular to subrounded coal, mudstone, sandstone and limestone. Cobbles are subrounded limestone.			
				End of trial pit at 1.70m	1.70		
			2				
			3				
			4				
			5				

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Descripeon	Depth (m)	Level (m AOD)	Legend
				MADE GROUND: Brown slightly gravelly SAND. Sand is ł ne to coarse. Gravel is ł ne to coarse subangular sandstone, dolomite, brick and concrete. Includes occasional roots.	0.15		
				MADE GROUND: Seī desiccated greyish brown slightly gravelly CLAY. Gravel is ł ne to coarse subangular coal, dolomite, brick and concrete.	0.45		
				MADE GROUND: Black sandy GRAVEL. Sand is ł ne to coarse. Gravel is ł ne to coarse angular clinker and coal.	0.50		
				Seī brown sandy silty CLAY of low plaseċity (ł eld assessment). Sand is ł ne to medium.	0.80		
			1	Seī brown bluish grey moΣ led slightly gravelly CLAY of high plaseċity (ł eld assessment). Low cobble content. Gravel is ł ne to coarse subangular to subrounded coal, mudstone, sandstone and limestone. Cobbles are subrounded limestone.	1.00		
				End of trial pit at 1.00m			
			2				
			3				
			4				
			5				

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Descripeon	Depth (m)	Level (m AOD)	Legend
				MADE GROUND: Brown slightly gravelly SAND. Sand is ¦ ne to coarse. Gravel is ¦ ne to coarse subangular sandstone, dolomite brick and concrete. Includes occasional roots.	0.15		
				MADE GROUND: Brown clayey SAND AND GRAVEL. Sand is ¦ ne to coarse. Gravel is ¦ ne to coarse angular brick, concrete and dolomite. Includes bricks.	0.55		
				Seī high strength orangish brown moΣ led grey slightly sandy slightly gravelly CLAY of high plaseθcity. Sand is ¦ ne to medium. Gravel is ¦ ne subangular coal, mudstone, sandstone and limestone.	0.90		
			1	Seī high strength brown bluish grey moΣ led slightly gravelly CLAY of high plaseθcity (¦ eld assessment). Low cobble content. Gravel is ¦ ne to coarse subangular to subrounded coal, mudstone, sandstone and limestone. Cobbles are subrounded limestone.			
			2				
				End of trial pit at 2.80m	2.80		
			3				
			4				
			5				

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend
				MADE GROUND: Brown slightly gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse subangular sandstone, dolomite brick and concrete. Includes occasional roots and degraded plastic.			
				Stiff high strength brown bluish grey mottled slightly gravelly CLAY of high plasticity (field assessment). Low cobble content. Gravel is fine to coarse subangular to subrounded coal, mudstone, sandstone and limestone. Cobbles are subrounded limestone.	0.40		
			1				
			2				
				Very weak cream LIMESTONE. Highly weathered.	2.40		
				End of trial pit at 2.90m	2.90		
			3				
			4				
			5				

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Descripϴon	Depth (m)	Level (m AOD)	Legend
				MADE GROUND: Brown slightly gravelly SAND. Sand is ļ ne to coarse. Gravel is ļ ne to coarse subangular sandstone, dolomite brick and concrete. Includes occasional roots.	0.15		
				MADE GROUND: Sϴī desiccated orangish brown slightly gravelly CLAY. Gravel is ļ ne to coarse subangular coal, dolomite, brick and concrete.	0.40		
				MADE GROUND: Brown sandy GRAVEL. Sand is ļ ne to coarse. Gravel is ļ ne to coarse angular mudstone, dolomite and shale. *At 0.5m - Suspected asbestos containing cement fragment*	0.65		
			1	Very sϴī high strength orangish brown slightly sandy slightly gravelly CLAY of high plasϴcity. Sand is ļ ne to medium. Gravel is ļ ne subangular coal, mudstone, sandstone and limestone.			
				Sϴī high strength brown bluish grey moΣ led slightly gravelly CLAY of high plasϴcity (ļ eld assessment). Low cobble content. Gravel is ļ ne to coarse subangular to subrounded coal, mudstone, sandstone and limestone. Cobbles are subrounded limestone.	1.40		
			2	Very weak cream LIMESTONE. Highly weathered.	1.90		
				End of trial pit at 2.35m	2.35		
			3				
			4				
			5				

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend
				MADE GROUND: Brown slightly gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse subangular sandstone, dolomite brick and concrete. Includes occasional roots.	0.15		
				MADE GROUND: Soft brown bluish grey mottled slightly gravelly CLAY of high plasticity (field assessment). Gravel is fine to coarse subangular to subrounded coal, mudstone, sandstone and limestone.	0.35		
				MADE GROUND: Brown sandy GRAVEL. Sand is fine to coarse. Gravel is fine to coarse angular concrete and dolomite.	0.50		
				Stiff high strength orangish brown slightly sandy slightly gravelly CLAY of medium plasticity (field assessment). Sand is fine to medium. Gravel is fine subangular coal, mudstone, sandstone and limestone.			
			1				
			2				
				End of trial pit at 2.10m	2.10		
			3				
			4				
			5				

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Descripeon	Depth (m)	Level (m AOD)	Legend
				MADE GROUND: Brown slightly gravelly SAND. Sand is ¡ ne to coarse. Gravel is ¡ ne to coarse subangular sandstone, dolomite brick and concrete. Includes occasional roots.	0.15		
				MADE GROUND: Seri desiccated orangish brown slightly gravelly CLAY. Gravel is ¡ ne to coarse subangular coal, dolomite, brick and concrete.	0.35		
				MADE GROUND: Black sandy GRAVEL. Sand is ¡ ne to coarse. Gravel is ¡ ne to coarse angular clinker and coal.	0.50		
				Seri high strength orangish brown slightly sandy slightly gravelly CLAY of medium plaseicity (¡ eld assessment). Sand is ¡ ne to medium. Gravel is ¡ ne subangular coal, mudstone, sandstone and limestone.			
			1				
				Very weak cream LIMESTONE. Highly weathered.	1.25		
				End of trial pit at 1.40m	1.40		
			2				
			3				
			4				
			5				

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend
				MADE GROUND: Brown slightly gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse subangular sandstone, dolomite brick and concrete. Includes occasional roots.			
				MADE GROUND: Grey SAND AND GRAVEL. Sand is fine to coarse. Gravel is fine to coarse angular concrete, brick and coal.	0.30		
				Stiff high strength orangish brown slightly sandy slightly gravelly CLAY of intermediate plasticity. Sand is fine to medium. Gravel is fine subangular coal, mudstone, sandstone and limestone.	0.50		
			1				
			2	End of trial pit at 2.05m	2.05		
			3				
			4				
			5				

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend
				MADE GROUND: Brown slightly gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse subangular sandstone, dolomite brick and concrete. Includes occasional roots.	0.15		
				MADE GROUND: Brown clayey SAND AND GRAVEL. Sand is fine to coarse. Gravel is fine to coarse angular brick, concrete and dolomite. Includes bricks.	0.60		
			1	Soft brown bluish grey mottled slightly gravelly CLAY of high plasticity (field assessment). Low cobble content. Gravel is fine to coarse subangular to subrounded coal, mudstone, sandstone and limestone. Cobbles are subrounded limestone.			
			2	End of trial pit at 2.00m	2.00		
			3				
			4				
			5				

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Descripeon	Depth (m)	Level (m AOD)	Legend
				MADE GROUND: Brown slightly gravelly SAND. Sand is ¦ ne to coarse. Gravel is ¦ ne to coarse subangular sandstone, dolomite, brick and concrete. Includes occasional roots.			
				Firm orangish brown slightly sandy slightly gravelly CLAY of medium plaseCity (¦ eld assessment). Sand is ¦ ne to medium. Gravel is ¦ ne subangular coal, mudstone, sandstone and limestone.	0.35		
				Seï brown bluish grey moΣ led slightly gravelly CLAY of high plaseCity (¦ eld assessment). Low cobble content. Gravel is ¦ ne to coarse subangular to subrounded coal, mudstone, sandstone and limestone. Cobbles are subrounded limestone.	0.85		
				End of trial pit at 1.90m	1.90		

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend
				MADE GROUND: Brown slightly gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse subangular sandstone, dolomite, brick and concrete. Includes occasional roots.	0.15		
				MADE GROUND: Grey SAND AND GRAVEL. Sand is fine to coarse. Gravel is fine to coarse angular concrete, brick and coal.	0.40		
				Firm orangish brown slightly sandy slightly gravelly CLAY of medium plasticity (field assessment). Sand is fine to medium. Gravel is fine subangular coal, mudstone, sandstone and limestone.			
			1				
				End of trial pit at 1.90m	1.90		
			2				
			3				
			4				
			5				

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend
				MADE GROUND: Brown slightly gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse subangular sandstone, dolomite, brick and concrete. Includes occasional roots.	0.15		
				MADE GROUND: Soft desiccated grey slightly gravelly CLAY. Gravel is fine to coarse subangular coal, dolomite, brick and concrete.	0.45		
				Firm orangish brown slightly sandy slightly gravelly CLAY of medium plasticity (field assessment). Sand is fine to medium. Gravel is fine subangular coal, mudstone, sandstone and limestone.	0.80		
			1	Soft brown bluish grey mottled slightly gravelly CLAY of high plasticity (field assessment). Low cobble content. Gravel is fine to coarse subangular to subrounded coal, mudstone, sandstone and limestone. Cobbles are subrounded limestone.			
				End of trial pit at 1.80m	1.80		
			2				
			3				
			4				
			5				

SOAKAWAY DESIGN IN ACCORDANCE WITH BRE DIGEST 365: 2007			
Client:	Gleeson Regeneration Ltd		
Site:	Jack Lawson Terrace, Wheatley Hill		
Job No:	C9843	Test No:	SA01-1

CALCULATION OF SOIL INFILTRATION RATE

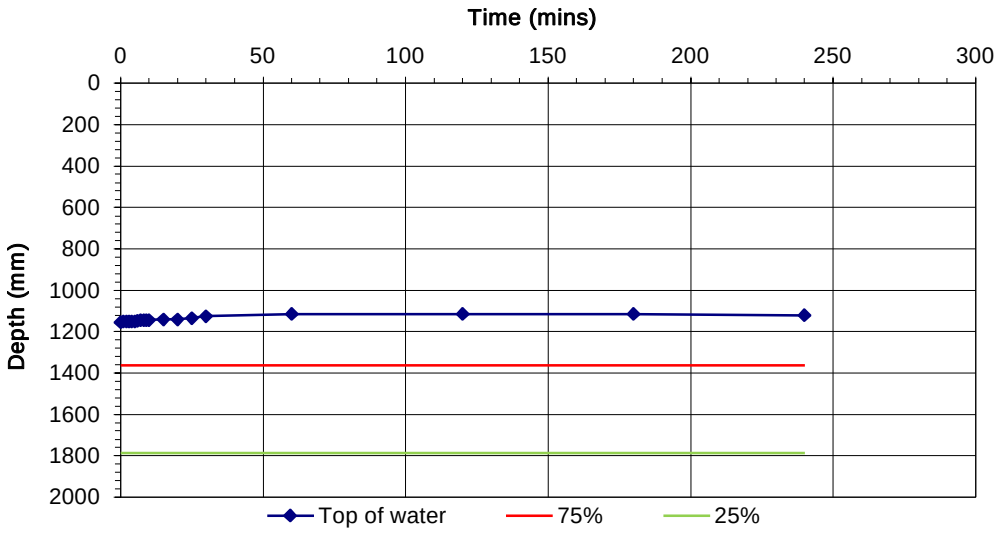
Time (min)	Depth (mm)
0	1155
1	1150
2	1150
3	1150
4	1150
5	1150
6	1147
7	1145
8	1145
9	1145
10	1145
15	1140
20	1140
25	1135
30	1125
60	1115
120	1115
180	1115
240	1120

Size of Soakaway		
	Length (m) =	2.05
	Width (m) =	0.35
	Depth (m) =	2.00

Depth at start of test (mm)=	1150mm
Depth of trial pit (mm)=	2000mm
75% effective depth (mm)=	1363mm
50% effective depth =	1575mm
25% effective depth =	1788mm
Base area of pit (m^2) =	0.718
Effective area of loss 50% (m^2) =	2.758
Volume outflow 75 - 25% (m^3) =	0.305

From the graph:	
tp 75 (min) =	n/a
tp 25 (min) =	n/a

Soil infiltration rate, f, (m/s) =	n/a	Normal test
Input by: JWM	Date:	27/06/2023
Checked by: MG	Date:	28/07/2023



SOAKAWAY DESIGN IN ACCORDANCE WITH BRE DIGEST 365: 2007			
Client:	Gleeson Regeneration Ltd		
Site:	Jack Lawson Terrace, Wheatley Hill		
Job No:	C9843	Test No:	SA02-1

CALCULATION OF SOIL INFILTRATION RATE

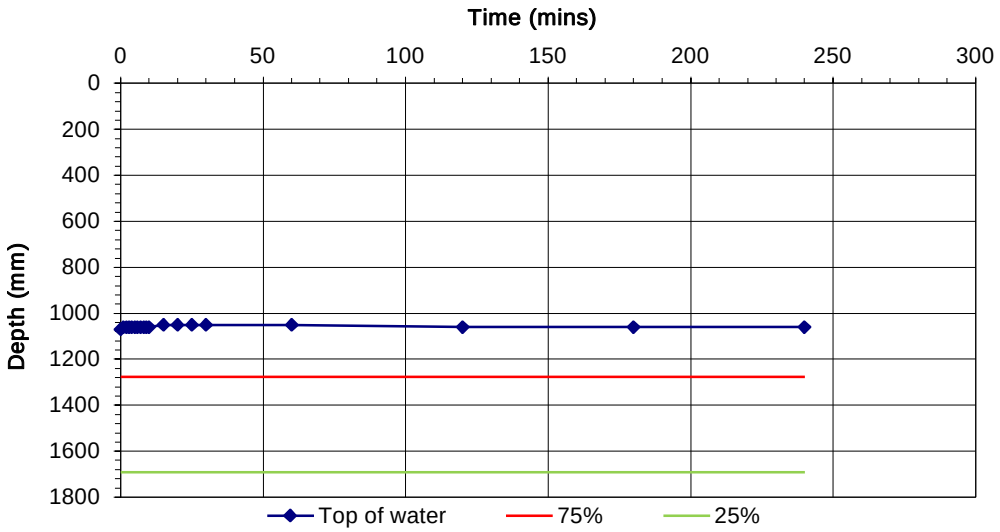
Time (min)	Depth (mm)
0	1070
1	1060
2	1060
3	1060
4	1060
5	1060
6	1060
7	1060
8	1060
9	1060
10	1060
15	1050
20	1050
25	1050
30	1050
60	1050
120	1060
180	1060
240	1060

Size of Soakaway		
	Length (m) =	2.25
	Width (m) =	0.35
	Depth (m) =	1.90

Depth at start of test (mm)=	1070mm
Depth of trial pit (mm)=	1900mm
75% effective depth (mm)=	1278mm
50% effective depth =	1485mm
25% effective depth =	1693mm
Base area of pit (m^2) =	0.788
Effective area of loss 50% (m^2) =	2.946
Volume outflow 75 - 25% (m^3) =	0.327

From the graph:	
tp 75 (min) =	n/a
tp 25 (min) =	n/a

Soil infiltration rate, f, (m/s) =	n/a	Normal test
Input by: JWM	Date:	27/06/2023
Checked by: MG	Date:	28/07/2023



SOAKAWAY DESIGN IN ACCORDANCE WITH BRE DIGEST 365: 2007			
Client:	Gleeson Regeneration Ltd		
Site:	Jack Lawson Terrace, Wheatley Hill		
Job No:	C9843	Test No:	SA03-1

CALCULATION OF SOIL INFILTRATION RATE

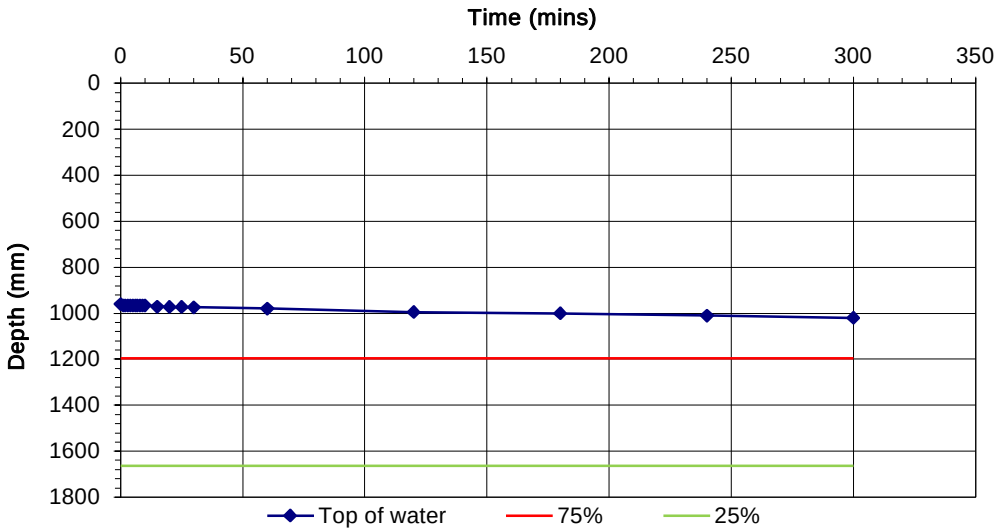
Time (min)	Depth (mm)
0	960
1	965
2	965
3	965
4	965
5	965
6	965
7	965
8	965
9	965
10	965
15	970
20	972
25	972
30	975
60	980
120	995
180	1000
240	1010
300	1020

Size of Soakaway		
	Length (m) =	2.05
	Width (m) =	0.35
	Depth (m) =	1.90

Depth at start of test (mm)=	960mm
Depth of trial pit (mm)=	1900mm
75% effective depth (mm)=	1195mm
50% effective depth =	1430mm
25% effective depth =	1665mm
Base area of pit (m^2) =	0.718
Effective area of loss 50% (m^2) =	2.974
Volume outflow 75 - 25% (m^3) =	0.337

From the graph:	
tp 75 (min) =	n/a
tp 25 (min) =	n/a

Soil infiltration rate, f, (m/s) =	n/a	Normal test
Input by: JWM	Date:	27/06/2023
Checked by: MG	Date:	28/07/2023



SOAKAWAY DESIGN IN ACCORDANCE WITH BRE DIGEST 365: 2007			
Client:	Gleeson Regeneration Ltd		
Site:	Jack Lawson Terrace, Wheatley Hill		
Job No:	C9843	Test No:	SA04-1

CALCULATION OF SOIL INFILTRATION RATE

Time (min)	Depth (mm)
0	1000
1	1000
2	1000
3	1000
4	1000
5	1000
6	1000
7	1000
8	1000
9	1000
10	1000
15	1000
20	1000
25	1000
30	1000
60	1000
120	990
180	990
240	990
300	990

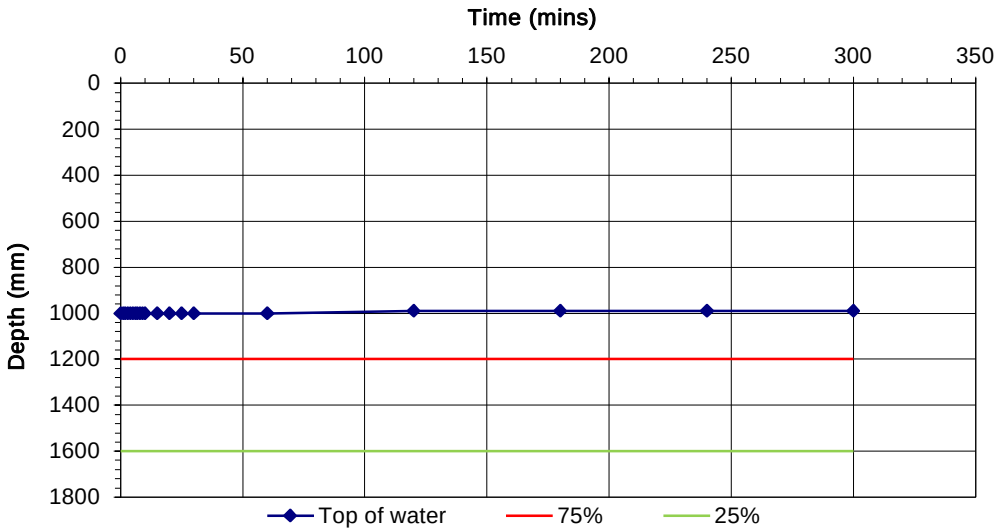
Size of Soakaway		
	Length (m) =	2.20
	Width (m) =	0.35
	Depth (m) =	1.80

Depth at start of test (mm)=	1000mm
Depth of trial pit (mm)=	1800mm
75% effective depth (mm)=	1200mm
50% effective depth =	1400mm
25% effective depth =	1600mm
Base area of pit (m^2) =	0.770
Effective area of loss 50% (m^2) =	2.810
Volume outflow 75 - 25% (m^3) =	0.308

From the graph:	
tp 75 (min) =	n/a
tp 25 (min) =	n/a

Soil infiltration rate, f, (m/s) =	n/a	Normal test

Input by:	JWM	Date:	27/06/2023
Checked by:	MG	Date:	28/07/2023



APPENDIX E
Geotechnical Laboratory Test Results

LABORATORY REPORT

Contract Number: PSL23/5349

Report Date: 07 August 2023

Client's Reference: C9843

Client Name: Sirius Durham
Suite 2, Russel House
Mill Road
Langley Moor
Durham
DH7 8HJ

For the attention of: Michelle Gibson

Project Name: Jack Lawson Terrace, Wheatley Hill

Date Received: 5/7/2023
Date Commenced: 5/7/2023
Date Completed: 07/08/2023

Notes: Opinions and Interpretations are outside the UKAS Accreditation

Checked and Approved Signatories:

A Watkins (Director)
R Berriman (Quality Manager)
S Royle (Laboratory Manager)

[redacted]

L Knight (Assistant Laboratory Manager)
S Eyre (Senior Technician)
M Fennell (Senior Technician)

5 – 7 Hexthorpe Road,
Hexthorpe,
Doncaster,
DN4 0AR
Tel: 01302 768098
Email: rberriman@prosoils.co.uk
awatkins@prosoils.co.uk

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
TP01		D	1.10		Brown slightly gravelly sandy CLAY.
TP02		D	0.70		Brown slightly gravelly sandy CLAY.
TP04		D	0.70		Brown slightly gravelly sandy CLAY.
TP06		D	0.80		Brown slightly gravelly sandy CLAY.
TP07		D	0.90		Brown gravelly sandy CLAY.
TP08		D	1.00		Brown gravelly sandy CLAY.
TP11		D	0.90		Brown slightly gravelly sandy CLAY.
TP13		D	0.90		Brown slightly gravelly sandy CLAY.
TP14		D	0.90		Brown sandy CLAY.
TP15		D	0.70		Brown CLAY.
TP18		D	1.50		Brown slightly gravelly sandy CLAY.
TP20		D	0.70		Brown gravelly sandy CLAY.
TP21		D	0.50		Brown slightly gravelly sandy CLAY.
TP22		D	0.60		Brown slightly gravelly slightly sandy CLAY.
TP24		D	1.00		Brown gravelly sandy CLAY.
TP25		D	0.80		Brown gravelly sandy CLAY.
TP26		D	0.90		Brown sandy CLAY.
TP27		D	0.70		Brown gravelly slightly sandy CLAY.
TP29		D	0.70		Brown gravelly sandy CLAY.

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
TP32		D	1.30		Brown sandy CLAY.

UKAS TESTING 4043

PSL PROFESSIONAL SOILS LABORATORY A PHENNA GROUP COMPANY

Jack Lawson Terrace, Wheatley Hill

Contract No:

PSL23/5349

Client Ref:

C9843

SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Moisture Content % Clause 3.2	Linear Shrinkage % Clause 6.5	Particle Density Mg/m^3 Clause 8.2	Liquid Limit % Clause 4.3/4	Plastic Limit % Clause 5.3	Plasticity Index % Clause 5.4	Passing .425mm %	Remarks
TP01		D	1.10		22			49	23	26	96	Intermediate Plasticity CI
TP02		D	0.70		21			44	22	22	93	Intermediate Plasticity CI
TP04		D	0.70		22			43	21	22	97	Intermediate Plasticity CI
TP06		D	0.80		25			45	22	23	98	Intermediate Plasticity CI
TP07		D	0.90		20			53	24	29	85	High Plasticity CH
TP08		D	1.00		19			51	23	28	90	High Plasticity CH
TP11		D	0.90		21			41	21	20	98	Intermediate Plasticity CI
TP13		D	0.90		19			56	24	32	99	High Plasticity CH
TP14		D	0.90		24			53	23	30	100	High Plasticity CH
TP15		D	0.70		33			75	31	44	100	Very High Plasticity CV
TP18		D	1.50		16			38	20	18	98	Intermediate Plasticity CI
TP20		D	0.70		18			42	21	21	85	Intermediate Plasticity CI
TP21		D	0.50		25			50	24	26	98	High Plasticity CH
TP22		D	0.60		27			60	26	34	98	High Plasticity CH
TP24		D	1.00		19			44	22	22	89	Intermediate Plasticity CI
TP25		D	0.80		15			44	22	22	65	Intermediate Plasticity CI
TP26		D	0.90		20			46	22	24	100	Intermediate Plasticity CI
TP27		D	0.70		24			52	24	28	98	High Plasticity CH
TP29		D	0.70		23			56	25	31	98	High Plasticity CH

SYMBOLS : **NP : Non Plastic** *** : Liquid Limit and Plastic Limit Wet Sieved.**

UKAS TESTING 4043

PSL PROFESSIONAL SOILS LABORATORY A PHENNA GROUP COMPANY

Jack Lawson Terrace, Wheatley Hill

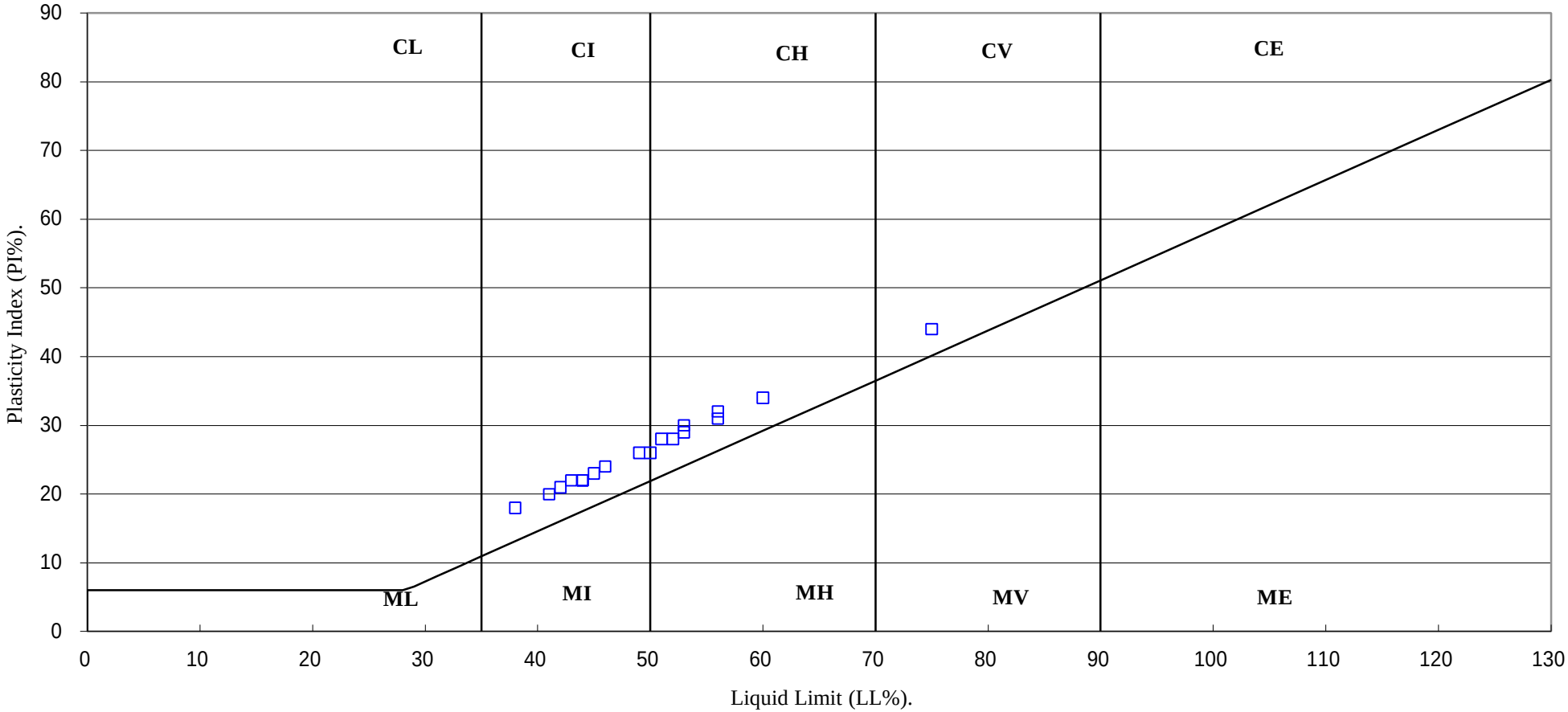
Contract No:

PSL23/5349

Client Ref:

C9843

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.



UKAS TESTING 4043	PSL PROFESSIONAL SOILS LABORATORY A PHENNA GROUP COMPANY	**Jack Lawson Terrace, Wheatley Hill**

Contract No:
PSL23/5349
Client Ref:
C9843

SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Moisture Content % Clause 3.2	Linear Shrinkage % Clause 6.5	Particle Density Mg/m^3 Clause 8.2	Liquid Limit % Clause 4.3/4	Plastic Limit % Clause 5.3	Plasticity Index % Clause 5.4	Passing .425mm %	Remarks
TP32		D	1.30		23			46	22	24	100	Intermediate Plasticity CI

SYMBOLS : **NP : Non Plastic** *** : Liquid Limit and Plastic Limit Wet Sieved.**

UKAS TESTING 4043

PSL PROFESSIONAL SOILS LABORATORY A PHENNA GROUP COMPANY

Jack Lawson Terrace, Wheatley Hill

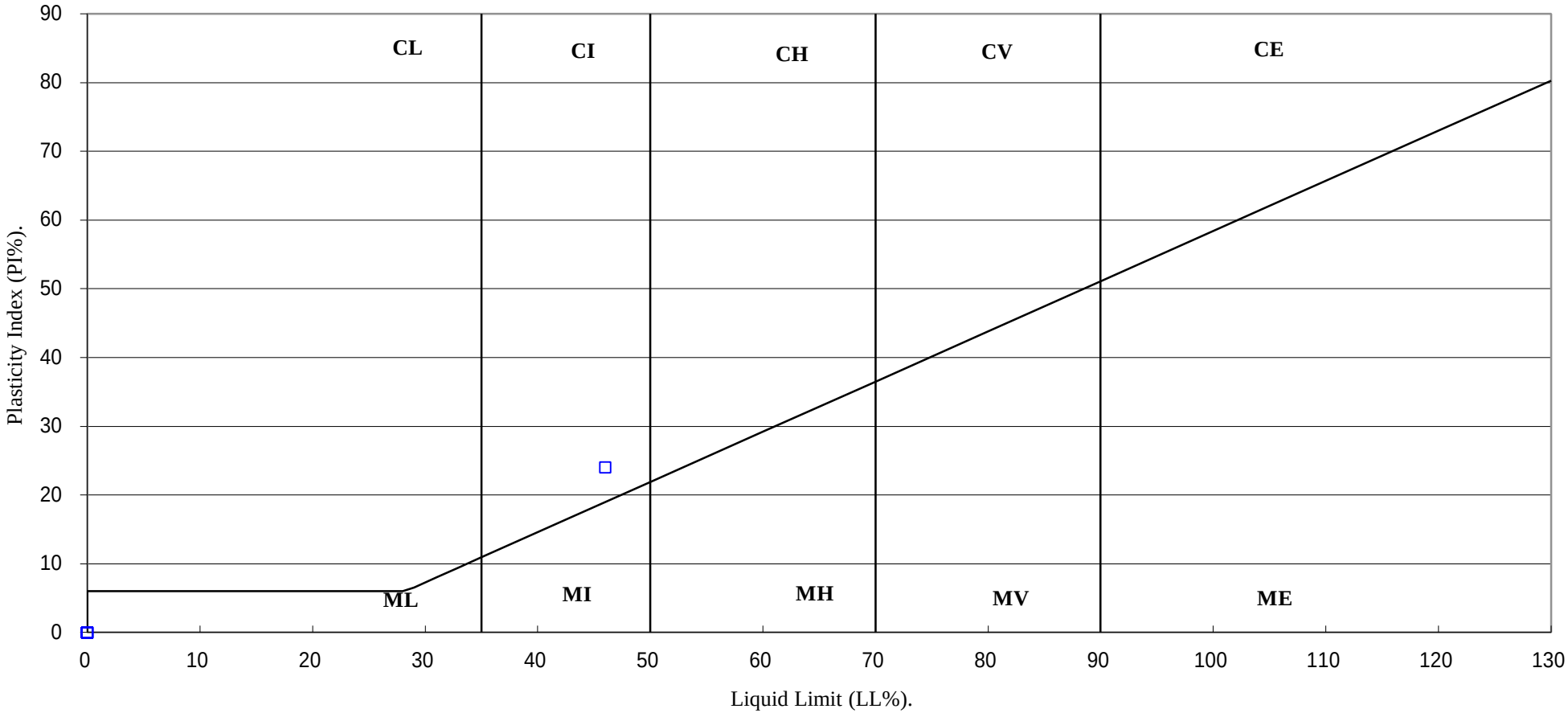
Contract No:

PSL23/5349

Client Ref:

C9843

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.



UKAS TESTING 4043	PSL PROFESSIONAL SOILS LABORATORY A PHENNA GROUP COMPANY	**Jack Lawson Terrace, Wheatley Hill**

Contract No:
PSL23/5349
Client Ref:
C9843

CTS Group
7 - 11 Harding Street
Leicester
LE1 4DH

Professional Soils Laboratory
5/7 Hexthorpe Road
Hexthorpe
Doncaster
DN4 0AR

Analytical Test Report: L23/03437/PSL - 23-35346

Your Project Reference:	**PSL23/5349 Jack Lawson Terrace, Wheatley Hill**		
Your Order Number:	Anthony	Samples Received / Instructed:	13/07/2023 / 13/07/2023
Report Issue Number:	1	Sample Tested:	13/07 to 18/07/2023
Samples Analysed:	20 soil samples	Report issued:	18/07/2023

Signed

[redacted]

James Gane
Analytical Services Manager
CTS Group

Notes:

General

Please refer to Methodologies page for details pertaining to the analytical methods undertaken.

Samples will be retained for 14 days after issue of this report unless otherwise requested.

Moisture Content was determined in accordance with CTS method statement MS - CL - Sample Prep, oven dried at <30˚C.

Moisture Content is reported as a percentage of the dry mass of soil, this calculation is in accordance with BS1377, Part 2, 1990, Clause 3.2

Where specification limits are included these are for guidance only. Where a measured value has been highlighted this is not implying acceptance or failure and certainty of measurement values have not been taken into account.

Uncertainty of measurement values are available on request.

Samples were supplied by customer, results apply to the samples as received.

Deviating Samples

On receipt samples are compared against our sample holding and handling protocols, where any deviations have been noted these are reported on our deviating sample page (if present)

Accreditation Key

UKAS = UKAS Accreditation, MCERTS = MCERTS Accreditation, u = Unaccredited

MCERTS Accreditation only covers the SAND, CLAY and LOAM matrices

Date of Issue: 06.07.23

Issued by: J. Gane

Issue No: 4

Rev No: 1

CTS Group
7 - 11 Harding Street
Leicester
LE1 4DH

L23/03437/PSL - 23-35346

Project Reference - PSL23/5349 Jack Lawson Terrace, Wheatley Hill

Analytical Test Results - Soil

Lab Reference			304146	304147	304148	304149	304150	304151	304152
Client Sample ID			-	-	-	-	-	-	-
Client Sample Location			TP01	TP02	TP04	TP06	TP07	TP08	TP11
Client Sample Type			D	D	D	D	D	D	D
Client Sample Number			-	-	-	-	-	-	-
Depth - Top (m)			1.10	0.70	0.70	0.80	0.90	1.00	0.90
Depth - Bottom (m)			1.10	0.70	0.70	0.80	0.90	1.00	0.90
Date of Sampling			-	-	-	-	-	-	-
Time of Sampling			-	-	-	-	-	-	-
Sample Matrix			Clay	Clay	Clay	Clay	Clay	Clay	Clay
Determinant	Units	Accreditation							
pH	pH Units	MCERTS	8.5	8.5	8.4	8.2	8.5	8.5	8.4
Sulphate (Water soluble as SO_4)	(mg/l)	u	34	44	78	36	48	90	66

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L23/03437/PSL - 23-35346

Project Reference - PSL23/5349 Jack Lawson Terrace, Wheatley Hill

Analytical Test Results - Soil

Lab Reference			304153	304154	304155	304156	304157	304158	304159
Client Sample ID			-	-	-	-	-	-	-
Client Sample Location			TP13	TP14	TP15	TP18	TP20	TP21	TP22
Client Sample Type			D	D	D	D	D	D	D
Client Sample Number			-	-	-	-	-	-	-
Depth - Top (m)			0.90	0.90	0.70	1.50	0.70	0.50	0.60
Depth - Bottom (m)			0.90	0.90	0.70	1.50	0.70	0.50	0.60
Date of Sampling			-	-	-	-	-	-	-
Time of Sampling			-	-	-	-	-	-	-
Sample Matrix			Clay	Clay	Clay	Clay	Clay	Clay	Clay
Determinant	Units	Accreditation							
pH	pH Units	MCERTS	8.5	8.2	8.1	8.5	8.5	8.3	8.2
Sulphate (Water soluble as SO_4)	(mg/l)	u	91	23	23	30	97	12	41

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Project Reference - PSL23/5349 Jack Lawson Terrace, Wheatley Hill

Analytical Test Results - Soil

Lab Reference			304160	304161	304162	304163	304164	304165
Client Sample ID			-	-	-	-	-	-
Client Sample Location			TP24	TP25	TP26	TP27	TP29	TP32
Client Sample Type			D	D	D	D	D	D
Client Sample Number			-	-	-	-	-	-
Depth - Top (m)			1.00	0.80	0.90	0.70	0.70	1.30
Depth - Bottom (m)			1.00	0.80	0.90	0.70	0.70	1.30
Date of Sampling			-	-	-	-	-	-
Time of Sampling			-	-	-	-	-	-
Sample Matrix			Clay	Clay	Clay	Clay	Clay	Clay
Determinant	Units	Accreditation						
pH	pH Units	MCERTS	8.2	8.5	7.9	8.3	8.0	8.4
Sulphate (Water soluble as SO_4)	(mg/l)	u	23	29	67	26	86	77

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L23/03437/PSL - 23-35346

Project Reference - PSL23/5349 Jack Lawson Terrace, Wheatley Hill

Sample Descriptions

Lab Reference	Client Sample ID	Client Sample Location	Client Sample Type	Client Sample Number	Description	Moisture Content (%)	Stone Content (%)	Passing 2mm test sieve (%)
304146	-	TP01	D	-	Mottled cream brown slightly sandy gravelly silty clay	-	-	100
304147	-	TP02	D	-	Mottled cream brown slightly sandy gravelly silty clay	-	-	100
304148	-	TP04	D	-	Mottled cream brown slightly sandy gravelly silty clay	-	-	100
304149	-	TP06	D	-	Brown slightly sandy gravelly silty clay	-	-	100
304150	-	TP07	D	-	Mottled cream brown slightly sandy gravelly silty clay	-	-	100
304151	-	TP08	D	-	Mottled cream brown slightly sandy gravelly silty clay	-	-	100
304152	-	TP11	D	-	Brown slightly sandy gravelly silty clay	-	-	100
304153	-	TP13	D	-	Mottled cream brown slightly sandy gravelly silty clay with rare chalk	-	-	100
304154	-	TP14	D	-	Mottled brown grey slightly sandy gravelly silty clay	-	-	100
304155	-	TP15	D	-	Mottled brown grey slightly sandy gravelly silty clay	-	-	100
304156	-	TP18	D	-	Mottled brown grey slightly sandy gravelly silty clay	-	-	100
304157	-	TP20	D	-	Mottled brown grey slightly sandy gravelly silty clay	-	-	100
304158	-	TP21	D	-	Brown slightly sandy gravelly silty clay	-	-	100
304159	-	TP22	D	-	Mottled cream grey slightly sandy gravelly silty clay	-	-	100
304160	-	TP24	D	-	Mottled cream grey slightly sandy gravelly silty clay	-	-	100
304161	-	TP25	D	-	Grey slightly sandy gravelly silty clay	-	-	100
304162	-	TP26	D	-	Grey slightly sandy gravelly silty clay	-	-	100
304163	-	TP27	D	-	Brown slightly sandy gravelly silty clay	-	-	100
304164	-	TP29	D	-	Brown slightly sandy gravelly silty clay	-	-	100
304165	-	TP32	D	-	Brown slightly sandy gravelly silty clay	-	-	100

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L23/03437/PSL - 23-35346

Project Reference - PSL23/5349 Jack Lawson Terrace, Wheatley Hill

Sample Comments

Lab Reference	Client Sample ID	Client Sample Location	Client Sample Type	Client Sample Number	Comments
304146	-	TP01	D	-	
304147	-	TP02	D	-	
304148	-	TP04	D	-	
304149	-	TP06	D	-	
304150	-	TP07	D	-	
304151	-	TP08	D	-	
304152	-	TP11	D	-	
304153	-	TP13	D	-	
304154	-	TP14	D	-	
304155	-	TP15	D	-	
304156	-	TP18	D	-	
304157	-	TP20	D	-	
304158	-	TP21	D	-	
304159	-	TP22	D	-	
304160	-	TP24	D	-	
304161	-	TP25	D	-	
304162	-	TP26	D	-	
304163	-	TP27	D	-	
304164	-	TP29	D	-	
304165	-	TP32	D	-	

7 - 11 Harding Street
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L23/03437/PSL - 23-35346

Project Reference - PSL23/5349 Jack Lawson Terrace, Wheatley Hill

Analysis Methodologies

Test Code	Test Name / Reference	Sample condition for analysis	Sample Preperation	Test Details
ANIONSS	MS - CL - Anions by Aquakem (2:1Extract)	Oven dried	Passing 2mm test sieve	Determination of Anions (inc Sulphate, chloride etc.) in soils by Aquakem. Analysis is based on a 2:1 water to soil extraction ratio
PHS	MS - CL - pH in Soils	As received	Passing 10mm test sieve	Determination of pH in soils using a pH probe (using a 1:3 soil to water extraction)
SAMPLEPREP	MS - CL - Sample Preparation	-	-	Preparation of samples (including determination of moisture content) to allow for subsequent analysis

7 - 11 Harding Street
Leicester
LE1 4DH

L23/03437/PSL - 23-35346

Project Reference - PSL23/5349 Jack Lawson Terrace, Wheatley Hill

Sample Deviations

Deviations are listed below against each sample and associated test method, where deviation(s) are noted it means data may not be representative of the sample at the time of sampling and it is possible that results provided may be compromised.
Observations on receipt
A - No date of sampling provided
C - Received in inappropriate container
H - Contains headspace
T - Temperature on receipt exceeds storage temperature
R - Date of sampling to receipt insufficient to allow analysis to be completed without deviation, Please note this is only a deviation if 'X' is also recorded against the sample
Observations whist in laboratory
X - Exceeds sampling to extraction or analysis timescales

Lab Reference	Client Sample ID	Client Sample Location	Client Sample Type	Client Sample Number	Test	Deviations
304146	-	TP01	D	-		A
304147	-	TP02	D	-		A
304148	-	TP04	D	-		A
304149	-	TP06	D	-		A
304150	-	TP07	D	-		A
304151	-	TP08	D	-		A
304152	-	TP11	D	-		A
304153	-	TP13	D	-		A
304154	-	TP14	D	-		A
304155	-	TP15	D	-		A
304156	-	TP18	D	-		A
304157	-	TP20	D	-		A
304158	-	TP21	D	-		A
304159	-	TP22	D	-		A
304160	-	TP24	D	-		A
304161	-	TP25	D	-		A
304162	-	TP26	D	-		A
304163	-	TP27	D	-		A
304164	-	TP29	D	-		A
304165	-	TP32	D	-		A

APPENDIX F
Chemical Laboratory Test Results

Certificate of Analysis

Certificate Number	23-15598	*Issued:*	11-Jul-23

Client Sirius Geotechnical & Environmental
Russel House
Suite 2
Mill Road
Langley Moor
DH7 8HJ

Our Reference	23-15598
Client Reference	C9843
Order No	23602/C9843/MG
Contract Title	Jack Lawson Terrace , Wheatley Hill
Description	35 Soil samples.
Date Received	03-Jul-23
Date Started	03-Jul-23
Date Completed	11-Jul-23
Test Procedures	Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By [redacted]

Kirk Bridgewood
General Manager

2139

Summary of Chemical Analysis
Soil Samples

Our Ref 23-15598
Client Ref C9843
Contract Title Jack Lawson Terrace , Wheatley Hill

Test	Method	LOD	Units	Lab No	2195529	2195530	2195531	2195532	2195533	2195534
				.Sample ID	TP01	TP02	TP02	TP03	TP04	TP05
				Depth	0.10	0.10	0.50	0.30	0.40	0.20
				Other ID						
				Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Sampling Date	20/06/2023	20/06/2023	20/06/2023	20/06/2023	20/06/2023	20/06/2023
				Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Metals										
Arsenic	DETSC 2301#	0.2	mg/kg		22	13	17	11	5.5	12
Cadmium	DETSC 2301#	0.1	mg/kg		0.5	0.3	0.2	0.3	< 0.1	0.2
Chromium	DETSC 2301#	0.15	mg/kg		25	18	18	22	26	21
Chromium, Hexavalent	DETSC 2204*	1	mg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg		73	48	47	35	19	36
Lead	DETSC 2301#	0.3	mg/kg		110	77	63	84	29	68
Mercury	DETSC 2325#	0.05	mg/kg		0.20	0.13	0.10	0.06	0.26	0.18
Nickel	DETSC 2301#	1	mg/kg		66	24	24	18	16	25
Selenium	DETSC 2301#	0.5	mg/kg		0.7	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg		220	140	140	150	52	150
Inorganics										
pH	DETSC 2008#		pH		7.7	7.7	8.0	7.4	7.6	7.5
Total Organic Carbon	DETSC 2002	0.1	%		2.3	2.0	1.4	1.8	0.9	1.7
Sulphate Aqueous Extract as SO4 (2:1)	DETSC 2076#	10	mg/l		14	23	22	16	12	52
Petroleum Hydrocarbons										
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg							
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg							
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg							
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg							
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg							
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg							
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg							
Aliphatic C5-C35	DETSC 3072*	10	mg/kg							
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg							
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg							
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg							
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg							
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg							
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg							
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg							
Aromatic C5-C35	DETSC 3072*	10	mg/kg							
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg							
Benzene	DETSC 3321#	0.01	mg/kg							
Ethylbenzene	DETSC 3321#	0.01	mg/kg							
Toluene	DETSC 3321#	0.01	mg/kg							
Xylene	DETSC 3321#	0.01	mg/kg							
MTBE	DETSC 3321	0.01	mg/kg							
PAHs										
Naphthalene	DETSC 3303#	0.03	mg/kg		< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg		< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg		< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-15598
Client Ref C9843
Contract Title Jack Lawson Terrace , Wheatley Hill

			Lab No	2195529	2195530	2195531	2195532	2195533	2195534
			.Sample ID	TP01	TP02	TP02	TP03	TP04	TP05
			Depth	0.10	0.10	0.50	0.30	0.40	0.20
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	20/06/2023	20/06/2023	20/06/2023	20/06/2023	20/06/2023	20/06/2023
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	Method	LOD	Units						
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.18	0.19	0.10	0.15	< 0.03	0.11
Anthracene	DETSC 3303	0.03	mg/kg	0.04	0.04	< 0.03	< 0.03	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.34	0.43	0.18	0.30	< 0.03	0.21
Pyrene	DETSC 3303#	0.03	mg/kg	0.28	0.36	0.15	0.25	< 0.03	0.17
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.15	0.20	0.09	0.12	< 0.03	0.08
Chrysene	DETSC 3303	0.03	mg/kg	0.20	0.26	0.11	0.16	< 0.03	0.12
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.19	0.29	0.12	0.16	< 0.03	0.11
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.09	0.13	0.04	0.06	< 0.03	0.04
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.12	0.21	0.06	0.10	< 0.03	0.06
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.06	0.10	0.04	0.05	< 0.03	0.04
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	0.04	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.08	0.13	0.05	0.06	< 0.03	0.04
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	1.7	2.4	0.93	1.4	< 0.10	0.99
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	0.5	0.4	0.4	0.7	< 0.3	0.5

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-15598
Client Ref C9843
Contract Title Jack Lawson Terrace , Wheatley Hill

Test	Method	LOD	Units	Lab No	2195535	2195536	2195537	2195538	2195539	2195540
				.Sample ID	TP06	TP06	TP07	TP07	TP08	TP09
				Depth	0.10	0.30	0.10	0.20	0.20	0.10
				Other ID						
				Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Sampling Date	20/06/2023	20/06/2023	22/06/2023	22/06/2023	22/06/2023	21/06/2023
				Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Metals										
Arsenic	DETSC 2301#	0.2	mg/kg		22	18	8.4	16	6.8	38
Cadmium	DETSC 2301#	0.1	mg/kg		0.2	0.5	0.4	0.4	< 0.1	0.7
Chromium	DETSC 2301#	0.15	mg/kg		21	23	17	19	22	25
Chromium, Hexavalent	DETSC 2204*	1	mg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg		56	71	33	39	21	79
Lead	DETSC 2301#	0.3	mg/kg		60	100	60	66	28	94
Mercury	DETSC 2325#	0.05	mg/kg		0.09	0.19	0.09	0.09	< 0.05	0.11
Nickel	DETSC 2301#	1	mg/kg		29	27	20	20	20	39
Selenium	DETSC 2301#	0.5	mg/kg		0.6	0.9	< 0.5	0.6	< 0.5	0.7
Zinc	DETSC 2301#	1	mg/kg		140	180	110	160	66	250
Inorganics										
pH	DETSC 2008#		pH		8.1	7.7	7.8	8.0	8.0	7.3
Total Organic Carbon	DETSC 2002	0.1	%		1.1	3.0	1.5	2.0	0.8	2.3
Sulphate Aqueous Extract as SO4 (2:1)	DETSC 2076#	10	mg/l		27	28	13	14	13	15
Petroleum Hydrocarbons										
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg							
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg							
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg							
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg							
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg							
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg							
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg							
Aliphatic C5-C35	DETSC 3072*	10	mg/kg							
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg							
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg							
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg							
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg							
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg							
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg							
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg							
Aromatic C5-C35	DETSC 3072*	10	mg/kg							
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg							
Benzene	DETSC 3321#	0.01	mg/kg							
Ethylbenzene	DETSC 3321#	0.01	mg/kg							
Toluene	DETSC 3321#	0.01	mg/kg							
Xylene	DETSC 3321#	0.01	mg/kg							
MTBE	DETSC 3321	0.01	mg/kg							
PAHs										
Naphthalene	DETSC 3303#	0.03	mg/kg		0.05	0.16	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg		0.10	0.21	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg		0.18	0.29	< 0.03	< 0.03	< 0.03	< 0.03

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-15598
Client Ref C9843
Contract Title Jack Lawson Terrace , Wheatley Hill

			Lab No	2195535	2195536	2195537	2195538	2195539	2195540
			.Sample ID	TP06	TP06	TP07	TP07	TP08	TP09
			Depth	0.10	0.30	0.10	0.20	0.20	0.10
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	20/06/2023	20/06/2023	22/06/2023	22/06/2023	22/06/2023	21/06/2023
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	Method	LOD	Units						
Fluorene	DETSC 3303	0.03	mg/kg	0.17	0.78	< 0.03	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	2.2	6.9	0.29	0.07	0.04	0.34
Anthracene	DETSC 3303	0.03	mg/kg	0.47	1.8	0.06	< 0.03	< 0.03	0.06
Fluoranthene	DETSC 3303#	0.03	mg/kg	8.4	17	0.66	0.15	0.09	0.85
Pyrene	DETSC 3303#	0.03	mg/kg	7.3	15	0.52	0.12	0.07	0.67
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	3.4	5.8	0.26	0.07	0.04	0.25
Chrysene	DETSC 3303	0.03	mg/kg	3.5	6.1	0.30	0.08	0.04	0.37
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	3.8	5.9	0.43	0.10	0.05	0.36
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	1.5	2.4	0.11	< 0.03	< 0.03	0.11
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	2.8	4.8	0.24	0.07	0.04	0.19
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	1.1	2.0	0.12	0.04	< 0.03	0.11
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	0.41	0.61	0.04	< 0.03	< 0.03	0.04
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	1.4	2.2	0.18	0.04	< 0.03	0.12
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	37	72	3.2	0.73	0.36	3.4
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	0.7	0.3	0.4	< 0.3	0.7

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-15598
Client Ref C9843
Contract Title Jack Lawson Terrace , Wheatley Hill

			Lab No	2195541	2195542	2195543	2195544	2195545	2195546
			.Sample ID	TP09	TP10	TP11	TP12	TP13	TP14
			Depth	0.30	0.20	0.20	0.10	0.20	0.20
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	21/06/2023	22/06/2023	22/06/2023	21/06/2023	21/06/2023	22/06/2023
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	Method	LOD	Units						
Metals									
Arsenic	DETSC 2301#	0.2	mg/kg	23	23	8.1	12	8.9	23
Cadmium	DETSC 2301#	0.1	mg/kg	0.5	0.4	< 0.1	0.2	0.1	0.6
Chromium	DETSC 2301#	0.15	mg/kg	18	21	22	18	17	38
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	45	71	26	45	24	57
Lead	DETSC 2301#	0.3	mg/kg	86	130	38	85	40	97
Mercury	DETSC 2325#	0.05	mg/kg	0.12	0.11	< 0.05	0.60	< 0.05	0.20
Nickel	DETSC 2301#	1	mg/kg	22	26	22	23	20	22
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	0.5	< 0.5	< 0.5	< 0.5	1.1
Zinc	DETSC 2301#	1	mg/kg	160	320	76	130	82	230
Inorganics									
pH	DETSC 2008#		pH	7.5	7.0	7.9	8.6	10.3	6.8
Total Organic Carbon	DETSC 2002	0.1	%	1.6	2.8	1.0	2.3	0.7	3.0
Sulphate Aqueous Extract as SO4 (2:1)	DETSC 2076#	10	mg/l	10	13	16	19	130	19
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg						
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg						
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg						
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg						
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg						
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg						
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg						
Aliphatic C5-C35	DETSC 3072*	10	mg/kg						
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg						
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg						
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg						
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg						
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg						
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg						
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg						
Aromatic C5-C35	DETSC 3072*	10	mg/kg						
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg						
Benzene	DETSC 3321#	0.01	mg/kg						
Ethylbenzene	DETSC 3321#	0.01	mg/kg						
Toluene	DETSC 3321#	0.01	mg/kg						
Xylene	DETSC 3321#	0.01	mg/kg						
MTBE	DETSC 3321	0.01	mg/kg						
PAHs									
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.04	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.04	< 0.03	< 0.03

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-15598
Client Ref C9843
Contract Title Jack Lawson Terrace , Wheatley Hill

			Lab No	2195541	2195542	2195543	2195544	2195545	2195546
			.Sample ID	TP09	TP10	TP11	TP12	TP13	TP14
			Depth	0.30	0.20	0.20	0.10	0.20	0.20
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	21/06/2023	22/06/2023	22/06/2023	21/06/2023	21/06/2023	22/06/2023
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	Method	LOD	Units						
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.04	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.05	0.20	0.20	0.49	0.09	0.18
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	0.04	0.07	0.13	< 0.03	0.04
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.15	0.48	0.56	1.3	0.29	0.42
Pyrene	DETSC 3303#	0.03	mg/kg	0.11	0.37	0.47	1.1	0.21	0.31
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.05	0.17	0.22	0.44	0.11	0.12
Chrysene	DETSC 3303	0.03	mg/kg	0.06	0.27	0.34	0.67	0.13	0.17
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.05	0.31	0.37	0.86	0.17	0.19
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.10	0.11	0.29	0.05	0.06
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.03	0.16	0.25	0.80	0.12	0.10
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.11	0.11	0.24	0.05	0.05
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.04	0.08	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	0.13	0.16	0.34	0.06	0.06
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	0.47	2.3	2.9	6.9	1.3	1.7
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	0.6	1.1	< 0.3	0.4	< 0.3	0.9

Summary of Chemical Analysis
Soil Samples

Our Ref 23-15598
Client Ref C9843
Contract Title Jack Lawson Terrace , Wheatley Hill

				Lab No	2195547	2195548	2195549	2195550	2195551	2195552
				.Sample ID	TP15	TP18	TP18	TP20	TP21	TP22
				Depth	0.20	0.10	0.30	0.10	0.20	0.20
				Other ID						
				Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Sampling Date	22/06/2023	22/06/2023	22/06/2023	23/06/2023	21/06/2023	21/06/2023
				Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	Method	LOD	Units							
Metals										
Arsenic	DETSC 2301#	0.2	mg/kg	28	8.6	6.7	8.9	23	19
Cadmium	DETSC 2301#	0.1	mg/kg	1.3	0.2	0.1	0.2	0.3	0.3
Chromium	DETSC 2301#	0.15	mg/kg	25	14	17	24	20	20
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	190	30	25	25	48	48
Lead	DETSC 2301#	0.3	mg/kg	180	55	48	42	79	69
Mercury	DETSC 2325#	0.05	mg/kg	0.55	0.11	< 0.05	0.08	0.32	0.07
Nickel	DETSC 2301#	1	mg/kg	35	17	33	35	23	18
Selenium	DETSC 2301#	0.5	mg/kg	0.7	< 0.5	< 0.5	< 0.5	0.6	0.6
Zinc	DETSC 2301#	1	mg/kg	400	90	74	100	120	97
Inorganics										
pH	DETSC 2008#		pH	7.0	8.1	8.0	8.2	7.2	7.6
Total Organic Carbon	DETSC 2002	0.1	%	2.8	1.7	2.3	1.3	2.4	3.0
Sulphate Aqueous Extract as SO4 (2:1)	DETSC 2076#	10	mg/l	19	37	27	28	18	220
Petroleum Hydrocarbons										
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg						
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg						
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg						
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg						
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg						
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg						
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg						
Aliphatic C5-C35	DETSC 3072*	10	mg/kg						
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg						
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg						
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg						
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg						
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg						
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg						
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg						
Aromatic C5-C35	DETSC 3072*	10	mg/kg						
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg						
Benzene	DETSC 3321#	0.01	mg/kg						
Ethylbenzene	DETSC 3321#	0.01	mg/kg						
Toluene	DETSC 3321#	0.01	mg/kg						
Xylene	DETSC 3321#	0.01	mg/kg						
MTBE	DETSC 3321	0.01	mg/kg						
PAHs										
Naphthalene	DETSC 3303#	0.03	mg/kg	0.03	< 0.03	0.67	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	0.05	0.30	< 0.03	0.05	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	1.4	< 0.03	< 0.03	< 0.03

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Summary of Chemical Analysis
Soil Samples

Our Ref 23-15598
Client Ref C9843
Contract Title Jack Lawson Terrace , Wheatley Hill

			Lab No	2195547	2195548	2195549	2195550	2195551	2195552
			.Sample ID	TP15	TP18	TP18	TP20	TP21	TP22
			Depth	0.20	0.10	0.30	0.10	0.20	0.20
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	22/06/2023	22/06/2023	22/06/2023	23/06/2023	21/06/2023	21/06/2023
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	Method	LOD	Units						
Fluorene	DETSC 3303	0.03	mg/kg	0.04	0.06	4.2	< 0.03	0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.69	0.37	33	0.12	0.46	0.21
Anthracene	DETSC 3303	0.03	mg/kg	0.13	0.21	5.1	0.04	0.13	0.06
Fluoranthene	DETSC 3303#	0.03	mg/kg	1.7	0.77	27	0.38	1.3	0.59
Pyrene	DETSC 3303#	0.03	mg/kg	1.3	0.64	12	0.32	1.0	0.46
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.47	0.31	7.4	0.19	0.55	0.19
Chrysene	DETSC 3303	0.03	mg/kg	0.70	0.33	5.8	0.20	0.59	0.24
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.71	0.38	4.8	0.23	0.73	0.22
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.25	0.12	2.0	0.08	0.24	0.07
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.35	0.24	3.2	0.14	0.42	0.13
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.18	0.11	0.99	0.07	0.19	0.06
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	0.05	0.03	0.58	< 0.03	0.07	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.22	0.12	0.83	0.08	0.20	0.06
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	6.8	3.7	110	1.9	5.9	2.3
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	0.6	< 0.3	< 0.3	< 0.3	0.5	0.5

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Summary of Chemical Analysis
Soil Samples

Our Ref 23-15598
Client Ref C9843
Contract Title Jack Lawson Terrace , Wheatley Hill

				Lab No	2195553	2195554	2195555	2195556	2195557	2195558
				.Sample ID	TP24	TP25	TP26	TP26	TP27	TP28
				Depth	0.20	0.10	0.30	0.60	0.30	0.20
				Other ID						
				Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Sampling Date	21/06/2023	23/06/2023	26/06/2023	26/06/2023	23/06/2023	23/06/2023
				Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	Method	LOD	Units							
Metals										
Arsenic	DETSC 2301#	0.2	mg/kg	15	11	6.8		7.4	12
Cadmium	DETSC 2301#	0.1	mg/kg	0.5	0.2	< 0.1		< 0.1	0.2
Chromium	DETSC 2301#	0.15	mg/kg	15	21	17		24	19
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	43	23	140		33	45
Lead	DETSC 2301#	0.3	mg/kg	86	52	48		33	57
Mercury	DETSC 2325#	0.05	mg/kg	0.12	0.07	< 0.05		< 0.05	0.11
Nickel	DETSC 2301#	1	mg/kg	20	15	13		47	17
Selenium	DETSC 2301#	0.5	mg/kg	0.7	< 0.5	< 0.5		< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	130	85	75		100	100
Inorganics										
pH	DETSC 2008#		pH	7.5	7.7	6.2		7.7	8.0
Total Organic Carbon	DETSC 2002	0.1	%	1.4	2.0	0.7		1.2	1.1
Sulphate Aqueous Extract as SO4 (2:1)	DETSC 2076#	10	mg/l	17	13	180		35	25
Petroleum Hydrocarbons										
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg			< 0.01	< 0.01		< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg			< 0.01	< 0.01		< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg			< 0.01	< 0.01		< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg			< 1.5	< 1.5		< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg			< 1.2	< 1.2		< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg			< 1.5	< 1.5		< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg			< 3.4	< 3.4		< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg			< 10	< 10		< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg			< 0.01	< 0.01		< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg			< 0.01	< 0.01		< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg			< 0.01	< 0.01		< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg			< 0.9	< 0.9		5.1
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg			1.4	< 0.5		6.2
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg			7.0	< 0.6		11
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg			26	< 1.4		26
Aromatic C5-C35	DETSC 3072*	10	mg/kg			34	< 10		48
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg			34	< 10		48
Benzene	DETSC 3321#	0.01	mg/kg			< 0.01	< 0.01		< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg			< 0.01	< 0.01		< 0.01
Toluene	DETSC 3321#	0.01	mg/kg			< 0.01	< 0.01		< 0.01
Xylene	DETSC 3321#	0.01	mg/kg			< 0.01	< 0.01		< 0.01
MTBE	DETSC 3321	0.01	mg/kg			< 0.01	< 0.01		< 0.01
PAHs										
Naphthalene	DETSC 3303#	0.03	mg/kg	0.03	< 0.03	0.21		< 0.03	0.04
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.04		0.07	0.08
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.06		< 0.03	0.05

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Summary of Chemical Analysis
Soil Samples

Our Ref 23-15598
Client Ref C9843
Contract Title Jack Lawson Terrace , Wheatley Hill

				Lab No	2195553	2195554	2195555	2195556	2195557	2195558
				.Sample ID	TP24	TP25	TP26	TP26	TP27	TP28
				Depth	0.20	0.10	0.30	0.60	0.30	0.20
				Other ID						
				Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Sampling Date	21/06/2023	23/06/2023	26/06/2023	26/06/2023	23/06/2023	23/06/2023
				Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	Method	LOD	Units							
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	0.11		0.04	0.06
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.19	0.16	0.31		0.52	0.97
Anthracene	DETSC 3303	0.03	mg/kg	0.05	0.05	0.17		0.15	0.17
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.43	0.38	0.49		1.6	1.9
Pyrene	DETSC 3303#	0.03	mg/kg	0.34	0.33	0.38		1.4	1.5
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.19	0.17	0.10		0.59	0.75
Chrysene	DETSC 3303	0.03	mg/kg	0.22	0.19	0.13		0.58	0.82
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.25	0.23	0.12		0.62	0.94
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.09	0.08	0.03		0.18	0.29
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.15	0.14	0.06		0.38	0.58
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.08	0.08	0.04		0.15	0.27
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03		0.04	0.09
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.09	0.08	0.05		0.17	0.28
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	2.1	1.9	2.3		6.4	8.9
Phenols										
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	0.5	0.4	0.6		< 0.3	0.3

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Summary of Chemical Analysis
Soil Samples

Our Ref 23-15598
Client Ref C9843
Contract Title Jack Lawson Terrace , Wheatley Hill

			Lab No	2195559	2195560	2195561	2195562	2195563
			.Sample ID	TP29	TP30	TP30	TP31	TP32
			Depth	0.50	0.10	0.40	0.40	0.10
			Other ID					
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	23/06/2023	23/06/2023	23/06/2023	23/06/2023	23/06/2023
			Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	Method	LOD	Units					
Metals								
Arsenic	DETSC 2301#	0.2	mg/kg	32	7.3	12	9.0	13
Cadmium	DETSC 2301#	0.1	mg/kg	0.8	0.2	0.2	0.4	0.4
Chromium	DETSC 2301#	0.15	mg/kg	29	17	21	21	29
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	120	34	39	40	68
Lead	DETSC 2301#	0.3	mg/kg	170	21	75	44	41
Mercury	DETSC 2325#	0.05	mg/kg	0.15	< 0.05	0.14	< 0.05	0.06
Nickel	DETSC 2301#	1	mg/kg	41	16	21	21	29
Selenium	DETSC 2301#	0.5	mg/kg	0.6	0.8	< 0.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	420	63	91	120	140
Inorganics								
pH	DETSC 2008#		pH	7.1	8.2	7.9	7.6	8.5
Total Organic Carbon	DETSC 2002	0.1	%	0.4	1.5	1.0	0.7	1.1
Sulphate Aqueous Extract as SO4 (2:1)	DETSC 2076#	10	mg/l	21	100	41	400	24
Petroleum Hydrocarbons								
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01			< 0.01	
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01			< 0.01	
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01			< 0.01	
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5			< 1.5	
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2			< 1.2	
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5			< 1.5	
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4			< 3.4	
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10			< 10	
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01			< 0.01	
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01			< 0.01	
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01			< 0.01	
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9			< 0.9	
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	1.9			< 0.5	
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	8.7			< 0.6	
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	24			< 1.4	
Aromatic C5-C35	DETSC 3072*	10	mg/kg	35			< 10	
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg	35			< 10	
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01			< 0.01	
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01			< 0.01	
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01			< 0.01	
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01			< 0.01	
MTBE	DETSC 3321	0.01	mg/kg	< 0.01			< 0.01	
PAHs								
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	0.07	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	0.06	< 0.03	< 0.03	< 0.03	< 0.03

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Summary of Chemical Analysis
Soil Samples

Our Ref 23-15598
Client Ref C9843
Contract Title Jack Lawson Terrace , Wheatley Hill

			Lab No	2195559	2195560	2195561	2195562	2195563
			.Sample ID	TP29	TP30	TP30	TP31	TP32
			Depth	0.50	0.10	0.40	0.40	0.10
			Other ID					
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	23/06/2023	23/06/2023	23/06/2023	23/06/2023	23/06/2023
			Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	Method	LOD	Units					
Fluorene	DETSC 3303	0.03	mg/kg	0.07	< 0.03	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	1.1	0.22	0.16	0.19	0.28
Anthracene	DETSC 3303	0.03	mg/kg	0.25	0.06	0.04	< 0.03	0.07
Fluoranthene	DETSC 3303#	0.03	mg/kg	2.4	0.49	0.51	0.29	0.53
Pyrene	DETSC 3303#	0.03	mg/kg	1.9	0.41	0.45	0.23	0.44
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	1.1	0.19	0.24	0.12	0.25
Chrysene	DETSC 3303	0.03	mg/kg	1.1	0.21	0.28	0.15	0.25
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	1.4	0.25	0.36	0.15	0.29
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.54	0.09	0.16	0.06	0.12
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	1.1	0.16	0.23	0.08	0.19
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.50	0.08	0.15	0.06	0.08
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	0.19	< 0.03	0.05	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.59	0.09	0.18	0.06	0.10
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	12	2.2	2.8	1.4	2.6
Phenols								
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	0.7	< 0.3	0.4	< 0.3	< 0.3

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Summary of Asbestos Analysis
Soil Samples

Our Ref 23-15598
Client Ref C9843
Contract Title Jack Lawson Terrace , Wheatley Hill

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
2195529	TP01 0.10	SOIL	NAD	N/A	SUB
2195530	TP02 0.10	SOIL	NAD	N/A	SUB
2195531	TP02 0.50	SOIL	NAD	N/A	SUB
2195532	TP03 0.30	SOIL	NAD	N/A	SUB
2195533	TP04 0.40	SOIL	NAD	N/A	SUB
2195534	TP05 0.20	SOIL	NAD	N/A	SUB
2195535	TP06 0.10	SOIL	NAD	N/A	SUB
2195536	TP06 0.30	SOIL	NAD	N/A	SUB
2195537	TP07 0.10	SOIL	NAD	N/A	SUB
2195538	TP07 0.20	SOIL	NAD	N/A	SUB
2195539	TP08 0.20	SOIL	NAD	N/A	SUB
2195540	TP09 0.10	SOIL	NAD	N/A	SUB
2195541	TP09 0.30	SOIL	NAD	N/A	SUB
2195542	TP10 0.20	SOIL	NAD	N/A	SUB
2195543	TP11 0.20	SOIL	NAD	N/A	SUB
2195544	TP12 0.10	SOIL	NAD	N/A	SUB
2195545	TP13 0.20	SOIL	NAD	N/A	SUB
2195546	TP14 0.20	SOIL	NAD	N/A	SUB
2195547	TP15 0.20	SOIL	NAD	N/A	SUB
2195548	TP18 0.10	SOIL	NAD	N/A	SUB
2195549	TP18 0.30	SOIL	NAD	N/A	SUB
2195550	TP20 0.10	SOIL	NAD	N/A	SUB
2195551	TP21 0.20	SOIL	NAD	N/A	SUB
2195552	TP22 0.20	SOIL	NAD	N/A	SUB
2195553	TP24 0.20	SOIL	NAD	N/A	SUB
2195554	TP25 0.10	SOIL	NAD	N/A	SUB
2195555	TP26 0.30	SOIL	NAD	N/A	SUB
2195557	TP27 0.30	SOIL	NAD	N/A	SUB
2195558	TP28 0.20	SOIL	NAD	N/A	SUB
2195559	TP29 0.50	SOIL	CHRYSOTILE	FREE FIBRES	SUB
2195560	TP30 0.10	SOIL	AMOSITE	FREE FIBRES	SUB
2195561	TP30 0.40	SOIL	NAD	N/A	SUB
2195562	TP31 0.40	SOIL	NAD	N/A	SUB
2195563	TP32 0.10	SOIL	NAD	N/A	SUB

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * -not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 23-15598
Client Ref C9843
Contract Jack Lawson Terrace , Wheatley Hill

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2195529	TP01 0.10 SOIL	20/06/23	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
2195530	TP02 0.10 SOIL	20/06/23	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
2195531	TP02 0.50 SOIL	20/06/23	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
2195532	TP03 0.30 SOIL	20/06/23	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
2195533	TP04 0.40 SOIL	20/06/23	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
2195534	TP05 0.20 SOIL	20/06/23	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
2195535	TP06 0.10 SOIL	20/06/23	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
2195536	TP06 0.30 SOIL	20/06/23	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
2195537	TP07 0.10 SOIL	22/06/23	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
2195538	TP07 0.20 SOIL	22/06/23	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
2195539	TP08 0.20 SOIL	22/06/23	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
2195540	TP09 0.10 SOIL	21/06/23	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
2195541	TP09 0.30 SOIL	21/06/23	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
2195542	TP10 0.20 SOIL	22/06/23	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
2195543	TP11 0.20 SOIL	22/06/23	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
2195544	TP12 0.10 SOIL	21/06/23	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
2195545	TP13 0.20 SOIL	21/06/23	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
2195546	TP14 0.20 SOIL	22/06/23	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
2195547	TP15 0.20 SOIL	22/06/23	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
2195548	TP18 0.10 SOIL	22/06/23	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
2195549	TP18 0.30 SOIL	22/06/23	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
2195550	TP20 0.10 SOIL	23/06/23	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
2195551	TP21 0.20 SOIL	21/06/23	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
2195552	TP22 0.20 SOIL	21/06/23	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
2195553	TP24 0.20 SOIL	21/06/23	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
2195554	TP25 0.10 SOIL	23/06/23	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
2195555	TP26 0.30 SOIL	26/06/23	GJ 250ml, PT 1L		BTEX/PRO
2195556	TP26 0.60 SOIL	26/06/23	GJ 250ml, PT 1L		BTEX/PRO
2195557	TP27 0.30 SOIL	23/06/23	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
2195558	TP28 0.20 SOIL	23/06/23	GJ 250ml, PT 1L	pH + Conductivity (7 days)	BTEX/PRO
2195559	TP29 0.50 SOIL	23/06/23	GJ 250ml, PT 1L	pH + Conductivity (7 days)	BTEX/PRO
2195560	TP30 0.10 SOIL	23/06/23	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
2195561	TP30 0.40 SOIL	23/06/23	PT 1L	pH + Conductivity (7 days)	Naphthalene, PAH MS
2195562	TP31 0.40 SOIL	23/06/23	GJ 250ml, PT 1L	pH + Conductivity (7 days)	BTEX/PRO
2195563	TP32 0.10 SOIL	23/06/23	GJ 250ml, PT 1L	pH + Conductivity (7 days)	

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Information in Support of the Analytical Results

Our Ref 23-15598
Client Ref C9843
Contract Jack Lawson Terrace , Wheatley Hill

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.
Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.
The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-
Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

End of Report

Certificate of Analysis

Certificate Number	23-18026	*Issued:*	14-Aug-23

Client Sirius Geotechnical & Environmental
Russel House
Suite 2
Mill Road
Langley Moor
DH7 8HJ

Our Reference	23-18026
Client Reference	C9843
Order No	23602/C9843/MG
Contract Title	Jack Lawson Terrace, Wheatley Hill
Description	7 Soil samples.
Date Received	28-Jul-23
Date Started	28-Jul-23
Date Completed	14-Aug-23
Test Procedures	Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By [redacted]
Kirk Bridgewood
General Manager

2139

Summary of Chemical Analysis
Soil Samples

Our Ref 23-18026
Client Ref C9843
Contract Title Jack Lawson Terrace, Wheatley Hill

Test	Method	LOD	Units	Lab No	2210138	2210139	2210140	2210141	2210142	2210143
				.Sample ID	TP26A	TP26B	TP26B	TP26C	TP26D	TP26E
				Depth	0.60	1.10	2.00	0.70	0.60	1.10
				Other ID						
				Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Sampling Date	12/07/2023	12/07/2023	12/07/2023	12/07/2023	12/07/2023	12/07/2023
				Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Petroleum Hydrocarbons										
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg		< 1.5	4.8	< 1.5	< 1.5	< 1.5	33
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg		< 1.2	44	< 1.2	< 1.2	< 1.2	130
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg		< 1.5	320	< 1.5	< 1.5	< 1.5	150
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg		< 3.4	980	< 3.4	< 3.4	< 3.4	150
Aliphatic C5-C35	DETSC 3072*	10	mg/kg		< 10	1400	< 10	< 10	< 10	460
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg		< 0.9	2.1	< 0.9	< 0.9	< 0.9	11
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg		< 0.5	21	< 0.5	< 0.5	< 0.5	130
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg		< 0.6	500	< 0.6	< 0.6	< 0.6	270
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg		< 1.4	1500	< 1.4	< 1.4	< 1.4	290
Aromatic C5-C35	DETSC 3072*	10	mg/kg		< 10	2000	< 10	< 10	< 10	710
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg		< 10	3400	< 10	< 10	< 10	1200
Benzene	DETSC 3321#	0.01	mg/kg		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
MTBE	DETSC 3321	0.01	mg/kg		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-18026
Client Ref C9843
Contract Title Jack Lawson Terrace, Wheatley Hill

Lab No	2210144
.Sample ID	TP26F
Depth	0.60
Other ID	
Sample Type	SOIL
Sampling Date	12/07/2023
Sampling Time	n/s

Test	Method	LOD	Units	
Petroleum Hydrocarbons				
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	6.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	4.8
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	4.2
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	10
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	26
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg	26
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01
MTBE	DETSC 3321	0.01	mg/kg	< 0.01

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Information in Support of the Analytical Results

Our Ref 23-18026
Client Ref C9843
Contract Jack Lawson Terrace, Wheatley Hill

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2210138	TP26A 0.60 SOIL	12/07/23	GJ 250ml, GJ 60ml, PT 1L	Aliphatics/Aromatics (14 days), BTEX / C5-C10 (14 days)	
2210139	TP26B 1.10 SOIL	12/07/23	GJ 250ml, GJ 60ml, PT 1L	Aliphatics/Aromatics (14 days), BTEX / C5-C10 (14 days)	
2210140	TP26B 2.00 SOIL	12/07/23	GJ 250ml, GJ 60ml, PT 1L	Aliphatics/Aromatics (14 days), BTEX / C5-C10 (14 days)	
2210141	TP26C 0.70 SOIL	12/07/23	GJ 250ml, GJ 60ml, PT 1L	Aliphatics/Aromatics (14 days), BTEX / C5-C10 (14 days)	
2210142	TP26D 0.60 SOIL	12/07/23	GJ 250ml, GJ 60ml, PT 1L	Aliphatics/Aromatics (14 days), BTEX / C5-C10 (14 days)	
2210143	TP26E 1.10 SOIL	12/07/23	GJ 250ml, GJ 60ml, PT 1L	Aliphatics/Aromatics (14 days), BTEX / C5-C10 (14 days)	
2210144	TP26F 0.60 SOIL	12/07/23	GJ 250ml, GJ 60ml, PT 1L	Aliphatics/Aromatics (14 days), BTEX / C5-C10 (14 days)	

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.
Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.
The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-
Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

End of Report

Certificate of Analysis

Certificate Number	23-18090	*Issued:*	08-Aug-23

Client Sirius Geotechnical & Environmental
Russel House
Suite 2
Mill Road
Langley Moor
DH7 8HJ

Our Reference	23-18090
Client Reference	C9843
Order No	23602/C9843/MG
Contract Title	Jack Lawson Terrace , Wheatley Hill
Description	2 Soil samples.
Date Received	03-Jul-23
Date Started	31-Jul-23
Date Completed	08-Aug-23
Test Procedures	Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By [redacted]

Kirk Bridgewood
General Manager

ilac-MRA

UKAS TESTING
2139

Summary of Asbestos Analysis
Samples

Our Ref 23-18090
Client Ref C9843
Contract Title Jack Lawson Terrace , Wheatley Hill

Lab No	Sample ID	Sample Location	Material Type	Result	Comment*	Analyst

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * -not included in laboratory scope of accreditation.

Summary of Asbestos Quantification Analysis
Soil Samples

Our Ref 23-18090
Client Ref C9843
Contract Title Jack Lawson Terrace , Wheatley Hill

		Lab No	2210484	2210485
		.Sample ID	TP29	TP30
		Depth	0.50	0.10
		Other ID		
		Sample Type		
		Sampling Date	23/06/2023	23/06/2023
		Sampling Time		
Test	Method	Units		
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	**2.207**	**0.001**
Gravimetric Quantification (a)	DETSC 1102	Mass %	2.206	na
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	0.001	0.001
Quantification by PCOM (c)	DETSC 1102	Mass %	na	na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na	na
Breakdown of Gravimetric Analysis (a)				
Mass of Sample		g	791.05	545.17
ACMs present*		type	Cement	
Mass of ACM in sample		g	116.35	
% ACM by mass		%	14.71	
% asbestos in ACM		%	15	
% asbestos in sample		%	2.206	
Breakdown of Detailed Gravimetric Analysis (b)				
% Amphibole bundles in sample		Mass %	na	0.001
% Chrysotile bundles in sample		Mass %	0.001	na
Breakdown of PCOM Analysis (c)				
% Amphibole fibres in sample		Mass %	na	na
% Chrysotile fibres in sample		Mass %	na	na
Breakdown of Potentially Respirable Fibre Analysis (d)				
Amphibole fibres		Fibres/g	na	na
Chrysotile fibres		Fibres/g	na	na

* Denotes test or material description outside of UKAS accreditation.
% asbestos in Asbestos Containing Materials (ACMs) is determined by by reference to HSG 264.
Recommended sample size for quantification is approximately 1kg
# denotes deviating sample

Information in Support of the Analytical Results

Our Ref 23-18090
Client Ref C9843
Contract Jack Lawson Terrace , Wheatley Hill

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2210484	TP29 0.50 SOIL	23/06/23	GJ 250ml, PT 1L		
2210485	TP30 0.10 SOIL	23/06/23	GJ 250ml, PT 1L		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-
Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

End of Report

APPENDIX G
Sirius Generic Assessment Criteria

SIRIUS GENERIC ASSESSMENT CRITERIA

Context

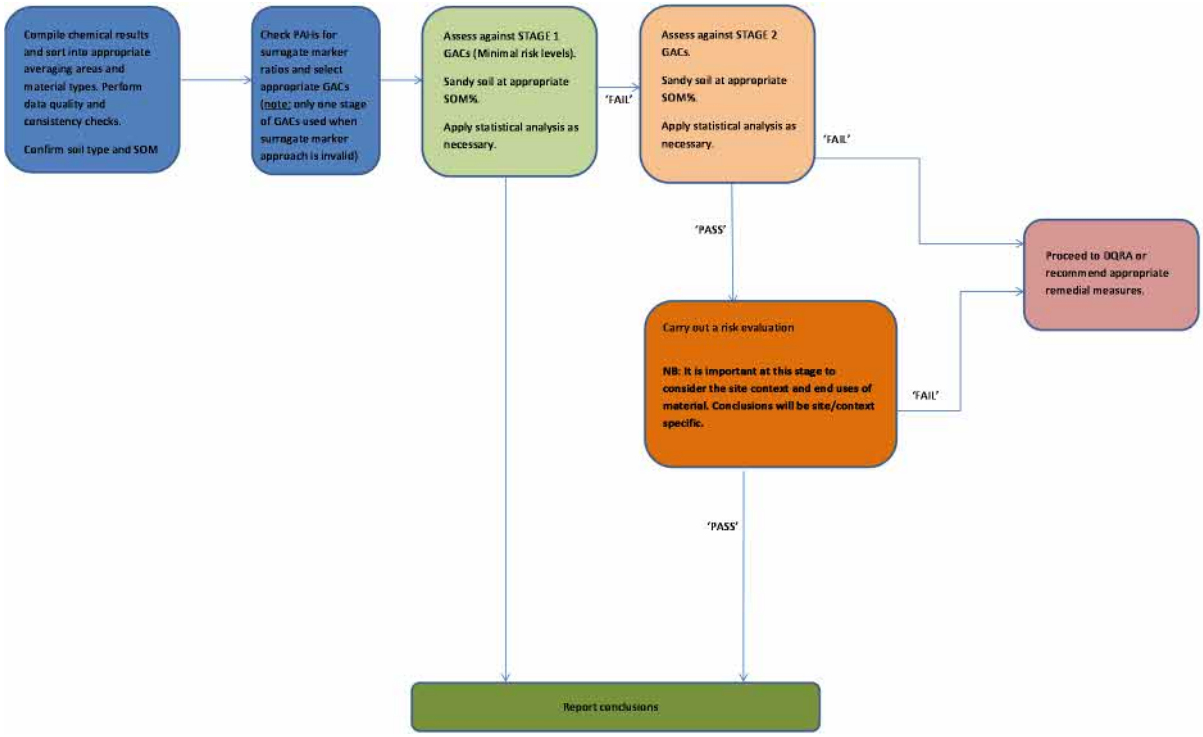
The framework for conducting site investigations, risk assessments and undertaking any necessary remedial works in the UK is provided by Environment Agency report CLR11 "Model Procedures for the Management of Contaminated Land". This presents a phased approach to risk assessment, involving: identification and qualitative assessment of potential pollutant linkages (source-pathway-receptor relationships) by means of a Conceptual Site Model; Generic Quantitative Risk Assessment (GQRA) of potentially significant pollutant links by comparing contaminant concentrations with appropriate Generic Assessment Criteria (GAC) values; and, if required, a Detailed Quantitative Risk Assessment (DQRA) based on site-specific conditions.

Assessment of Risk to Human Health

Introduction

A staged approach to GQRA has been adopted by Sirius for the evaluation of soil concentration data, as shown schematically in Figure 1.

Figure 1. GQRA Process.



The first stage of GQRA comprises assessment of the data against GAC values derived using toxicological parameter values based on "minimum risk". Any contaminants exceeding their GACs at this stage are further assessed against Stage 2 GACs, which have been derived using Low Level of Toxicological Concern (LLTC) criteria, where these are available.

With appropriate justification, a contaminant concentration that does not exceed the relevant Stage 2 GAC value may be considered to indicate that the land is "suitable for use". The appropriate use of LLTC-based criteria within the planning regime is considered reasonable by government agencies, as most recently highlighted in the letter (dated 3rd September 2014) to all local authorities from Lord de Mauley, Parliamentary Under Secretary at DEFRA.

A narrative "risk evaluation" must therefore accompany any Stage 2 assessment to justify the conclusions drawn. Where appropriate, this may provide a basis for eliminating from further consideration those contaminants whose concentrations do not exceed the applicable Stage 2 GAC value.

For the specific case of lead, the Category 4 Screening Level criteria given in CL:AIRE (2014)[1] have been adopted directly as GACs, as these are considered to be based on expert interpretation of current toxicological evidence.

In some areas, background concentrations of lead, other metals and metalloids, and/or individual PAHs may exceed their respective GACs and it may be appropriate to consider relative site and background concentration data as part of a more detailed assessment of the data.

Derivation of GACs

Except where otherwise stated, GACs have been derived by Sirius using CLEA version 1.071.

The GAC values have been derived for a sandy soil type, which will be conservative for the majority of soils (including made ground) encountered on historically contaminated sites. For organic contaminants of concern, criteria have been derived for a number of Soil Organic Matter (SOM) contents.

Genotoxic PAHs are assessed by the "Surrogate Method" using benzo(a)pyrene. Further information on this approach is given below.

Unless specifically stated, chemical properties and Health Criteria Values (HCVs) were obtained from:

> Environment Agency Science Report SC050021 series;
>
> Nathanail et al. (2009) "The LQM/CIEH Generic Assessment Criteria for Human Health Risk Assessment", 2nd edition, Land Quality Press, Nottingham;
>
> CL:AIRE - AGS - EIC (2010) "Soil Generic Assessment Criteria for Human Health Risk Assessment". CL:AIRE, London.

GACs for arsenic, benzene, benzo(a)pyrene, cadmium and chromium (VI) have been derived using the

[1] CL:AIRE (2014) "Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination", Report SP1010, rev. 2.

Low Level of Toxicological Concern (LLTC) criteria given in CL:AIRE (2013). These criteria are considered a reasonable basis for assessment as they are still highly precautionary and definitely do not approach an intake level that could be defined as approaching Significant Possibility of Significant Harm to human health in the context of Part 2A of the Environmental Protection Act 1990. It must be further understood that the GACs derived will still incorporate a residual level of conservatism resulting from the exposure parameters used and the assumptions inherent in the model algorithms.

GACs for Genotoxic PAHs

Our approach to the assessment of genotoxic PAHs retains the use of benzo(a)pyrene as a surrogate marker. This approach for genotoxic PAHs is recommended by the HPA (2010)[2], which we consider to be the authoritative current guidance produced by a UK expert body and note that it was retained in the DEFRA Category 4 Screening Levels project (CL:AIRE, 2014).

The surrogate marker approach allows the assessment of the combined carcinogenic risk associated with all genotoxic PAHs[3] present as a mixture within soil, even though detailed toxicological information for many of the individual compounds may be lacking. The approach is based on determining the risk posed by the genotoxic PAH mixture using the concentration of benzo(a)pyrene present as an indicator.

To use the GAC for benzo(a)pyrene as a surrogate marker, a number of requirements must be met (HPA, 2010):

> Benzo(a)pyrene must be present in all soil samples containing genotoxic PAHs for which this method of assessment is being used;
> A similar profile of the genotoxic PAHs relative to benzo(a)pyrene should be present in all of the samples being assessed;
> The PAH profile of PAHs in the soil samples should be similar to that present in the pivotal toxicity study on which toxicological criterion for benzo(a)pyrene was based (Culp et al., 1998[4]). Table 1 provides the basis for defining the acceptable range.

Data indicate that contaminated soils in the UK generally meet these criteria[5] but the assessor must review their dataset before adopting this approach. If the above criteria are not met, then the surrogate marker approach must not be adopted and individual GAC or SSAC values are to be applied.

[2] HPA (2010) "Risk Assessment Approaches for Polycyclic Aromatic Hydrocarbons (PAHs)", version 5.
[3] The genotoxic PAHs included in the USEPA PAH 16 analysis reported by analytical labs are: benz[a]anthracene, benzo[b]fluoranthene, benzo[k]fluoranthene, benzo[g,h,i]perylene, benzo(a)pyrene, chrysene, dibenz[a,h]anthracene and indeno[1,2,3-c,d]pyrene.
[4] Culp, S. et al. (1998) Carcinogenesis, 19, 117-124.
[5] Bull, S. & Collins, C. (2013) Environ. Geochem. Health, 31, 101-109.

Table 1. Profile of Genotoxic PAHs Relative to Benzo(a)pyrene that are Considered Acceptable for Application of Benzo(a)pyrene as a Surrogate Marker.

PAH	Acceptable Ratio of PAH Concentration to Benzo(a)pyrene for Application of Surrogate Marker Assessment	
	Lower Limit	Upper Limit
Benz[a]anthracene	0.12	12.43
Benzo[b]fluoranthene	0.11	10.85
Benzo[k]fluoranthene	0.04	3.72
Benzo[g,h,i]perylene	0.08	8.22
Chrysene	0.12	11.61
Dibenz[a,h]anthracene	0.01	1.38
Indeno[1,2,3-c,d]pyrene	0.07	7.27

For further information see: HPA (2010).

Soil Criteria Set for Purposes Other Than Human Health Protection

The Sirius GACs for sulphate, total organic carbon (TOC) and calorific value are set on basis of risks other than human health and their exceedance does not indicate a potential risk to future site users:

The GAC for sulphate content is based on potential detrimental effects on buried concrete[6] and must be assessed with reference to the soil pH;

The GAC for TOC content is provided for indicative assessment of disposal options if off-site landfill of soil were to be considered. This GAC is set at the 'Inert' waste threshold and should be considered as being applied for information purposes only;

The GAC for calorific value is set to assist in an initial assessment of the potential fire risk posed by made ground or natural soils containing elevated concentrations of potentially combustible organic matter.

Assessment criteria more stringent than those for human health may be set for specific purposes, for example, elimination of nuisance odours or ensuring that potentially mobile free-phase organic products are not present.

Controlled Waters

The Environment Agency's "Remedial Targets Methodology" (2006) provides a framework for assessing the potential for pollution of controlled waters and for deriving remedial target concentrations in soil and groundwater.

There are no generic groundwater or surface water quality standards that are applicable to all sites. Drinking Water Standards and Environmental Quality Standards (EQS) are used by Sirius as assessment criteria where they are appropriate to the contaminant linkages under consideration. Given that these standards apply at the receptor point, this is a conservative approach for samples collected at a source or along a transport pathway.

[6] BRE (2005) "Concrete in Aggressive Ground", Special Digest No. 1; 3rd Edition.

Soil Leachability

Sirius specifies that the analytical laboratory undertakes leachate preparation by BS EN 12475-2:2002. Where specific circumstances require a different method to be used, then this will be explained and justified within the report body text.

The results of leachate analysis are compared to the relevant GAC values for controlled waters.

The Sirius Group
Stage 1 Generic Assessment Criteria for Soils

Revision: 24 January 2020

Parameter	Residential (mg/kg, unless otherwise stated)						Commercial / Industrial (mg/kg, unless otherwise stated)			Note
	With Homegrown Produce			Without Homegrown Produce						
	1% SOM	2.5% SOM	5% SOM	1% SOM	2.5% SOM	5% SOM	1% SOM	2.5% SOM	5% SOM	
Metals/Metalloids										
Arsenic (inorganic)	37			40			630			[1]
Cadmium	11			85			190			[2]
Chromium (III)	910			4000			8600			
Chromium (VI)	6.0			6.1			33			[3]
Copper	200			7100			68000			[4]
Lead	200			310			2300			[5]
Mercury (inorganic)	40			56			1100			[6]
Nickel	130			180			980			[7]
Selenium	250			430			12000			
Vanadium	410			1200			9000			
Zinc	450			40000			750000			[4]
Other Inorganics										
pH	<5 or >9			<5 or >9			<5 or >9			
Total Sulphate	2400			2400			2400			[8]
Water-Soluble Sulphate	0.5 g/l			0.5 g/l			0.5 g/l			[8]
Free Cyanide	34			34			1400			[9]
Organics										
PAHs										
Acenaphthene	200	490	920	2000	3600	4900	75000	92000	100000	
Acenaphthylene	170	400	760	2000	3600	4900	76000	93000	100000	
Anthracene	2300	5300	9400	30000	34000	36000	520000	540000	540000	[10]
Benzo(a)anthracene	Assessed using benzo(a)pyrene as a surrogate marker									[10]
Benzo(a)pyrene	2.1	2.1	2.2	2.3	2.3	2.3	27	27	27	[11]
Benzo(b)fluoranthene	Assessed using benzo(a)pyrene as a surrogate marker									[10]
Benzo(k)fluoranthene	Assessed using benzo(a)pyrene as a surrogate marker									[10]
Benzo(g,h,i)perylene	Assessed using benzo(a)pyrene as a surrogate marker									[10]
Chrysene	Assessed using benzo(a)pyrene as a surrogate marker									[10]
Dibenzo(a,h)anthracene	Assessed using benzo(a)pyrene as a surrogate marker									[10]
Fluoranthene	280	560	820	1500	1600	1600	23000	23000	23000	
Fluorene	170	390	730	2200	3400	4000	60000	67000	70000	
Indeno(1,2,3-c,d)pyrene	Assessed using benzo(a)pyrene as a surrogate marker									[10]
Naphthalene	1.0	2.3	4.6	1.0	2.4	4.7	110	260	510	
Phenanthrene	95	220	380	1300	1400	1500	22000	22000	23000	
Pyrene	620	1200	1900	3700	3800	3800	54000	54000	54000	
BTEX and related										
Benzene	0.063	0.13	0.24	0.16	0.30	0.38	15	28	49	
Toluene	100	240	460	370	830	1100	33000	68000	110000	
Ethylbenzene	26	62	120	34	81	110	3200	7400	14000	
Xylenes (total)	28	67	130	33	78	110	3200	7700	15000	[12]
1,2,4-trimethylbenzene	0.22	0.53	1.1	0.24	0.58	1.2	39	93	170	
Iso-propylbenzene	6.6	16	32	6.8	17	33	1300	3100	6100	
Propylbenzene	21	51	100	23	57	110	3800	9100	17000	
Styrene	6.9	16	32	21	49	93	3100	6100	9500	
TPH										
Aliphatic EC 5-6	24	41	68	24	41	68	2400	4100	6900	
Aliphatic EC >6-8	53	110	210	53	110	210	5300	11000	21000	
Aliphatic EC >8-10	13	31	61	13	31	61	1300	3100	6000	
Aliphatic EC >10-12	62	150	300	62	150	300	6100	15000	28000	
Aliphatic EC >12-16	510	1200	2300	510	1200	2300	43000	72000	85000	
Aliphatic EC >16-35	41000	70000	90000	42000	70000	90000	>1E6	>1E6	>1E6	[13]
Aromatic EC >5-7	53	110	200	150	300	538	15000	28000	48000	
Aromatic EC >7-8	100	240	460	370	820	1500	33000	68000	110000	
Aromatic EC >8-10	20	48	94	22	54	100	2200	5200	9800	
Aromatic EC >10-12	63	150	290	120	290	560	11000	22000	30000	
Aromatic EC >12-16	140	320	570	1100	1900	2200	35000	37000	37000	
Aromatic EC >16-21	260	540	840	1800	1900	1900	28000	28000	28000	
Aromatic EC >21-35	1100	1500	1700	1900	1900	1900	28000	28000	28000	
Chlorinated Organics										
Chlorobenzene	0.19	0.44	0.86	0.19	0.45	0.87	31	71	140	
Dichloromethane (DCM)	0.47	0.78	1.2	1.2	1.7	2.4	250	340	470	
1,1-dichloroethane (DCA)	1.4	2.4	4.0	1.4	2.4	4.1	260	420	690	
1,2-dichloroethane (DCA)	0.0031	0.0048	0.0076	0.0035	0.0053	0.0084	0.34	0.51	0.81	
1,1-dichloroethene (DCE)	0.15	0.26	0.45	0.15	0.26	0.46	24	43	74	
cis-1,2-dichloroethene (DCE)	0.066	0.12	0.20	0.069	0.12	0.21	14	23	38	
trans-1,2-dichloroethene (DCE)	0.11	0.21	0.38	0.12	0.22	0.39	21	37	65	

Parameter	Residential (mg/kg, unless otherwise stated)						Commercial / Industrial (mg/kg, unless otherwise stated)			Note
	With Homegrown Produce			Without Homegrown Produce						
	1% SOM	2.5% SOM	5% SOM	1% SOM	2.5% SOM	5% SOM	1% SOM	2.5% SOM	5% SOM	
Pentachlorophenol	0.21	0.52	1.0	27	30	31	400	400	400	
1,1,1,2-tetrachloroethane	0.56	1.3	2.6	0.63	1.5	2.9	59	140	270	

Parameter	Residential (mg/kg, unless otherwise stated)						Commercial / Industrial (mg/kg, unless otherwise stated)			Note
	With Homegrown Produce			Without Homegrown Produce						
	1% SOM	2.5% SOM	5% SOM	1% SOM	2.5% SOM	5% SOM	1% SOM	2.5% SOM	5% SOM	
1,1,2,2-tetrachloroethane	0.98	2.1	4.0	1.6	3.4	6.3	150	310	570	
Tetrachloroethene (PCE)	0.074	0.17	0.32	0.07	0.17	0.33	10	23	45	
Tetrachloromethane (CT)	0.011	0.024	0.046	0.011	0.024	0.046	1.6	3.6	6.9	
1,1,1-trichloroethane (TCA)	3.7	7.8	15	3.8	7.9	15	370	770	1400	
1,1,2-trichloroethane (TCA)	0.39	0.85	1.6	0.51	1.1	2.0	89	180	320	
Trichloroethene (TCE)	0.0070	0.015	0.028	0.0071	0.015	0.028	1.5	2.8	44	
Trichloromethane (CF)	0.43	0.80	1.4	0.48	0.89	53	98	170	300	
Vinyl Chloride	0.00034	0.00045	0.00062	0.00037	0.00048	0.00066	0.038	0.049	0.068	
Miscellaneous Organics										
Carbon disulphide	0.066	0.13	0.25	0.066	0.13	0.25	6.7	14	25	
Di-(2-ethylhexyl)-phthalate	290	660	1100	3900	4000	4100	85000	85000	8600	
MTBE	31	55	94	39	68	120	7400	12000	19000	
Phenol	110	190	330	420	440	440	440			[14]
Methylphenols (cresols), total	78	170	330	5600	8200	9900	160000	170000	18000	[15]
2,4-dimethylphenol (m-xylenol)	18	43	82	200	430	720	15000	23000	28000	
Other Parameters										
TOC	3% w/w			3% w/w			3% w/w			[16]
Calorific Value	2 MJ/kg			2 MJ/kg			2 MJ/kg			[17]
Asbestos	Fibres present			Fibres present			Fibres present			

All concentration-based criteria are rounded to 2 significant figures.

The criteria assume a sandy soil type, which will be conservative for the great majority of soils (including made ground) encountered on historically contaminated sites.

Except where otherwise stated, criteria have been derived by Sirius using CLEA version 1.06. Parameters for the land use cases are consistent with those given in Environment Agency (2009) "Updated Technical Background to the CLEA Model", report SC050021/SR3 but updated (where relevant) for respiration rate, exposure frequency for dermal contact outdoors, soil adherence factors for children, and plant uptake concentration factors given in CL:AIRE (2014) and Nathanail et al., (2015). No correction has been made for the "Top Two" crop types in the Residential with Homegrown Produce land use and the criteria will therefore be conservative in this regard.

Health Criteria Values (HCVs) and (except where specifically noted) chemical property data were obtained from:
- Environment Agency Science Report SC050021 Series;
- Nathanail et al. (2015);
- CL:AIRE-AGS-EIC (2010).

Footnotes

[1] Based on oral GAC as this is the lower GAC and reflects a cancer risk many orders of magnitude greater than for inhalation.

[2] Determined for lifetime exposure. Plant uptake concentration factors applied were as given in CL:AIRE (2014). The GAC values are based on data for soils having a pH value in the range 6-8; caution should be applied in applying them at pH values outside this range, especially at pH values <5.

[3] Both oral and inhalation HCVs are based on local toxicological effects and therefore the lowest (oral) GAC value is adopted.

[4] For the Residential with Homegrown Produce land use, the GAC values for Cu and Zn are based on potential phytotoxic effects and have been set at the maximum allowable concentrations for sewage sludge-amended soils presented in the "Sludge (Use in Agriculture) Regulations" (SI 1263/1989); these criteria may also be applied in any land use where plants are to be grown. The equivalent GAC values for human health protection in the Residential with Homegrown Produce land use are around an order of magnitude greater.

[5] The Category 4 Screening Levels for lead defined in CL:AIRE (2013) have been adopted directly to provide an acceptable basis for initial assessment of data. Where background concentrations of lead exceed the GAC value, then site-specific evaluation will be required.

[6] The SGV for mercury is based on inorganic mercury which represents the most common form encountered within the environment. This is considered appropriate for most sites as: "..the SGV for inorganic mercury can normally be compared with chemical analysis for total mercury content because the equilibrium concentrations of elemental and methylmercury compounds are likely to be very low" (Environment Agency report SC050021/Mercury SGV). Analysis and specific assessment for elemental or methylated forms of mercury will need to be considered if historical land use or site-specific factors indicate that these forms of mercury are likely to be present.

[7] Toxicological effects by inhalation are localised, therefore the lower of the GAC values for oral and inhalation HCVs have been adopted.

[8] BRE (2005). Sulphate is not considered to pose a potential risk to human health under normal circumstances – this GAC applies to construction cases only and is set at the upper limit for DS-1 Design Sulphate Class concrete.

[9] GAC calculated for acute risk. Further information can be provided upon request.

[10] The genotoxic PAHs (benz(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, chrysene, dibenz(a,h)anthracene, indeno(1,2,3-c,d)pyrene) are routinely assessed using benzo(a)pyrene as a surrogate (HPA (2010) "Risk Assessment Approaches for Polycyclic Aromatic Hydrocarbons (PAHs)", version 5). Separate information on this approach is provided.

[11] Calculated using a 'minimum risk' oral index dose derived from the application of a 10,000x safety factor to the BMD10 presented in CL:AIRE (2014) for benzo(a)pyrene as a surrogate marker and the inhalation index dose specified in CL:ARE (2014) and Nathanail *et al*. (2015). As a conservative measure, the GAC is based on combined exposure pathways to account for systemic carcinogenic effects. Further information on the derivation can be provided upon request.

[12] For screening purposes, a single GAC has been set for total xylene. This is the lowest of the values calculated for the three individual xylene isomers.

[13] "No GAC" indicates that no value has been specified for this land use as the TDSI cannot be exceeded at achievable soil concentrations.

[14] 440mg/kg is the minimum concentration that is protective for direct skin contact with phenol (See Environment Agency SR050021/Phenol SGV) and is adopted where GACs for chronic exposure are higher.

[15] For screening purposes, a single GAC has been set for total methylphenol. This is the lowest of the values calculated for the three individual methylphenol isomers.

[16] The Hazardous Waste (England and Wales) Regulations 2005. TOC content in itself does not represent a potential risk to human health. This GAC is provided for indicative assessment of disposal options, in the case that off-site landfill of soil is undertaken. This GAC is specified at the 'Inert' waste threshold and should be considered as for information purposes only.

[17] ICRCL (1986) Guidance Note 61/84, 2nd Edition, Notes on the Fire Hazards of Contaminated Land. Calorific value is not an indication of direct human health risk but may be useful in assessment of the potential fire risk posed by made ground or natural soils containing elevated concentrations of potentially combustible organic matter.

APPENDIX H
Terms of Reference

Ref 1	NA to BS EN ISO 1997-2: 2007 UK National Annex to Eurocode 7: Geotechnical Design Part 2: Ground Investigation and Testing.
Ref 2	BS EN ISO 1997-1:2004 Eurocode 7 Geotechnical Design, General Rules
Ref 3	BS EN ISO 199 -2: 2007 Eurocode 7 Geotechnical Design, Ground Investigation and Testing
Ref 4	BS EN ISO 14688-1: 2018 Geotechnical Investigation and Testing –Identification and Classification of Soil, Identification and Description (IS -1: 2017)
Ref 5	BS EN ISO 14688-2: 2018 Geotechnical Investigation and Testing –Identification and Classification of Soil, Principals of Classification (ISO 14688-2: 2017)
Ref 6	BS EN ISO 14689: 2018 Geotechnical Investigation and Testing –Identification, Description and Classification of Rock (ISO 14689; 2017)
Ref 7	BS EN ISO 22476-3: 2005 +A1: 2011 Geotechnical Investigation and Testing, Field Testing, Standard Penetration Testing
Ref 8	BS5930:20 +A1:2020 Code of Practice for Ground Investigations
Ref 9	BS 137 -1 to 9:1990-2022 Methods of Test for soils for Civil Engineering Purposes.
Ref 10	BS EN ISO 17892-1 to 12: 2014-2022 Geotechnical Investigation and Testing, Laboratory Testing of Soil
Ref 11	BS5975: 2019 Code of Practice for Temporary Works
Ref 12	CIRIA Report 97 1992 (2001 revision) Trenching Practice
Ref 13	Highways England CD225 & CD226 Design for new pavement construction.
Ref 14	BRE Digest SD1 (v3): 2005 Concrete in Aggressive Ground
Ref 15	BRE BD365: 2016 Soakaway Design
Ref 16	CIRIA 758D: 2019 Abandoned Mine Workings Manual
Ref 17	NHBC Standards 2 3 Chapter 4
Ref 18	Highways Agency Manual of Contract Documents for Highways Works Volume 1 Series 600 Earthworks.
Ref 19	Land Contamination:Risk Management. https://www.gov.uk/guidance/land-contamination-how-to-manage-the-risks

Ref 20	CL:AIRE 2020 'Professional guidance : Comparing Soil Contamination Data with a Critical Concentration'.
Ref 21	BS 10175:2011+A2:2017 Investigation of potentially conta – Code of practice.
Ref 22	BS 8485:2015+A1:2019 Code or practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings.
Ref 23	BS 8576:2013 Guidance on investigations for ground gas –Permanent gases and Volatile Organic Compounds (VOCs).
Ref 24	CIRIA C665: 2007 Assessing risks posed by hazardous ground gases to buildings.
Ref 25	CIRIA C682: 2009 The VOCs Handbook.
Ref 26	CIRIA C735: 2014 Good practice on the testing and verification of protection systems for buildings against hazardous ground gases.
Ref 27	CIRIA C733: 2014 Asbestos in soil and made ground: a guide to understanding and managing risks.
Ref 28	Environment Agency Technical Guidance WM3 Version 1.2.GB October 2021 Waste Classification guidance on the classification and assessment of waste.
Ref 29	Stroud, M.A. "The standard penetration test in insensitive clay and soft rocks", Proceedings of the European Symposium on Penetration Testing, 2, 367-375 1975.
Ref 30	TRL publication LR1132 "Structural design of bituminous roads", 1984

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