

United Living

Halsnead Garden Village

Environmental Impact Assessment Scoping Report

2nd April 2026

665038

RSK

GENERAL NOTES

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1 INTRODUCTION

1.1 Background

1.1.1 RSK has been instructed by United Living (hereafter referred to as the 'Applicant') to produce information to support a Scoping Opinion Request (hereafter referred to as the 'EIA Scoping Report') to accompany an detailed planning application for a parcel of the wider Halsnead Garden Village which will comprise up to 260 dwellings (hereafter referred to as the 'Proposed Development'). The planning application boundary of the site (hereafter referred to as the 'Site') is shown in **Figure 1.1**.

1.1.2 The determining authority for the planning application is Knowsley Council (KC), and the Site is approximately 7.7 hectares (ha) in size, located south of Lickers Lane centred on Ordnance Survey (OS) National Grid Reference (NGR) SJ 47146 90231.

1.1.3 The Proposed Development is anticipated to comprise up to 260 dwelling, associated access and internal roads including connections to surrounding committed developments and from Lickers Lane, and open space.

1.1.4 The purpose of this EIA Scoping Report is to establish the scope of the Environmental Impact Assessment (EIA) to be reported in an Environmental Statement (ES) that will be prepared in accordance with The Town and County Planning (Environmental Impact Assessment) Regulations 2017 (as amended) (hereafter referred to as the 'EIA Regulations') to accompany the Applicant's planning application.

1.2 EIA definition and requirements

1.2.1 The term 'Environmental Impact Assessment' ('EIA') describes a procedure that must be followed for certain types of project before it can be given 'consent'. The procedure is a means of drawing together, in a systematic way, an assessment of a project's likely significant environmental effects. This helps to ensure that the importance of the predicted effects and the scope for avoiding, preventing, reducing or, if possible, offsetting them are properly understood by the public and the authority granting consent (the 'determining authority') before it makes its decision.

1.2.2 The requirements for an EIA are set out within the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (as amended), SI 2017/571 (the

"EIA Regulations"). Development types listed within Schedule 2 of the EIA Regulations are subject to an EIA if they exceed specified thresholds and are likely to have significant effects on the environment by virtue of such factors as their nature, size or location (Regulation 2 (1)). For urban development projects these thresholds[1] are as follows:

- the development includes more than 1 hectare of urban development which is not dwellinghouse development; or
- the development includes more than 150 dwellings; or
- the overall area of the development exceeds 5 ha.

1.2.3 The Proposed Development exceeds these thresholds as it would comprise more than 5ha of total development and more than 150 dwellings. On review of the selection criteria in Schedule 3 of the EIA Regulations, RSK is of the opinion that the Proposed Development qualifies as EIA development, and therefore, an Environmental Statement will be required to support the planning application. Therefore, it is not proposed to seek a formal Screening Opinion.

1.3 Purpose of the report

1.3.1 Regulation 15 of the EIA Regulations allow applicants to request the relevant local planning authority to state in writing their opinion as to the scope and level of detail of the information to be provided in the ES. Therefore, this EIA Scoping Report has been prepared to support this request.

1.3.2 The purpose of this EIA Scoping Report is to ensure that the subsequent EIA is focused on the key impacts likely to give rise to significant environmental effects, and to obtain agreement on the EIA approach and scope. As well as identifying elements to be considered in the EIA, this EIA Scoping Report also identifies those elements that are not considered necessary to assess further. This approach is in line with the general aim to undertake proportionate EIA, as advocated by industry best practice.

1.3.3 While this EIA Scoping Report seeks to establish the overall framework for the EIA in relation to the environmental factors and associated effects, the exact scope of the EIA will be influenced by the Scoping Opinion received, the on-going design evolution of the Proposed Development, and through on-going baseline data collection (e.g. field surveys etc.).

[1] Schedule 2, Section 10(b)

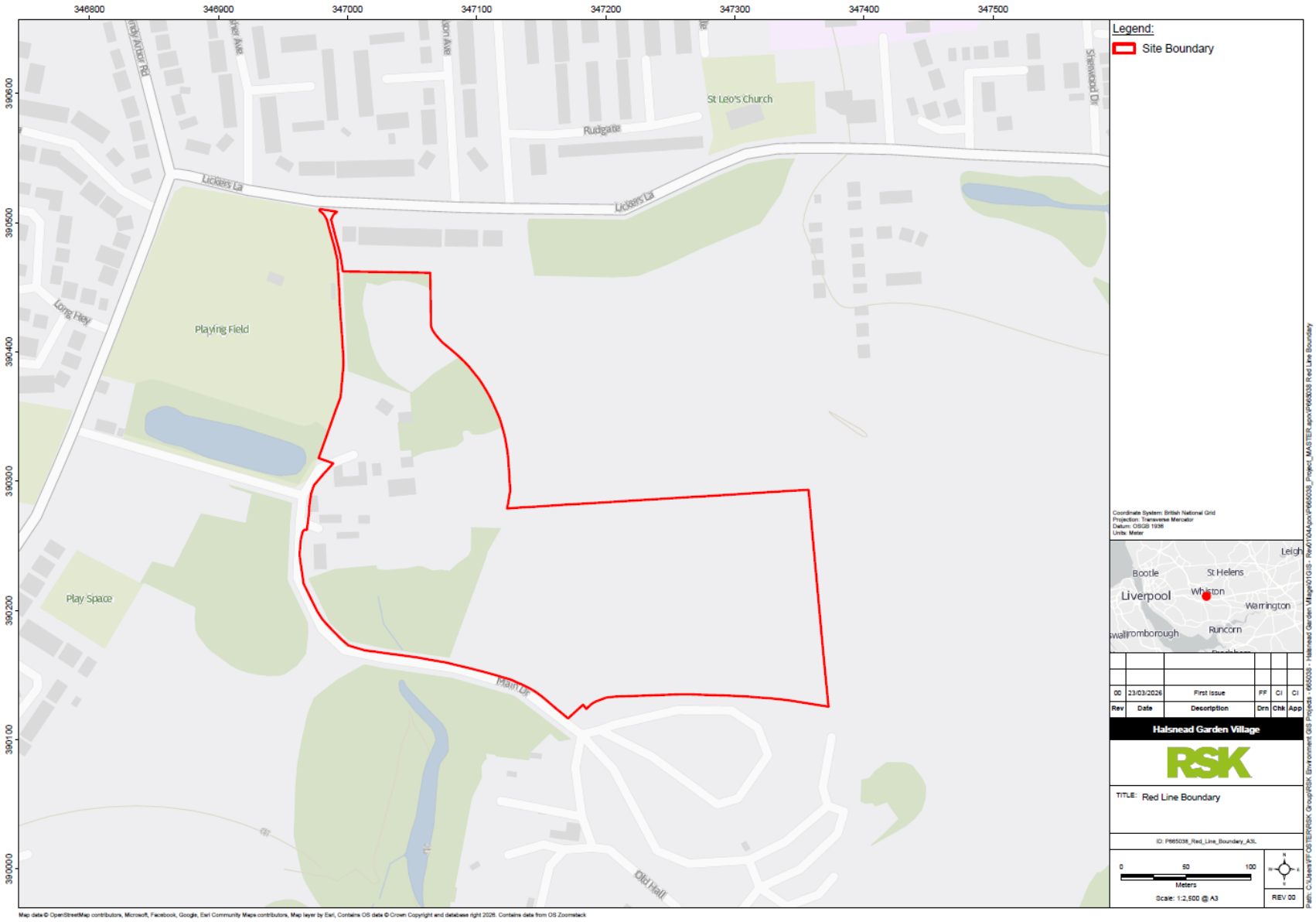
1.3.4 **Table 1.1** sets out what information the EIA Regulations (Regulation 15 (2)) state that a request for a Scoping Opinion must include and where this information can be found in this EIA Scoping Report.

Table 1.1: Information required by the EIA Regulations 2017 to accompany a Scoping Opinion request

Information required	Location within the report
A plan sufficient to identify the land.	Figure 1.1
A brief description of the nature and purpose of the development, including its location and technical capacity.	Section 2 and Section 4
An explanation of the likely significant effects of the development on the environment.	Section 7
Such other information or representations as the person making the request may wish to provide or make.	Sections 2 to 10

1.3.5 In accordance with the EIA Regulations, the ES will be based on the Scoping Opinion received.

Figure 1.1: Site boundary



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1.4 EIA team

1.4.1 RSK Environment Ltd (RSK) has undertaken the EIA Coordination and preparation of this EIA Scoping Report on behalf of the Applicant.

1.4.2 RSK is one of the founder members of the Institute of Sustainability & Environmental Professionals (ISEP; formerly known as IEMA) EIA Quality Mark which recognises our capabilities and quality of work in the field of environmental assessment and our commitment to ongoing excellence in EIA.

1.4.3 The EIA team comprises a group of qualified and experienced professionals in their field. Details of the EIA team are provided in **Table 1.2** below.

Table 1.2: EIA technical team

Project role	Organisation
The Applicant	United Living
Architect	Ascot Design
Landscape Architect, LVIA, Ecology, Arboriculture	FPCR
Town Planning	Grimster Planning
EIA Coordination; Socio-Economics; Health and Social Value	RSK Environment
Flood Risk	Townsend Water Engineering
Air Quality	Miller Goodall
Noise	NJD Environmental
Transport	SCP
Heritage and Archaeology	Lanpro
Energy	Anderson Goddard
Geotechnical and contamination	Brownfield Solutions

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2 DESCRIPTION OF CONTEXT AND KEY RECEPTORS

2.1 Site description

2.1.1 Currently, the Site comprises open fields, a patch of woodland, a house and a series of agricultural outbuildings. The Site is bounded by:

- Lickers Lane (numbers 32-46) to the north;
- the Fox Wood Phase 2 development (eastern parcel) under construction under consent 20/00399/OUT to the east;
- the Halsnead Park park home development and Main Drive to the south;
- the western parcel of the Fox Wood Phase 3 development and the Whiston Juniors football pitches to the west.

2.2 Site context

2.2.1 The Site is part of the wider Halsnead Garden Village Masterplan, allocated in the KC Core Strategy as Land South of Whiston - SUE1, site (h), and the subject of a Masterplan Supplementary Planning Document[2] setting out the expectations across the wider area. Several planning applications have come forward for parcels of the wider masterplan as listed in **Table 6.2** and **Figure 6.3.**

2.2.2 The wider masterplan area lies north of the M62, east of the M57 and south of Whiston. The location of the Site in its wider geographical context is presented in **Figure 2.1**.

2.2.3 The Site is located within the Whiston South ward of Knowsley Council (KC), and within the Knowsley 013c Lower Super Output Layer which is in the 40% most deprived in England[1].

2.2.4 The nearest train station is Whiston, 560m north of the Site and is served by trains towards Manchester, Liverpool and Wigan. The nearest bus stop is on Windy Arbor Road, 193 m west of the Site, served by the 61 and C50 buses towards Liverpool, Widnes and Runcorn. A section of National Cycle Network Route 56 begins 575 m southeast, however this only extends as far as Huyton and does not join the main Chester to Liverpool route.

[2] Knowsley Council, 2017. Halsnead Garden Village Masterplan Supplementary Planning Document

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2.2.5 Vehicular access to the Site is from Licker Lane and Main Drive, with access to the M57 and M62 via Windy Arbor Road.

2.2.6 The Site is not within an AQMA; the nearest AQMA is the Liverpool City Council AQMA 2.6 km to the west.

2.2.7 Noise at the Site is predominantly from local roads including the M57 and M62.

2.2.8 The Site is within Flood Zone 1. There are no watercourses on-site. A review of the EA Risk of Flooding from Surface Water map indicates that the majority of the Site has a very low (less than 0.1%) chance of flooding every year. There are isolated patches of low (0.1-1%), medium (1 - 3.3%) and high (greater than 3.3%) chance of surface water flooding across the Site, with one more substantive area of higher risk in the northern part of the Site. There is a low risk of groundwater flooding. The Site is within the Dittton Brook (Halewood to Mersey Estuary) Nitrate Vulnerable Zone. The Site is not within a drinking water safeguard zone; the nearest Source Protection Zone is 250m to the east.

2.2.9 The underlying geology is part of the Pennine Coal Measures Formation and this is overlain by glacial Till. Both are Secondary A Aquifers.

2.2.10 Potential sources of ground contamination on or adjacent to the Site include limited patches of made ground and historic mine shafts.

2.2.11 There are no European or national-level designated sites for biodiversity within 5 km. There are no local nature reserves within 2 km. The Site contains Ancient Woodland..

2.2.12 Other habitats on the Site include grassland, wood pasture, broadleaved woodland and a pond, and the Site has the potential to support the following protected species: badgers, bats, breeding birds, grass snake and great crested newt.

2.2.13 The majority of land at the Site is classified as being Grade 2 under the Agricultural Land Classification system[4] where Grade 1 is the highest quality, Grade 5 is the lowest quality, and Grades 1-3a are considered 'Best and Most Versatile' (BMV) land for agriculture.

2.2.14 There are no listed buildings on the Site. There are two listed buildings within 500 m of the Site. There are no scheduled monuments, registered parks or gardens or conservation areas in proximity of the Site. The Site is within the historic non-designated Halsnead Park Estate landscape.

2.2.15 The Site is within a coal mining area with mine shafts on Site that will require stabilisation. No other structural, geomorphological or geochemical features are recorded on or near the Site by BGS mapping. There are no Health and Safety Executive (HSE) Control of Major Accident Hazards (COMAH) sites in close proximity to the Site. There are furthermore no intersections with pipelines or hazard zones as reported by HSE's

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Planning Advice Web App / info about pipelines. The Site has a low risk for unexploded ordnance.

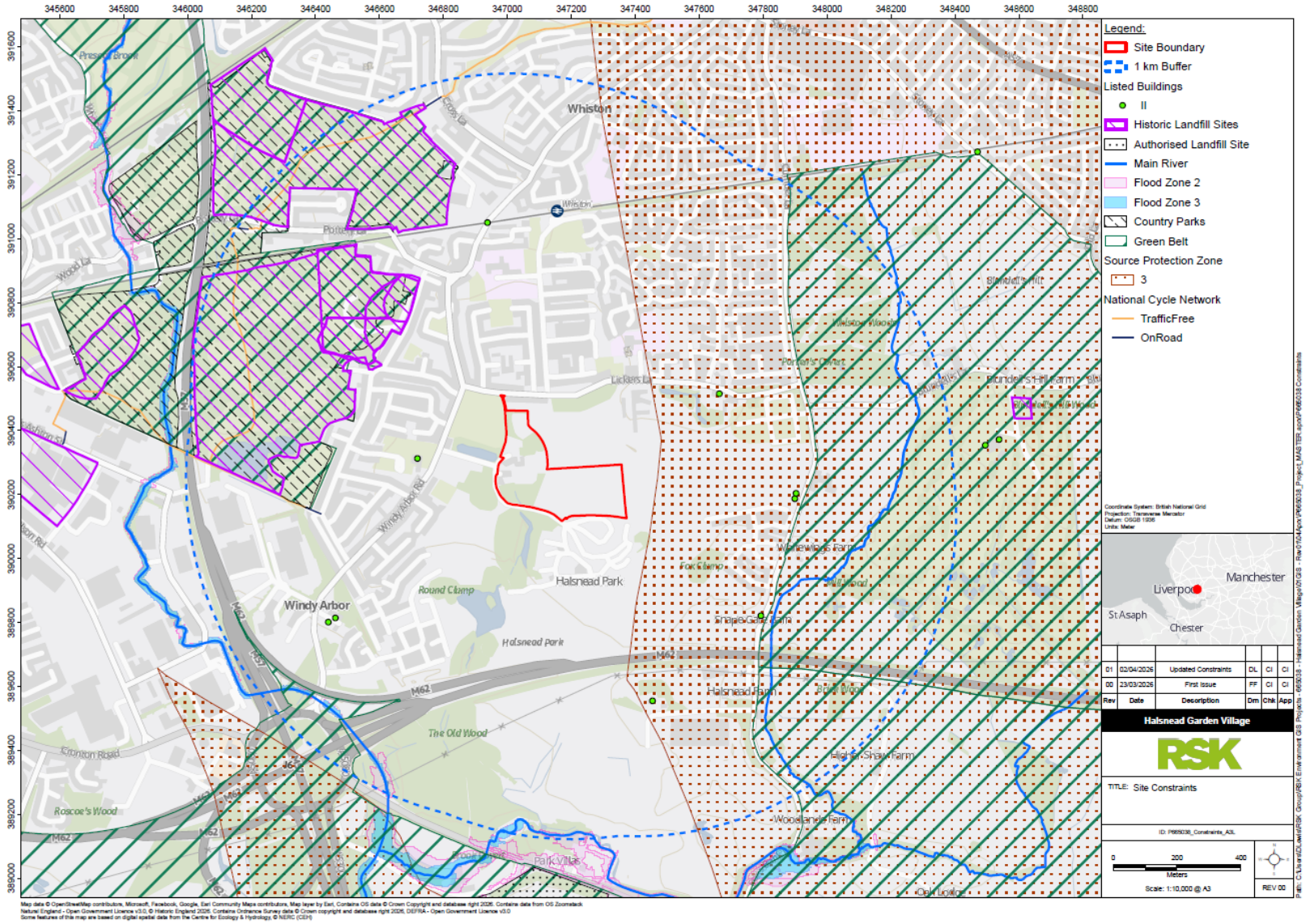
2.2.16 The key receptors which are considered potentially sensitive to the demolition and construction and operation of the Proposed Development have been identified and are summarised in **Table 2.1**.

Table 2.1: Potential key receptors

Receptor	Change likely to experience/potential impacts	Phase
Residents and other people in the surrounding area.	Increase in traffic, dust, air pollution, noise and visual impacts	Construction / operation
Future residents	Increase in traffic, dust, air pollution, noise and visual impacts	Construction / operation
Local Views	Visual impacts	Construction / operation
Habitats including woodland, ancient woodland, wood pasture, grassland, scrub, hedgerow and a pond. Species including badgers, bats, birds, great crested newts and reptiles	Habitat removal, species disturbance and harm, increased recreation and pet pressure	Construction / operation
Groundwater, surface water	Risk of pollution	Construction
Unknown archaeological remains	Removal through groundworks	Construction
Grade I, Grade II and Grade II* listed buildings Halsnead Park historic landscape	Change to setting of listed buildings	Construction / operation
Climate	Greenhouse gas emissions	Construction / operation / decommissioning

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Figure 2.1: Site context



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3 POLICY CONTEXT

3.1 Planning context

3.1.1 The EIA will consider legislation and relevant national and local planning policy guidance as summarised below.

3.2 National planning policy

3.2.1 The ES will have regard to the National Planning Policy Framework (NPPF)[3], which sets out the Government's economic, environmental and social planning policies for England. The policies contained within the NPPF articulate the Government's vision of sustainable development, which are intended to be interpreted at a local level, to meet the requirements of local aspirations.

3.2.2 The NPPF should be read alongside the national Planning Practice Guidance (PPG), which aims to make planning guidance more accessible, and to ensure that the guidance is kept up to date.

3.2.3 The ES will have regard to the most recent revision of the NPPF, published in February 2025.

3.3 Local planning policy

3.3.1 The Knowsley Local Plan Core Strategy[4] sets out the vision, objectives and policies that will guide Knowsley's development up to the year 2028.

3.3.2 The Halsnead Garden Village Masterplan Supplementary Planning Document[5] sets out KC's vision, objectives, development framework and masterplanning guidance for the masterplan area.

3.3.3 The Halsnead Garden Village Design and Local Distinctiveness Guide[6] sets out the requirements for design of streets, public realm, green and blue infrastructure across the

[3] Ministry of Housing, Communities and Local Government (MHCLG) (February 2025); National Planning Policy Framework.

[4] KC (2016); Knowsley Local Plan Core Strategy. Available at: https://www.knowsley.gov.uk/planning-and-development/planning-policy/adopted-documents

[5] KC (2017); Halsnead Garden Village Masterplan Supplementary Planning Document Available at : https://www.knowsley.gov.uk/planning-and-development/planning-policy/supplementary-planning-documents

[6] KC (2020); Halsnead Garden Village Design and Local Distinctiveness Guide. Available at : https://www.knowsley.gov.uk/planning-and-development/planning-policy/supplementary-planning-documents

Halsnead Garden Village Masterplan.

3.3.4 The Liverpool City Region Growth Plan[7] sets out the economic plan for the wider city region.

3.4 Other policy and guidance considerations

3.4.1 There are several supporting policy and guidance documents that are relevant to each environmental topic and will be considered on a topic-by-topic basis within the ES.

[7] Liverpool City Region Combined Authority (2025) Liverpool City Region Growth Plan 2025-2035 Available at: https://www.liverpoolcityregion-ca.gov.uk/lcr-growth-plan

4 DESCRIPTION OF THE PROPOSED DEVELOPMENT

4.1 Proposed Development description

4.1.1 The Proposed Development will comprise the construction of up to 260 homes and access from Lickers Lane, Main Drive and surrounding housing developments.

4.1.2 The buildings would range in heights and massing. While the heights and massing have not yet been finalised, it is anticipated that the Proposed Development will be up to a maximum of 2.5 storeys in height.

4.2 Demolition and construction

4.2.1 The ES will include a chapter describing the proposed construction methodology, the likely phasing of the Proposed Development and the proposed construction timescales. It will indicate the likely plant and equipment to be used, construction traffic access and management, the location and size of construction welfare facilities, materials and resource use, and anticipated waste quantities.

Construction programme

4.2.2 It is anticipated that the construction of the Proposed Development will take place over a period of approximately 3 years and will be occupied in a phased manner, yet to be determined.

4.2.3 At this stage, limited detail is available on the proposed construction methodology; however, timescales and construction methods are likely to be comparable to those of any similar scale development. As such, the stages are likely to include any necessary grading of the land; installation of the necessary infrastructure, drainage, access roads etc.; digging and pouring of foundations; construction of the homes and building structures; internal fit out and landscaping. The ES will include a chapter describing the proposed construction methodology and timescales.

4.3 Operation

4.3.1 Once the Proposed Development is fully operational, it will be occupied by Site residents and users. This will be detailed further within the ES.

5 CONSULTATION AND ENGAGEMENT

5.1.1 The process of consultation is important to the development of a comprehensive and balanced ES. Views of the interested and affected parties serve to focus the environmental studies and to identify specific issues that require further investigation. Consultation is an ongoing process as part of the design development.

5.1.2 Information and views are being sought from a range of statutory and non-statutory bodies through public consultation and the intention is for consultees to be involved in the evolution of the design and assessment of environmental effects.

5.1.3 Key consultees are considered to include, but are not limited to:

- Local residents;
- Knowsley Council including Environmental Health;
- Neighbouring boroughs (e.g. Halton Borough Council, St Helens Borough Council), where necessary;
- Important neighbouring occupiers and landowners, where necessary;
- Knowsley Council Lead Local Flood Authority;
- Liverpool City Region Combined Authority;
- Highways England;
- Merseyside Environmental Advisory Service;
- Mining Remediation Authority;
- United Utilities;
- Environment Agency (EA);
- Health and Safety Executive;
- Historic England (HE);
- Natural England (NE); and
- National Grid (NG) and other statutory utility providers.

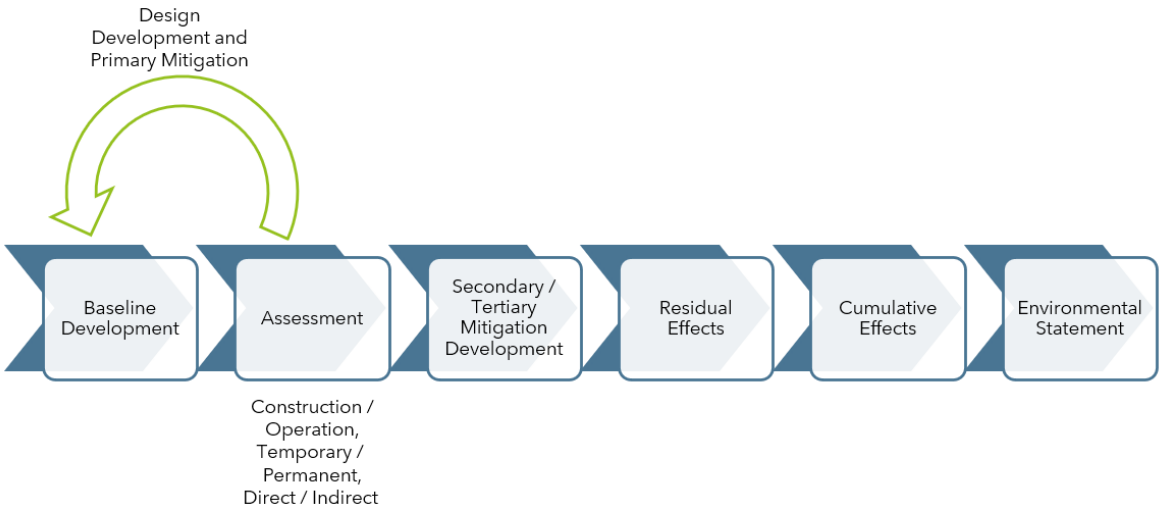
5.1.4 A programme of community consultation is being undertaken by the project team who will continue to engage with third parties and stakeholders throughout the planning process.

6 APPROACH TO EIA

6.1.1 The general approach to assessment will establish a baseline for each topic. Receptors and resources will be identified, and their sensitivity classified. The potential impacts of the proposed development on these receptors and resources will be assessed, for the demolition and construction and operation of the Proposed Development. Subsequent mitigation of impacts will be considered, along with the identification of likely cumulative and residual effects.

6.1.2 The process that the EIA will take is shown in **Figure 6.1** below:

Figure 6.1: EIA assessment process



6.2 General difficulties and uncertainties

6.2.1 Factor specific difficulties and uncertainties are set out in the relevant sections of this EIA Scoping Report. The following key general difficulties and uncertainties apply to several factors:

- The design of the Proposed Development is still emerging, as are the environmental surveys and assessments required to support the planning and EIA process. This EIA Scoping Report is provided based on the information available at the time of writing. Where relevant, the proposed scope will be reviewed and updated to reflect progress in the design of the Proposed Development that may occur post-scoping and agreed with relevant statutory consultees. Any changes to the scope of the EIA will be reported in the ES.

- Data from third parties relied upon for the baseline against which any effects will be assessed could potentially be out of date or inaccurate. However, any such data will be procured from reputable and industry standard sources. It will be reviewed and used by competent and experienced professional experts. The combination of appropriate data sources being used by competent and experienced experts should ensure that the data are suitable for its purpose and will, therefore, provide an appropriate evidence base from which the existing environmental baseline will be informed.

6.3 Baseline development

6.3.1 The EIA will primarily describe environmental impacts in terms of the extent of likely change to the baseline environment. The baseline represents the environmental conditions of the Site at the time of the assessment.

Spatial scope

6.3.2 The planning boundary of the Site is shown in **Figure 1.1**. Assessment study areas will vary by topic areas, according to the baseline information and the nature of likely impacts. These will be determined during the EIA.

Temporal scope

6.3.3 The ES will assess the environmental impacts of the Proposed Development during the demolition and construction, and operational, stages. The assessment will compare current and future baseline conditions (as appropriate) to those conditions expected with the demolition and construction, and operation, of the Proposed Development. The assessment will assume that the demolition and construction works will start in 2027, subject to securing planning permission.

6.3.4 The assessment will consider the totality of the Proposed Development from demolition and construction through to operation, using the following assessment scenarios:

- existing baseline;
- future baseline (without Proposed Development);
- assessment of peak demolition and construction effects;
- assessment of operational effects (all demolition and construction complete, the Proposed Development fully occupied and operational).

6.3.5 The point at which peak demolition and construction effects are anticipated varies between assessment topics. For those assessments driven by the effects of traffic, peak demolition and construction traffic is likely to lead to peak effects. For assessment topics where effects are driven by massing, effects are likely to increase over the duration of the

demolition and construction period. Effects related to the sub-surface will be greatest during enabling works, demolition, excavation and substructure stages.

6.3.6 This assessment of peak demolition and construction effects will assess a worst-case scenario and, therefore, be a conservative assessment of any interim effects; consequently, no time-slices or interim demolition and construction assessments are considered necessary for most topics. This will be reviewed on a topic-by-topic basis.

6.4 Consideration of alternatives

6.4.1 The ES will include consideration of the main alternatives considered during the design process, such as the location and types of land uses and layouts. The rationale for the selection of the preferred option will also be included within the ES.

6.5 Assessment of effects and defining significance

Prediction of impacts

6.5.1 Once impacts have been identified, prediction methods will be used to identify the magnitude and nature of changes to the environment resulting from the Proposed Development, compared to the situation without the Proposed Development (i.e. the baseline conditions). The relative significance of these changes will then be defined using thresholds and criteria, as appropriate.

6.5.2 There are several methods available for predicting the effects of the Proposed Development, some of which are qualitative and quantitative. Quantitative methods predict measurable changes resulting from a development and, hence, rely on the ability to measure and or model baseline conditions accurately, for example the concentration of air pollutants. In comparison, qualitative techniques rely on expert judgement; for example, the Landscape and Visual Impact Assessment (LVIA). In these circumstances, a clear distinction will be made between matters of fact and professional judgement.

Evaluation and assessment of level of impacts

6.5.3 The definition of impact level thresholds and criteria will take account of the:

- value / sensitivity of the resource (international, national, regional and local level importance);
- magnitude of the impact (for example the number of receptors);
- duration of the impact; and
- reversibility of the effect.

6.5.4 Typically, the criteria will be developed from a matrix approach comprising the value / sensitivity of the resource on one axis and the magnitude of the predicted impacts on the other. The classification of the level of effects is shown in **Table 6.1**.

Table 6.1: Classification of the level of effects

Magnitude of impact	Value / sensitivity		
	Low	Moderate	High
Negligible	Negligible	Negligible	Negligible
Minor	Minor-negligible	Minor	Moderate-minor
Moderate	Moderate-minor	Moderate	Major-moderate
Major	Moderate-minor	Major-moderate	Major

6.5.5 The classification of the effect will also consider the following descriptors:

- adverse, neutral or beneficial;
- permanent or temporary;
- duration / frequency or likelihood; or
- direct or indirect.

6.5.6 The duration of the effect will be assessed to be either temporary or permanent where:

- temporary (e.g. demolition and construction phase):
- short term (<5 years);
- medium term (5 – 10 years);
- long term (>10 years); or
- permanent (e.g. once the Proposed Development is completed and operational).

6.5.7 **Table 6.1** displays a range of effects associated with the magnitude of change and sensitivity as, in certain situations, the effect may fall within this range. Ultimately, the level of effect is based upon the professional opinion of the specialist involved and the assessment matrix table is intended as a guide.

Definition of significance

6.5.8 Whether an effect is deemed to be 'significant' or 'not significant' will be determined, based on professional experience and judgement. Generally, based on the described classification and professional judgement, effects considered to be moderate or major will be deemed significant, and those considered minor, or negligible, will be deemed not significant. Where this differs, this will be detailed within the individual chapters / volume of the ES.

Mitigation development

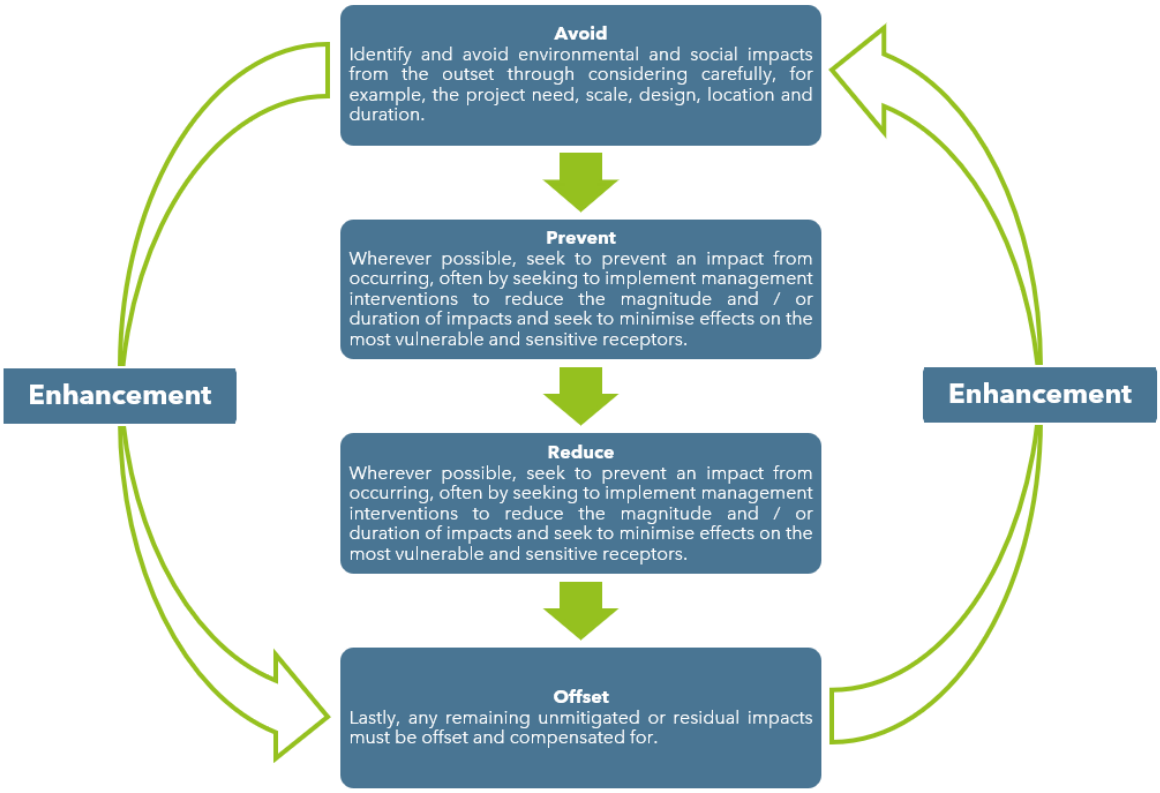
6.5.9 During the EIA, there will be an on-going design process, looking at ways to best mitigate any likely environmental effects through amendments to the design of the Proposed Development. This will constitute embedded design mitigation and where this has occurred it will be identified within the relevant topic chapters within the ES.

6.5.10 Further assessment mitigation measures may be introduced where adverse environmental impacts remain following the culmination of the design process and, in these instances, further mitigation will be proposed where feasible within the relevant technical chapters. A practical example of this (for illustrative purposes only) could be that all dwellings are designed to fulfil certain requirements in terms of noise insulation (embedded design mitigation); however, the noise assessment may identify, post outputs from modelling, that a specific dwelling requires enhanced glazing specification (additional assessment mitigation).

6.5.11 Proposals for mitigation will follow the following hierarchy set out in **Figure 6.2**. Where beneficial effects and or opportunities for enhancement and betterment are identified, measures to maximise these will also be proposed.

6.5.12 Design mitigation will include compliance with legislation, industry good practice, Best Practicable Measures (BPM) and construction environmental management procedures. Design features that have been adapted to reduce or prevent impacts will be described.

Figure 6.2: Mitigation hierarchy



Residual effects

6.5.13 The residual effects will be assessed using the same system as described above taking account of any assessment mitigation proposals.

6.5.14 Residual effects will be presented within each individual topic chapter and summarised in a chapter entitled *Residual Effects and Conclusions*.

Cumulative effects

6.5.15 The EIA Regulations specify that an ES should include 'a description of the likely significant effects of the development on the environment, which should cover the direct effects and any indirect, secondary, cumulative…effects.'

6.5.16 Cumulative effects are the combined effects of several development schemes (in conjunction with the Proposed Development) which may, on an individual basis be non-significant but, cumulatively, have a significant effect.

6.5.17 Two types of cumulative effects will be considered in the assessment. These include intra-project effects (or effect interactions) which are the combined effects of individual topic impacts on a particular sensitive receptor, and inter-project effects which are the combined effects of different development projects, alongside the Proposed Development.

6.5.18 Intra-project cumulative effects will be addressed in a separate ES chapter. Inter-project cumulative effects will be assessed in each individual topic chapter. Cumulative effects during both the construction and operational phases of the Proposed Development will be assessed.

6.5.19 The EIA will consider inter-project cumulative effects from schemes of an appropriate scale and spatial extent in the context of the Proposed Development.

6.5.20 Applying the EIA thresholds for what is more likely to be considered significant development schemes and therefore give rise to cumulative effects, schemes which are likely to produce an uplift of more than 10,000 m^2 (GEA) of mixed use floorspace or over 150 residential units have been considered within a 1 km radius of the Site.

6.5.21 These schemes include:

- approved but incomplete projects (i.e. unimplemented or under construction);
- projects for which a planning application has been submitted and which are under consideration by the consenting authorities;
- project for which a request for an EIA Scoping Opinion has been submitted; and

- for certain topics (e.g. visual impact) it may be appropriate to include developments outside of this area of search, should those projects individual characteristics warrant it (e.g. a particularly tall building). Additional schemes for each topic will be identified within the individual topic chapters.

6.5.22 From an initial planning search, 10 schemes were found that could potentially give rise to significant effects when considered in cumulation with the Proposed Development. These schemes are presented in **Table 6.2** and **Figure 6.3** below.

6.5.23 It should be noted that allocated sites are not included within the cumulative assessment unless they fall within the criteria outlined in **paragraph 6.4.20** above. This is because the available information regarding the use, scale, and location of the proposed sites is typically too uncertain or lacking in detail to allow for any meaningful assessment. The exception to this rule is in transport modelling, where allocated sites are taking into consideration in future flows.

6.5.24 KC officers are invited to identify any additional committed or consented schemes that they believe are likely to require consideration within the ES as a result of likely significant inter-project environmental effects.

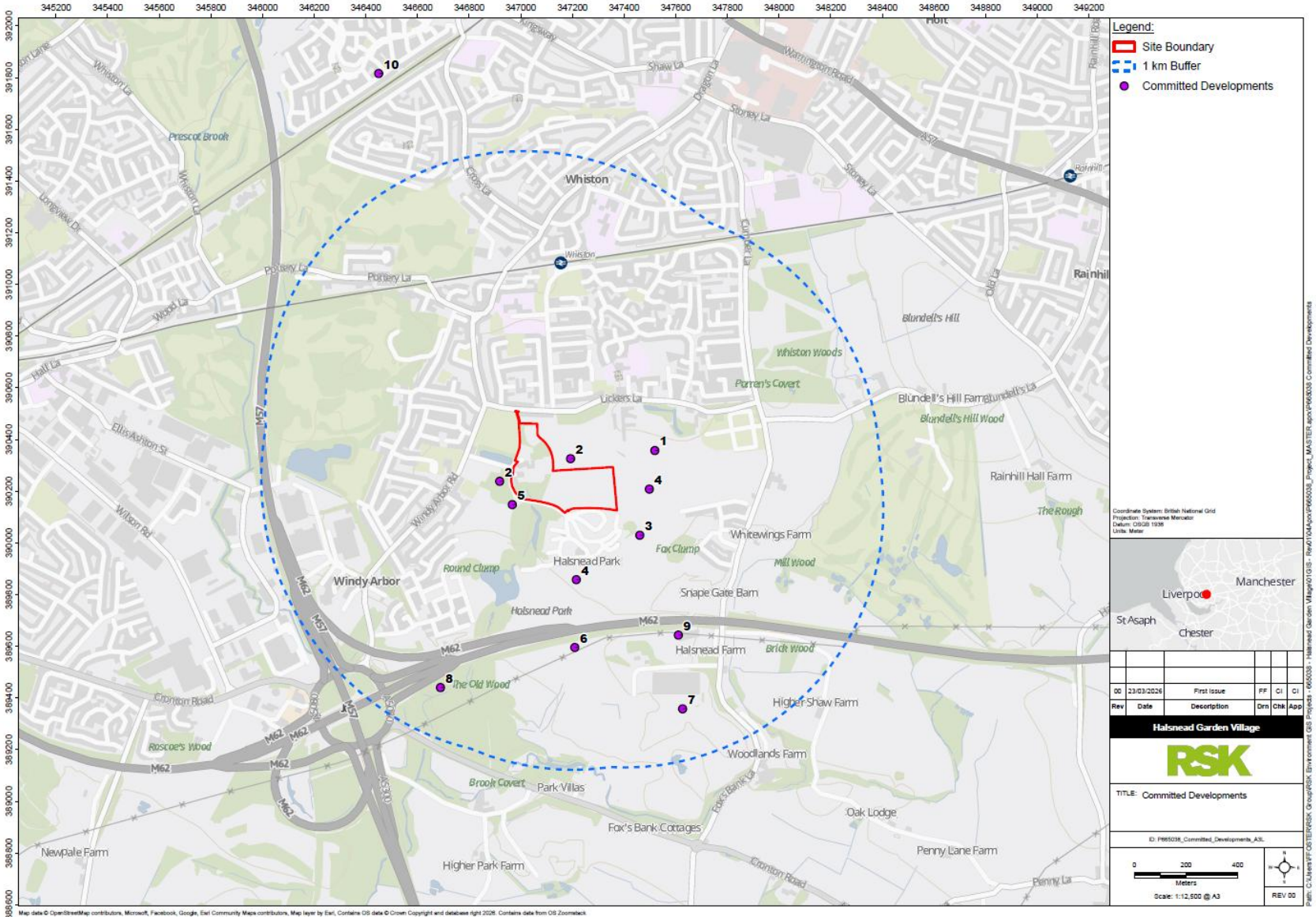
Table 6.2 Consented and committed cumulative schemes

Ref.	Planning reference	Site Address	Summary of development	Distance & Direction from Site	Status
1.	22/00600/FUL	Land to the South of Lickers Lane	ERECTION OF 120 NO. DWELLINGS WITH 1 NO. VEHICULAR ACCESS OFF LICKERS LANE AND OTHER ASSOCIATED WORKS	257m east of Site	Granted, under construction
2.	20/00399/OUT Reserved matters 23/02378/REM for Parcel A	Land South Of Lickers Lane And Site Of Former Saunder's Nursery, Windy Arbor Road,	OUTLINE APPLICATION FOR PROPOSED RESIDENTIAL DEVELOPMENT OF UP TO 277 NO. DWELLINGS (USE CLASS C3) AND AN APARTMENT DEVELOPMENT OF UP TO 100 UNITS FOR OVER 55'S (USE CLASS C3) TOGETHER WITH NEW VEHICULAR ACCESS TO LICKERS LANE AND WINDY ARBOR ROAD, LANDSCAPING AND ASSOCIATED WORKS (INC. DEMOLITION OF BUILDINGS. Parcel A - RESERVED MATTERS APPLICATION PURSUANT IN PART TO PLANNING PERMISSION 20/00399/OUT FOR THE ERECTION OF 239 NO. DWELLINGS AND ASSOCIATED WORKS - APPROVAL SOUGHT FOR APPEARANCE, LANDSCAPING, LAYOUT, SCALE AND ACCESS TO ADJACENT LAND. Parcel B comprises the balance of the consented dwellings and the care home.	Parcel A - Adjacent north / east of Site Parcel B – adjacent west of Site	Parcel A reserved matters application granted, under construction. No RMA submitted for Parcel B at time of writing.
3.	20/00417/FUL	Fox's Bank Lane, L35 3SS	RESIDENTIAL DEVELOPMENT COMPRISING OF THE ERECTION OF 350 NO. DWELLINGS TOGETHER WITH THE CONSTRUCTION OF VEHICULAR ACCESS OFF FOX'S BANK LANE (COMPRISING SIGNALISED JUNCTION), SUDS PONDS, LANDSCAPING, BOUNDARY TREATMENTS AND OTHER ASSOCIATED WORKS (INCLUDING DEMOLITION OF EXISTING FARM BUILDINGS)	90m south-east of Site	Granted, under construction
4.	25/00063/SO	Land off Windy Arbor Road, L35 3SD	SCOPING OPINION FOR PROPOSED PHASE 2B AND PHASE 3 COMPRISING OF THE BELOW - APPROXIMATELY 425 DWELLINGS, C. 225 RESIDENTIAL DWELLINGS ON PHASE 2B AND C. 200 RESIDENTIAL DWELLINGS ON PHASE 3, IN ADDITION TO AN INDEPENDENT LIVING APARTMENT BUILDING COMPRISING C. 85 APARTMENTS (USE CLASS C3) AND RESIDENTIAL CARE HOME DEVELOPMENT COMPRISING C. 72 BEDS (USE CLASS C2), APPROXIMATELY 4,000SQFT CONVENIENCE STORE ON PHASE 2B, AND ASSOCIATED OPEN SPACE, ACCESS AND RELATED INFRASTRUCTURE ON BOTH PARCELS.	Adjacent south-west of Site.	EIA required, application forthcoming
5.	18/00283/HYB **22/00213/REM**	Land off Windy Arbor Road, L35 1AN	HYBRID APPLICATION COMPRISING FULL APPLICATION FOR ERECTION OF 123 NO. DWELLINGS, CONSTRUCTION OF VEHICULAR/PEDESTRIAN ACCESSES, LAYING OUT OF PUBLIC OPEN SPACE AND ASSOCIATED WORKS; OUTLINE APPLICATION FOR ERECTION OF UP TO 237 NO. DWELLINGS, CAR PARK AND ASSOCIATED WORKS.	Adjacent south-west of Site	Granted, under construction

Ref.	Planning reference	Site Address	Summary of development	Distance & Direction from Site	Status
			RESERVED MATTERS APPLICATION PURSUANT TO PLANNING PERMISSION 18/00283/HYB FOR THE ERECTION OF 208 NO. DWELLINGS AND ASSOCIATED WORKS		
6.	20/00494/HYB Plus subsequent reserved matters	Land off Cronton Road L35 1QR	HYBRID PLANNING APPLICATION COMPRISING: FULL APPLICATION FOR THE DEVELOPMENT OF 161,900 SQ FT (15,041 SQ M) (GIA) OF STORAGE AND DISTRIBUTION FLOORSPACE (USE CLASS B8), INCLUDING ANCILLARY OFFICES (USE CLASS B1), SECURITY GATEHOUSE, SITE ACCESS ROAD, ENGINEERING EARTHWORKS TO FORM A PART COUNTRY PARK, PUBLIC CAR PARK TO SERVE COUNTRY PARK, AND ASSOCIATED WORKS; AND OUTLINE APPLICATION WITH DETAILS OF POINT OF ACCESS (DETAILS OF PART-ACCESS, LANDSCAPING, APPEARANCE, SCALE AND LAYOUT ARE RESERVED) FOR THE DEVELOPMENT OF UP TO 838,100 SQ FT (77,862 SQ M) (GIA) OF STORAGE AND DISTRIBUTION FLOORSPACE (USE CLASS B8), WITH ANCILLARY OFFICES AND LIGHT INDUSTRIAL (USE CLASS B1); ENGINEERING EARTHWORKS TO FORM COUNTRY PARK AND DRAINAGE ATTENUATION PONDS; PEDESTRIAN/CYCLE/EQUESTRIAN ROUTE CONNECTING EXISTING M62 FOOTBRIDGE WITH PROPOSED COUNTRY PARK; AND ASSOCIATED WORKS	525m south of Site	Granted, under construction
7.	20/00578/FUL	Former Cronton Colliery, L35 3AA	CONSTRUCTION OF A NEW COUNTRY PARK COMPRISING OF THE CREATION OF SCULPTURED LANDSCAPE, HABITAT/WETLAND CREATION, ASSOCIATED WORKS AND INFRASTRUCTURE, ENGINEERING/EARTHWORKS INCLUDING CHANGES TO SITE LEVELS TOGETHER WITH THE ERECTION OF A SINGLE STOREY VISITOR CENTRE INCLUDING RECEPTION, CAFÉ, EDUCATION SPACE, RANGER OFFICES AND AN OUTDOOR TERRACE AREA; ERECTION OF OUTDOOR CLASSROOM CANOPY; SKY ROOM; PROVISION OF COLLIERY AND MINERAL LINE MULTI USER ROUTE, NEW PATHS INCLUDING A MULTI USER ROUTE NORTH OF THE M62 BRIDGE UP TO WINDY ARBOR ROAD AND PROVISION OF NEW CAR PARK.	700m south-east of Site	Granted, under constructio
8.	22/00587/FUL	Land off Cronton Road, L35 1QR	Construction of a single commercial unit of 29,081 square metres of Use Class B8 floorspace.	810m south-west of Site	Granted
9.	25/00617/FUL	Halsnead Farm, Fox's Bank Lane, L35 3SU	DEMOLITION OF EXISTING BUILDINGS AND CONSTRUCTION OF UP TO 88 AFFORDABLE HOMES.	510 m south-east of Site	Awaiting decision
10.	15/00022/OUT Plus subsequent	Land East of M57, north of	OUTLINE APPLICATION FOR MIXED USE DEVELOPMENT COMPRISING UP TO 750NO. DWELLINGS & UPTO 929 SQ M OF COMMERCIAL/INDUSTRIAL BUILDINGS (USE	1.37 km north-west	Granted, construction

Ref.	Planning reference	Site Address	Summary of development	Distance & Direction from Site	Status
	reserved matters	the railway line, Prescot L34 1BB	CLASSES B1/B2/B8)	of Site	nearing completion

Figure 6.3: Consented and committed cumulative schemes



United Living
Halsnead Garden Village
665038

7 ENVIRONMENTAL FACTORS PROPOSED TO BE SCOPED IN

7.1 Topic sections

7.1.1 The following topics are proposed to be scoped into the ES, and these are further described below:

- Socio-economics;
- Archaeology and Built Heritage;
- Transport and Access;
- Noise and Vibration;
- Landscape and Visual Impact; and
- Ecology.

7.2 Socio-economics

Summary of baseline conditions and anticipated sensitive receptors

7.2.1 The Site is located within the Whiston and Cronton ward, which forms part of the Knowsley Metropolitan Borough Council.

7.2.2 According to the most recently established population statistics, the ward had an estimated population of approximately 9,078 in 2021. The largest age group was 50–64 years, accounting for 21.9%% of the population, followed by those aged 35–49 (16.8%). Additionally, individuals aged 25–34 made up around 12.1% of the population.

7.2.3 Based on the 2025 Indices of Multiple Deprivation (IMD), there are approximately nine Lower Layer Super Output Areas (LSOAs) within the comparable Whiston and Cronton ward. The IMD data indicate that the LSOA covering the Site fall within the 62% most deprived neighbourhoods nationally.

Key issues and potential likely impacts identified

Construction phase

7.2.4 The construction phase of the Proposed Development is expected to generate temporary employment opportunities within the construction sector. In addition, the presence of the construction workforce is likely to result in short-term economic benefits for the town and surrounding centres, driven by increased local spending.

Operational phase

7.2.5 The Proposed Development is anticipated to have a permanent impact through the delivery of new housing. The new residential population is also expected to contribute to local economic activity through additional spending in the town and surrounding centres.

7.2.6 Potential adverse impacts may arise for certain local services and facilities due to increased demand from the new residential population. These include childcare services, healthcare provision, and community and recreational amenities.

Assessment methodology

Determination of the baseline

7.2.7 The baseline socio-economic conditions of the local area will be established using a range of data sources. These include the 2021 Census, which provides the most up-to-date information on social and housing conditions at the local level; annual population surveys for economic indicators; and published lists of community facilities serving the study area from Knowsley Council, the National Health Service (NHS), and other relevant organisations.

7.2.8 The assessment of impacts on social and economic determinants and facilities will be based on various geographical impact areas, selected according to the expected spatial extent of each impact. These areas will be compared against socio-economic data for Knowsley, the North West region and England to provide contextual analysis.

7.2.9 **Table 7.1** outlines the spatial areas of impact that will be used for both the baseline and the assessment. As there is no standard accepted guidance for assessing socio-economic effects, the significance of these effects will be determined using best practice guidance where available. In the absence of such guidance, professional judgement will be applied.

Table 7.1: Geographical area of impact for different socio-economic themes

Category	Study Area
Local population and demographics	Whiston and Cronton ward
Housing	Whiston and Cronton ward
Education	State-funded primary schools – 2 miles road travel distance from Site. State-funded secondary schools – 3 miles road travel distance from Site.
Childcare	2 km road travel distance from Site
Health	GP surgeries within 2 km of the Site (road travel distance). NHS dentists nearest to the Site.

Category	Study Area
Open and play space	800 m (local parks and open spaces) and 1.2 km (larger parks) road travel distance.
Community and leisure facilities	Government-funded library, leisure or sports centre, youth and community centres within 1 km / 3 km of the Site (road travel distance).
Crime, fear of crime and anti-social behaviour	Lower Layer Super Output Areas (LSOA) Knowsley 013C.
Town and other centres	Knowsley
Local economy, employment and skills	Knowsley

Prediction methodology

7.2.10 Assessments will be undertaken in the context of national and local planning and other policy, e.g. Knowsley Council housing targets. In addition to the baseline data, the assessment of effects will be underpinned by forecasts / estimates for both the construction and operational phases.

Construction phase

7.2.11 Effects during construction will be assessed for the entire duration of the construction period.

7.2.12 Employment (gross) in the construction of the Proposed Development will be estimated from:

- The indicative total construction cost and the anticipated duration of the construction programme (in years); and
- The average number of people employed in the regional construction sector, along with the approximate Gross Value Added (GVA) contributed by the sector, as reported in the Annual Business Survey.

Operational phase

7.2.13 Fundamental to the assessment is an estimate of the likely population of the Proposed Development. This will be based on the ONS 2024 Mid-Year Population Estimates (small areas) will provide contextual evidence to estimate the likely size of the future population of the Proposed Development. This will inform the assessments of additional demand for services.

7.2.14 The following benchmarks will be used to calculate the likely demand for school places and the likely GP demand created from the Proposed Development:

- Schools – estimates of primary and secondary places based on the ONS 2024 Mid-Year Population Estimates; and

- GPs – average numbers of patience to GP ratios in the UK from NHS Digital.

7.2.15 The assessment of net employment effects will be guided by the principles set out in the (now withdrawn) Homes and Communities Agency's *Additionality Guide*. This approach aims to exclude, as far as possible, jobs that would have been created irrespective of the Proposed Development. The additionality assessment will also consider the reference case (i.e., employment levels on-site in the absence of the development), as well as factors such as leakage, and indirect and induced employment, which contribute to the overall employment multiplier. The potential adjustments for these factors are outlined in **Table 7.2.**

Table 7.2: Proposed Levels of Leakage, Displacement and Multiplier Effects

	Construction jobs	Operational jobs
Leakage	Low	Low
Displacement	Low	Low
Multiplier	TBC	TBC

7.2.16 The economic and regeneration effects of the Proposed Development will be included within the assessment; for example, the stimulation of spending in the local area.

Mitigation recommendation

7.2.17 The socio-economics assessment will explore the scope for mitigation and enhancement measures which could add value to the local economy and community.

7.2.18 The residual effects on the Proposed Development during both construction and operation will be presented within the chapter.

Cumulative effects

7.2.19 As appropriate, the assessment will consider the effects from the Proposed Development with other developments identified for Socio-economics during both the construction and operational phases.

7.3 Archaeology and Built Heritage

Summary of baseline conditions and anticipated sensitive receptors

7.3.1 The Site is within the former late 18th century Halsnead Park; there are remaining components of the former Prince's House Farm located on the Site. KC has requested that the Halsnead Park landscape be treated as a non-designated heritage asset for previous EIAs for submitted applications within the masterplan.

7.3.2 Archaeological remains could potentially include those associated with Prince's House Farm, as well as with post-medieval coal mining undertaken in the area.

7.3.3 There are two listed buildings within 500 m of the Site.

Key issues and potential likely impacts identified

7.3.4 KC have previously requested that the Halsnead Park landscape is treated as a non-designated heritage asset in previous planning applications, and it has been included as a receptor accordingly.

Construction phase

7.3.5 Buried archaeological remains could be partially or fully removed by ground disturbance associated with foundation trenches, services, landscaping, access roads and drainage. The effect would be permanent.

7.3.6 There would also be a permanent change and loss of some features of the landscape of the former Halsnead Park.

7.3.7 The setting of off-site heritage assets could be temporarily affected by visual, noise and air quality impacts from construction activities and traffic.

Operational phase

7.3.8 There would be no further effect on archaeological remains during the operational phase.

7.3.9 There would be a permanent change in the setting of the Halsnead Park Landscape due to the new homes, access roads and landscaping onsite.

7.3.10 The Proposed Development when built and operational has the potential to affect the setting of off-site heritage assets through visual impact and increased traffic.

Assessment methodology

Determination of the baseline

7.3.11 Heritage assets would be identified from a number of sources including the Merseyside Historic Environment Record (HER), LiDAR imagery, historic mapping and the results of a geophysical survey.

Prediction methodology

7.3.12 The assessment would be undertaken in line with the following good practice guidance:

- Chartered Institute for Archaeologists (CIfA) 2020. Standard and Guidance for Historic Environment Desk-Based Assessment. Reading: CIfA.
- Chartered Institute for Archaeologists (CIfA) 2022. Code of Conduct. Reading: CIfA.

- Historic England 2015. Historic Environment Good Practice Advice in Planning Note 1: The Historic Environment in Local Plans. London: Historic England.
- Historic England 2015. Historic Environment Good Practice Advice in Planning Note 2: Managing Significance in Decision-Taking in the Historic Environment. London: Historic England.
- Historic England 2017. Historic Environment Good Practice Advice in Planning Note 3 (2nd edn): The Setting of Heritage Assets. London: Historic England.
- Historic England 2008. Conservation Principles, Policies and Guidance for the Sustainable Management of the Historic Environment. London: English Heritage.
- Historic England 2019. Statements of Heritage Significance: Analysing Significance in Heritage Assets. Swindon: Historic England

7.3.13 The assessment of likely significant effects on the historic environment is undertaken through a structured process comprising:

- Identification of heritage assets (designated and non-designated);
- Assessment of their heritage significance (sensitivity);
- Assessment of the magnitude of impact arising from the Proposed Development; and
- Derivation of the significance of effect through professional judgement.

7.3.14 This approach accords with:

- Managing Significance in Decision-Taking in the Historic Environment;
- The Setting of Heritage Assets; and
- Standard and guidance for historic environment desk-based assessment.

7.3.15 Sensitivity reflects the importance of the heritage asset and the degree to which its significance may be affected, informed by its evidential, historical, aesthetic and communal values (after *Conservation Principles*).

Table 7.3 – Approach to sensitivity

Sensitivity	Typical Criteria
Very High	World Heritage Sites; assets of international importance; assets of exceptional significance
High	Scheduled Monuments; Grade I and II* Listed Buildings; Grade I/II* Registered Parks and Gardens; highly important non-designated assets of demonstrably equivalent significance
Medium	Grade II Listed Buildings; Grade II Registered Parks and Gardens; Conservation Areas; regionally important archaeological remains
Low	Non-designated heritage assets of local importance; assets with limited heritage value
Negligible	Assets with very limited or no heritage interest

Note: Sensitivity is not solely designation-led and may be adjusted where justified (e.g. undesignated assets of high archaeological potential).

7.3.16 Magnitude of impact considers the degree of change to the asset and/or its setting, and the extent to which its significance is altered. **Table 7.4** sets out the approach to magnitude for archaeological remains and **Table 7.5** sets out the approach to magnitude for impacts on setting for built heritage.

Table 7.4 - Archaeological remains (physical impacts) – approach to magnitude

Magnitude	Typical Criteria
High	Total or substantial loss of archaeological remains or their setting
Medium	Partial loss or material change affecting key elements of significance
Low	Minor disturbance or change; limited impact on significance
Negligible	Very slight or imperceptible change
No Change	No impact

Table 7.5 - Built heritage and setting impacts – approach to magnitude

Magnitude	Typical Criteria
High	Fundamental change to setting, resulting in substantial harm to significance
Medium	Noticeable change affecting how the asset is experienced or understood
Low	Minor change; limited effect on appreciation of significance
Negligible	Barely perceptible change
No Change	No effect

7.3.17 The significance of effect is derived by combining sensitivity and magnitude, using a matrix as shown in **Table 7.6** and professional judgement.

Table 7.6 - Illustrative matrix – significance of effects

Sensitivity / Magnitude	High	Medium	Low	Negligible
Very High	Major	Major	Moderate	Minor
High	Major	Moderate	Minor	Negligible
Medium	Moderate	Moderate	Minor	Negligible
Low	Minor	Minor	Negligible	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible

Mitigation recommendation

7.3.18 An appropriate level of archaeological mitigation relative to the potential for buried heritage assets, and the anticipated value of those heritage assets, would be identified. This would be expected to be secured by planning condition.

7.3.19 If additional mitigation for the effects on the setting of the former Halsnead Park landscape and the offsite heritage assets, this would be in line with mitigation identified in the Landscape and Visual Impact and Noise chapters of the ES.

Cumulative effects

7.3.20 No cumulative assessment is required for buried archaeological remains as the receptor is limited to within the Site.

7.3.21 The cumulative effects on the setting of heritage assets and the Halsnead Park landscape from the Proposed Development and other committed developments would be assessed using the same methodology as set out above.

7.4 Transport and Access

Summary of baseline conditions and anticipated sensitive receptors

7.4.1 The nearest train station is Whiston, 560m north of the Site and is served by trains towards Manchester, Liverpool and Wigan. The nearest bus stop is on Windy Arbor Road, 193m west of the Site, served by the 61 and C50 buses towards Liverpool, Widnes and Runcorn. A section of National Cycle Network Route 56 begins 575m southeast, however this only extends as far as Huyton and does not join the main Chester to Liverpool route.

7.4.2 Vehicular access to the Site is from Lickers Lane, with access to the M57 and M62 via Windy Arbor Road.

7.4.3 The Site is currently predominantly greenfield with a small number of buildings and trips associated with the Site are expected to be minimal.

Key issues and potential likely impacts identified

7.4.4 The Proposed Development is likely to generate vehicle movements during construction and operation.

7.4.5 The ISEP (formerly IEMA) 'Guidelines: Environmental Assessment of Road Traffic and Movement' (2023) provides guidance on the method of assessing the environmental and community impacts of traffic. The specific traffic and movement related impacts to be assessed are changes in the following:

Community severance - severance is the perceived division that can occur within a community when it becomes separated by an increase in traffic;

- Driver delay;
- Non-motorised user (pedestrian and cyclist) delay;
- Non-motorised user amenity - defined as the relative pleasantness of a journey;
- Fear and intimidation;
- Accidents and safety; and

- Hazardous and Large Loads.

Hazardous and large loads – beyond standard construction and delivery vehicles – are not anticipated and have been scoped out of the ES.

Construction phase

7.4.6 Traffic associated with construction activity includes movements of construction workers as well as delivery of materials and removal of wastes. Trips associated with construction typically have a high proportion of heavy goods vehicles (HGVs).

7.4.7 The assessment will consider any links where construction vehicles exceed the thresholds set out in the ISEP (formerly IEMA) guidelines.

Operational phase

7.4.8 Traffic associated with the operation of the Proposed Development would predominantly comprise journeys made by the residents of the Proposed Development as well as deliveries made to their homes.

7.4.9 An initial trip forecast has been undertaken using trip rate data from the TRICS database. Based on this, a development of 258 dwellings on the site could be expected to generate around 1,200 daily vehicle trips.

7.4.10 The assessment will consider any links where operational vehicles exceed the thresholds set out in the ISEP (formerly IEMA) guidelines. The focus for the assessment is likely to be Lickers Lane.

Assessment methodology

Determination of the baseline

7.4.11 The assessment will identify relevant road links and identify the sensitivity of those links in line with the ISEP (formerly IEMA) 2023 guidelines. It will calculate the development generated impact against a future year baseline position representing the opening year of the development. Future year baseline traffic flows will be established using traffic survey data and will take into account future background traffic growth using the TEMPRO database and committed developments.

7.4.12 Traffic survey data that will be used to inform the assessment may comprise Automatic Traffic Counts (ATC) and Manual Classified Count (MCC) surveys. For links where the anticipated construction or operational traffic leads to a total traffic uplift of over 30% (or 10% for sensitive links), assessment of the above impacts would be scoped in.

Prediction methodology

7.4.13 Assessment for each impact would be undertaken in line with the ISEP (formerly IEMA) 2023 guidelines and draw on the analysis undertaken for the Transport Assessment, including accident data within the study area for a five-year period.

Mitigation recommendation

7.4.14 Several sustainable transport measures will be set out in the Framework Travel Plan for the Proposed Development, and any further requirements for mitigation identified in the ES will be incorporated into the Travel Plan.

Cumulative effects

7.4.15 The future year assessment will account for the effect of cumulative development through the consideration of traffic that is forecast to be generated by committed development schemes in the area.

7.5 Noise and Vibration

Summary of baseline conditions and anticipated sensitive receptors

7.5.1 The baseline noise environment at the Site is likely to be primarily influenced by road traffic from Windy Arbor Road, Lickers Lane, and the M62. Intermittent noise from adjacent sports pitches is also likely to contribute to the local sound environment. An environmental noise survey will be undertaken to quantify existing noise levels and to characterise the acoustic environment.

7.5.2 Existing noise sensitive receptors include residential properties located along Lickers Lane and Windy Arbor Road, as well as park homes within the estate to the south of the Site. In addition, the surrounding masterplan area and the Proposed Development will introduce new noise-sensitive receptors, which will be considered as part of the assessment.

Key issues and potential likely impacts identified

Construction phase

7.5.3 Key issues during the construction phase are likely to include noise from construction activities, plant and equipment, and associated construction traffic. These activities have the potential to give rise to temporary disturbance at nearby noise sensitive receptors.

7.5.4 At this stage, significant vibration impacts are not anticipated; however, this will be reviewed once detailed construction methodologies are confirmed.

7.5.5 Where the assessment identifies the potential for significant effects, appropriate mitigation measures will be developed in accordance with Best Practicable Means, as defined under the Control of Pollution Act 1974. Such measures will be implemented to minimise noise impacts and reduce effects on nearby receptors as far as reasonably practicable.

Operational phase

7.5.6 During the operational phase, key issues are likely to include changes in road traffic noise affecting existing receptors, as well as noise from fixed building services plant.

7.5.7 In addition, a site suitability assessment will be undertaken to consider the impact of existing environmental noise sources on the Proposed Development, including both internal and external residential amenity areas.

7.5.8 Operational vibration impacts are not anticipated due to the absence of significant vibration sources; therefore, a detailed vibration assessment is not expected to be required.

Assessment methodology

Determination of the baseline

7.5.9 A baseline noise survey will be undertaken over several days to establish representative baseline noise levels. This will include weekday measurements to characterise road traffic noise, and weekend monitoring to capture noise associated with the adjacent sports pitches.

7.5.10 Up to three monitoring locations will be established within the Site boundary to characterise noise from the surrounding sources. One position will be located towards the northern boundary to capture noise from Lickers Lane. A second position will be located towards the western boundary to capture noise from Windy Arbor Road and the adjacent football pitches, and a third position will be located towards the southern boundary to capture noise from the M62.

7.5.11 Measurements will be undertaken using Class 1 sound level meters, which will be calibrated before and after the survey using a field calibrator. All equipment will hold valid calibration certificates traceable to national standards and will comply with the requirements of BS 7445. Monitoring will be undertaken by a suitably qualified and experienced acoustic consultant

Prediction methodology

7.5.12 Noise modelling will be undertaken using CadnaA software to predict sound propagation across the Site. The model will be developed in accordance with the

methodology set out in ISO 9613-2 *Acoustics – Attenuation of sound during propagation outdoors*.

7.5.13 The noise model will incorporate detailed input parameters, including verified road traffic noise levels, site layout, proposed building locations, topographical data, and ground absorption characteristics. Future traffic flows will also be used to consider the potential increase in road traffic noise levels at existing receptors, if necessary.

7.5.14 A site suitability assessment will be carried out by comparing predicted internal and external noise levels against relevant guideline values, including those set out in BS 8233:2014 and World Health Organization (WHO) guidance, as well as any specific Local Authority requirements.

7.5.15 The following additional impact assessments will be carried out:

- Construction noise assessment – calculations and assessment in accordance with BS 5228-1:2009+A1:2014.
- Construction and operational road traffic noise assessment – undertaken in accordance with the Design Manual for Roads and Bridges (DMRB).
- Operational mechanical plant noise assessment – where applicable and subject to the Energy Strategy for the Proposed Development. Air source heat pumps (ASHPs) will be assessed with reference to relevant guidance, including MCS standards and, where appropriate, BS 8233:2014. Detailed specifications of the mechanical plant are not expected to be available at this stage; therefore, appropriate noise limits will be derived to ensure that adverse impacts are avoided.

Mitigation recommendation

7.5.16 Where necessary, appropriate mitigation measures will be identified to achieve suitable internal and external noise environments.

Cumulative effects

7.5.17 The assessment will consider the potential for cumulative noise effects arising from the proposed development in combination with other committed and consented developments within the surrounding area.

7.5.18 During the construction phase, cumulative effects will be assessed by considering overlapping construction activities where information is available, and evaluating the potential for combined noise impacts at nearby sensitive receptors.

7.5.19 For the operational phase, cumulative impacts will include consideration of combined road traffic noise associated with the proposed development and other committed

schemes. Traffic data will account for committed developments, and therefore traffic-related noise assessments will represent cumulative conditions.

7.5.20 In addition, future residents of committed developments will be considered as sensitive receptors within the assessment, where relevant.

7.6 Landscape and Visual Impact

Summary of baseline conditions and anticipated sensitive receptors

7.6.1 The Site lies within land allocated as Sustainable Urban Extension – South of Whiston / Halsnead Garden Village.

7.6.2 There are no National Park or National Landscape (previously AONB) designations covering the Site or its immediate context. The Site and its immediate context is not covered by any local-level landscape designations.

7.6.3 Other designations and recordings of relevance to landscape matters within the Site include:

- Community Forest: The Mersey Forest;
- Ancient & Semi-Natural Woodland: Halsnead Park; and
- Ancient Wood Pasture: Princes House.

7.6.4 As noted in **Appendix C – Statement on the identification of land as 'Ancient Wood Pasture**, the area recorded as Ancient Wood Pasture lacks evidence of long-established wood-pasture structure and management and it is considered that the historic mapping demonstrates that the Site does not meet the criteria for AWP.

7.6.5 There are no Public Rights of Way (PRoW) within the Site or within the immediate context.

7.6.6 The Site comprises a series of grass fields, woodland, and scattered trees, as well as dwellings, farm buildings, and hardstanding areas / access routes including Cock Glades, Halsnead Farm, Princes House, and Princes Cottage. The eastern part of the Site is more open, comprising grass fields and only a few trees.

7.6.7 To the north of the Site are existing dwellings on Lickers Lane which back-on to the Site.

7.6.8 To the east of the Site is a residential development under construction.

7.6.9 Adjacent to the southern edge of the Site is Halsnead Park Mobile Home Park and an area of existing woodland.

7.6.10 'Main Drive' – an existing lane which provides access from Windy Arbor Road to the Mobile Home Park - defines much of the south-western edge of the Site. Further south-west and west are additional woodlands, bare ground / land under construction, a pond, and playing fields.

7.6.11 Landscape Receptors include:

- National Character Area (NCA) 56: Lancashire Coal Measures.
- Landscape Character Assessment of Knowsley Metropolitan Borough (LCT: Urban Fringe Parkland, LCA: Halsnead Estate).
- The Site and its Immediate Context.
- Site Landscape Features (Landform, Vegetation, Watercourses/Waterbodies etc).

7.6.12 While not a landscape receptor in itself, it is noted that the Site lies within 'North Halsnead' Residential Character Area within Knowsley Council's Halsnead Garden Village Masterplan Supplementary Planning Document (SPD) (June 2017).

7.6.13 The Site is visually well-contained from the wider landscape by existing built development and woodlands.

7.6.14 Visual Receptors include:

- Residents on Lickers Lane, north of the Site.
- Residents at Halsnead Park Mobile Home Park, south of the Site.
- Residents on Windy Arbor Road, west of the Site.
- Users of the playing fields, north-west of the Site.
- Users of surrounding roads including Lickers Lane, Windy Arbor Road, and Main Drive.

Key issues and potential likely impacts identified

Construction phase

7.6.15 The landscape character of the Site will change from agricultural land to a construction site. Similarly, the Proposed Development will change the land cover and use on the Site from predominantly agricultural to a construction site. The views from sensitive visual receptors into the Site, including residential properties on the Site boundaries and transient receptors on the transport corridors surrounding the site will change from predominantly agricultural and greenfield land to a construction site.

Operational phase

7.6.16 The landscape character of the Site will change from agricultural to built form. Similarly, the Proposed Development will change the land cover and use on the Site from predominantly agricultural and greenfield to a new housing with associated green

infrastructure. Views from sensitive visual receptors into the Site, including residential properties on the Site boundaries and transient receptors on the transport corridors surrounding the site will change from predominantly agricultural and greenfield land to a residential led development.

Assessment methodology

Determination of the baseline

7.6.17 The landscape baseline will be established using a combination of desk-based study and site survey. It will include the identification and recording of the character of the landscape and the elements, features and aesthetic and perceptual factors that contribute to it, as well as viewpoints chosen to represent certain groups of visual receptors and / or specific viewpoints. The value attached to the receiving landscape as a whole will be assessed, before identifying the landscape receptors and their relative values.

7.6.18 The value of the landscape and visual receptors and their susceptibility to the type of change proposed will be established.

7.6.19 We understand that the Site is covered by the Landscape Character Assessment of Knowsley Metropolitan Borough (2007) and LCT: Urban Park Fringeland and LCA: Halsnead Estate.

Prediction methodology

7.6.20 The LVIA will be carried out in accordance with the principles set out in the Guidelines for Landscape and Visual Impact Assessment; Third Edition, 2013 (GLVIA3) published by the Landscape Institute and ISEP (formerly IEMA).

7.6.21 The magnitude of change which each receptor may experience during the Construction Phase, at the first year of operation, and at 15 years when landscape proposals should have matured, will be assessed; from this the residual significance of 'effect' following any proposed mitigation will be assessed.

7.6.22 In line with best practice, while interrelated, landscape and visual effects will be considered separately.

Mitigation recommendation

7.6.23 Construction hoarding and proposed landscaping will be considered as embedded mitigation in the assessment.

Cumulative effects

7.6.24 An assessment of cumulative landscape and visual impacts from identified committed developments will be carried out, using the methodology set out above.

7.7 Ecology

Summary of baseline conditions and anticipated sensitive receptors

7.7.1 The Site contains a wide range of habitats of varying ecological value including grassland, broadleaved woodland, bramble scrub, mixed scrub, Ruderal/ephemeral, tall forbs, several buildings and a pond.

7.7.2 Two habitat parcels within the Site are identified on the Liverpool City Region Combined Authority Local Nature Recovery Strategy (LNRS) map as core local nature sites / irreplaceable habitat. Both are also included on the updated Ancient Woodland – Revised (England) - Completed Counties map layer. A northern parcel - Princes House wood is recorded as Ancient Wood Pasture and a southern parcel – Halsnead Park is designated as Ancient Semi-natural Woodland.

7.7.3 As noted in **Appendix C – Statement on the identification of land as 'Ancient Wood Pasture**, the area recorded as Ancient Wood Pasture lacks evidence of long-established wood-pasture structure and management and it is considered that the historic mapping demonstrates that the Site does not meet the criteria for AWP. It remains priority habitat wood pasture.

7.7.4 Several further parcels of Ancient semi-natural woodland are present within the wider landscape, including adjacent to the Site.

7.7.5 A pond is present in the eastern part of the Site. Nine further waterbodies were identified from OS maps and aerial imagery within 250m of the Site. A drainage ditch / small stream which is culverted at the northern and southern extent, was present within the southern woodland.

7.7.6 Two hedgerows were identified on Site. Both hedges were comprised of non-native ornamental species and would not be considered a priority habitat or an important hedgerow under the wildlife criteria of the hedgerow regulations.

7.7.7 The Schedule 9 invasive and non-native species (INNS) Himalayan balsam, Japanese knotweed and Montbretia were identified onsite during the habitat survey.

7.7.8 The Mersey Estuary SPA and Ramsar lies approximately 6.7 km to the South at its closest point. No nationally designated sites are located within 5km of the site and residential

development is not specified as a potential impact within the SSSI Impact risk Zone where the Site is located.

7.7.9 The following LWS were identified within 1km:

- Lickers Lane Wood – 80m NE
- Big water and Big water Wood – 190m S
- Sandfield Park woodland – 234m NE
- Stadt Moers – 368m NW
- The Old wood North – 412m SSW
- Tushinghams Pond – 600m W
- Parrens covert – 627m NE
- The Old Wood South - 628m S
- Blundells Hill golf course – 652m E
- Land East of Fox's Bank Brook – 750m SE
- Strettles Bog – 792m SSW
- Mine Waste Cronton – 907m S

7.7.10 At this stage it is considered that Site provides suitable habitat for the following protected species:

- Badger: Two disused outlier setts were identified on the western boundary.
- Bats: Records were returned for up to nine species within 2km including brown long-eared, common, soprano and Nathusius' pipistrelle, Myotis species including Daubenton's and Whiskered/Brandt's bat and Nyctalus species including Noctule and Leisler's bat. No records refer directly to the Site. Buildings and trees provide potential suitable roosting habitat and habitats provide high quality foraging and commuting value (on account of the woodland and ponds onsite and nearby).
- Birds: Records were returned for twenty nine notable species within 2km, No records refer directly to the Site. The habitats on site provide suitable breeding habitat for a range of bird species.
- Great crested newt: No GCN records were returned within 1km of the Site. There is one pond onsite which was categorised as 'Good' using the ARG UK Habitat suitability index calculator. A further six ponds were identified within 250m using aerial photographs and OS maps. The site includes suitable terrestrial habitat.
- Reptiles: two records of grass snake were received from consultees, both are over 700m to the west. No records refer directly to the Site. The variation of habitats within the site provides suitable basking, foraging and hibernacula habitat.

Key issues and potential likely impacts identified

Construction phase

7.7.11 Key issues and potential impacts associated with the Proposed Development include:

- Impacts from hydrological changes and pollution to onsite waterbodies and downstream priority habitat, Ancient Woodland and LWS;
- Air quality impacts to retained onsite habitats including Ancient woodland, and offsite priority habitat, Ancient Woodland and nearby LWS;
- Disturbance from noise and vibration to Ancient woodland and offsite LWS;
- Impacts from accidental damage to retained and adjacent habitats including Ancient Woodland;
- Adverse effects on protected or notable species from habitat loss and degradation, loss or severance/isolation of habitats, disturbance through noise, vibration, construction lighting, vegetation removal;
- Risk of killing/injury of protected species; and
- Spread of INNS around Site and offsite.

Operational phase

7.7.12 Key issues and potential impacts associated with the operation of the Proposed Development include:

- Recreational impacts on retained habitats including onsite Ancient woodland, offsite priority habitats including Ancient woodland, LWS within the Zone of Influence and the Mersey Estuary SPA and Ramsar;
- Impacts from hydrological changes and pollution to retained habitats including onsite Ancient woodland, offsite priority habitats including Ancient woodland and LWS within the Zone of Influence;
- Air quality impacts on retained habitats including onsite Ancient woodland, offsite priority habitats including Ancient woodland and LWS within the Zone of Influence;
- Adverse effects from recreational and lighting disturbance to protected species; and
- Control and management of INNS.

Assessment methodology

Determination of the baseline

7.7.13 The Site is considered to provide suitable habitat for a range of protected/notable species. A suite of further surveys are being undertaken throughout 2026 to inform the presence/likely absence of these species, and any required mitigation, should impacts be likely.

7.7.14 The following species surveys will be undertaken:

- Bats

- Monthly static deployment (6 locations) ;
- Seasonal walked transects and flightline surveys (increasing to monthly if any Annexe 2 species are recorded);
- Detailed roost assessment (with additional aerial or nocturnal surveys where necessary) of trees impacted by proposals;
- Nocturnal presence/ likely absence survey of buildings identified as having the potential to support roosting bats;

- Up to six breeding bird surveys;
- Great crested newt presence/ likely absence survey of suitable ponds within 250m;
- Reptile surveys of suitable habitat; and
- An additional detailed survey of woodland and grassland habitats will be taken at an appropriate time of year to inform habitat type and condition.

Prediction methodology

7.7.15 The effect of the Proposed Development on ecological receptors will be assessed in accordance with the Chartered Institute of Ecology and Environmental Management (CIEEM) guidelines for Ecological Impact Assessment (EcIA) (CIEEM, 2018).

7.7.16 A separate Biodiversity Net Gain (BNG) Assessment will be undertaken, to be submitted as part of the planning application, based on current best practice (CIEEM) and the Statutory Defra metric. This will be provided as a separate report document.

Mitigation recommendation

7.7.17 Necessary mitigation will be identified follow the species surveys to address the potential impacts set out above, in line with best practice guidance for the relevant species or habitat.

Cumulative effects

7.7.18 Other developments within the vicinity of the Site will be considered for their potential to lead to cumulative effects in combination with the Proposed Development. The cumulative assessment will focus on any ecological receptors where a negative impact is within the residual effects of the main assessment of the Site, this will also consider any ecological receptors that have been documented or can be reasonably foreseen from other developments, considered as part of the cumulative assessment.

8 ENVIRONMENTAL FACTORS PROPOSED TO BE SCOPED OUT

8.1 Topic sections

8.1.1 The following sections of this EIA Scoping Report describe the topics where it is believed there is not the potential for significant environmental effects to arise from impacts associated with the Proposed Development.

8.1.2 The following topics are proposed to be scoped out of the EIA as standalone chapters:

- Water Resources and Flood Risk;
- Ground Conditions and Contamination;
- Air Quality;
- Climate Change Adaptation and Greenhouse Gas Emissions;
- Microclimate (daylight, sunlight and wind);
- Agriculture, Land and Soils;
- Human Health;
- Waste and Materials; and
- Major Accidents and Disasters.

8.2 Water Resources and Flood Risk

8.2.1 The Site is with in Flood Zone 1. There are no watercourses on-site. A review of the EA Risk of Flooding from Surface Water map indicates that the majority of the Site has a very low (less than 0.1%) chance of flooding every year. There are isolated patches of low (0.1-1%), medium (1 - 3.3%) and high (greater than 3.3%) chance of surface water flooding across the Site. The Site is within the Ditton Brook (Halewood to Mersey Estuary) Nitrate Vulnerable Zone. The Site is not within a drinking water safeguard zone.

8.2.2 Current planning policy and EA guidance will require the proposed development to employ Sustainable Drainage Systems (SuDS). Therefore, careful design of SuDS features that closely reflects the natural hydrology can be managed through statutory consultation as part of the planning application and will ensure that the Proposed Development does not cause an increase in flood risk in the surrounding area.

8.2.3 A Flood Risk Assessment and Drainage Strategy will be submitted as part of the planning application.

8.2.4 Construction phase management of surface water and groundwater will be set out in the Construction Environmental Management Plan to be secured by planning condition.

8.2.5 In view of the above, it is proposed to scope water resources and flood risk out of the EIA.

8.3 Ground Conditions and Contamination

8.3.1 The Site has predominantly remained in open fields from 1850 to the present day. A coal pit was present 70m west of the Site and sandstone quarries 250m north of the Site in the earliest available mapping (1850) but both were disused by 1891.

8.3.2 The underlying geology is part of the Pennine Coal Measures Formation, and coal seams are abundant in the area. The property is in a surface area that could be affected by underground mining in 4 seams of coal at 146 m to 391 m depth, last worked in 1903. Any movement in the ground due to coal mining activity should have stopped.

8.3.3 There are two historic mine entries present onsite. One in the west with evidence of subsidence was found to be backfilled with natural site arisings, and one in the south-east with no evidence of subsidence was backfilled with made ground. There is the potential for further unrecorded mining features.

8.3.4 The superficial deposits are glacial Till. Both the glacial Till and underlying geology are secondary A Aquifers.

8.3.5 There is limited Made Ground present at the Site.

8.3.6 The preliminary conceptual site model set out in the Phase 1 Geoenvironment Report (**Appendix A)** indicates a moderate to low level of risk associated with soil/groundwater contaminants and ground gas within locally isolated patches of Made Ground, ground gas associated with the on-site mine shaft, and ground gas generation from surrounding off-site features (coal pit, opencast mine, and infilled pond). There is a low level of risk to human health and groundwatersassociated with all other contamination sources and pathways.

8.3.7 The results of an intrusive site investigation are set out in the Phase 2 Geoenvironmental Report (**Appendix B).** There is evidence of coal working identified within the boreholes analysed as part of the Phase 2 investigation. Elevated arsenic and lead were identified in one exploratory borehole within Made Ground. This will require localised remediation through the removal of Made Ground from the site and a 'clean cap' of topsoils for any landscaping within this area. No other elevated contaminants were identified across the Site. Gas Screening Values indicate low levels of methane but potentially elevated levels of carbon dioxide, however these are associated with natural levels of microbial respiration within soils, and ground gas protection measures are not required.

8.3.8 There is a low risk of unexploded ordnance across the Site.

8.3.9 Mine entries would be stabilised and capped before development. Drilling and grouting would be required to stabilise belowground mine workings. A watching brief would be required for unrecorded mine workings.

8.3.10 A level of contamination protection for clean potable water supply pipes will be determined. Barrier pipe is likely to be required subject to confirmation with the water supply company.

8.3.11 A Materials Management Plan should be produced to allow reuse of suitable materials on site.

8.3.12 Any current boreholes should be decommissioned in line with Environment Agency guidance to remove preferential pathways for ground gas migration.

8.3.13 With the above mitigation measures, likely significant effects are not anticipated for ground conditions. Mitigation and remedial measures should be secured by planning condition.

8.3.14 In view of the above, it is proposed to scope ground conditions and contamination out of the EIA.

8.4 Air Quality

8.4.1 The Site is not within an Air Quality Monitoring Area (AQMA); the nearest AQMA is the Liverpool City Council AQMA 2.6 km to the west. KMBC operates four diffusion tubes within 1.2 km of the site. The 2025 Annual Status Report reports the concentrations.

8.4.2 Diffusion tubes H11a/H11b and H12a/H12b are situated approximately 800 m southwest of the site. Monitor H12 is positioned on Windy Arbor Road, which connects to Junction 6 of the M57/M62 interchange. H11 lies close to H12 but is located 65 m west of Windy Arbor Road within a residential cul-de-sac (Windy Arbor Brow). Air pollution concentrations recorded at H11 and H12 are likely influenced by their close proximity to the M57. This is the most probable reason why these sites show higher pollutant levels compared with P7 and P8, which are also located in a residential urban area but are situated further from the motorway.

8.4.3 Diffusion tubes P7a/P7b and P8Aa/P8Ab are located approximately 920 m and 1.1 km, respectively, to the north of the site. These monitors are located on Cross Lane, a residential access road. The monitors reside in the residential urban area.

8.4.4 The results from these diffusion tubes are shown in **Table 8.1**.

Table 8.1: Annual mean NO_2 concentrations

Site ID & Classification	Location		Annual Mean NO_2 Concentrations (µg/m³)				
			2020	2021	2022	2023	2024
H11a, H11b (Suburban)	346329	389782	23.3	21.9	21.6	22.4	21.3
H12a, H12b (Roadside)	346425	389669	27.2	35.9	28.7	26.3	24.6
P7a, P7b (Roadside)	346799	391419	-	-	17.9	16.2	17.1
P8Aa, P8Ab (Roadside)	346792	391617	-	-	17.9	16.0	16.0
Annual mean NO_2 air quality objective			40 µg/m³				

8.4.5 The monitoring results in **Table 8.1** indicate that annual mean concentrations of NO2 were well below the NO2 annual mean objective at the identified monitoring sites during the period shown.

8.4.6 The monitor positions are located in the study area, consisting of positions along road traffic routes leading south to the motorway and north to the town centre.

8.4.7 Background concentrations of NO2, PM10 and PM2.5 were obtained from the Defra 2021-background maps for the site. 2024 values are shown as this will be the base and verification year used in the modelling (2024 representing the most recent annual data record available by KMBC).

8.4.8 Background concentrations are shown in the table below. Background concentrations of NO2 and PM10 at the development are well below health-based air quality objectives of 40 µg/m3 for these pollutants and background PM2.5 concentrations are well below the target value.

Table 8.2: Background concentrations

Grid Square	Pollutant	2024
		(µg/m³)
347500, 390500 (SITE)*	NO_2	11.90
	PM_{10}	12.98
	$PM_{2.5}$	7.36
*Background concentrations in the adjacent 1*1 km grid squares (i.e. AQ monitors and existing receptors) are similar.		

8.4.9 There are no nationally or European designated ecological receptors within 200m of the Site boundary, or within 200m from a route used by construction vehicles on the public highway. There is ancient woodland within the site boundary.

8.4.10 As noted above, effects on designated ecological sites are not anticipated due to lack of proximity. Dust effects on the ancient woodland within the site boundary would be assessed within the ecology chapter.

8.4.11 During the construction phase, construction activities have the potential to generate fugitive dust emissions which may give rise to annoyance due to the soiling of surfaces. Emissions of this nature can also pose a risk of human health effects due to the increase in exposure to PM10 concentrations. A dust risk assessment will be undertaken for the planning application, which will identify standard and best practice mitigation measures associated with the level of risk identified at the Site. These will be set out in the ES mitigation summary and would be expected to be incorporated into a Dust Management Plan, as part of a Construction Environmental Management Plan to be secured by planning condition.

8.4.12 As noted above, levels of key pollutants in the surrounding area are comfortably below the air quality objectives, such that a development of this scale would not be expected to cause exceedances of pollutant levels, nor is it expected that the additional trip generation from the development would cause encroachment towards the objectives.

8.4.13 An assessment of air quality impacts of vehicles is not expected to result in a significant change. An assessment of air quality change will be included in the standalone assessment proposed, including cumulative traffic flows in the baseline without development scenario. Screening thresholds have been established by guidance for detailed dispersion modelling outside of an AQMA (500 LDVs AADT). The scheme is residential; therefore, operational HDV generation is insignificant. The scheme is expected to create more than 500 LDV AADT; however, this criterion is only expected to be met on the immediate roads outside the site access, before dispersing into the wider road network. Therefore no likely significant effects are anticipated. As well as the relatively small scale of the Proposed Development, the operational impacts on specific links are reduced through the multiple available exits from the wider Halsnead Garden Village, directing traffic onto Lickers Lane, Windy Arbor Road and Fox's Bank Lane, enabled by the connectivity between each of the developments within the wider masterplan.

8.4.14 No substantive combustion sources are proposed that would require air quality modelling.

8.4.15 In view of the above, it is proposed to scope air quality out of the EIA.

8.5 Climate Change Adaptation and Greenhouse Gas Emissions

Greenhouse gas emissions

8.5.1 As the current Site comprises open fields, woodland, agricultural buildings and a single home, the greenhouse gas emissions currently arising from the Site are assumed to be near zero.

8.5.2 Given the scale of the Proposed Development at 260 homes, it is considered unlikely that the greenhouse gas emissions will be considered significant in EIA terms from the scale of the development alone, as the Proposed Development would not make up a substantive component of national or local (Knowsley Council) carbon budgets.

8.5.3 The significance and level of effects can also be assessed in line with IEMA (2022) guidance[8] (**Table 8.3**).

Table 8.3: IEMA's guidance to assessing GHG significance (2022 framework for assessment of significant effects)

Significance	Level	Criteria
Significant	Major adverse	Project adopts a business-as-usual approach, not compatible with the national Net Zero trajectory, or aligned with the goals of the Paris Agreement (i.e., a science-based 1.5°C trajectory). GHG impacts are not mitigated or reduced in line with local or national policy for projects of this type.
	Moderate adverse	Project's GHG impacts are partially mitigated and may partially meet up-to-date policy; however, emissions are still not compatible with the national Net Zero trajectory, or aligned with the goals of the Paris Agreement.
Not Significant	Minor adverse	Project may have residual emissions, but the project is compatible with the goals of the Paris Agreement, complying with up-to-date policy and good practice.
	Negligible	Project has minimal residual emissions and goes substantially beyond the goals of the Paris Agreement, complying with up-to-date policy and best practice.
Significant	Beneficial	Project causes GHG emissions to be avoided or removed from the atmosphere, substantially exceeding the goals of the Paris Agreement with a positive climate impact.

8.5.4 As can be seen in **Table 8.3**, for a development to have a negative, significant effect it must, at minimum, show non compatibility *"with the national Net Zero trajectory, or aligned with the goals of the Paris Agreement."* Developments which comply with up-to-date policy and good practice are generally considered not to lead to significant effects as a result of greenhouse gas emissions.

8.5.5 Greenhouse gas emissions associated with construction primarily arise from the embodied carbon within building materials. The Applicant is committed to reducing material waste throughout the construction process and exploring opportunities to use lower embodied carbon materials and local sourcing and re-use of materials. This would be set out in the CEMP to be secured by planning condition.

[8] ISEP's (formerly IEMA) guidance 'Assessing Greenhouse Gas Emissions and Evaluating Their Significance' (2022)

8.5.6 Homes in the Proposed Development will be compliant with the Future Homes Standard, which ensures that the energy use of the Proposed Development will be zero carbon once the energy grid is fully decarbonised. This will be achieved through air source heat pumps as the heating technology. Photovoltaic panels will also be provided on all homes.

8.5.7 The sustainability framework set out in the Halsnead Garden Village Masterplan SPD demonstrates the opportunities that the location provides for encouraging active travel and public transport use. In addition to the 10 minute walk from the Site to Whiston train station , the scale of the wider masterplan means that commercial bus service penetration and a range of facilities including a primary school within walking distance are anticipated. The pedestrian footbridge over the M62 connects the residential area to the north of the motorway with the employment uses and country park south of the motorway.

8.5.8 Taken as a whole, it is considered that the Proposed Development will be compliant with policy requirements and best practice and greenhouse gas emissions would not be significant.

Resilience and adaptation to climate change

8.5.9 UK Climate Projections (2018) (UKCP18) projections suggest that climate change will lead to hotter drier summers, warmer wetter winters, increased likelihood of extreme weather events (e.g., heat waves, high rainfall events) and sea-level rise.

8.5.10 As the construction phase of the Proposed Development would take place in the short term, it is unlikely that the impacts of climate change would alter the baseline conditions to a materially sufficient degree to constitute an assessment of resilience. Regarding the operational and decommissioning phases, residential developments designed and constructed in line with best practice guidance will have sufficient embodied mitigation against the projected changes to the UK climate, even when taking a worst-case RCP 8.5 projection scenario into account. Taking this into consideration, combined with the supplementary assessments and documents to be submitted as part of the planning application, which are already designed to assess climate resilience and adaptation, it is considered that there is sufficient justification to scope out a dedicated climate change resilience assessment.

8.5.11 A separate Flood Risk Assessment (FRA) will be carried out for the Proposed Development, which will incorporate the impacts of future climate change into its modelling. The vulnerability of the Proposed Development to flooding and its potential to exacerbate flooding will be covered in more technical detail in the stand-alone FRA to be submitted as part of the planning application, which is believed to be sufficient justification for scoping this element out.

8.5.12 In view of the above, it is proposed to scope climate change out of the EIA.

8.6 Microclimate

8.6.1 The maximum height of the Proposed Development is 2.5 storeys. This height is insufficient to lead to likely significant effects from altered wind microclimate or from loss of daylight or sunlight to adjacent properties.

8.6.2 In view of the above, it is proposed to scope microclimate out of the EIA.

8.7 Agriculture, Land and Soils

8.7.1 The majority of the Site comprises ALC classification Grade 2 soil, which is considered Best and Most Versatile (BMV). While the area of the Site is 7.7 ha, some of this land is previously developed, associated with the farm buildings and house on Main Drive.

8.7.2 While BMV land is considered high sensitivity, the magnitude of development is likely to be minor, as the total area of current BMV land sealed for development is likely to be less than 5ha, which is the suggested upper threshold for minor magnitude in relevant guidance[9]. This is because:

- Approximately 0.6 ha of the Site is occupied by Ancient Woodland, which will not be developed;
- Approximately 0.4 ha of the Site is occupied by previously developed land, specifically agricultural buildings;
- A substantial proportion of the development would be private gardens, which are not permanently sealed.

8.7.3 Appropriate use of soil resources will be achieved through:

- Planning of site levels to reduce the amount of imported or exported soil, favouring on-site reuse wherever possible;
- Clear segregation of contaminated soil, topsoil, subsoil and non-soil excavations;
- Compliance with Defra's 'Construction Code of Practice for the Sustainable Use of Soils on Construction Sites' including limitations on stockpile height;' and
- Measures will be included within a Materials Management Plan or Construction Environment Management Plan to be secured by planning condition.

8.7.4 In view of the above, it is proposed to scope Agriculture, Land and Soils out of the EIA.

[9] IEMA (now ISEP), 2022. A New Perspective on Land and Soil in Environmental Impact Assessment and Design Manual for Roads and Bridges LA109

8.8 Human Health

8.8.1 Health is influenced by many factors (i.e. determinants of health), including (but not limited to) physical activity; diet and nutrition; housing; open space; leisure and play space; transport modes, access and connections; social participation, interaction and support; education and training; employment and income, climate change and adaptation; air quality; noise and vibration; land quality; and health and social care services.

8.8.2 Those who will experience changes in health as a result of the Proposed Development (i.e. sensitive receptors) include vulnerable groups of the general population (i.e. older people, people with disabilities, communities experiencing deprivation). The general population will cover future residents, future users of the Site, construction workers and maintenance workers.

8.8.3 While ISEP's Guide to Determining Significance for Human Health in Environmental Impact Assessment (2022) highlights that there could be a range of sensitivities within sub-populations, with some who are more vulnerable and less able to deal with changes (for example, being more sensitive than others), it was considered that the population and sub-populations anticipated to be affected by the Proposed Development are unlikely to have an increased sensitivity to health impacts. Consequently, a low sensitivity of receptor was assumed.

8.8.4 Further to the above, it is considered that the Proposed Development will have a low magnitude of impact on elements such as (but not limited to) risk taking behaviour, air quality, water quality or availability and land quality, as the implementation of a CEMP would reduce risk taking behaviour and potential adverse effects on air quality, water quality and land quality during the construction of the Proposed Development.

8.8.5 However, it was considered that the Proposed Development will also have a medium magnitude of impact on elements such as (but not limited to) physical activity levels, housing need, provision of facilities for older people, play space, transport modes and connections and community safety, as the Proposed Development will promote physical activity through the provision of open/play space and encouragement to use sustainable modes of transport, provide a dwelling mix relative to the community need and provide affordable housing and be designed to minimise actual fear and crime.

8.8.6 Given the above, in line with the generic indicative EIA significance matrix presented in ISEP's Guide to Determining Significance for Human Health in Environmental Impact Assessment, it is considered that the Proposed Development would not result in any likely significant effects. Although beneficial effects would likely be realised as a result of the Proposed Development, these would be considered to be minor and not significant. Therefore, Human Health is proposed to be scoped out of the ES.

8.8.7 In line with KC planning requirements, a separate Health Impact Assessment will be submitted with the planning application. In view of the above, it is proposed to scope human health out of the EIA.

8.9 Waste and Materials

8.9.1 It is expected that the landfill diversion rate for construction and demolition waste for this project will be in line with the UK average, which is estimated to sit at over 90%[10]. This would not be considered significant under the landfill diversion assessment method set out in ISEP (formerly IEMA's) guide to Materials and Waste in Environmental Impact Assessment is applied.[11] Waste arisings from contaminated land are anticipated to be minimal as only localised contamination is expected.

8.9.2 As the Proposed Development will be wholly residential, operational waste collection will be the responsibility of Merseyside Recycling and Waste Authority.

8.9.3 The overall recycling and composting rate for the Liverpool City Region was 35.31%. in the most recently reported year (2024)[12]. This would be anticipated to increase with the introduction in food waste recycling since this figure was reported. The substantial majority of residual waste is sent to the Energy from Waste Plant at Wilton International in Teeside.

8.9.4 As the total amount to landfill is likely to be less than 40% of the waste of the Proposed Development, noting also the relatively small scale of the Proposed Development, it is considered that effects are unlikely to be significant under the ISEP methodology.

8.9.5 In view of the above, it is proposed to scope waste and materials out of the EIA.

8.10 Major Accidents and Disasters

8.10.1 Under Schedule 3 of the EIA Regulations, the risks of major accidents and natural disasters relevant to the Proposed Development need to be considered.

8.10.2 As a residential development, the Proposed Development would not be a source of hazard that could result in a major accident or disaster during operation. Measures to eliminate the risk of major accidents of disasters as a result of the construction of the Proposed Development will be outlined in a CEMP.

8.10.3 A review has been undertaken of potential sources of hazard in the surrounding area, that have the potential to interact with the Proposed Development. The primary source

[10] Defra, 2025. UK statistics on waste. Available at: https://www.gov.uk/government/statistics/uk-waste-data/uk-statistics-on-waste

[11] ISEP (formerly IEMA) 2020 – IEMA guide to: Materials and Waste in Environmental Impact Assessment

[12] Merseyside Recycling and Waste Authority Annual Report 2023-2024.

of risk is the mine shafts on Site and in the surrounding area, as discussed in the ground conditions section above. As these would be fully mitigated as part of the Proposed Development, it is not considered that any likely significant effects relating to major accidents and disasters remain.

8.10.4 In view of the above, it is proposed to scope major accidents and disasters out of the EIA as a standalone topic chapter.

9 PROPOSED STRUCTURE OF THE ENVIRONMENTAL STATEMENT

9.1 Structure of the assessment chapters

9.1.1 The proposed structure for the individual technical assessment chapters is as follows:

- Introduction
- Scope of assessment
  - EIA scoping
  - Consultation
- Relevant legislation, policy and guidance considerations
  - Legislation and regulations
  - Planning policy
  - Technical standards and guidance
- Approach and methodology
  - Determination of the baseline
  - Assessment methodology
  - Significance criteria
  - Limitations and assumptions
- Baseline conditions
  - Existing baseline
  - Future baseline
- Assessment of potential effects, mitigation and residual effects
  - Construction phase
    - Primary (embedded) mitigation measures
    - Potential effects
    - Secondary / tertiary (additional) mitigation measures and enhancements
    - Residual effects
  - Operational Phase
    - Primary (embedded) mitigation measures
    - Potential effects
    - Secondary / tertiary (additional) mitigation measures and enhancements
    - Residual effects

- Assessment against future baseline
- Cumulative effects
- Assessment summary

9.2 Structure of the ES

9.2.1 The ES will comprise the following set of documents:

- ES Volume 1: Non-Technical Summary NTS: this document will provide a clear and concise summary of the proposed development, alternative designs that were considered, environmental impacts and mitigation measures;
- ES: Volume 2: Main Text: this will contain the main body of the EIA with the proposed chapter headings as set out below; and
- ES Volume 3: Technical Appendices: these will provide supplementary details of the environmental studies conducted during the EIA including relevant data tables, figures and photographs.

9.2.2 It is currently envisaged that the ES Volume 2: Main Text will be structured with the following chapter headings:

- Chapter 1: Introduction and Site;
- Chapter 2: Description of the Proposed Development and construction Works;
- Chapter 3: Reasonable alternatives considered and design evolution;
- Chapter 4: Methodology and approach to the EIA;
- Chapter 5: Socioeconomics;
- Chapter 6: Archaeology and Built Heritage;
- Chapter 7: Transport and Access;
- Chapter 8: Noise and Vibration;
- Chapter 9: Ecology
- Chapter 10: Landscape and Visual Impact
- Chapter 11: Cumulative effects; and
- Chapter 12: Residual effects and conclusions.

9.2.3 There will also be the following related standalone documents submitted as part of the planning application:

- Flood Risk Assessment
- Drainage Strategy
- Health Impact Assessment
- Social Value Statement

10 SUMMARY

10.1.1 This report requests a Scoping Opinion from Knowsley Council (KC), pursuant to Regulation 15 of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (as amended).

10.1.2 KC and consultees are invited to consider the contents of this report and comments accordingly within the five-week period prescribed by the EIA Regulations.

APPENDIX A – PHASE 1 GEOENVIRONMENTAL REPORT

BROWNFIELD SOLUTIONS LTD

GEO-ENVIRONMENTAL ENGINEERING EXCELLENCE

UNITED LIVING

Whiston, Prescot

Phase I Geo-Environmental Assessment Report

JL/C5980/13829

January 2025

PROJECT QUALITY CONTROL DATA SHEET

Site Name:	Whiston, Prescot		
Document Name:	Phase I Geo-Environmental Assessment Report		
Reference:	JL/C5980/13829		
Status:	-	22/01/2025	Final.

Issued By:	**Client:**	**Engineer**
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C5980/01	-	Site Location Plan
C5980/02	-	Site Features Plan

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Photographs	Site Walkover Photographs
Appendix A	BSL Methodology and Guidance
Appendix B	Historical Maps
Appendix C	Geo-Environmental Data Report
Appendix D	BGS Exploratory Hole Records
Appendix E	Mining Search Report
Appendix F	UXO Screening Map

1.0 INTRODUCTION

1.1 Context

This report describes a desk-based Phase I Geo-Environmental Assessment Report carried out by Brownfield Solutions Limited (BSL) for United Living on a site off Main Drive, Whiston and has been completed in general accordance with the following guidance:

- Environment Agency guidance - Land Contamination: Risk Management (LCRM).
- BS 10175:2011+A2:2017 Investigation of Potentially Contaminated Sites.
- BS5930: 2015+A1:2020 Code of Practice for Ground Investigations.
- BS EN 1997-1:2004+A1:2013 Eurocode 7. Geotechnical design. General rules plus UK National Annex.
- BS EN 1997-2:2007 Eurocode 7 Geotechnical design. Ground investigation and testing plus UK National Annex.
- NHBC Standards. Chapter 4.1: Land Quality - Managing Ground Conditions.

Definitions of terms and acronyms used within this report is presented in Section 7.0.

1.2 Proposed Development

The proposed development is for a residential end use comprising 235 residential houses, containing a mix of two storey semi-detached and detached dwellings along with 2.5 storey townhouses and mews, with associated private gardens, highways, public open space (POS) areas and infrastructure as shown on the proposed development plan, drawing No. 23076/255 provided to BSL by the client.

1.3 Objectives and Scope

The objectives of this assessment were to determine the environmental setting and ground conditions of the site, highlighting potential areas of concern that may govern the redevelopment.

The scope of works comprises a Phase I Assessment and site walk-over, with a review of the site, surroundings, historical uses and environmental setting in order to develop a preliminary Conceptual Site Model (CSM).

This report is intended to meet the requirements of a Preliminary Investigation as defined in BS10175:2011+A2:2017 and has been produced in general accordance with the recommendations for a Tier 1 Preliminary Risk Assessment as described in LCRM guidance.

1.4 Limitations

This Phase 1 Geo-Environmental Assessment Report has been prepared in accordance with the relevant legislative framework, guidance and risk assessment methodology as outlined in Appendix A.

The findings and opinions conveyed via this assessment are based on information obtained from a number of sources as detailed within this report, BSL have assumed this information is correct and reliable. Nevertheless, BSL cannot and does not guarantee the authenticity or reliability of the information it has relied upon.

BSL have used reasonable skill, care and diligence in the production of this report. There may be other conditions prevailing on the site which are outside the scope of work and have not been highlighted by this assessment and therefore have not been taken into account by this report. Responsibility cannot be accepted for such site conditions not revealed by the assessment.

This report has been prepared for the sole use and reliance of the Client, United Living. No other third party may rely upon or reproduce the contents of this report without the written permission of Brownfield Solutions Ltd (BSL); a charge may be levied against such approval. If any unauthorised third party comes into possession of this report, then they rely on it at their own risk and BSL do not owe them any Duty of Care. This report may not be relied upon by the client or submitted to a third party for their reliance for the purposes of valuation, mortgage, insurance and regulatory approval, until all invoices have been settled in full.

Any recommendations made in this report should be confirmed with the Regulatory Authorities prior to implementation to ensure compliance.

This assessment has been based on the proposed planning layouts provided. Any subsequent change to the planning layout may have an impact on the validity of recommendations made within this report. Furthermore, new information, changed practices or new legislation may necessitate revised interpretation of the report after the date of its submission.

The site plans enclosed in this report should not be scaled off. Any site boundary line depicted on plans does not imply legal ownership of land.

Notwithstanding site observations concerning the presence or otherwise of archaeological issues, asbestos-containing materials (ACM) or invasive weeds (e.g. Japanese knotweed), this report does not constitute a formal survey of these potential issues and specialist advice should be sought.

2.0 THE SITE

2.1 Location

The site is located off Main drive, Whiston, Prescot, L35 3PW, centred on National Grid Reference 347199 390255 as shown on the Site Location Plan, Drawing No. C5980/01.

2.2 Site Description

A site reconnaissance survey was carried out at the site on 14th January 2025. The main site features and potential issues identified during this survey are detailed below and are shown on the Site Features Plan, Drawing No. C5980/02. A selection of photographs from the site walkover are presented to the rear of this report.

Feature	Description
Site Area	6.15 hectares.
Site Access	Access to the site is gained off Main Drive to the south of the site. Access is open with no boundary separating the site from the public road.
Site Overview Imagery	 Orientated North
	Update from Google: All images: Imagery Google©2023, Imagery ©2023 Airbus, CNES / Airbus, Getmapping plc, Infoterra Ltd & Bluesky, Maxar Technologies, The Geoinformation Group, Map data ©2023.
Current Land Use and Site Features	The site is predominantly occupied by open fields with areas of thick vegetation. There is a shallow pond approximately 10 meters in diameter, located within the north-west of the site. Evidence of underground services onsite includes two water chambers/ above ground manholes present in the western area of the site and spray paint indicating the potential presence of underground services was seen to be running along the southern border of the site, parallel to the road. A suspected mineshaft was noted toward the south-east of the site, evidenced by a slight depression in the field in the approximate location of a recorded mineshaft. A number of gas monitoring wells were noted toward the west of the site.
Potential Sources of Gross Contamination	No potential sources of gross contamination were identified.
Vegetation / Ecology	The site is generally covered with grass. There are semi-mature and mature trees throughout the north-west of the site and sporadically along the sites north, south and eastern boundaries. In addition, there are patches of dense brambles in the north-west and along the sites southern border.
Topography	The site generally slopes from the south-west to the north-east with a gentle gradient. While the north-west section of the site is mostly flat, access to this area is only possible from the southern portion of the site. The southern area includes a steep slope running from the south-east to the north-west, near to the existing pond.

Feature	Description
Site Boundaries	The north the site is bound by wooden fencing separating the site from residential gardens, and heras fencing, separating the site from a construction site on the other side. To the east and west the site is bound by a mix of dense vegetation, chicken wire fencing, and heras fencing. The south of the site is bordered by Main Drive.
Surrounding Area	The site is set within a residential area. A construction site is present to the north and east, appearing to be a developing residential housing estate. Residential homes are present to the south and playing fields present to the west, with homes beyond these.

3.0 GEO-ENVIRONMENTAL SETTING

3.1 Historical Setting

A review of the available historical Ordnance Survey Maps and satellite imagery has been conducted, with the pertinent issues that may have affected the site, or its environs, summarised below. The Historical Maps are presented in Appendix B. A review of the historical industrial data within the geo-environmental data report has also been undertaken below, the report is presented in Appendix C.

Notable features on site, and potentially contaminative or geotechnically relevant features within 100m of the site boundary have been presented. Any features that have potentially been infilled will be considered up to 250m from the site boundary.

Feature	Distance (m) & Direction	Years Present	Description
Prince's House Buildings	On-Site	1850 - 1956	A number of buildings labelled Prince's House are shown to be present within and abutting the sites western boundary from the earliest map of 1850. The buildings that are present within the site associated with Prince's House are last shown on the map of 1956, no longer shown on the subsequent map of 1966. The buildings abutting the western boundary remain present on the most recent map of 2025.
	Abutting western boundary	1850 – Present	
Pond	On-site	1891 – 2010	Pond is first indicated to be present on the 1891 map, within the north west of the site and remains present until the 2010 map, no longer shown on the latest 2025 map. During site walkover it was noted that this pond is still present.
	40m SW	1891 - Present	Pond is first indicated to be present on the 1891 map 40m south west of the site. Still present on most recent map dated 2025.
	50m W	1850 - Present	Pond is indicated to be present on the earliest map in 1850, 50m west of the site. Still present on most recent map dated 2025.
	80m S	1850 - 1955	Pond is indicated to be present on the earliest map in 1850, 80m south east of the site until the map of 1955, no longer shown on the consequent map of 1959. A caravan park has since been constructed in its place.
	85m SE	1850 - 2010	Pond is indicated to be present on the earliest map in 1850, 85m south east of the site. Still present on the 2010 map, but not on the latest 2025 map. Believed to be infilled during this time.
	90m W	1850 - Present	Pond is indicated to be present on the earliest map in 1850, 90m west of the site. Still present on most recent map dated 2025.
Pump house	5m S	1985 - 2010	A pump house is indicated to be present 5m south of the site, first appearing on the 1985 map, and remaining present until the map of 2010 no longer shown on the map of 2025.
Tank	25m W	1927 - 1959	A tank is indicated 25m west of the site, first appearing on the 1927 map, and lastly appearing on the 1959 map. In the next available map dated 1985 the tank is no longer present, presumed to have been removed circa 1959 - 1985.
	30m W	1937 – 1959	A tank is indicated 30m west of the site, first appearing on the 1937 map, and lastly appearing on the 1959 map. In the next available map dated 1985 the tank is no longer present, presumed to have been removed circa 1959 - 1985.
Coal pit	50m W	1850	A coal pit is indicated to be present on the earliest mapping dated 1850, however is no longer present on the next available map dated 1891, being replaced by an area of vegetation, and is presumed to have been infilled between 1850-1891.
Electrical substation	95m N	1959 – Present	An building associated with new residential development is seen to be present 95m N of the site on the map of 1959, this building is labelled as an electrical substation on the maps of 1973 and 1995, this remains as an electrical substation on present day mapping.

Feature	Distance (m) & Direction	Years Present	Description
Sandstone quarry	250m N	1850	A sandstone quarry, labelled stone quarry is first shown on the earliest map dated 1850, circa 250m north of the site, however on the next available map dated 1891 it is shown as an area of vegetation labelled old quarry, implying the quarry to have been infilled potentially prior to 1850, definitely prior to 1891.

In summary, the map evidence indicates that the site has remained as open fields from 1850 up until the present day. A pond is present towards the north west of the site. A building was present toward the western boundary of the site but has since been demolished.

Potential historic offsite sources of contamination include the two tanks 30m west of the site, alongside the coal pit located 70m west of the site, and the historic quarries 250m to the north.

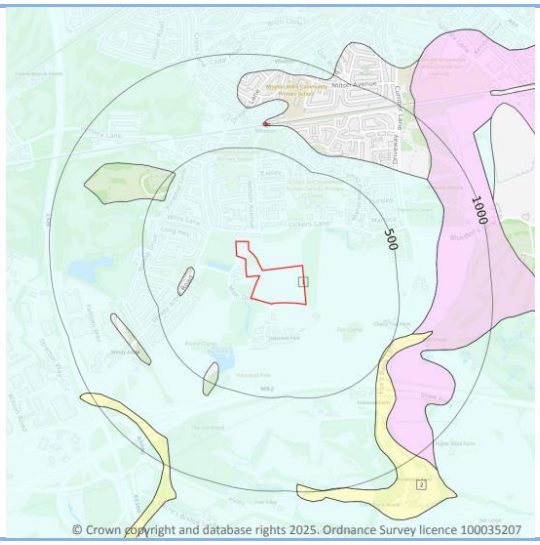
3.2 Published Geology

The following publications of the British Geological Survey (BGS) were examined in respect of the geology underlying the site:

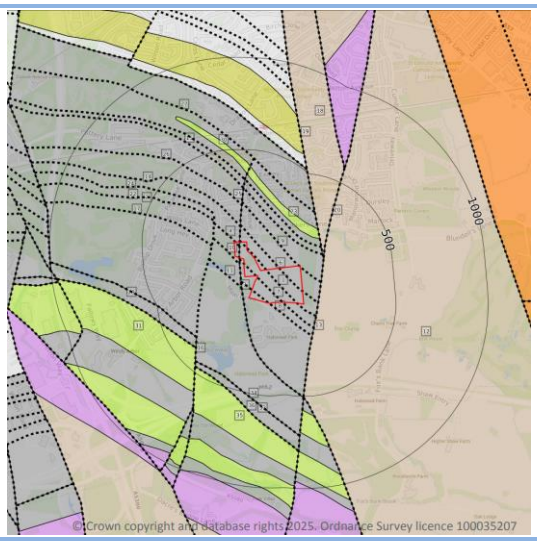
- British Geological Survey (BGS) 1:50,000 Scale Geological Map Sheet 97 Runcorn. Solid and Drift Edition.
- BGS Geology of Britain Map Viewer.
- BGS GeoIndex Onshore.
- BGS 1:10,000 Scale Geological Map SJ48NE.
- Mining Remediation Authority Interactive Map.
- Geo-Environmental Data Report.

Extracts of the 1:50,000 geological mapping from the Geo-Environmental Data Report are presented below for reference:

BGS 1:50 000 Superficial Geology



BGS 1:50 000 Solid Geology



Made Ground

BGS mapping does not display any significant made ground deposits on site, and based on the historical mapping and the lack of previous development that has taken place, only small amounts and thicknesses of made ground deposits on the western border may be present.

Superficial Deposits

The site is indicated to be underlain by glacial Till (Diamicton). This stratum typically comprises a mixture of clay, silt, sand, and gravel, suspended in an unconsolidated matrix.

Solid Geology

The deeper solid geology is indicated to be part of the Pennine Middle Coal Measures Formation, which typically comprises interbedded mudstone, siltstone, and sandstone with coal seams.

A fault is shown to traverse the north western corner of the site in a north to south direction. However, any movements associated with this fault should now have stopped.

The site is also in an area where coal seams are abundant, traversing the site in a north west to south east direction. A Coal Mining Risk Assessment (CMRA) would be required to assess seam locations, depths, thickness and associated potential risks in detail.

3.3 BGS Exploratory Hole Records

There are no BGS exploratory hole records within a relevant distance of the site (assumed as an approximate 50m radius).

3.4 Mining and Mineral Extraction

Coal Mining
The online Coal Authority Interactive Map layers have been reviewed and the details are summarised in the table below:

Relevant Interactive Map Data	Issue at Subject Site?
Coal Authority Reporting Area	Yes
High Risk Development Area	Yes

As the site lies within the Coal Authority Reporting Area, a mining search has been undertaken as the site could be affected by past or current coal mining.

The mining searches are presented in Appendix E, the main findings of which are presented below.

Highlighted Evidence	Issue	Details
Past Underground Mining	Yes	The property is in a surface area that could be affected by underground mining in 4 seams of coal at 146m to 391m depth, last worked in 1903. Any movement in the ground due to coal mining activity should have stopped. The property is in an area where the Authority believe there is coal at or close to the surface and may have been worked at some time in the past.
Present Underground Mining	No	
Future Underground Mining	No	
Mine Entries	Yes	There are 2 known coal mine entries on or within 20 metres of the boundary of the property. There may also be mine entries/additional mine entries in the local area which the Coal Authority has no knowledge of.
Past, present and future opencast coal mining	No	There is a historic opencast mining area registered approximately 180m west of the site.
Coal mining subsidence	No	
Mine gas	No	
Withdrawal of support	No	
Information from the Cheshire Brine Subsidence Compensation Board	No	

Non-Coal Mining
A historical mineral planning area was present approximately 180m west of the site. Groundsure reports the planning status for clay, shale, and brick surface mineral working existed from 1947 – 1952, this feature aligns with the historic opencast mining area reported on the Consultant's report.

3.5 Hydrogeology

Based on the inferred geology, a summary of the Environment Agency aquifer designations is presented in the table below:

Stratum	Coverage	Aquifer Designation
Superficial Till (Diamicton)	Full Site	Secondary Aquifer (Undifferentiated). Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
Pennine Middle Coal Measures Formation	Full Site	Secondary (A) Aquifer. Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers

A summary of the pertinent hydrogeological features within the Geo-Environmental Data Report are provided below:

Feature	Distance (m) & Direction	Details
Nearest Active Groundwater Abstraction	1192m E	Licence No: 2569028021 Details: Spray Irrigation - Direct Direct Source: Ground Water - North West Region Point: B/HOLE AT BLUNDELLS HILL GOLF CLUB, BLUNDELLS LANE, RAINHILL Annual Volume (m3): 21966.87 Original Start Date: 06/09/1994
Nearest Active Potable Groundwater Abstraction	1192m E	Licence No: 2569028021 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: Ground Water - North West Region Point: B/HOLE AT BLUNDELLS HILL GOLF CLUB, BLUNDELLS LANE, RAINHILL Annual Volume (m3): 21966.87 Original Start Date: 06/09/1994
Source Protection Zones	78m SE	Type 3 Total catchment

3.6 Hydrology

A summary of the pertinent hydrological aspects within the Geo-Environmental Data Report are provided below:

Feature	Distance (m) & Direction	Details
Nearest Watercourse	35m SW	Unnamed inland river, watercourse contains water year round.
Nearest Surface Water Abstraction	1161m SW	Status: Historical Licence No: 2569028018 Details: Spray Irrigation - Direct Direct Source: "Surface, Non-Tidal - North West Region" Point: "OCHRE & DOG CLOG BRKS, TARBOCK HALL FARM, TARBOCK, PRESCOT" Annual Volume (m3): - Original Start Date: 13/05/1976
Closest Active Licenced Discharge Consent	-	None within 500m.

Information obtained from the Environment Agency (EA) Risk of Flooding from Rivers and the Sea (RoFRaS) database indicates that the risk of flooding across the site is negligible.

The British Geological Survey indicate there is a potential for groundwater flooding at the subject site, with a low risk rating.

No further consideration of flood risk is undertaken in this report. Specialist flood risk advice should be sought with regards to drainage and flooding.

3.7 Landfill and Waste Management Sites

There are no active landfill sites recorded within 500m.

There are four historic landfills within 500m recorded by Environment Agency and Natural Resources Wales, the closest being located 410m north west at Tushinghams Quarry, Coalgate Lane, Paradise Lane, Stadt-Moers Park, Whiston, Merseyside, Knowsley, registered to W F Doyle and Company Limited. First recorded in 1967 and last recorded in 1979. Stated to accept commercial waste.

There are no current waste management sites recorded within 250m of the site.

BSL recommends contacting the Local Authority for further information about LA tips.

3.8 Environmental Regulatory Data

A summary of the relevant environmental aspects, both on site and within 250m of the site contained in the Geo-Environmental Data Report, are presented in the table below:

Entry	On-site	0 – 50m	50 – 250m	Details
Recent Industrial Land Uses	-	1	4	The closest record is a pump house located 8m south of the site.
Current or Recent Fuel Stations	-	-	-	None within 250m .
Licensed Industrial Activities (Part A(1))	-	-	-	None within 250m.
Licensed Pollutant Release (Part A(2)/B)	-	-	-	None within 250m.
Radioactive Substances	-	-	-	None within 250m.
Pollution Incidents (EA/NRW)	-	-	2	The closest record was in 2002, and was 123m west of the site, pollutant was not identified, this was recorded as a category 3 (minor) impact to water. The other incident was in 2002, 238m west of the site, and was recorded as household waste, this was recorded as a category 3 (minor) impact to land.

In regard to the entries identified above, only recent industrial land uses are considered to be of significant relevance to be carried forward to the preliminary CSM. No other entries require further consideration.

3.9 Radon

Information from the environmental database report indicates the property is in an area where <1% of properties are above the Action Level for radon, and therefore radon protective measures are not required in accordance with BRE Report 211 'Radon – Guidance on protective measures for new dwellings'.

3.10 UXO Risk

In accordance with CIRIA Report C681, BSL have reviewed non-specialist UXO data for the site using the online Zetica Bomb Risk Mapping data.

There is no indication of former military use from the Phase I Assessment. The map indicates the site to be in an area where the bomb risk is low. A copy of the map is presented in Appendix F.

3.11 Other Potential Development Constraints

If asbestos is present in soils, these will need to be dealt with in accordance with the Control of Asbestos Regulations (CAR) 2012 and CARSOILS™.

There are known underground services on site, these may need to be disconnected prior to any construction activities.

4.0 PHASE 1 SUMMARY AND RISK ASSESSMENT

4.1 Introduction

The risk posed by any contaminants in soil or groundwater will depend on the nature and level of the source, the probability of exposure occurring, the potential pollution pathway and the likely effects on the receptors.

A contaminant is defined as a substance that has the potential to cause harm, a risk is considered to exist if such a substance is present at sufficient concentrations to cause harm and if a pathway is present through which a receptor could be exposed to the contaminant.

The following sections discuss the identified potential on-site and off-site sources, and any pollution that could impact receptors via the pathways associated with the proposed development. Pollution linkages are assessed which may represent a risk to human health and/or controlled water receptors from the information gained from the Phase I Assessment searches. The assessment has been carried out on a qualitative basis and aims to produce a complete and comprehensive Preliminary Conceptual Site Model.

Three potential impacts exist for any given site and all three need to be considered in the qualitative risk assessment, these are:

- On-site impacts.
- The site impacting its surroundings.
- Off-site sources impacting the subject site.

4.2 Potential Contaminative Sources

On-Site
From the information obtained, the following sources have been identified which may affect the redevelopment of the site for residential end use:

- Made ground associated with previous developments.
- Solid geology - Coal Measures.
- Mine shafts.

One pond was recorded on-site, however, it was still present at the time of the walkover and as such is not considered a risk for a potential contaminative source due to infilling, and can be discounted.

Off-Site
The following off-site sources have been identified which may affect the redevelopment of the site:

- Pump house (5m S).
- Tanks (closest 25m W).
- Coal Pit (50m W).
- Infilled pond (80m S).
- Electrical substation (95m N).
- Opencast mine (180m W).
- Infilled quarries (closest 250m N).

Three of the recorded off-site ponds were still present at the time of the walkover and as such are not considered a risk for a potential contaminative source due to infilling, and can be discounted

The closest pollution incident recorded in 2002, was 123m west of the site, pollutant was not identified. This has been discounted due to its proximity from site, and its low measured impact, being recorded as a category 3 (minor) impact to water, with no impact to ground or air. The other incident in 2002 was 238m west of the site, and was recorded as household waste. This has been discounted due to its proximity to site and its low measured impact, being recorded as a category 3 (minor) impact to land, with no impact to water or air.

Associated Contaminants

The contaminants commonly associated with the potential sources of contamination identified are tabulated below:

Contaminative Sources	Department of the Environment Industry Profile or Other Source	Commonly Associated Contaminants
On Site		
Made Ground	AGS Guides, CIRIA C665	Heavy metals, polycyclic aromatic hydrocarbons (PAHs), asbestos, ground gases (carbon dioxide and methane).
Solid geology – Coal Measures	CIRIA C665	Carbon dioxide, methane, carbon monoxide and hydrogen sulphide
Old mine shafts	BS8485 and BS8576	Heavy metals, PAHs, mine gases (carbon dioxide and methane, carbon monoxide, hydrogen sulphide)
Off Site		
Pump house		Localised oils, hydrocarbons
Tank	Road vehicle fuelling, service and repair	Petroleum hydrocarbons, BTEX, MTBE, VOCs
Infilled ponds	AGS Guides, CIRIA C665, BS8485 and BS8576	Heavy metals, polycyclic aromatic hydrocarbons (PAHs), asbestos, ground gases (carbon dioxide and methane)
Coal pit		PAHs, petroleum hydrocarbons, carbonised wastes
Electrical substation	Electrical works	PCBs, oils, BEFORE 1968
Opencast mine	BS8485 and BS8576	Mine gases (carbon dioxide, methane, carbon monoxide, hydrogen sulphide)
Infilled Stone quarries	AGS Guides BS8485 and BS8576	Heavy metals, PAHs, asbestos, ground gases (carbon dioxide and methane)

4.3 Pathways

A pathway is defined as a medium by which a contaminant comes into contact with, or otherwise impacts a receptor.

At this stage the potential contaminants identified above are considered to present potential risks to site end users and controlled waters through the following pathways:

Potential Pathways	
Pathways in respect to Human Health	• Ingestion of contaminated soils. • Dermal contact with contamination. • Inhalation of dusts. • Inhalation of gases or vapours in both indoor and outdoor air.
Pathways in respect to Controlled Waters – Surface water	• Surface run-off /over land flow. • Drainage discharge. • Base flow from groundwater.
Pathways in respect to Controlled Waters – Groundwater	• Leaching of mobile contamination into groundwater via the unsaturated zone. • Migration of perched groundwater in any permeable soils or along existing or proposed service runs. • Migration into the saturated zone and flow through the aquifers underlying the site.
Pathways in respect to Property/structures/water pipes	• Direct contact with substances deleterious to building materials and potable water supply pipelines. • Migration of ground gases (methane) into confined spaces (explosion and damage to property).

4.4 Receptors

The identified receptors are listed below:

- Residential end users (human health).
- Structures/Property/Potable water supply pipes.
- Nearest watercourse. Unnamed inland River 35m SW (Controlled waters).
- Superficial Aquifer. Till (Diamicton) - Secondary (Undifferentiated) Aquifer (Controlled waters).
- Bedrock Aquifer. Pennine Middle Coal Measures Formation - Secondary (A) Aquifer (Controlled waters).

Under current UK health and safety legislation, employers are required to carry out their own appropriate site-specific risk assessments and mitigation to protect employees. It has been assumed that any future construction works onsite will be undertaken in compliance with these requirements. Therefore, construction workers have not been specifically considered as part of this assessment.

4.5 Preliminary Conceptual Site Model (CSM)

The information obtained in the previous sections has been used to compile a Preliminary CSM. The identified potential contaminants and receptors have been assessed in the table below as to whether a plausible source-pathway-receptor pollutant linkage for the proposed end use of the site exists. The risk classification has been estimated in accordance with information in the BSL Guidance and Methodology in Appendix A.

The Preliminary CSM's are presented in the tables overleaf, any assessed risk above moderate will possibly require further action:

Human Health						
Potential Source	Potential Pathway	Potential Receptor	Likelihood	Severity	Level of Risk	Justification
On site Made Ground Metals, PAHs, asbestos	Root uptake, ingestion, direct contact, inhalation of dusts	End-users	Low Likelihood	Medium	Moderate/ Low	The site has been subject to limited development throughout its history. The presence of made ground is considered likely in the west of the site. Generally, made ground deposits are not anticipated to be substantial in thickness, nor have any significant contaminative processes been identified on site. However, highly localised deep deposits may be present in the location of the former mine shafts. The risk is therefore considered to be moderate/ low. Further investigation and assessment will be required to confirm the risk.
On site Made Ground Metals and organic contamination	Migration into/chemical attack of water supply pipelines	Water Pipelines / End users	Unlikely	Medium	Low	Contaminants within the soil/groundwater could potentially attack the clean potable water supply pipe, contaminants should be assessed to determine the correct pipe material and level of precautions required.
On site Made Ground/Natural Geology - Coal measures Ground Gas (carbon dioxide and methane)	Migration into confined spaces, inhalation and asphyxiation/ explosion	End-users / Property	Unlikely	Severe	Moderate/ low	As discussed above, significant thickness' of made ground deposits are not likely to be present on site and the gas generation potential of these materials is likely to be very low. The Pennine Middle Coal Measures that underly the site exhibit low-permeability coal seams and mudstones, which typically restrict gas migration, this is supported by the Coal Authority showing no risk considered by mine gas to the site. Therefore, the risk posed by made ground and coal measures is currently assessed as moderate/ low with further investigation including gas monitoring and assessment required to confirm the risk.
On site Mine shaft Ground gas (carbon dioxide and methane)	Migration into confined spaces, inhalation and asphyxiation/ explosion	End-users / Property	Unlikely	Severe	Moderate/ Low	The onsite shaft is considered possible to accommodate significant thicknesses of made ground and is likely to act as a vector for ground gas or mine gas, however due to its highly localised and small area, this likelihood is assessed as unlikely. Assessed as moderate to low risk. Further investigation to determine made ground thickness within the shaft, including targeted ground gas monitoring, will be required to confirm the level of risk.
Off-site Pump House and ASTs (localised oils, hydrocarbons, PAHs)	Ingestion, direct contact, inhalation of vapours	End-users	Unlikely	Medium	Low	A pump house was indicated to be present 5m south of the site and tanks 25-30m west of the site, likely associated with residential use based on historical mapping evidence. Any oils, lubricants or fuels etc would likely have been used in very small quantities any spillages are likely to be small to negligible and it is unlikely for them to have migrated onto the site given the presence of low permeability cohesive soils that underly the site. The risk is therefore considered to be low.

Human Health						
Potential Source	**Potential Pathway**	**Potential Receptor**	**Likelihood**	**Severity**	**Level of Risk**	**Justification**
Off site Electricity Substation PCBs	Ingestion, direct contact, inhalation of dusts	End-users	Unlikely	Medium	Low	The substation has been present since at least 1973, which pre-dates the ban on PCBs implemented in 1986, presenting a potential source of PCBs. However, these compounds were typically used in very low volumes with regular maintenance regimes carried out which would identify any significant leaks or spillages of this contaminant. In addition, PCBs are relatively immobile and are unlikely to have migrated away from the substation, especially as the substation appears to have been seated on a hard standing base which is likely to have contained any contaminants. The majority of the site will be occupied by the residential development with soft landscaping and given the residential nature of the proposed development, there is a low likelihood of exposure, and intrusive investigation is required to confirm the risk. The overall risk is considered to be low.
Off site Potentially Infilled Features Coal Pit/ Opencast Mine/ Quarry / Pond Ground Gas (carbon dioxide, methane)	Migration into confined spaces, inhalation and asphyxiation/ explosion	End-users / Property	Unlikely	Severe	Moderate/ Low	A coal pit, opencast mine, a quarry, and a pond were historically present from 50m to 250m from the site, later being infilled with unknown materials. These infilled features may present a potential for ground gas generation. Given the distance of these infilled features to the site and the presence of cohesive deposits associated with the Till indicated to be present in that area and the propensity for ground gas to migrate upwards it is considered unlikely any ground gases produced will migrate onsite. Additionally, considering the time since the potential infilling of the off site features any resultant ground gasses generated will have likely dissipated. The risk is therefore considered moderate / low with further investigation required to confirm the risk.

Controlled Waters						
Potential Source	**Potential Pathway**	**Potential Receptor**	**Likelihood**	**Severity**	**Level of Risk**	**Justification**
Made Ground PAHs, Metals	Overland flow, / migration through saturated zone	Unnamed river 35m SW away (Surface waters)	Unlikely	Medium	Low	It is considered contaminants associated with the made ground and other past industrial uses are unlikely to impact the River. This is due to the small area of made ground present, the low permeability of the clays underlying the area, which will inhibit lateral migration, and the potential for contaminants to attenuate and degrade over this distance. The proposed development will include gardens which would minimise overland flow to the river and roadways would include drainage which would channel rainfall away. Therefore, a low risk is posed to the river from the made ground.
	Leaching through unsaturated zone / Migration through saturated zone	Secondary Superficial Undifferentiated Aquifer (Groundwater)	Unlikely	Medium	Low	Gross contamination is not anticipated to be present at the site. Contaminants are unlikely to be transmitted in low permeability strata such as Till, where migration of groundwater will be limited. The Secondary undifferentiated aquifer is not considered to be a significantly sensitive receptor. The site is not located within an SPZ and there are no groundwater abstractions for potable water supply within 1km of the site. New roadways with drainage are proposed as part of the development, however areas of gardens and soft landscaping are also planned. By virtue of the development taking place, this should contribute to an overall “betterment” of groundwater quality.
	Migration through saturated zone	Secondary A Bedrock Aquifer (Groundwater)	Unlikely	Medium	Low	There are no groundwater abstraction licences or Source Protection Zones within 1km of the site. New roadways with drainage are proposed as part of the development, however areas of gardens and soft landscaping are also planned. As stated above, the site is underlain by low permeability deposits, which will inhibit vertical migration, with a new surface water drainage system installed which will further reduce the risk to controlled waters, and by virtue of the development taking place, it should contribute to an overall “betterment” of groundwater quality..

Human Health Risk – Soils Contamination Summary
Based on the preliminary CSM and the current use of the site, the overall risk from land contamination at the site is considered to be **low to moderate / low** for a redeveloped site. This would need to be confirmed by appropriate intrusive investigation, testing and assessment.

Human Health Risk – Ground Gas Summary
A potential on-site gas source has been identified associated with natural solid geology, and underground historic mine workings. Off-site potential sources include historic infilled quarries and mines. Potentially viable linkages are considered to exist and the preliminary CSM considers these sources to be of **moderate / low to moderate** risk.

In accordance with BS8576 and CIRIA C665 as set out in Appendix A of this report, the gas generation potential is considered to be very low. The sensitivity of the development is high on account of the proposed residential use.

In line with current guidance, it is recommended that ground gas monitoring should comprise 6 visits over a 3 month period.

Controlled Waters Risk - Summary
Based on the preliminary CSM, BSL believes the overall risk to controlled waters at the site is **low**.

The above assessed level of risk will need to be confirmed by intrusive investigation and quantitative risk assessment.

5.0 PRELIMINARY GEOTECHNICAL ASSESSMENT

5.1 Hazard Identification

A preliminary geotechnical hazard identification exercise has been undertaken in general accordance with the Highways England document CD 622, 'Managing geotechnical risk'. Potential geotechnical hazards based on the expected ground conditions are listed below:

- Made ground of unknown nature; if placed in a non-engineered manner may cause excessive settlement of foundations, highways and infrastructure.
- Attack of buried concrete by aggressive ground conditions; the site may contain unknown made ground and potentially sulphate bearing soils. The coal measures are known to be high in naturally occurring sulphates.
- Shrink / swell of clay; settlement / heave of foundations and floor slabs when located within the influence of trees and vegetation.
- Shallow groundwater / groundwater rise causing resulting in difficulties with excavations due to trench collapse.
- Mining subsidence; the site is in an area of former shallow coal mine workings.

In respect to potential for mining induced stability, the site has two former coal mine shafts, where the Coal Authority holds no further details on treatment, except that shaft 347390-006 has been proved to be filled and may have been capped to an unknown specification. The site is also in an area of probable shallow coal mine workings and will likely require further investigation. Further research should be carried out in the form of a site-specific Coal Mining Risk Assessment to fully determine the risk. The location of the mine entries may have an impact on the development layout as an easement is required around the shaft for any proposed structures.

The above identified geotechnical hazards will need to be considered as part of further investigations and assessments.

5.2 Foundation and Geotechnical Design

The proposed development will comprise low-rise residential housing with associated gardens and infrastructure. The type of foundation solution should be informed by an onsite intrusive investigation to confirm ground conditions and obtain geotechnical parameters for preliminary design.

Given the historical coal mining that has occurred in the local area, it would be considered prudent to contact the Local Authority Building Control and take advice on any localised foundation designs that may be required (e.g. a reinforced raft design).

5.3 Drainage

Given the site is underlain by low permeability clays, it is unlikely that drainage to SuDS such as traditional soakaways will be suitable.

5.4 Recommendations

To confirm the ground conditions in respect to the identified potential geotechnical hazards and risks, an appropriate intrusive investigation will need to be undertaken.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Geo-Environmental Summary

The site has generally remained as greenfield since mapping began in 1850, having only a very small amount of residential development on site, although historical coal mining is present. Based on the proposed residential end-use, the overall risk to human health from on site contamination is considered to be low to moderate/ low.

The risk from off-site sources of contamination considered to be low to moderate/ low.

The risk from permanent ground gases is considered to be moderate/ low to moderate and further monitoring is recommended.

Radon is not considered to pose a risk.

The overall risk to controlled waters is considered to be low.

Intrusive investigations will be required to confirm the above assessed levels of risks and determine remedial requirements, if any.

6.2 Geotechnical Summary

Intrusive investigations will be required to confirm the most suitable foundation solution and to obtain parameters for concrete classification, floor slab and highways design.

Whilst the site lies within a Coal Authority Reporting Area, mining related instability is not considered to pose a risk to the site.

Drainage to SuDS is unlikely to be a viable option for the site subject to intrusive investigation and testing.

6.3 Further Work

To confirm the risks to the identified receptors and confirm the ground conditions in respect to the identified geotechnical and geo-environmental risks, an appropriate intrusive investigation will need to be undertaken. The following further works are recommended, although this list is not exhaustive and should be read in conjunction with any planning conditions that are applicable to the site:

- Topographical survey / utility mapping.
- Demolition / Refurbishment Asbestos survey (where applicable).
- Intrusive ground investigation comprising:
  - Trial pitting, windowless sampling and rotary open hole drilling.
  - Installation of standpipes in boreholes to allow gas concentrations and groundwater levels to be monitored.
  - The undertaking of soil infiltration rate testing.
  - Geotechnical testing of soils.
  - Contamination analyses of soil.
- Assessment and recommendations based on the above, including requirements for further work, if necessary.

7.0 ABBREVIATIONS AND DEFINITIONS

GLOSSARY	
Term / Abbreviation	**Definition**
AST	Above Ground Storage Tank.
B(a)P	Benzo (a) Pyrene.
BGS	British Geological Survey.
BRE	Building Research Establishment.
BS	British Standard.
BSL	Brownfield Solutions Ltd.
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes.
CBR	California Bearing Ratio (used in pavement/highways design).
CAR 2012	Control of Asbestos Regulations (2012).
CBCB	Cheshire Brine Compensation Board.
CBCD	Cheshire Brine Compensation District.
CBR	California Bearing Ratio.
CIEH	Chartered Institute of Environmental Health.
CIRIA	Construction Industry Research Association.
CL:AIRE	Contaminated Land: Applications in Real Environments.
CLEA	Contaminated Land Exposure Assessment.
CLO	Contaminated Land Officer.
COMAH	Control of Major Accident Hazards.
Contamination	Presence of a substance which is in, on or under land, and which has the potential to cause significant harm or to cause significant pollution of controlled water. There is no assumption in this definition that harm results from the presence of the contamination. Naturally enhanced concentrations of harmful substances can fall within this definition of contamination. Contamination may relate to soils, surface water, groundwater or ground gas.
Controlled Waters	Inland freshwater (any lake, pond or watercourse above the freshwater limit), water contained in underground strata and any coastal water between the limit of highest tide or the freshwater line to the three-mile limit of territorial waters.
CPT	Cone Penetration Test.
CSM	Conceptual Site Model. A schematic hypothesis of the nature and sources of contamination, potential migration pathways (including description of the ground and groundwater) and potential receptors, developed on the basis of the information from the preliminary investigation and refined during subsequent phases of investigation and which is an essential part of the risk assessment process. The conceptual site model is initially derived from the information obtained by the preliminary investigation (i.e. the Phase I Phase I Assessment). This conceptual model is used to focus subsequent investigations, where these are considered to be necessary, in order to meet the objectives of the investigations and the risk assessment. The results of intrusive investigations can provide additional data that can be used to further refine the conceptual site model.
DCP	Dynamic Cone Penetrometer.
DNAPL	Dense Non-Aqueous Phase Liquid.
DoWCoP	Definition of Waste Code of Practice.
DWS	Drinking Water Standard.
EA	Environment Agency.
EHO	Environmental health Officer.
EQS	Environmental Quality Standard.
GAC	Generic Assessment Criteria.

GLOSSARY	
Term / Abbreviation	**Definition**
GDR	Geotechnical Design Report.
GFR	Geotechnical Feedback Report.
GIR	Ground Investigation Report.
GSV	Gas Screening Value.
Harm	Adverse effect on the health of living organisms, or other interference with ecological systems of which they form part, and, in the case of human health, including property/structures and water supply pipelines.
Hazard	Inherently dangerous quality of a substance, procedure or event.
HDPE	High Density Polyethylene.
HSV	Hand Shear Vane.
K	Modulus of Subgrade Reaction.
LCRM	Land Contamination: Risk Management (EA guidance).
LNAPL	Light Non-Aqueous Phase Liquid (petrol, diesel, kerosene).
LOD	Limit of Detection (for particular method adopted).
MMP	Materials Management Plan.
Mv	Modulus of Volume of Compressibility.
ND	Not Detected.
NHBC	National House Building Council.
NR	Not Recorded.
OS	Ordnance Survey.
PAH	Polycyclic Aromatic Hydrocarbon.
Pathway	Mechanism or route by which a contaminant comes into contact with, or otherwise affects, a receptor.
PCB	Poly-Chlorinated Biphenyl.
PCSM	Preliminary Conceptual Site Model.
pH	Scale used to specify how acidic or basic a water-based solution is.
PHC	Petroleum Hydrocarbons.
PID	Photo Ionisation Detector.
PNEC	Predicted No-Effect Concentration.
Precision	Level of agreement within a series of measurements of a parameter.
PSD	Particle Size Distribution.
PVC	Polyvinyl Chloride.
Receptor	Human health, living organisms, ecological systems, controlled waters (surface waters and groundwater within aquifers), atmosphere, structures and utilities that could potentially be adversely affected by contaminant(s).
Risk	Probability of the occurrence, magnitude and consequences of an unwanted adverse effect on a receptor.
Risk Assessment	Process of establishing, to the extent possible, the existence, nature and significance of risk.
Sampling	Methods and techniques used to obtain a representative sample of the material under investigation.
SOM	Soil Organic Matter.
Source	Location from which contamination is, or was, derived. This could possibly be the location of the highest soil, groundwater or gas concentration of the contaminant(s).
SPT	Standard Penetration Test.
SVOCs	Semi Volatile Organic Compounds.
TOC	Total Organic Carbon.
TPH CWG	Total Petroleum Hydrocarbon (Criteria Working Group).

GLOSSARY	
Term / Abbreviation	**Definition**
TVOCs	Total volatile organic compounds.
UCS	Unconfined Compressive Strength.
Uncertainty	Parameter, associated with the result of a measurement that characterises the dispersion of the values that could reasonably be attributed to the measurement.
UST	Underground Storage Tank.
UXO	Unexploded Ordnance.
VCCs	Vibro Concrete Columns.
VSCs	Vibro Stone Columns
VOCs	Volatile Organic Compounds.
WAC	Waste Assessment Criteria.
WFD (in waste context)	Waste Framework Directive.
WFD (in water context)	Water Framework Directive.
Units	**Definition**
°	Degrees
Φ	Phi angle (in degrees)
g/l	Grams per Litre
Km	Kilometres
kPa	Kilo Pascal (Equivalent to kN/m^2)
$KN/m^2/mm$	Kilo Newton per metered squared per millimeter
kN/m^2	Kilo Newtons per metre squared
kPa	Kilo Pascal (Equivalent to kN/m^2)
l/hr	Litres per hour
MJ/kg	Mega joule per kilogram
MN	Mega Newton
M^2/MN	Mega Newton per metre squared
M	Metres
m bgl	Metres Below Ground Level
m OD	Metres Ordnance Datum (sea level)
µg/l	Micrograms per Litre (parts per billion)
µm	Micrometre
mb	Millibars (atmospheric pressure)
mg/kg	Milligrams per kilogram (parts per million)
mg/m^3	Milligram per metre cubed
mm	Millimetre
ppb	Parts Per Billion
Ppm	Parts Per Million

8.0 REFERENCES

References used in the production of this report are listed below; note not all of the below are relevant to the subject site and may not have been utilised.

Association of Ground Investigation Specialists. 'Description Of Anthropogenic Materials– A Practitioners' Guide'. 2018.

BS 8576 'Guidance on investigations for ground gas – Permanent gases and Volatile Organic Compounds (VOCs)'. 2013.

BS 5930+A1:2020: 'Code of Practice for Site Investigations'. 2020.

BS 10175:2011+A2:2017 'Investigation of Potentially Contaminated sites - code of practice'. 2017.

BRE Report BR211, Scivyer, C. 'Radon – Guidance on protective measures for new buildings' 2023 Edition.

CIRIA Special Publication SP32, PSA Civil Engineering Technical Guide 34, 'Construction over abandoned mine workings'. 1984.

CIRIA C574 'Engineering in Chalk'. 2002.

CIRIA C665 'Assessing Risks Posed by Hazardous Ground Gases to Buildings'. 2007.

CIRIA C681 'Unexploded Ordnance (UXO) A guide for the construction industry'. 2009.

CIRIA C753 'The SuDS Manual'. 2015.

CIRIA C758 'Abandoned Mine Workings Manual'. 2019.

CL:AIRE RB17 'A Pragmatic Approach to Ground Gas Risk Assessment'. 2012.

CL:AIRE TB19 'Managing Risks and Liabilities associated with Per and Polyfluoroalkyl Substances (PFASs)'. 2019.

CL:AIRE TB22 'An overview of the uses of PFAS to assist with identification of sites of concern'. 2023.

Department of the Environment. 'Industry Profiles' - 48 separate publications available from The Stationery Office, London. 1995.

DEFRA and the Environment Agency, CLR Report No 11 'Model Procedures for the Management of Contaminated Land'. 2004. [Withdrawn 2019.]

Environment Agency (EA) - Land Contamination Risk Management (LCRM). 2019.

Health and Safety Executive (HSE). Control of Asbestos Regulations (CAR). 2012.

Highways England. CD 622, 'Managing geotechnical risk'. 2020.

National Planning Policy Framework (NPPF). 2023.

National Planning Policy Framework - Technical Guidance. March 2012.

NHBC Standards. Chapter 4.1: Land Quality - Managing Ground Conditions.

NHBC. 'Hazardous Ground Gas - An essential guide for housebuilders'. May 2023.

Water Framework Directive, 2000.

DRAWINGS

Windy Arbor Road, Halsnead

Schedule Of Accommodation

Name	Description	Beds	SqFt	Sqm	No.	Footage		%
NDS-42	1 Bed Cottage Flat (GF)	1B2P	555	51.6	8	4440	SqFt	5%
	2 Bed Cottage Flat (FF)	2B3P	727	67.6	8	5816	SqFt	5%
NDS-33	2 Bed Semi Detached	2B4P	868	80.62	38	32984	SqFt	25%
NDS-37	3 Bed Corner Semi	3B5P	1022	94.96	10	10220	SqFt	7%
NDS-31	3 Bed Semi Detached	3B5P	1021	94.84	33	33693	SqFt	22%
NDS-13	3 Bed Detached Dual Aspect	3B5P	1021	107.92	10	10210	SqFt	7%
NDS-13	3 Bed Semi Dual Aspect	3B5P	1021	107.92	6	6126	SqFt	4%
NDS-15	3 Bed Semi Mews (Ginnel)	3B5P	1020	94.76	8	8160	SqFt	5%
NDS-19	4 Bed Detached	4B6P	1162	107.92	8	9296	SqFt	5%
NDS-06	4 Bed 2.5 storey Townhouse	4B6P	1243	115.49	22	27346	SqFt	15%
					151	**148291**	**SqFt**	**100%**
F114	2 Bed Semi / Mews	2B	781		21	16401	SqFt	20%
F113	3 Bed Semi Dual Aspect	3B	907		10	9070	SqFt	10%
F113	3 Bed Detached Dual Aspect	3B	907		1	907	SqFt	1%
F112	3 Bed Semi / Mews	3B	907		58	52606	SqFt	56%
F115	3 Bed mews with ginnel	3B	921		14	12894	SqFt	13%
BTR TOTAL					**104**	**91878**	**SqFt**	**100%**
Total					**255**	**240169**		

GIFA

Gross Site Area	0.00 Acres
Nett Site Area	0.00 Acres
Nett Footage	#DIV/0! SqFt / A
Nett Density	#DIV/0! Units / A

Titles Key:

Stockley - MS328384
39.487 SqM
9.75 Acres
52.3%

Stockley - MS337466
11,576 SqM
2.86 Acres
15.4%

Williamson - MS202647
13,544 SqM
3.34 Acres
18%

Fantin - MS610818
10,838 SqM
2.67 Acres
14.3%

Total - 75,445 SqM
18.62 A

Titles below excluded from total area as they are part of Stockley - MS328384

Richardson - MS340245
711 SqM
0.17 Acres

Stockley - MS577597
906 SqM
0.22 Acres

1:1000
20m 0 20m 40m 60m 80m 100m

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Rev	Date	Revision	Initial

+ Client: united living new homes

+ Drawing Title: SKETCH LAYOUT

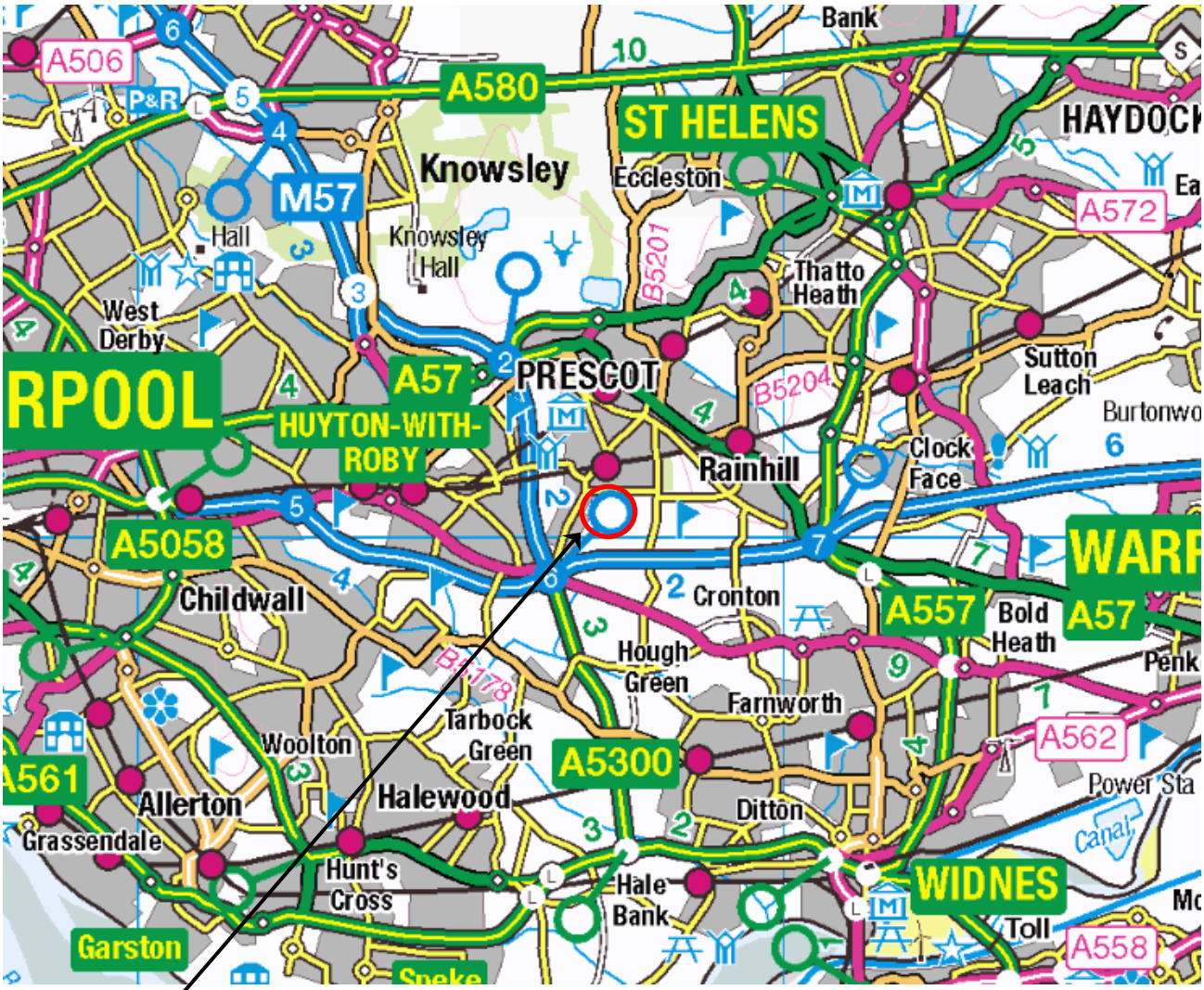
+ Project: Halsnead Garden Village
Windy Arbor Road, Halsnead

Job No	Drg No	Drawn	Rev
23076	255	mpsl	
Scale	**Date**	**Stage**	
1:1000 @ A1	10.09.2024	DRAFT SKETCH	

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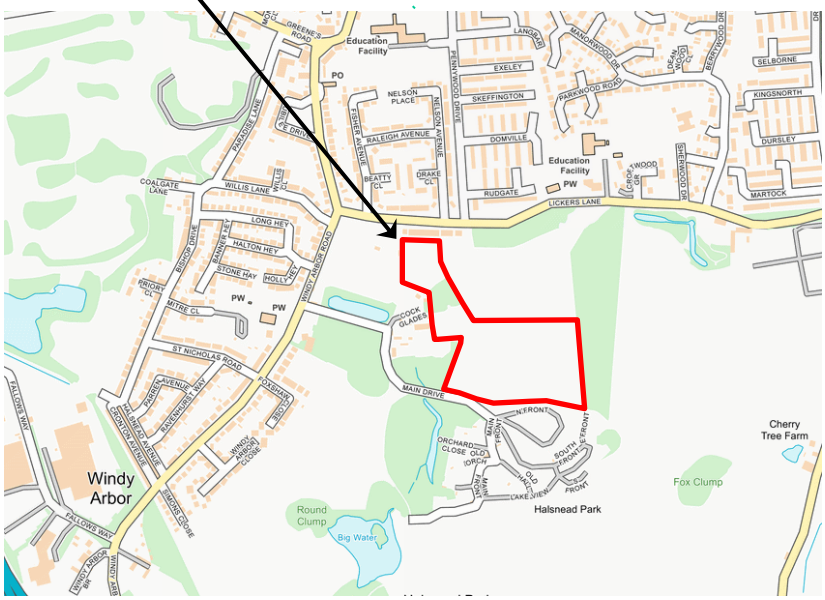
DRAFT FOR DISCUSSIONS



SITE LOCATION

NEAREST POSTCODE: L35 3PW

SITE ENTRANCE WHAT3WORDS: ///GATES.MAYBE.SWEEP



REV	DATE	DESCRIPTION	BY	CKD

BROWNFIELD SOLUTIONS LTD
GEO-ENVIRONMENTAL ENGINEERING EXCELLENCE

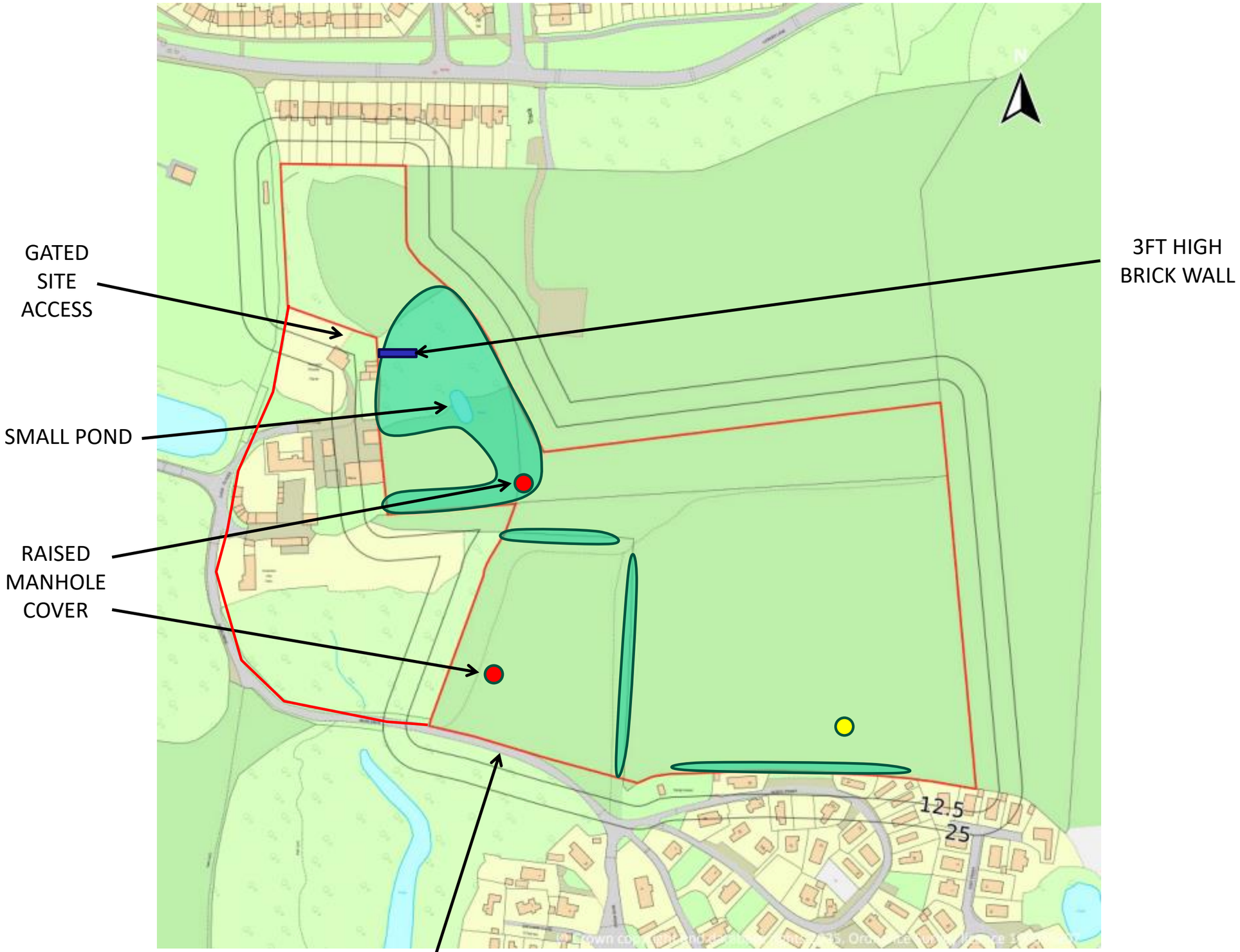
CLIENT
UNITED LIVING

PROJECT TITLE
HALSNEAD GARDENS PHASE 1

DRAWING TITLE
SITE LOCATION PLAN

DRAWING No.	REVISION	SCALE	DATE
C5980/01	-	NTS	10/01/25

DRAWN BY	CHECKED BY
SD	JM



KEY

- APPROXIMATE SITE BOUNDARY
- DENSE VEGETATION
- BRICK WALL
- RAISED MANHOLE COVERS
- SUSPECTED MINE SHAFT

NOTES

1. ALL DIMENSIONS TO BE CHECKED ON SITE BEFORE COMMENCING WORKS. ANY DISCREPANCIES ARE TO BE REPORTED TO THE ARCHITECT & ENGINEER FOR VERIFICATION. FIGURED DIMENSIONS ONLY ARE TO BE TAKEN FROM THIS DRAWING.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEERS REPORTS. THIS DRAWING IS COPYRIGHT OF BSL.
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BROWNFIELD SOLUTIONS LTD
GEO-ENVIRONMENTAL ENGINEERING EXCELLENCE

CLIENT
UNITED LIVING

PROJECT TITLE
HALSNEAD GARDENS PHASE 1

DRAWING TITLE
SITE FEATURES PLAN

DRAWING No.	REVISION	SCALE	DATE
C5980/02	-	NTS	14/01/25

DRAWN BY	CHECKED BY
JL	JEM

PHOTOGRAPHS



Photograph 1: Site Entrance



Photograph 2: SW area of site



Photograph 3: Above ground manhole



Photograph 4: Dense vegetation toward NW of site



Photograph 5: Onsite pond



Photograph 6: 3ft high brick wall



Photograph 7: SE area of site



Photograph 8: Suspected mine shaft toward SE



Photograph 9: Previous gas monitoring well



Photograph 10: Evidence of underground services

APPENDIX A

BSL Methodology and Guidance

BSL Phase I Geo-Environmental Assessment Reports - Methodology and Guidance

Background

This Appendix provides information on the approaches, methods and guidance used by Brownfield Solutions Ltd in the preparation of this report.

The term 'geo-environmental' is used to describe aspects relating to ground-related environmental issues (such as potential soils and groundwater contamination). The term 'geotechnical' is used to describe aspects relating to the physical nature of the site (such as foundation requirements). It should be noted that this is an integrated investigation and these two main aspects are related, unless otherwise specified within the report.

Phase I reports are written in general accordance with the description of a Preliminary Investigation as defined in BS10175:2011+A2:2017 and are also produced in general accordance with the recommendations for a Tier 1 Preliminary Risk Assessment as described in LCRM guidance.

The first stage of the investigation and assessment of a site is the Preliminary Investigation/Tier 1 Preliminary Risk Assessment, often referred to as a Phase 1 Desk Study, comprising a desk study and walk-over survey and collation of desk-based searches, which culminates in the Preliminary Risk Assessment and the development of a preliminary/initial **Conceptual Site Model (CSM)**. From this are identified any potential geotechnical and geo-environmental hazards and the qualitative degree of risk associated with them. In the case of the geotechnical hazard identification, this is referred to as the **Ground Model.**

From the geo-environmental perspective, the hazard Identification process uses professional judgement to evaluate all the hazards in terms of possible contaminant linkages (of source-pathway-receptor). Possible contaminant linkages are potentially unacceptable risks in terms of the current contaminated land regime legal framework and require either remediation or further assessment. These are normally addressed via intrusive ground investigation and generic risk assessment as part of Phase II investigations and reports.

The second stage is the Ground Investigation, Generic Risk Assessment and Geotechnical Interpretation. This represents the further assessment mentioned above. The Ground Investigation comprises field work and laboratory testing based on the findings of the Preliminary Risk Assessment, to reduce uncertainty in the geotechnical and geo-environmental hazard identification. This may include an exploratory, a detailed or/and supplementary Investigations as described in BS 10175:2011+A2:2017. Phase II Assessments are produced in general accordance with the recommendations for a Tier 2 Generic Quantitative Risk Assessment as described in LCRM guidance and are also intended to fulfil the requirements of a Ground Investigation Report (GIR) as detailed in BS EN 1997-2:2007.

Contaminated Land - Legislative Background

Land contamination can be addressed in several ways, e.g. during planning, under Part 2A, following an incident, during an investigation into environmental damages, or during the application of an environmental permit, or its surrender.

For the planning process the key test is **as a minimum the site cannot be determined as contaminated land**, e.g. there is not significant harm, significant possibility of significant harm to human health or that there is not significant harm to, or the significant possibility that the pollution of controlled waters will occur.

Environmental liabilities and risks have been evaluated in terms of a source -pathway - target relationship in accordance with the approach set out in:

- The 1995 Environment Act.
- The Contaminated Land Statutory Guidance, DEFRA – April 2012.
- The Contaminated Land (England) Regulations 2006.
- The Contaminated Land (England) Amendment Regulations 2012.
- Water Resources Act.
- Water Framework Directive.
- Environmental Damage Regulations.
- Environment Agency (EA) - Land Contamination Risk Management (LCRM) 2019.

Contaminated land is defined within the legislative framework as land which is in such condition by reason of substances in, on or under the land that:

1) Significant harm is being caused or there is a significant possibility of such harm being caused.
2) Significant pollution of controlled waters is being or is likely to be caused.

The potential for harm is based on the presence of three factors:

Source - substances that are potential contaminants or pollutants that may cause harm.
Pathway - a potential route by which contaminants can move from the source to the receptor, and the impact of that migration on the source e.g., attenuation.
Receptor - a receptor that may be harmed, for example the water environment, humans and water, considering the sensitivity of the receptor.

Where a source, pathway and target are all present a pollutant linkage exists and there is potential for harm to be caused.



Where any one of the “pollution linkages” between the above is absent there is deemed to be no risk.

The presence of a source does not automatically imply that a contamination problem exists, since contamination must be defined in terms of pollutant linkages and unacceptable risk of harm. The nature and importance of both pathways and receptors are site specific and will vary according to the intended end use of the site, its characteristics and its surroundings.

The key principle which supports the S-P-R approach is ‘suitable for use’ criteria. This requires remedial action only where contamination is considered to pose unacceptable actual or potential risks to health or the environment and, taking into account the proposed use of the site.

Relevant Guidance Documents
This report has been prepared in accordance with the list of guidance below, however the list is not exhaustive:

- DETR: Circular 02/2000: Environmental Protection Act 1990: Part IIA: Contaminated land. 2012.
- Environment Agency technical advice to third parties on Pollution of Controlled Waters for Part IIA of the EPA1990, May 2002.
- BS 10175:2011+A2:2017.
- Environment Agency (EA) - Land Contamination Risk Management (LCRM). 2019.
- Groundwater Protection https://www.gov.uk/government/collections/groundwater-protection
- UK Technical Advisory Group (UKTAG) - - Water Framework Directive
- Incidents and their classification: the Common Incident Classification Scheme (CICS) – Used by the Environment Agency to classify pollution incidents.

Relevant Legislative Documents
The following is a non-exhaustive list of legislative framework documents that has been considered in the production of this report:

- The Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance (2012).
- The Environment Protection Act (1990).
- The Water Resources Act (1991).
- The Environment Act (1995).
- The Contaminated Land (England) Act (2000).
- The Pollution Prevention and Control (England and Wales) Regulations (2000).
- The Landfill Regulations (England and Wales) Regulations (2002).
- The Landfill (England and Wales) (Amendment) Regulations (2004).
- Contaminated Land (England) Regulations (2012).
- The Environmental Damage (Prevention and Remediation) Regulations (2009).
- Environmental Permitting Regulations (England and Wales) Regulations (2010).
- The Water Environment (Water Framework Directive) (England and Wales) Regulations (2017).
- Health and Safety at Work Act.
- National Planning Policy Framework (NPPF) – latest version.

Contaminated Land Risk Assessment Approach

Contaminated Land Risk Assessment is a technique that identifies and considers the associated risk, determines whether the risks are significant and whether action needs to be taken. The four main stages of risk assessment are:



LCRM outlines the framework to be followed for risk assessment in the UK. The framework is designed to be consistent with UK legislation and policies including planning. The starting point of the risk assessment is to identify the context of the problem and the objectives of the process. Under LCRM, three tiers of risk assessment exist – Stage/Tier Preliminary Risk Assessment, Stage 2 Generic Quantitative Assessment and Stage 3 Detailed Quantitative Assessment.

Further information can be found at the below site:
https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm

Formulating and developing a conceptual model for the site is an important requirement of risk assessment, this supports the identification and assessment of pollutant linkages. Development of the conceptual model forms the main part of preliminary risk assessment, and the model is subsequently refined or revised as more information and understanding is obtained through the risk assessment process.

Risk is a combination of the likelihood of an event occurring and the magnitude of its consequences. Therefore, both the likelihood and the consequences of an event must be taken into account when assessing risk.

The risk assessment process needs to take into account the degree of confidence required in decisions. Identification of uncertainties is an essential step in risk assessment.

The likelihood of an event is classified on a four-point system using the following terms and definitions from CIRIA C552, with reference to Incidents and their classification: the Common Incident Classification Scheme (CICS), Environmental Protection Act 1990: Part 2A – Contaminated Land Statutory Guidance 2012 and other guidance as appropriate which will be detailed within the main body of the report if applied.

The likelihood of a given receptor being impacted is related to a number of factors, e.g. the geology which could inhibit contaminant migration. For example, a site with a significant thickness of clay between it and a receptor may reduce migration of contamination via the subsurface, which will reduce the likelihood of a given receptor being impacted. The geology or drainage for example could offer a preferential pathway e.g. mines shafts/faults increasing the likelihood and potential magnitude of an impact. The depth of contamination will also affect the exposure pathway, for example petroleum hydrocarbons at depth are unlikely to reach a receptor via dermal contact but could via vapour pathways which will influence the likelihood of an impact being felt e.g. if there are no buildings on site.

The terms and definitions used for the assessment of the likelihood are provided below:

High likelihood: There is a pollution linkage and an event appears very likely in the short term and almost inevitable over the long term, or there is evidence at the receptor of harm or pollution.
Examples - Extensive areas with concentrations above saturation limits for mobile contamination e.g. petroleum hydrocarbons within the water table.

Likely: There is a pollution linkage and all the elements are present and in the right place, which means it is probable that an event will occur. Circumstances are such that the event is not inevitable, but possible in the short term and likely over the long term.
Examples – Localised areas of contaminants with concentrations above saturation limits for mobile contamination e.g. localised petroleum hydrocarbons within the water table; shallow contamination above relevant human health generic assessment criteria is present with little or no hardstanding,

Low likelihood: There is a pollution linkage and circumstances are possible under which an event could occur. However, it is by no means certain even over a longer period such event would take place, and is less likely in the short term.
Examples - A thickness/distance of low permeability deposits preventing contaminant migration to a receptor is present; a site is mostly covered hard standing preventing exposure to soil contamination.

Unlikely: There is a pollution linkage but circumstances are such that it is improbable the event would occur even in the long term.
Examples – A site is underlain by a substantial thickness of low permeability clays, between the source and potential receptors which will inhibit significantly, but not completely rule out migration to sensitive receptors.

The severity is also classified using a system based on CIRIA C552, with reference to Incidents and their classification: the Common Incident Classification Scheme (CICS), Environmental Protection Act 1990: Part 2A – Contaminated Land Statutory Guidance 2012 and other guidance as appropriate which will be detailed within the main body of the report, if applied. The terms and definitions are:

Severe: Short term (acute) risk to human health likely to result in 'significant harm' as defined by the Environment Protection Act 1990, Part IIA. Short-term risk of pollution of sensitive water resources. Catastrophic damage to buildings or property. A short-term risk to a particular ecosystem or organism forming part of that ecosystem (note definition of ecosystem in 'Draft Circular on Contaminated Land', DETR 2000);
Examples – High concentrations of contaminant on surface of recreation area, major spillage of contaminants from site into controlled waters, explosion causing building to collapse.

Medium: Chronic damage to human health ('significant harm' as defined in DETR 2000). Pollution of sensitive water resources. A significant change in a particular ecosystem or organism forming part of that ecosystem (note definition of ecosystem in 'Draft Circular on Contaminated Land', DETR 2000);
Examples - Concentrations of contaminants exceed the generic assessment criteria, leaching of contaminants from a site to a Principal or Secondary Aquifer, death of species within a designated nature reserve.

Mild: Pollution of non-sensitive water resources. Significant damage to crops, buildings, structures and services ('significant harm' as defined in 'Draft Circular on Contaminated Land', DETR 2000). Damage to sensitive buildings, structures, services or the environment.
Examples – Pollution of non-classified groundwater or damage to buildings rendering it unsafe to occupy.

Minor: harm, not necessarily significant harm, which may result in financial loss or expenditure to resolve. Non-permanent health effects to human health (easily prevented by use of personal protective clothing etc). Easily repairable effects of damage to buildings, structures and services.
Examples – Presence of contaminants at such concentrations PPE is required during site work, loss of plants in landscaping scheme or discolouration of concrete.

Once the likelihood and severity have been determined, a risk category can be assigned using the table below.

		Consequences			
		Severe	Medium	Mild	Minor
Probability	Highly likely	Very high	High	Moderate	Moderate/low
	Likely	High	Moderate	Moderate/low	Low
	Low likelihood	Moderate	Moderate/low	Low	Very low
	Unlikely	Moderate/low	Low	Very Low	Very low
	Negligible	Negligible Risk / No Linkage			

Definitions of the risk categories obtained from the above table are as follows together with an assessment of the further work that might be required:

Very high: There is a high probability that severe harm could arise to a designated receptor from an identified hazard or there is evidence that severe harm is currently happening. This risk, if realised, could result in substantial liability. Urgent investigation and remediation are likely to be required.

High: Harm is likely to arise to a designated receptor from an identified hazard. 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 arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, or if any harm were to occur it would be more likely to be relatively mild. Investigation is normally required to clarify the risk and determine the liability. Some remedial works may be required in the longer term.

Low: It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild.

Very Low: There is a low possibility that harm could arise to a receptor. In the event of such harm being realised, it is not likely to be severe.

Some linkages may be identified which constitutes a theoretical connection between a source and a receptor, but professional judgement shows them not to be possible for some reason. These are labelled 'negligible risk' and 'no linkage' in the summary table, which give rise to an overall **negligible** risk category and no further action is required.

Ground Gas Risk Assessment

BS8485:2015+A1:2019, BS 8576:2013, CL:AIRE RB17, and NHBC 'Hazardous Ground Gas - An essential guide for housebuilders' 2023, are the current guidance which gives up-to-date advice on all aspects of permanent ground gas risk. BS8576 alongside CIRIA C682 also provides guidance on assessment of hydrocarbon vapour intrusion.

The CL:AIRE publication 'Good Practice for Coal Mine Gas Emissions" 2021 provides guidance on the assessment of risks from mine gas sources.

The above all outline good practice in investigation, the collection of relevant data and monitoring programmes in a risk-based approach to ground gas contamination. The aim of the guidance is for a consistent approach to decision making, particularly relating to the scope of protective design measures on a site-specific basis.

Legislative Framework
BS8485:2015+A1:2019, BS 8576:2013 and CIRIA C665 provides technical guidance, however they also recognise the context into which the guidance has to be employed. Government policy is based upon a "suitable for use approach", which is relevant to both the current and proposed future use of land. When considering the current use of land, Part IIA of the Environment Protection Act 1990 provides the regulatory regime. The presence of hazardous ground gases could provide the "source" in a "pollutant linkage" which could lead the regulator to determine that considerable harm or there is a significant possibility of such harm being caused. Under such circumstances, the regulator would determine the land to be "contaminated land" under the provisions of the Act, setting out the process of remediation as described in the DETR Circular 02/2000 *Statutory guidance on contaminated land*.

Generation Potential of Sources
BS 8576:2013 Figure 6 provides a basis for assessing the generation potential from sources identified as part of the Phase I Assessment. These are summarised below:

Generation Potential	Typical Sources
Very Low	• Natural carbonate soil and strata, e.g. chalk and limestone. • Natural soil strata with a low degradable organic content, e.g. alluvium, peat. • In-filled pond less than 15 m diameter, in-filled before 1930s to 1940s. • Made ground with low degradable organic content (e.g. up to 5% organic material such as pieces of wood, pieces of paper, rags, etc. with a high proportion of ash and no food or other easily degradable waste). • Mine workings shallow or shaft (where there is clear evidence that they are flooded). • Inert landfill sites.
Low	• Natural soil strata with a high degradable organic content (DOC). • Made ground with total organic carbon (TOC) up to 6% (e.g. dock silt, no food or other easily degradable waste). • Foundry sand (includes phenolic binders, rags and wood that decay, albeit at low rates). • Landfill 1945 to mid 1960s (see also Moderate below).
Moderate	• Sewage sludge. • Mine workings – unflooded, more than 50 years since last worked (gas is liberated from coal when mine workings are excavated; this continues for up to about 50 years). • Landfill 1945 to mid 1960s (this could also be "low" or, if disturbed, "high").
High	• Landfill mid 1960s to early 1990s. • Mine workings – unflooded – less than 50 years since last worked.
Very High	• Municipal landfill sites. • Landfill early 1990s onward.

Frequency and Duration of Monitoring

BS8576 notes to determine where and how to monitor ground gases requires consideration of credible pathways of possible exposure of the receptors, taking into account what is known about the geology and hydrogeology, building construction and services layout, foreseeable events such as flooding, changes in groundwater level, climate change, extreme weather conditions, the closure of mines, and possible changes to the gas regime caused by future development.

The monitoring period for a specific site should cover the "worst case" scenario. A "worst case" scenario will typically occur during falling atmospheric pressure and, in particular, weather conditions such as rainfall, frost and dry weather.

The benefits of additional information and whether it is likely to change the scope of gas protection should be considered, as are the consequences of failing to characterise adequately pollutant linkages. Investigations concerned with ground gas are required to provide monitoring data sufficient to allow prediction of worst case conditions enabling the confident assessment of risk and subsequent design of appropriate gas protection schemes. Monitoring programmes should not be an academic exercise in data collection. CL:AIRE publication TB17 "Ground Gas Monitoring and 'Worst-Case' Conditions" provides further guidance.

Below are matrices that will aid in determining an appropriate number of gas monitoring visits and the length of monitoring period.

Typical/idealised periods of monitoring

		Generation of Potential Source				
		Very Low	Low	Moderate	High	Very High
Sensitivity of Development	Low (Commercial)	1 month	2 months	3 months	6 months	12 months
	Moderate (Apartments)	2 months	3 months	6 months	12 months	24 months
	High (Low rise Residential)	3 months	6 months	6 months	12 months	24 months

Typical/idealised frequency of monitoring/Number of Visits Required

		Gas Generation of Potential Source				
		Very Low	Low	Moderate	High	Very High
Sensitivity of Development	Low (Commercial)	4	6	6	12	12
	Moderate (Apartments)	6	6	9	12	24
	High (Low rise Residential)	6	9	12	24	24

Notes

1 Generation potential of sources based on descriptions within BS 8576:2013.

2 At least two sets of readings should be at low and falling atmospheric pressure (but not restricted to periods below <1000 mb) known as worst case conditions. Historical data can be used as part of the data set (Table 5.5b).

RB17 Approach

CL:AIRE RB17 (Card et al 2012) is a pragmatic approach to ground gas risk assessment and was developed because gas concentration, pressure and flow rate measured in a well headspace may not be representative of the conditions in the surrounding formation.

In these low-risk situations, the approach is to use the conceptual site model and the estimation of the likely gas generation from a source to identify where or if gas monitoring is required to better define the risks.

Under this approach, for sites with natural soils only with no credible methane source, then no action is required (no monitoring or gas protection measures) as this represents Characteristic Situation 1 (CS1).

Radon
Advice on radon protection in England is provided by the UK Health Security Agency, https://www.ukradon.org/information/ukmaps and by the BRE (BR 211 (Scivyer 2023)).

Areas of the country can be categorised according to the percentage of existing homes where radon is present above the Action Level:

- 0-1% lower probability.
- 1-3% and 3-10% intermediate probability.
- >10% higher probability.

Basic radon protection measures are required in new buildings and extensions in areas of England and Wales where 3-10% of properties exceed the Action Level and full radon protection measures where >10% exceed the Action Level.

Unexploded Ordnance (UXO) Guidance

Clients have a legal duty under the CDM 2015 Regulations to provide designers and contractors with project-specific health and safety information needed to identify hazards and risks. This includes the possibility of unexploded ordnance (UXO) being encountered on the site. Further details are given in CIRIA report C681.

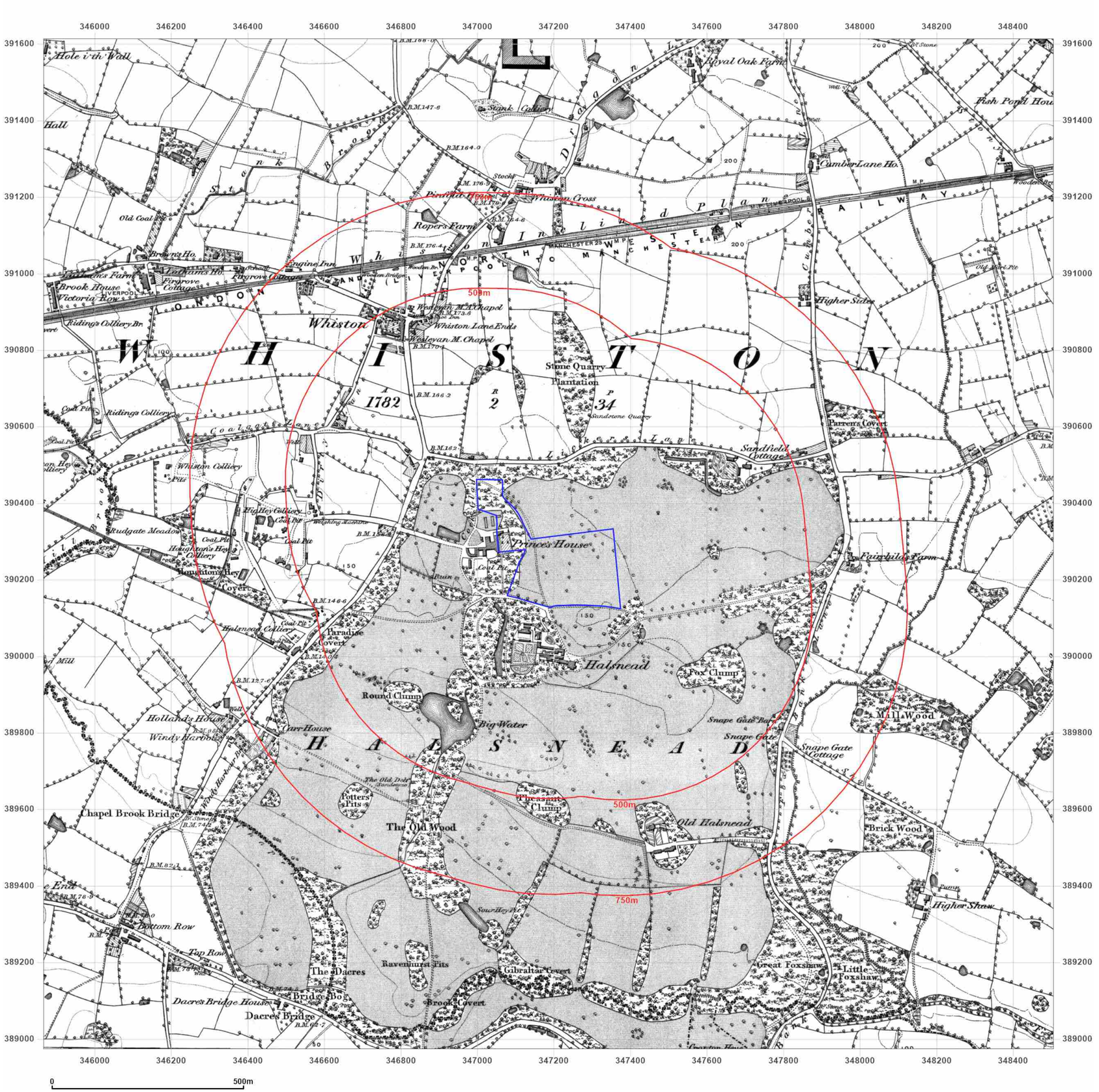
BSL carry out non-specialist UXO screening exercises by considering any evidence of UK defence activities on or near the site evident from gathered desk study information and the unexploded aerial delivered bomb (UXB) online risk maps produced by Zetica. Other data sources are available, but as a first stage screening exercise the freely available online Zetica maps have been used. The level of risk stated is that determined by Zetica, a company experienced and considered competent in the assessment of UXO.

Geotechnical Guidance

A preliminary risk assessment of geotechnical hazards is carried out at the desk study stage and confirmed (or amended) at the ground investigation stage. The desk-based stage my include the requirements for a Coal Mining Risk Assessment (CMRA) which specifically assesses the risks from mining induced instability and related issues in high risk development areas: https://www.gov.uk/guidance/planning-applications-coal-mining-risk-assessments

APPENDIX B

Historical Maps



Groundsure INSIGHTS

Site Details:

Whiston, Prescot, L35 3PW

Client Ref: C5980-6002-SD
Report Ref: GS-QLM-MGF-L3A-EIX
Grid Ref: 347185, 390293

Map Name: County Series

Map date: **1849-1850**

Scale: 1:10,560

Printed at: 1:10,560

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Surveyed 1847
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Edition 1850
Copyright N/A
Levelled N/A

Surveyed 1846
Revised N/A
Edition 1849
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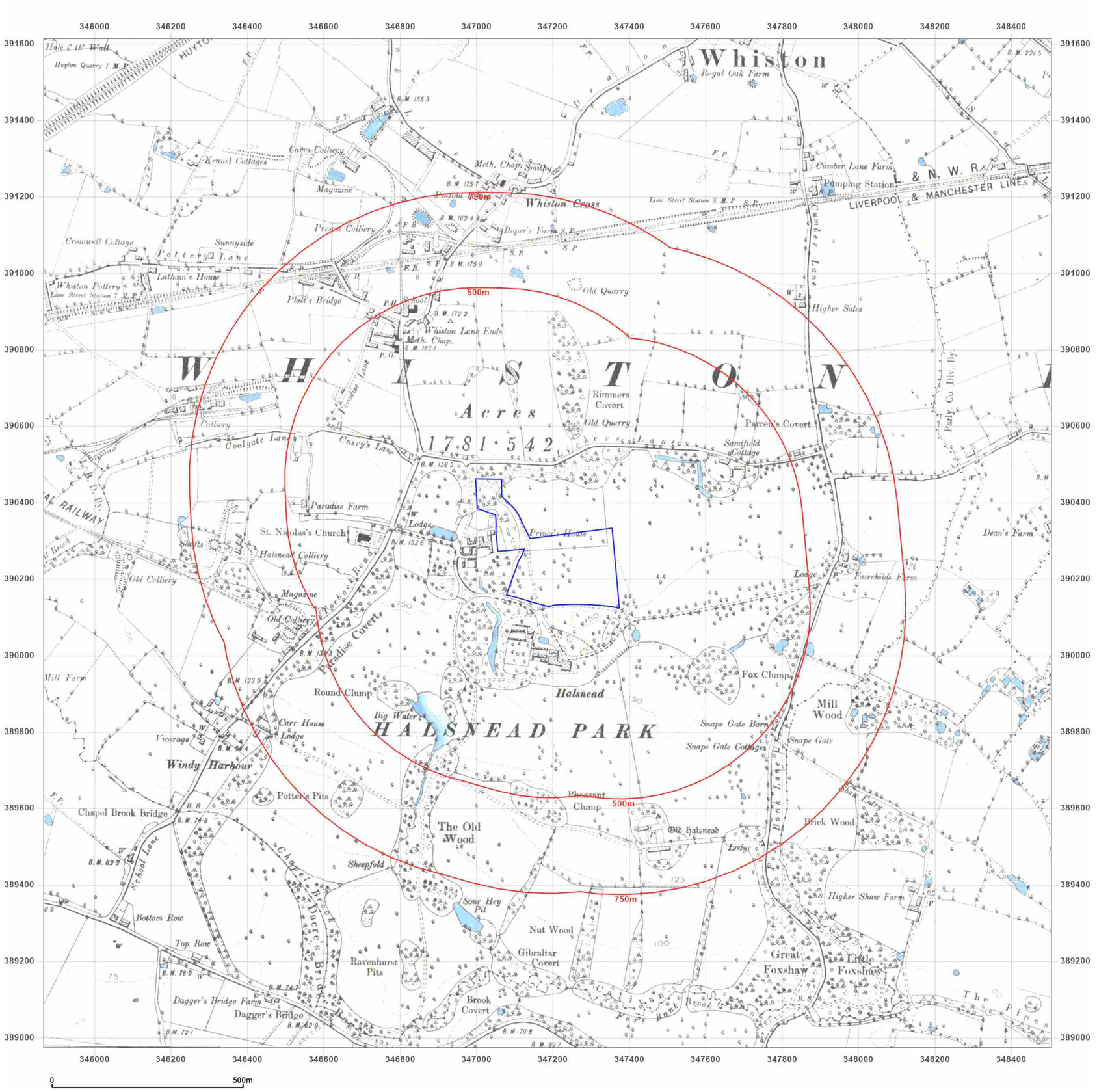
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Map legend available at:
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Site Details:

Whiston, Prescot, L35 3PW

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Report Ref: GS-QLM-MGF-L3A-EIX
Grid Ref: 347185, 390293

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Revised 1891
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Surveyed 1891
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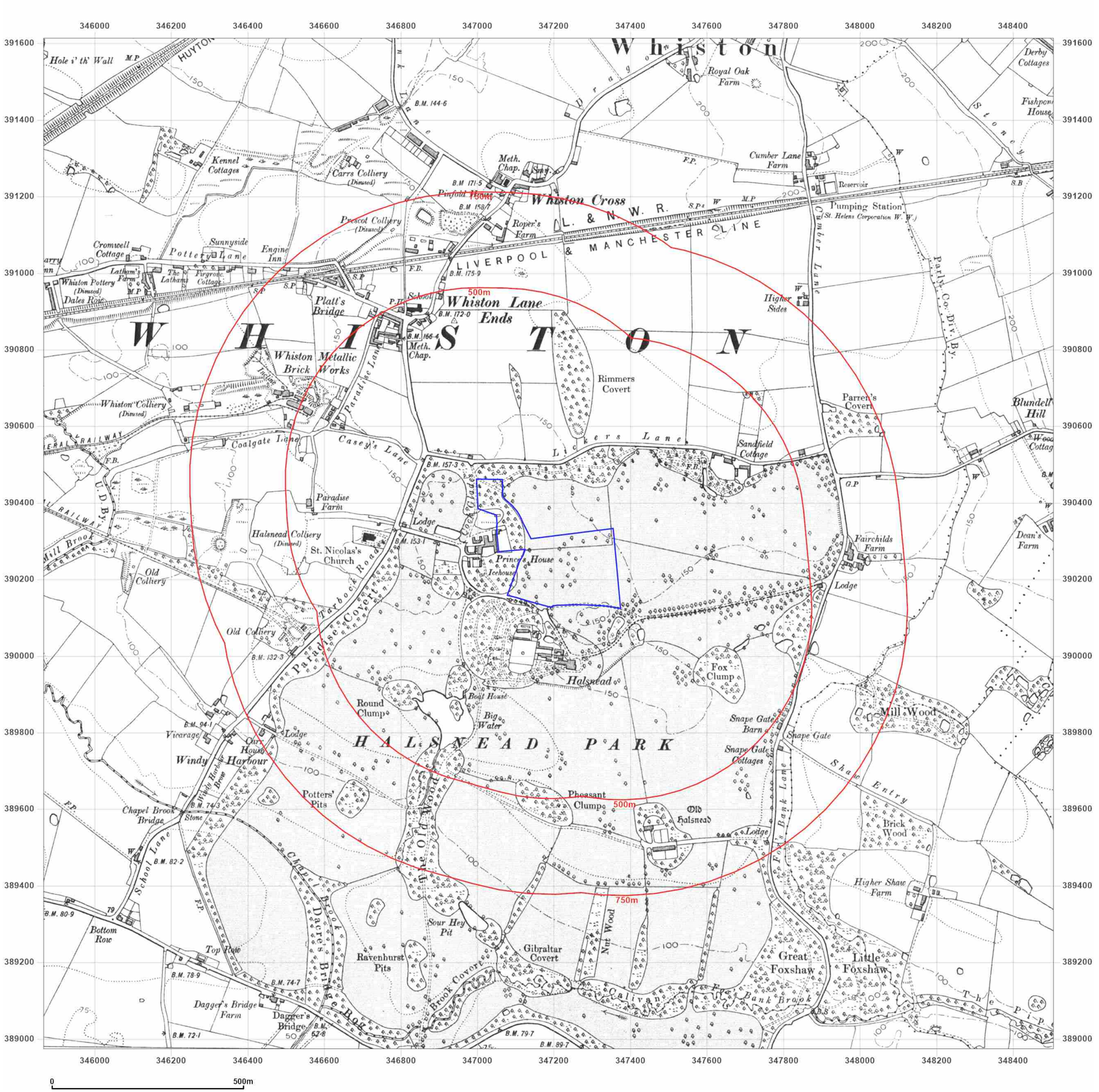
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Client Ref: C5980-6002-SD
Report Ref: GS-QLM-MGF-L3A-EIX
Grid Ref: 347185, 390293

Map Name: County Series

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Revised 1906
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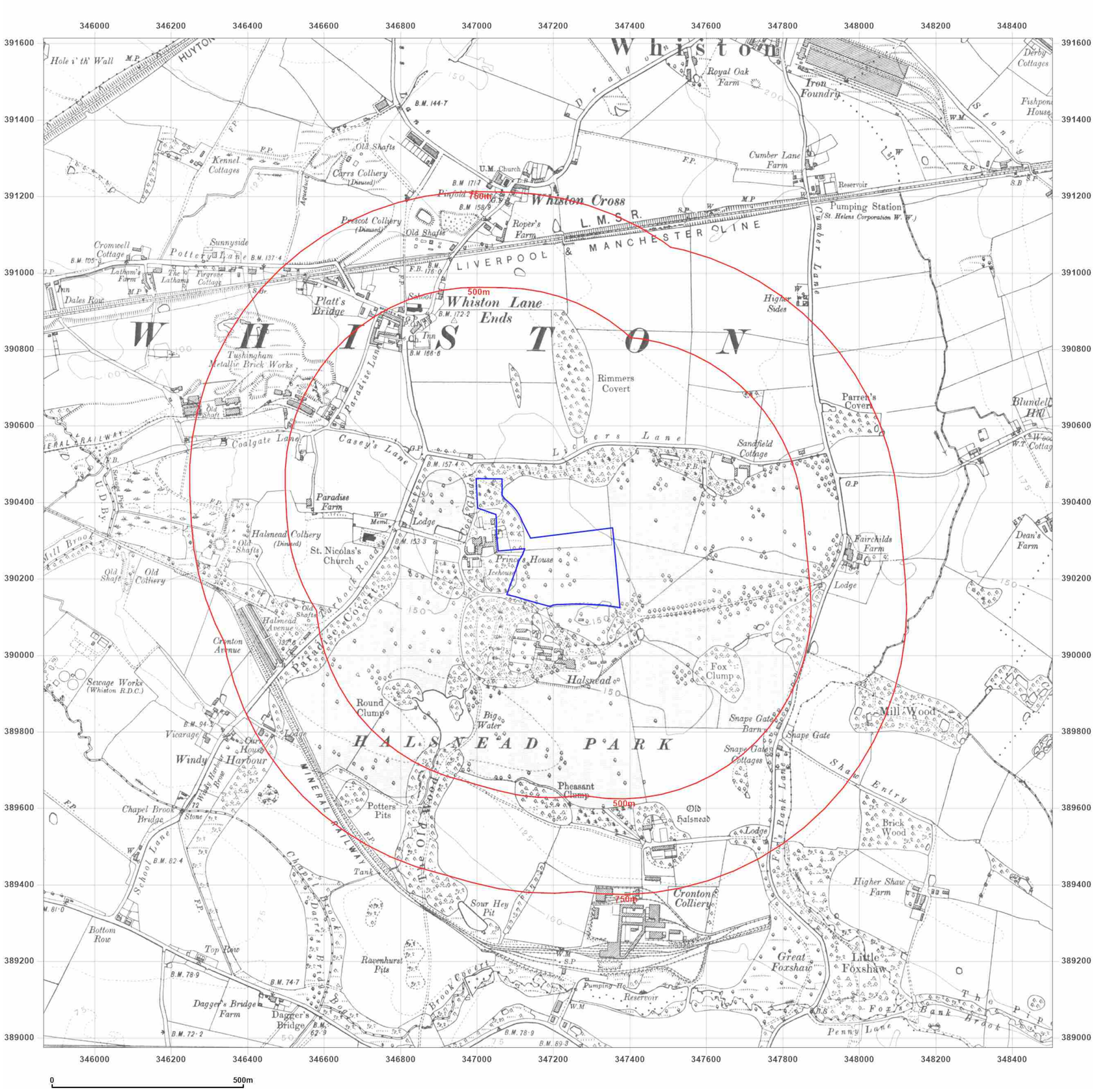
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Report Ref: GS-QLM-MGF-L3A-EIX
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Map Name: County Series

Map date: **1925**

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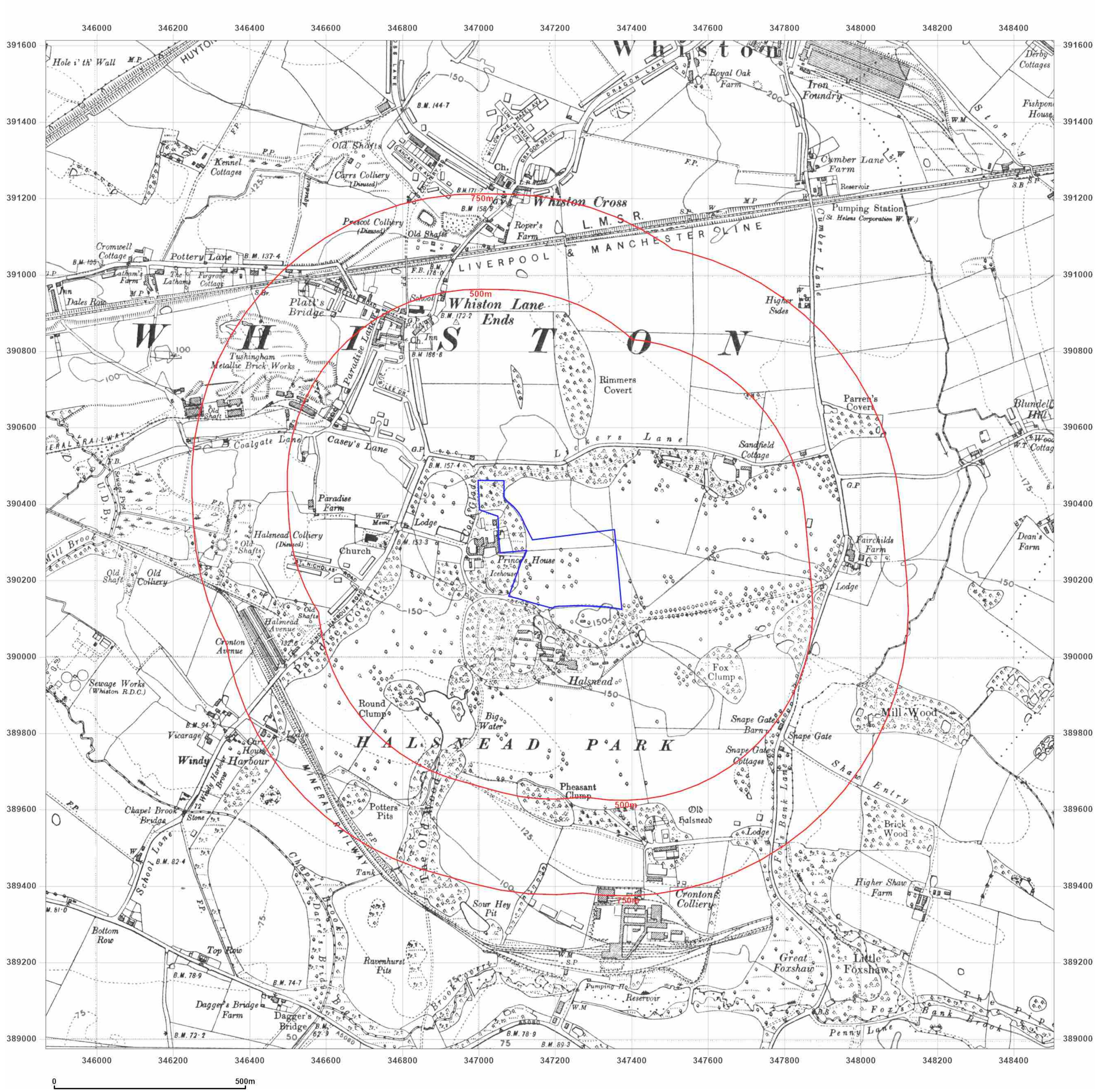
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Report Ref: GS-QLM-MGF-L3A-EIX
Grid Ref: 347185, 390293

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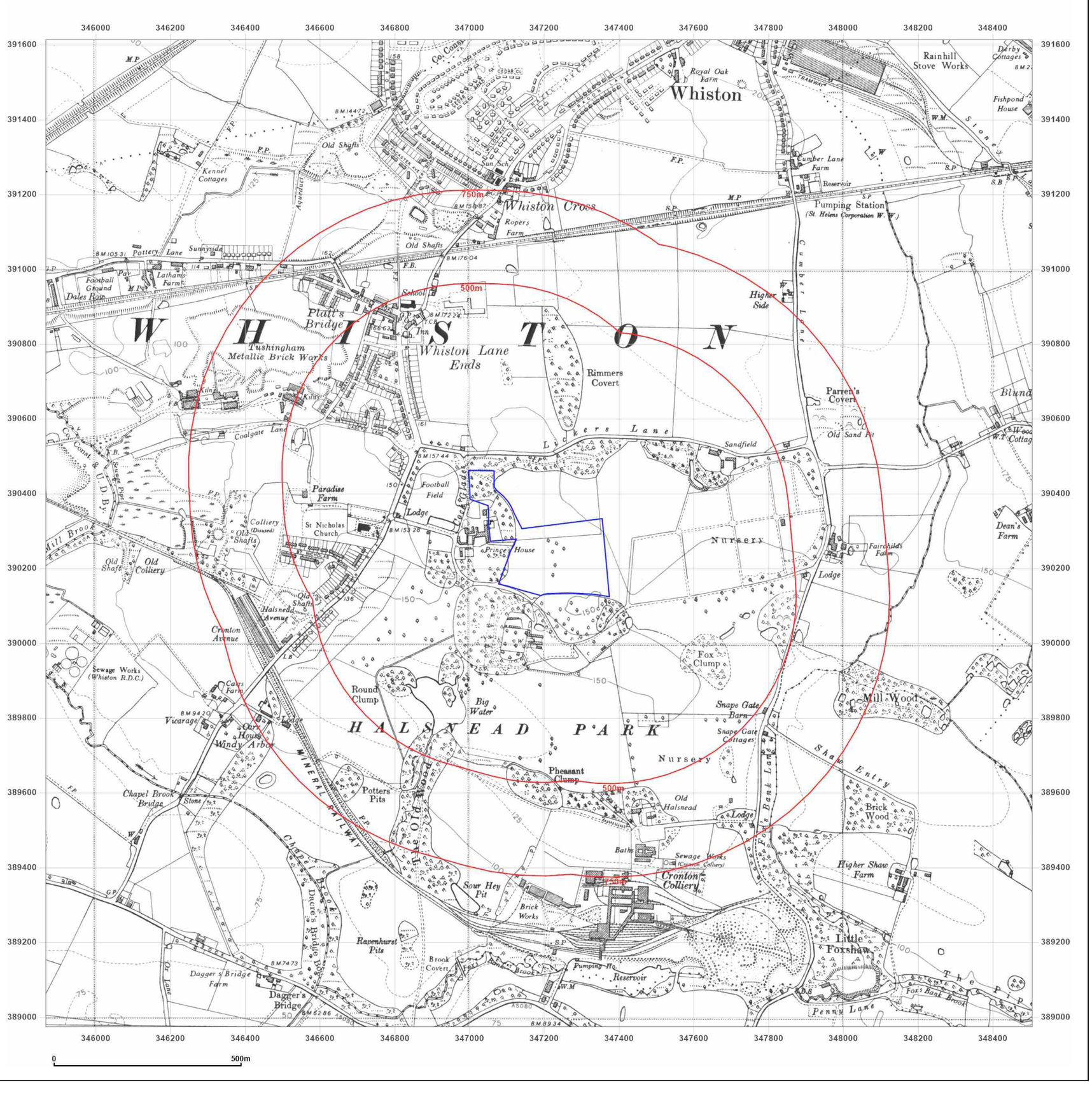
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Report Ref: GS-QLM-MGF-L3A-EIX
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Levelled N/A

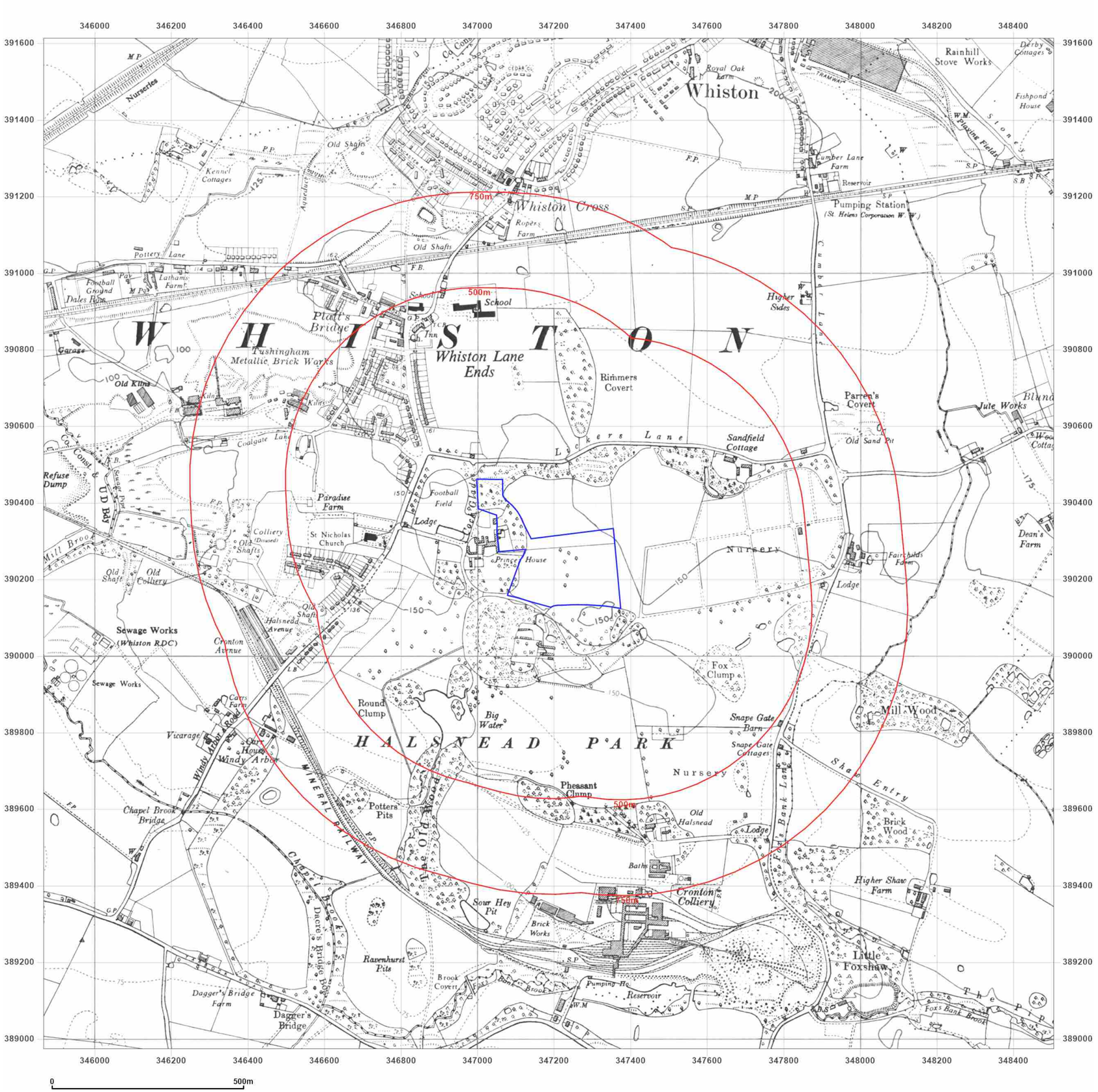
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Site Details:

Whiston, Prescot, L35 3PW

Client Ref: C5980-6002-SD
Report Ref: GS-QLM-MGF-L3A-EIX
Grid Ref: 347185, 390293

Map Name: Provisional

Map date: **1955-1956**

Scale: 1:10,560

Printed at: 1:10,560

N
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Surveyed 1947
Revised 1955
Edition 1956
Copyright N/A
Levelled N/A

Surveyed N/A
Revised 1955
Edition N/A
Copyright 1955
Levelled N/A

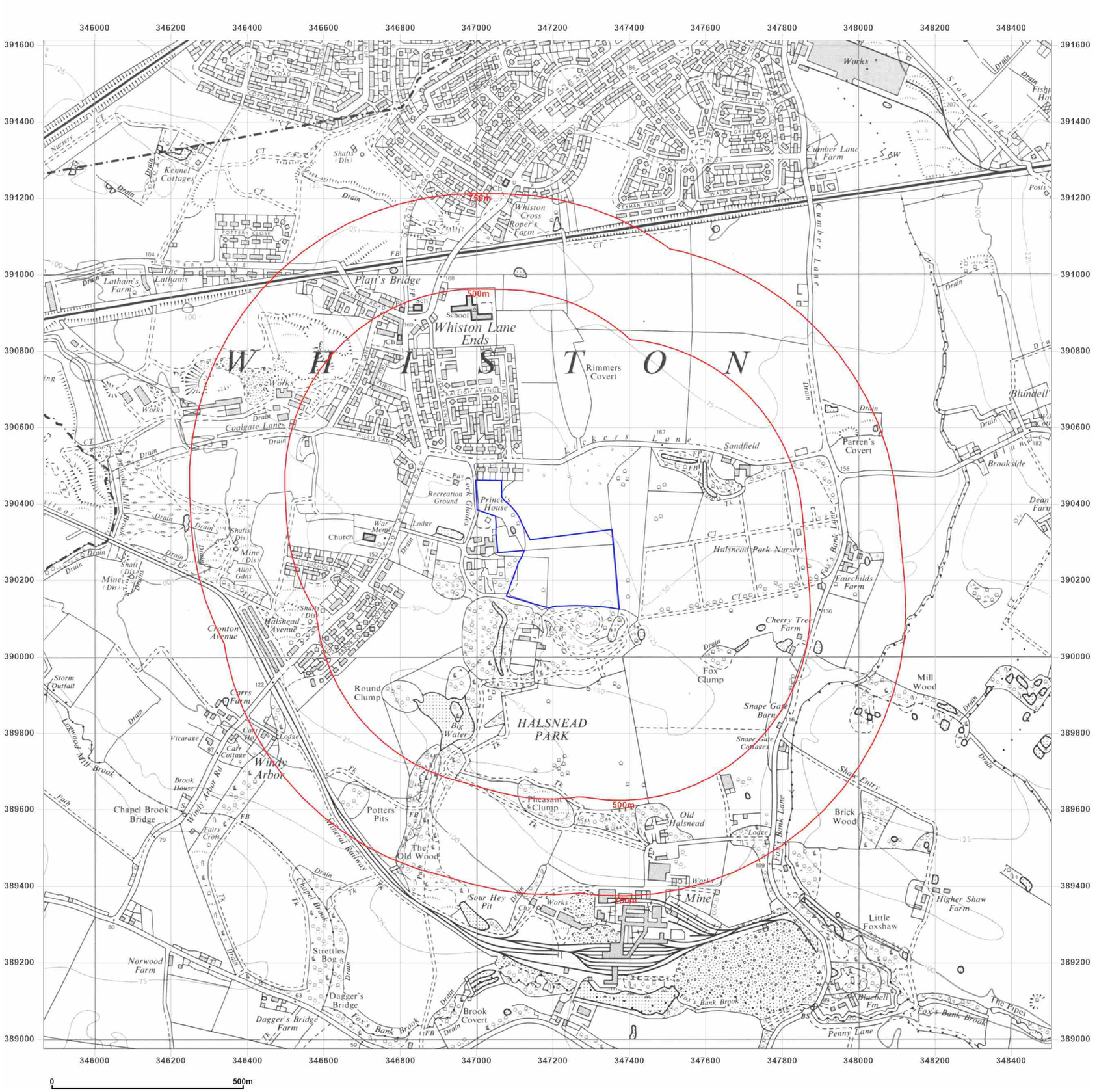
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Site Details:

Whiston, Prescot, L35 3PW

Client Ref: C5980-6002-SD
Report Ref: GS-QLM-MGF-L3A-EIX
Grid Ref: 347185, 390293

Map Name: Provisional

Map date: **1966-1967**

Scale: 1:10,560

Printed at: 1:10,560

N
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Surveyed 1966
Revised 1966
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1967
Revised 1967
Edition N/A
Copyright N/A
Levelled N/A

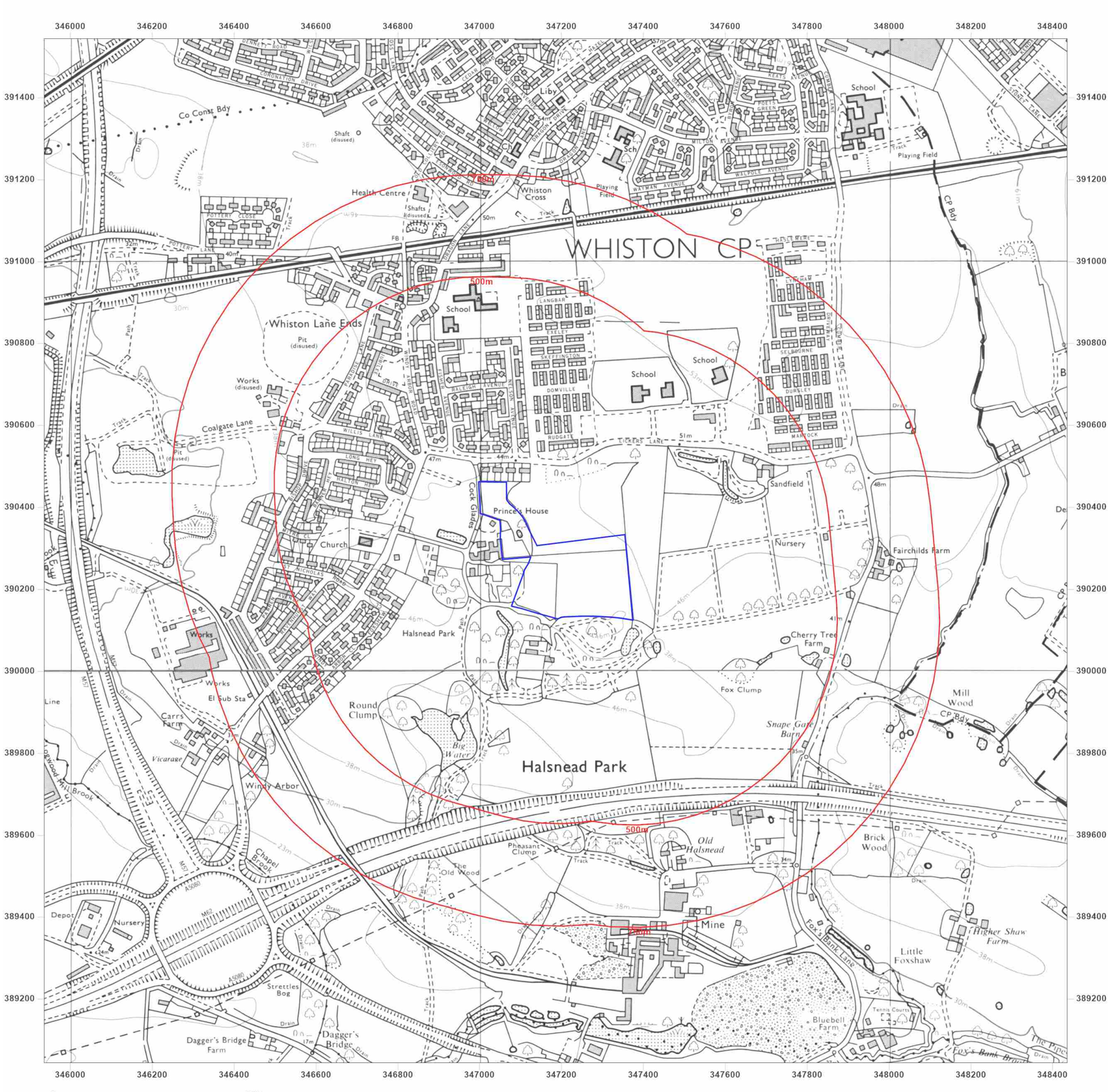
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Site Details:

Whiston, Prescot, L35 3PW

Client Ref: C5980-6002-SD
Report Ref: GS-QLM-MGF-L3A-EIX
Grid Ref: 347185, 390293

Map Name: National Grid

Map date: **1977-1978**

Scale: 1:10,000

Printed at: 1:10,000

N
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Surveyed 1975
Revised 1978
Edition N/A
Copyright 1978
Levelled 1964

Surveyed 1975
Revised 1977
Edition N/A
Copyright 1977
Levelled 1964

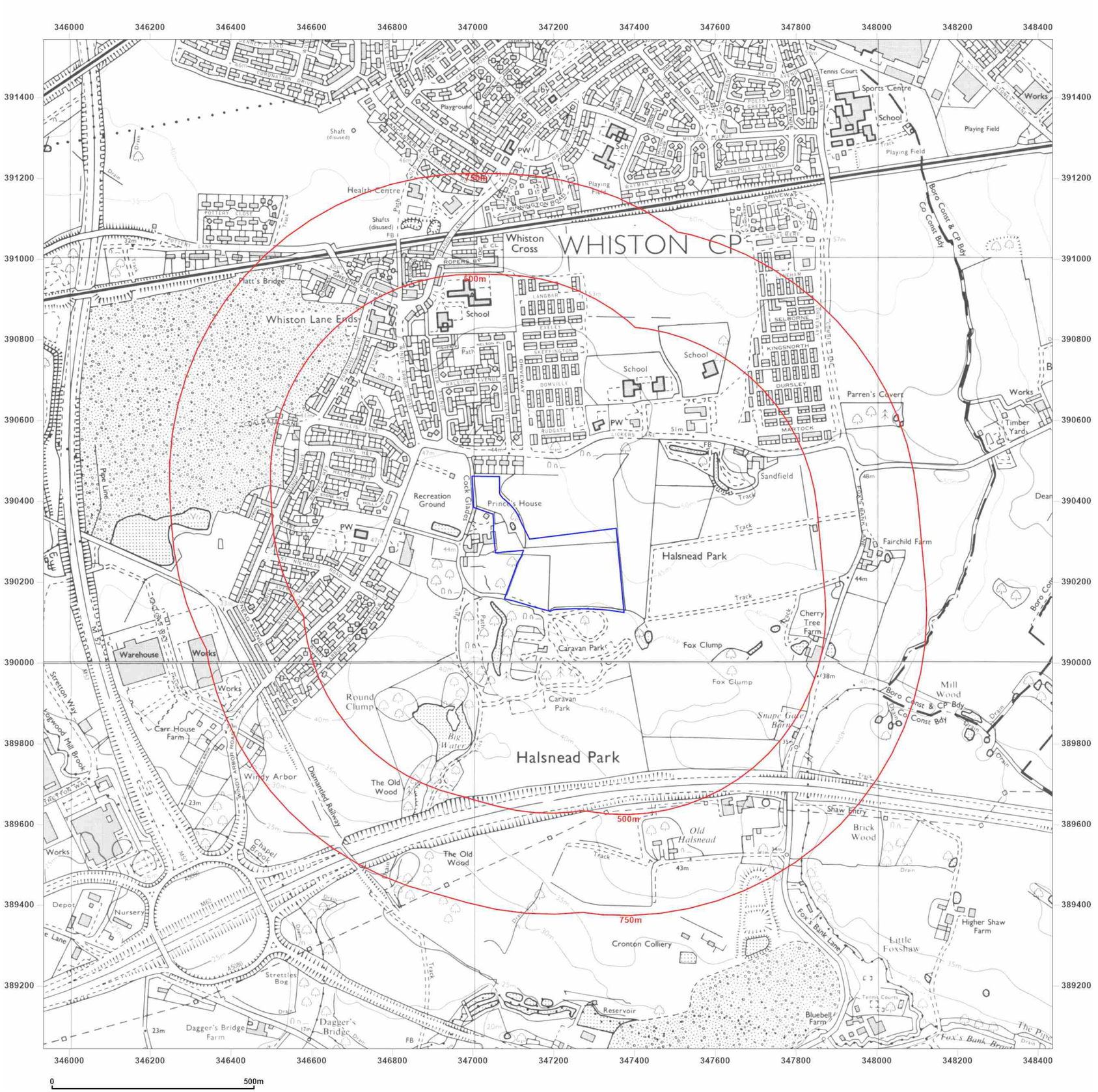
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Site Details:

Whiston, Prescot, L35 3PW

Client Ref: C5980-6002-SD
Report Ref: GS-QLM-MGF-L3A-EIX
Grid Ref: 347185, 390293

Map Name: National Grid

Map date: **1989-1990**

Scale: 1:10,000

Printed at: 1:10,000

N
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Surveyed 1989
Revised 1990
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1986
Revised 1989
Edition N/A
Copyright N/A
Levelled N/A

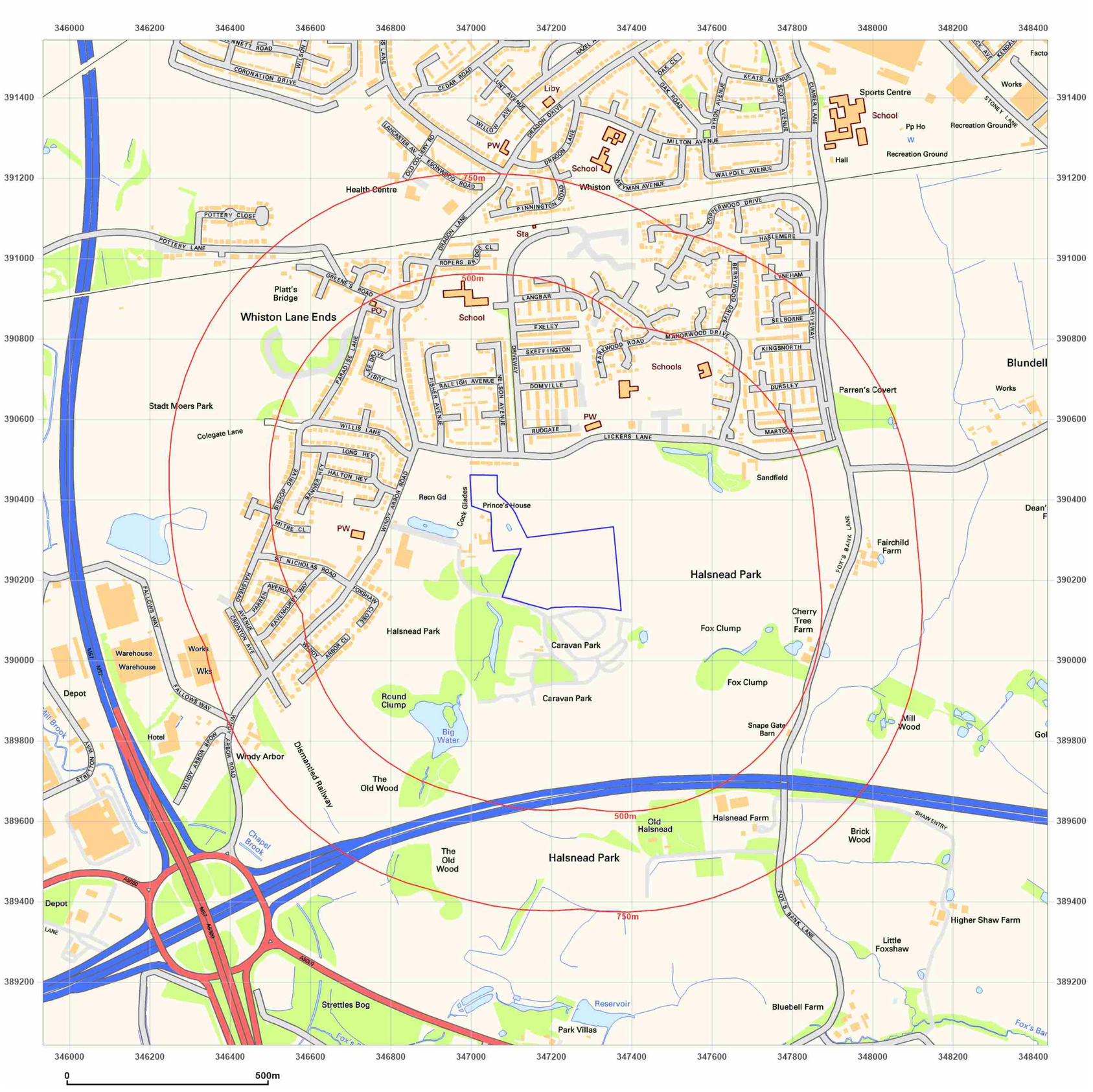
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Groundsure INSIGHTS

Site Details:

Whiston, Prescot, L35 3PW

Client Ref: C5980-6002-SD
Report Ref: GS-QLM-MGF-L3A-EIX
Grid Ref: 347185, 390293

Map Name: National Grid

Map date: **2001**

Scale: 1:10,000

Printed at: 1:10,000

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2001

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Groundsure INSIGHTS

Site Details:

Whiston, Prescot, L35 3PW

Client Ref: C5980-6002-SD
Report Ref: GS-QLM-MGF-L3A-EIX
Grid Ref: 347185, 390293

Map Name: National Grid

Map date: **2010**

Scale: 1:10,000

Printed at: 1:10,000

N
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2010

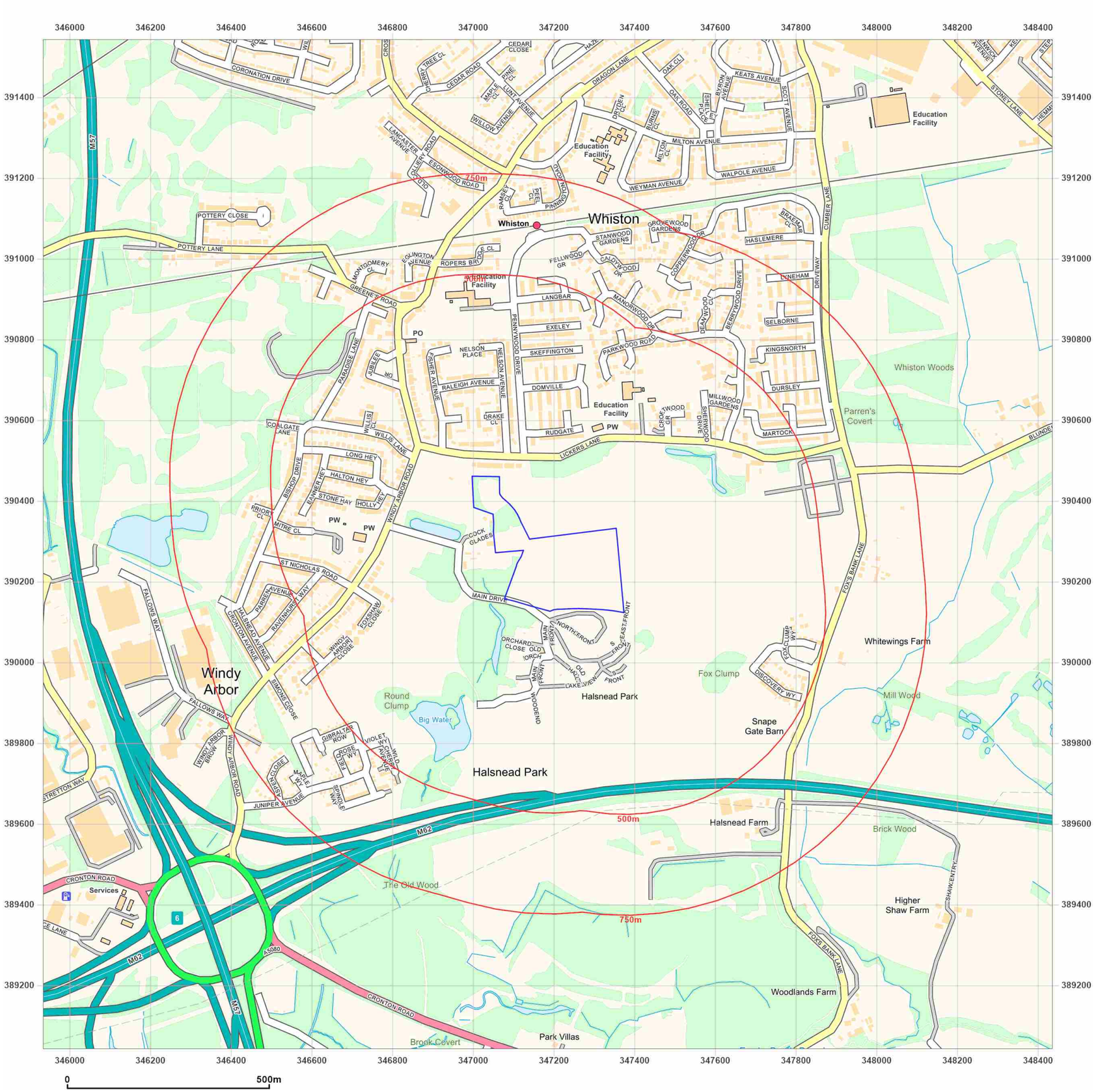
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Groundsure INSIGHTS

Site Details:

Whiston, Prescot, L35 3PW

Client Ref: C5980-6002-SD
Report Ref: GS-QLM-MGF-L3A-EIX
Grid Ref: 347185, 390293

Map Name: National Grid

Map date: **2025**

Scale: 1:10,000

Printed at: 1:10,000

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Groundsure INSIGHTS

Site Details:

Whiston, Prescot, L35 3PW

Client Ref: C5980-6002-SD
Report Ref: GS-QLM-MGF-L3A-EIX_1250_1_1
Grid Ref: 346934, 390043

Map Name: National Grid

Map date: **1973**

Scale: 1:1,250

Printed at: 1:2,000

N
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Surveyed 1972
Revised 1972
Edition N/A
Copyright 1973
Levelled 1963

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Groundsure INSIGHTS

Site Details:

Whiston, Prescot, L35 3PW

Client Ref: C5980-6002-SD
Report Ref: GS-QLM-MGF-L3A-EIX_1250_1_1
Grid Ref: 346934, 390043

Map Name: National Grid
Map date: **1984**
Scale: 1:1,250
Printed at: 1:2,000

N
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Surveyed 1963
Revised 1984
Edition N/A
Copyright 1984
Levelled 1963

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Site Details:

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Client Ref: C5980-6002-SD
Report Ref: GS-QLM-MGF-L3A-EIX_1250_1_1
Grid Ref: 346934, 390043

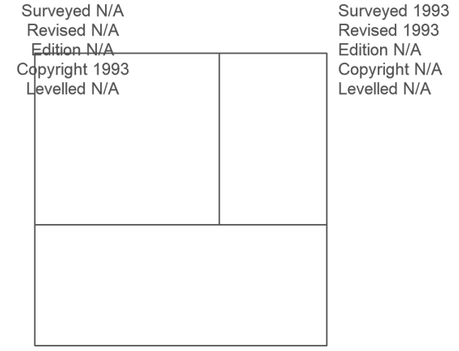
Map Name: National Grid

Map date: **1993**

Scale: 1:1,250

Printed at: 1:2,000

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Site Details:

Whiston, Prescot, L35 3PW

Client Ref: C5980-6002-SD
Report Ref: GS-QLM-MGF-L3A-EIX_1250_1_2
Grid Ref: 346934, 390543

Map Name: National Grid

Map date: **1973-1974**

Scale: 1:1,250

Printed at: 1:2,000

N
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Surveyed 1972
Revised 1972
Edition N/A
Copyright 1973
Levelled 1963

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

Surveyed 1972
Revised 1972
Edition N/A
Copyright 1973
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Site Details:

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Client Ref: C5980-6002-SD
Report Ref: GS-QLM-MGF-L3A-EIX_1250_1_2
Grid Ref: 346934, 390543

Map Name: National Grid

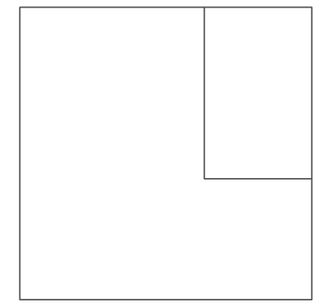
Map date: **1974**

Scale: 1:1,250

Printed at: 1:2,000

N
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Surveyed 1973
Revised 1973
Edition N/A
Copyright 1974
Levelled 1963



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Site Details:

Whiston, Prescot, L35 3PW

Client Ref: C5980-6002-SD
Report Ref: GS-QLM-MGF-L3A-EIX_1250_1_2
Grid Ref: 346934, 390543

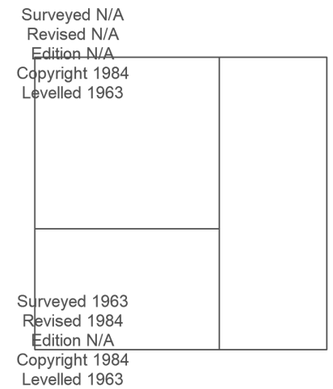
Map Name: National Grid

Map date: **1984**

Scale: 1:1,250

Printed at: 1:2,000

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Site Details:

Whiston, Prescot, L35 3PW

Client Ref: C5980-6002-SD
Report Ref: GS-QLM-MGF-L3A-EIX_1250_1_2
Grid Ref: 346934, 390543

Map Name: National Grid

Map date: **1993**

Scale: 1:1,250

Printed at: 1:2,000

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Surveyed N/A
Revised N/A
Edition N/A
Copyright 1993
Levelled N/A

Surveyed N/A
Revised N/A
Edition N/A
Copyright 1993
Levelled N/A

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Revised N/A
Edition N/A
Copyright 1993
Levelled N/A

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Site Details:

Whiston, Prescot, L35 3PW

Client Ref: C5980-6002-SD
Report Ref: GS-QLM-MGF-L3A-EIX_1250_1_2
Grid Ref: 346934, 390543

Map Name: National Grid

Map date: **1994-1995**

Scale: 1:1,250

Printed at: 1:2,000

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

Surveyed 1995
Revised 1995
Edition N/A
Copyright 1995
Levelled N/A

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Site Details:

Whiston, Prescot, L35 3PW

Client Ref: C5980-6002-SD
Report Ref: GS-QLM-MGF-L3A-EIX_1250_1_2
Grid Ref: 346934, 390543

Map Name: National Grid

Map date: **1994-1995**

Scale: 1:1,250

Printed at: 1:2,000

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

Surveyed N/A
Revised N/A
Edition N/A
Copyright 1995
Levelled N/A

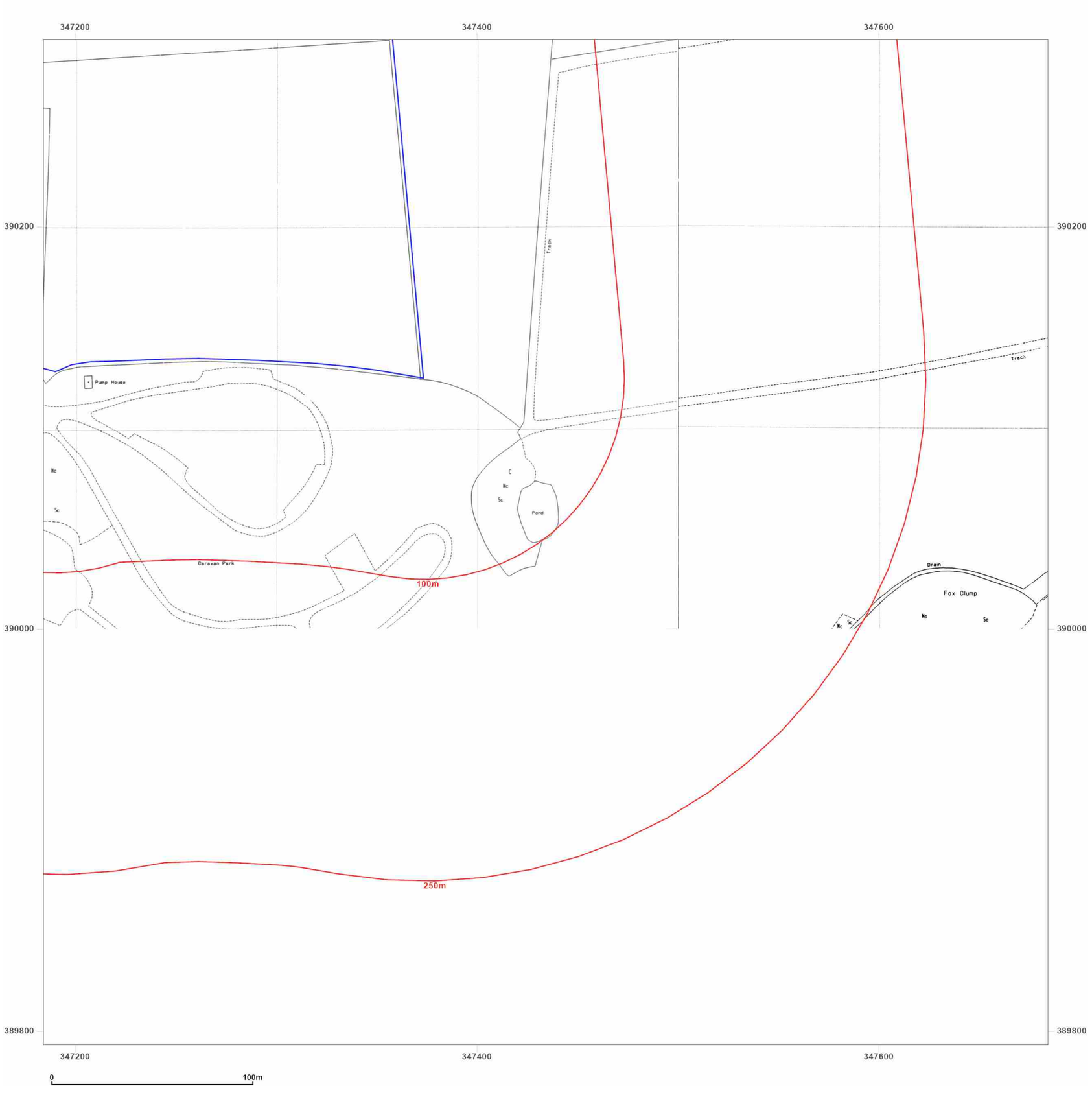
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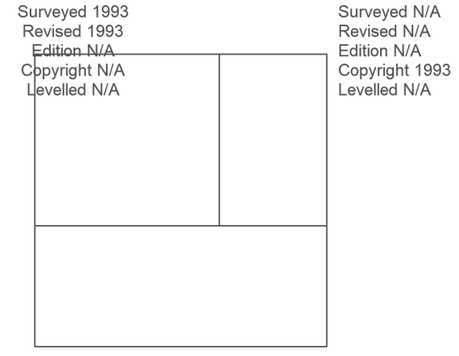
Site Details:

Whiston, Prescot, L35 3PW

Client Ref: C5980-6002-SD
Report Ref: GS-QLM-MGF-L3A-EIX_1250_2_1
Grid Ref: 347434, 390043

Map Name: National Grid
Map date: **1993**
Scale: 1:1,250
Printed at: 1:2,000

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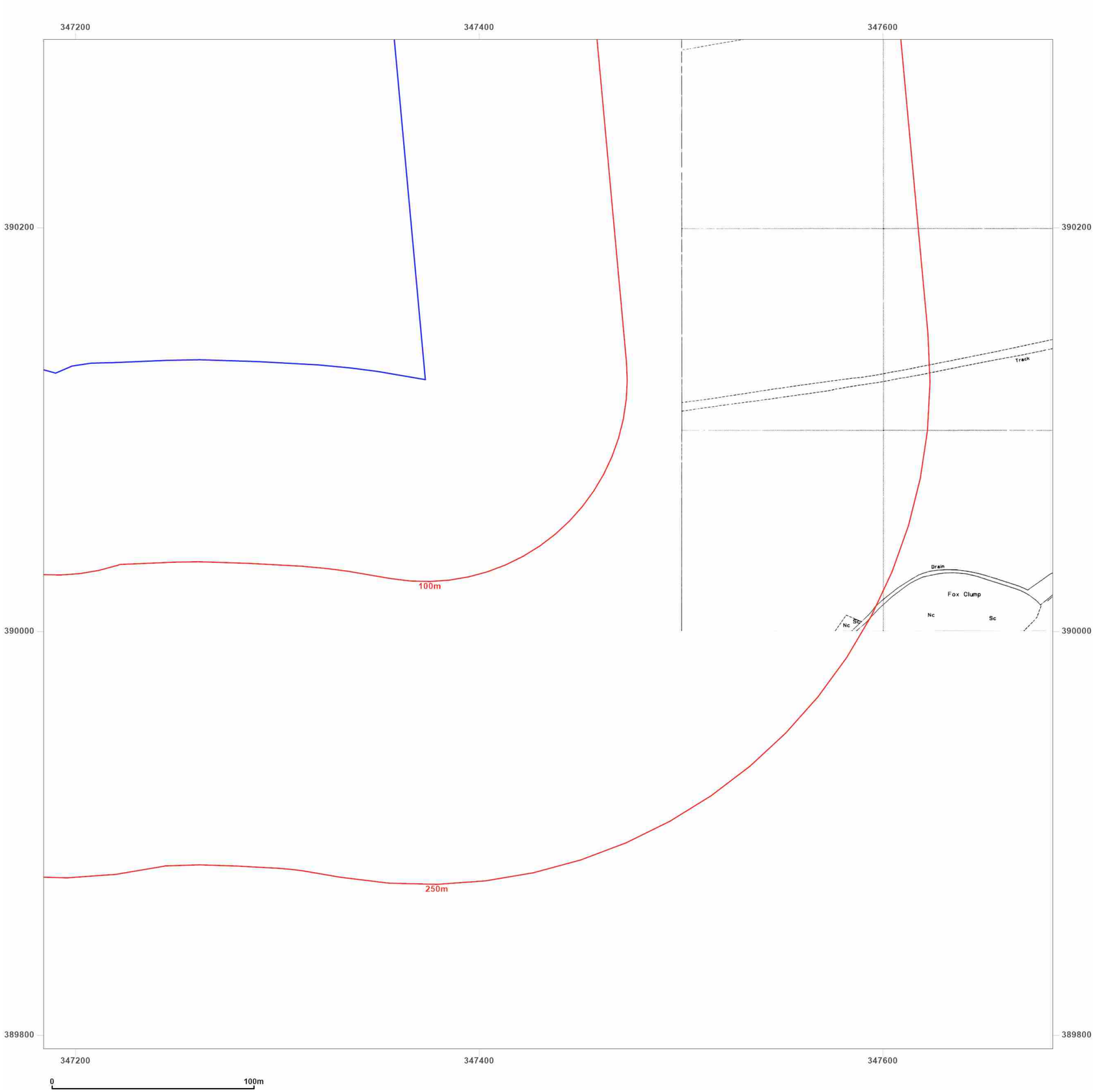
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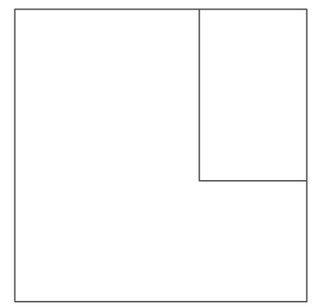
Site Details:

Whiston, Prescot, L35 3PW

Client Ref: C5980-6002-SD
Report Ref: GS-QLM-MGF-L3A-EIX_1250_2_1
Grid Ref: 347434, 390043

Map Name: National Grid
Map date: **1994**
Scale: 1:1,250
Printed at: 1:2,000

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

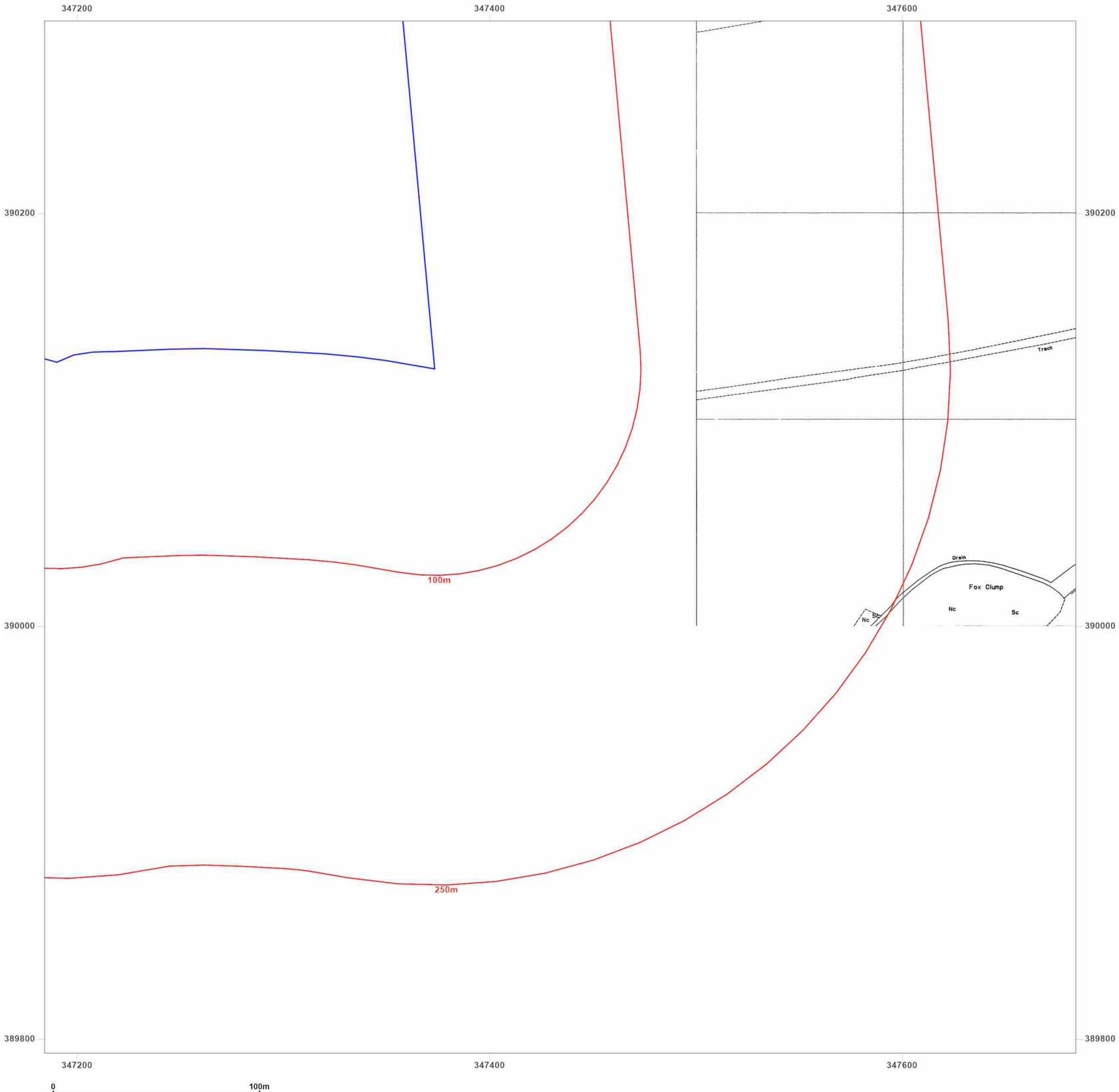
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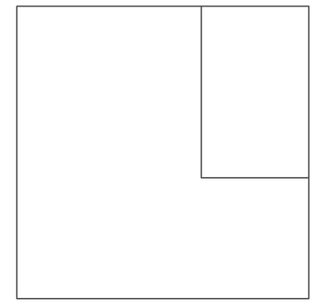
Site Details:

Whiston, Prescot, L35 3PW

Client Ref: C5980-6002-SD
Report Ref: GS-QLM-MGF-L3A-EIX_1250_2_1
Grid Ref: 347434, 390043

Map Name: National Grid
Map date: **1994**
Scale: 1:1,250
Printed at: 1:2,000

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

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Groundsure INSIGHTS

Site Details:

Whiston, Prescot, L35 3PW

Client Ref: C5980-6002-SD
Report Ref: GS-QLM-MGF-L3A-EIX_1250_2_2
Grid Ref: 347434, 390543

Map Name: National Grid

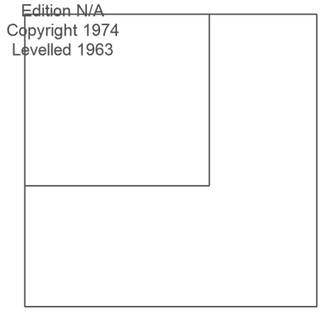
Map date: **1974**

Scale: 1:1,250

Printed at: 1:2,000

N
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Surveyed 1973
Revised 1973
Edition N/A
Copyright 1974
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Groundsure INSIGHTS

Site Details:

Whiston, Prescot, L35 3PW

Client Ref: C5980-6002-SD
Report Ref: GS-QLM-MGF-L3A-EIX_1250_2_2
Grid Ref: 347434, 390543

Map Name: National Grid

Map date: **1974-1976**

Scale: 1:1,250

Printed at: 1:2,000

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Surveyed N/A	Surveyed 1975
Revised N/A	Revised 1975
Edition N/A	Edition N/A
Copyright N/A	Copyright 1976
Levelled N/A	Levelled 1963

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Groundsure INSIGHTS

Site Details:

Whiston, Prescot, L35 3PW

Client Ref: C5980-6002-SD
Report Ref: GS-QLM-MGF-L3A-EIX_1250_2_2
Grid Ref: 347434, 390543

Map Name: National Grid

Map date: **1993**

Scale: 1:1,250

Printed at: 1:2,000

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Surveyed N/A Revised N/A Edition N/A Copyright 1993 Levelled N/A	Surveyed N/A Revised N/A Edition N/A Copyright 1993 Levelled N/A
Surveyed 1993 Revised 1993 Edition N/A Copyright N/A Levelled N/A	Surveyed N/A Revised N/A Edition N/A Copyright 1993 Levelled N/A

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Groundsure INSIGHTS

Site Details:

Whiston, Prescot, L35 3PW

Client Ref: C5980-6002-SD
Report Ref: GS-QLM-MGF-L3A-EIX_1250_2_2
Grid Ref: 347434, 390543

Map Name: National Grid

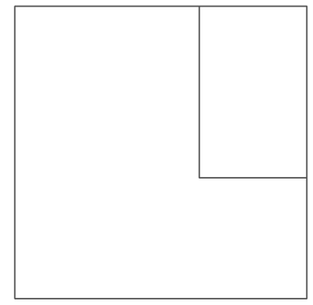
Map date: **1994**

Scale: 1:1,250

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



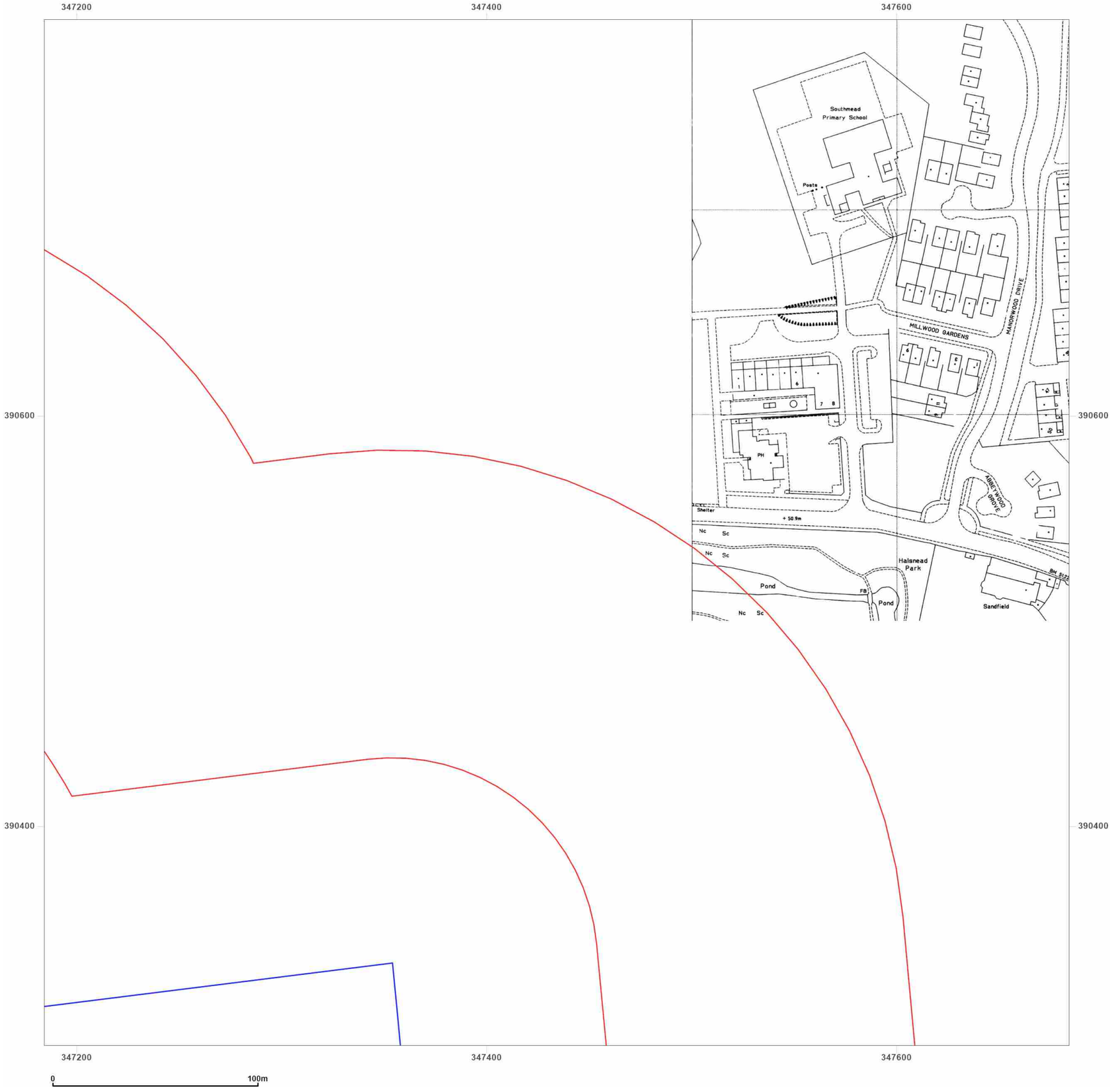
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Site Details:

Whiston, Prescot, L35 3PW

Client Ref: C5980-6002-SD
Report Ref: GS-QLM-MGF-L3A-EIX_1250_2_2
Grid Ref: 347434, 390543

Map Name: National Grid

Map date: **1994**

Scale: 1:1,250

Printed at: 1:2,000

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

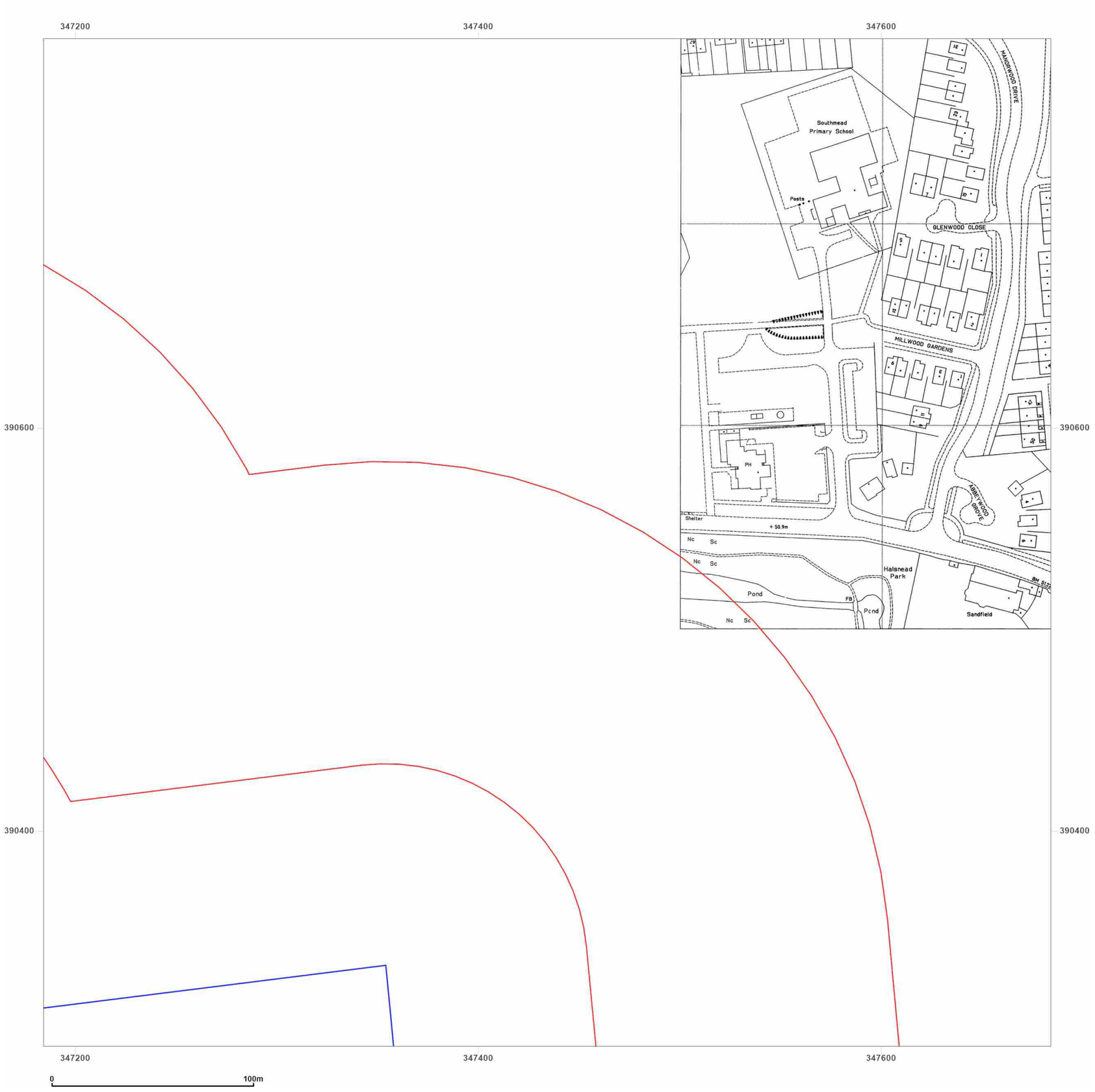
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Site Details:

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Client Ref: C5980-6002-SD
Report Ref: GS-QLM-MGF-L3A-EIX_1250_2_2
Grid Ref: 347434, 390543

Map Name: National Grid

Map date: **1995**

Scale: 1:1,250

Printed at: 1:2,000

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

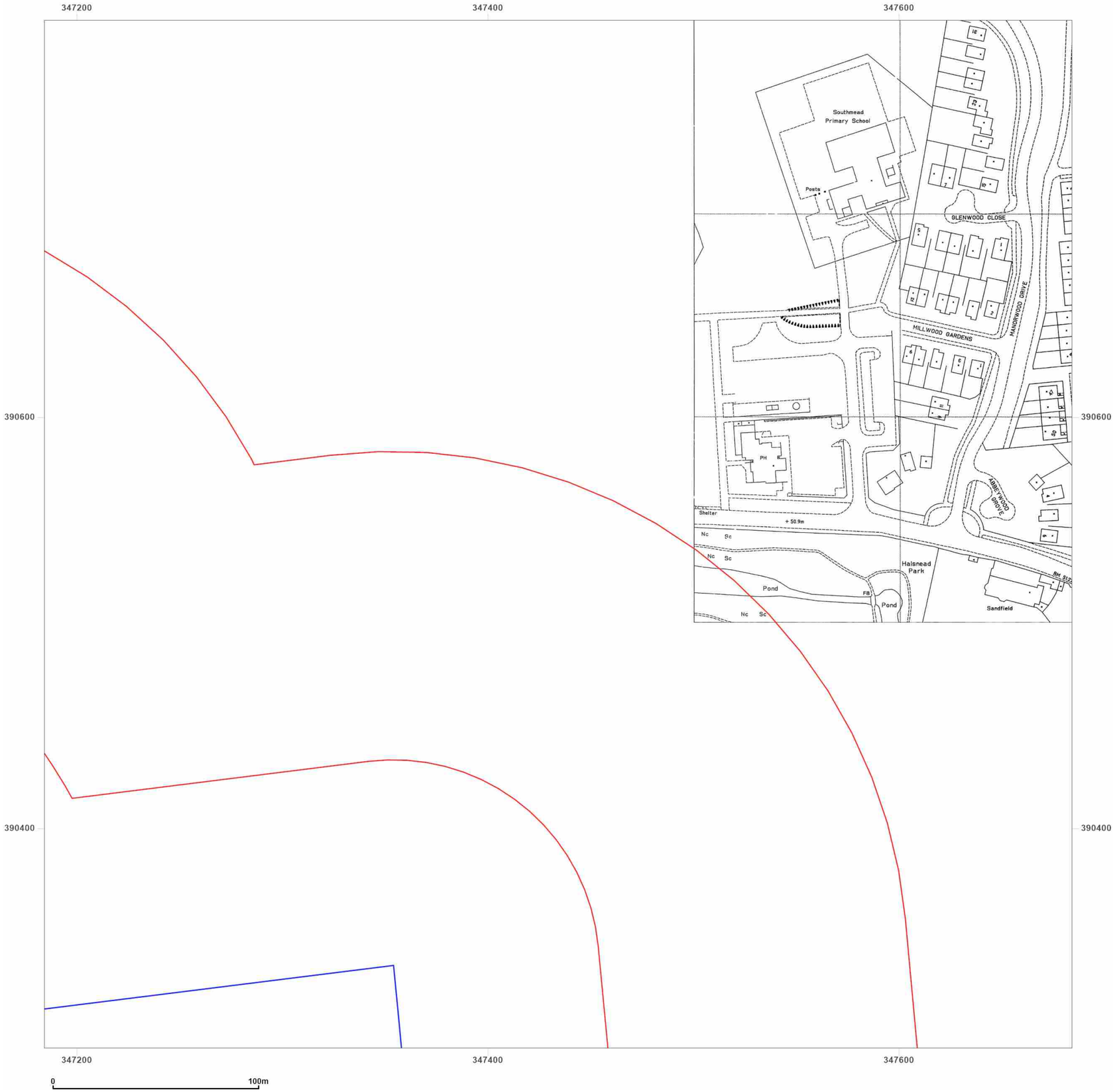
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Site Details:

Whiston, Prescot, L35 3PW

Client Ref: C5980-6002-SD
Report Ref: GS-QLM-MGF-L3A-EIX_1250_2_2
Grid Ref: 347434, 390543

Map Name: National Grid

Map date: **1995**

Scale: 1:1,250

Printed at: 1:2,000

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Surveyed 1995
Revised 1995
Edition N/A
Copyright 1995
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Site Details:

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Client Ref: C5980-6002-SD
Report Ref: GS-QLM-MGF-L3A-EIX_1250_2_2
Grid Ref: 347434, 390543

Map Name: National Grid
Map date: **1994-1995**
Scale: 1:1,250
Printed at: 1:2,000

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Revised 1995
Edition N/A
Copyright 1995
Levelled N/A

Surveyed 1994
Revised 1994
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Copyright 1994
Levelled N/A

Surveyed N/A
Revised N/A
Edition N/A
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Site Details:

Whiston, Prescot, L35 3PW

Client Ref: C5980-6002-SD
Report Ref: GS-QLM-MGF-L3A-EIX_1250_2_2
Grid Ref: 347434, 390543

Map Name: National Grid

Map date: **1994-1995**

Scale: 1:1,250

Printed at: 1:2,000

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Revised N/A
Edition N/A
Copyright 1995
Levelled N/A

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

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

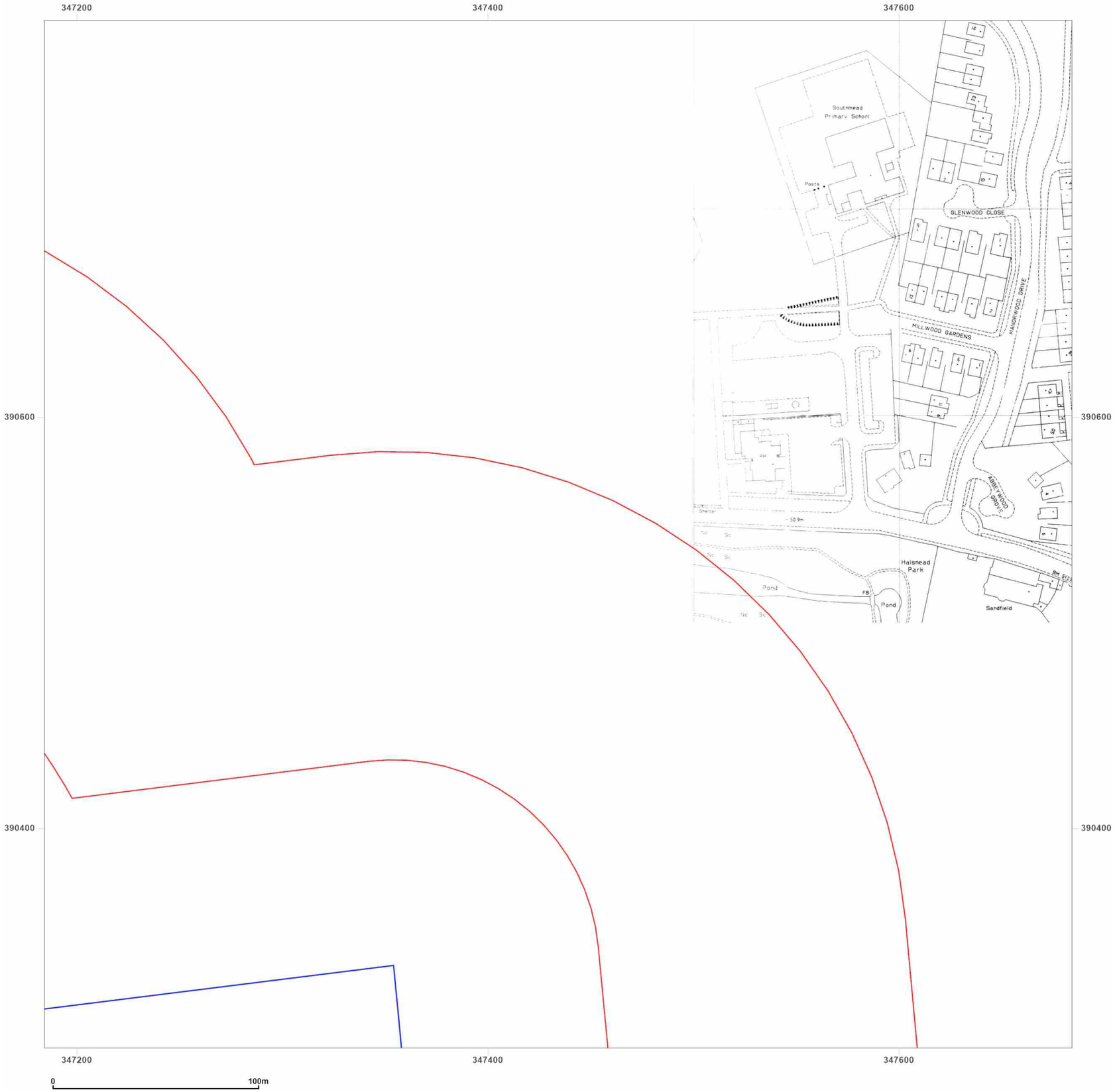
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Site Details:

Whiston, Prescot, L35 3PW

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Report Ref: GS-QLM-MGF-L3A-EIX_1250_2_2
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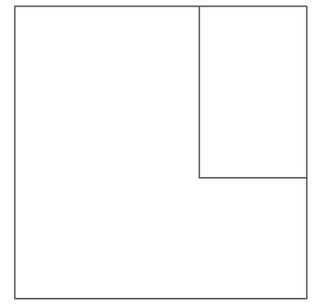
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Surveyed N/A
Revised N/A
Edition N/A
Copyright 1995
Levelled N/A



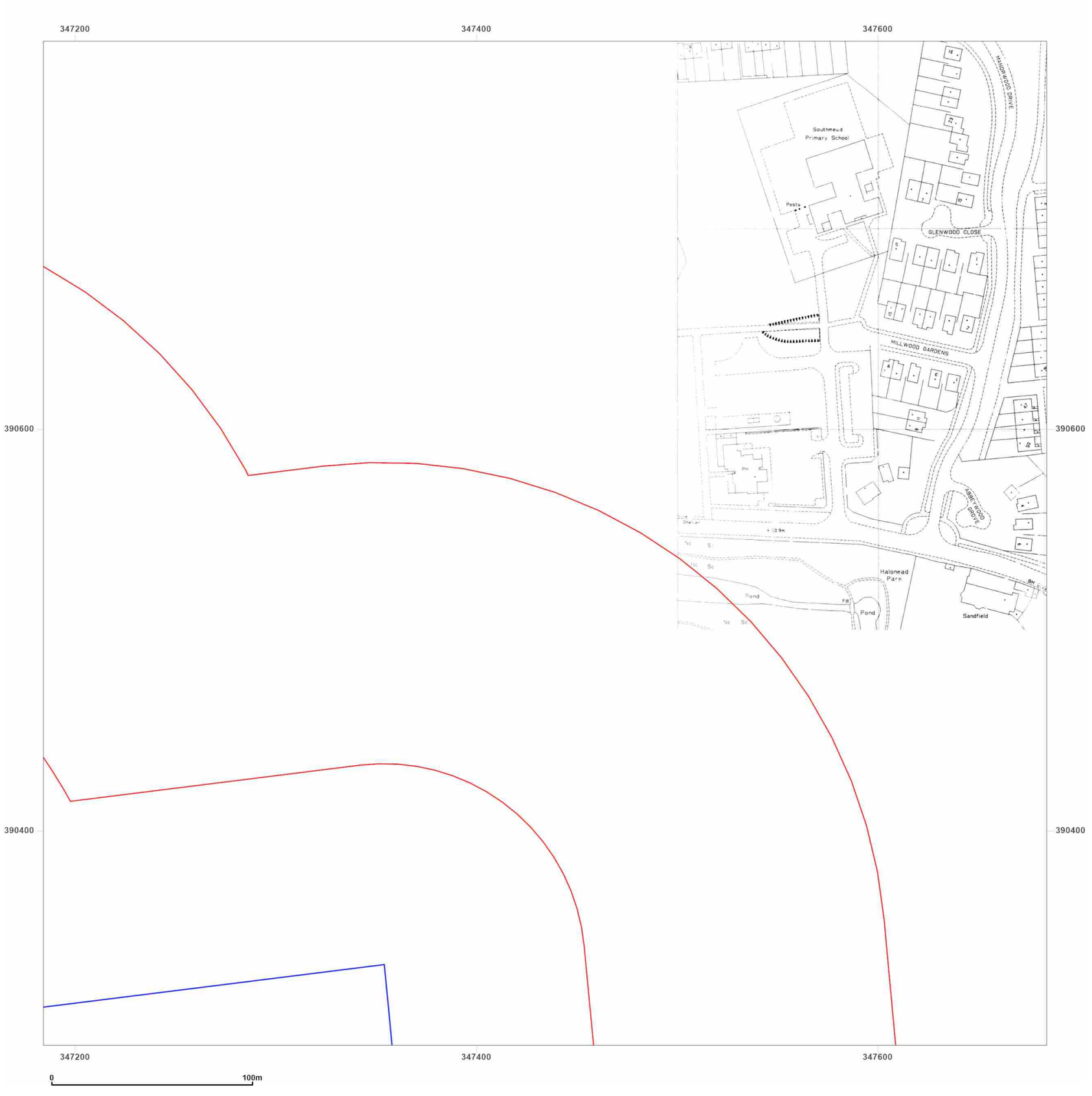
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Site Details:

Whiston, Prescot, L35 3PW

Client Ref: C5980-6002-SD
Report Ref: GS-QLM-MGF-L3A-EIX_1250_2_2
Grid Ref: 347434, 390543

Map Name: National Grid

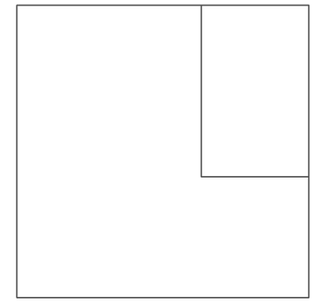
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Revised N/A
Edition N/A
Copyright 1995
Levelled N/A



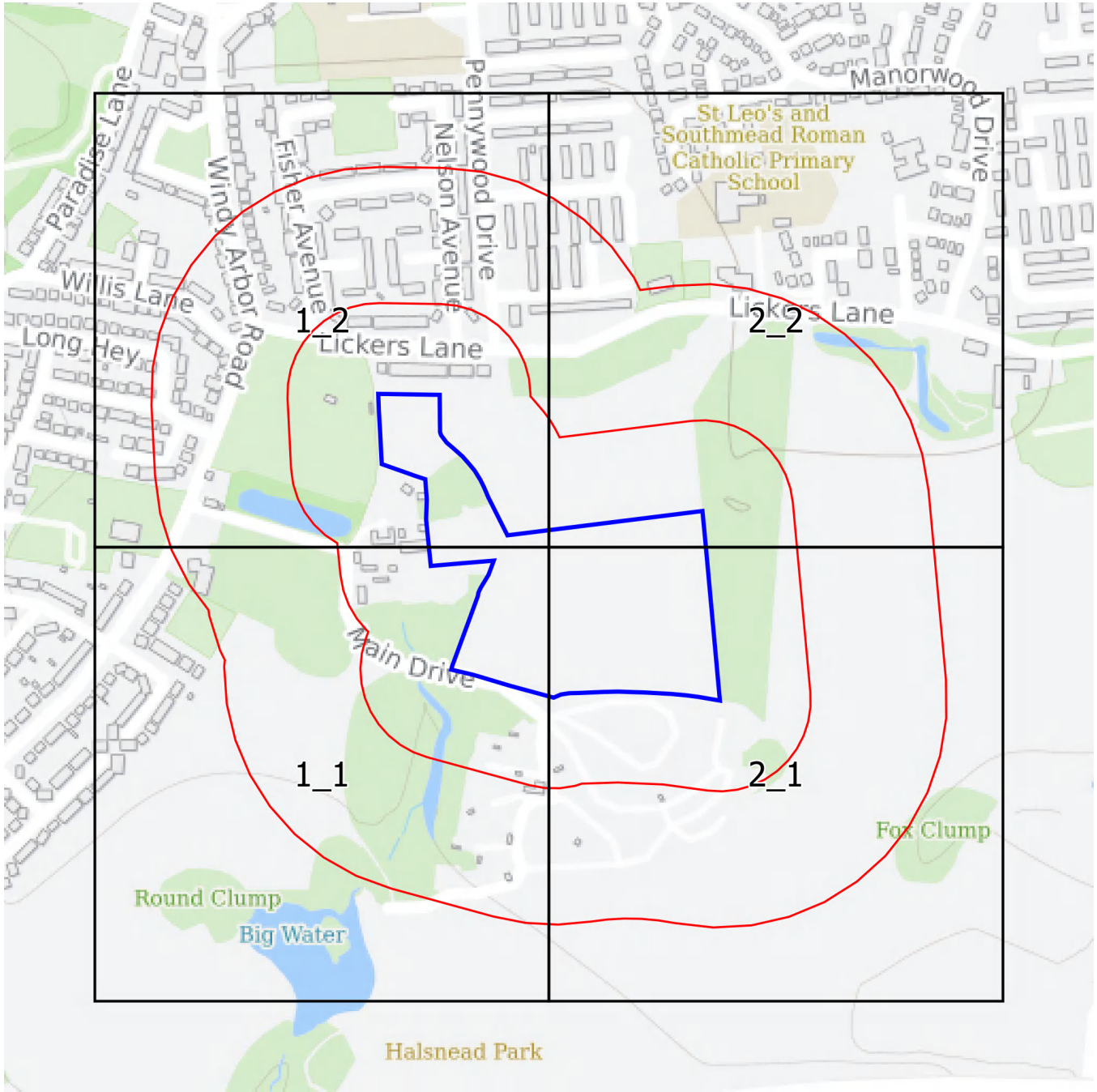
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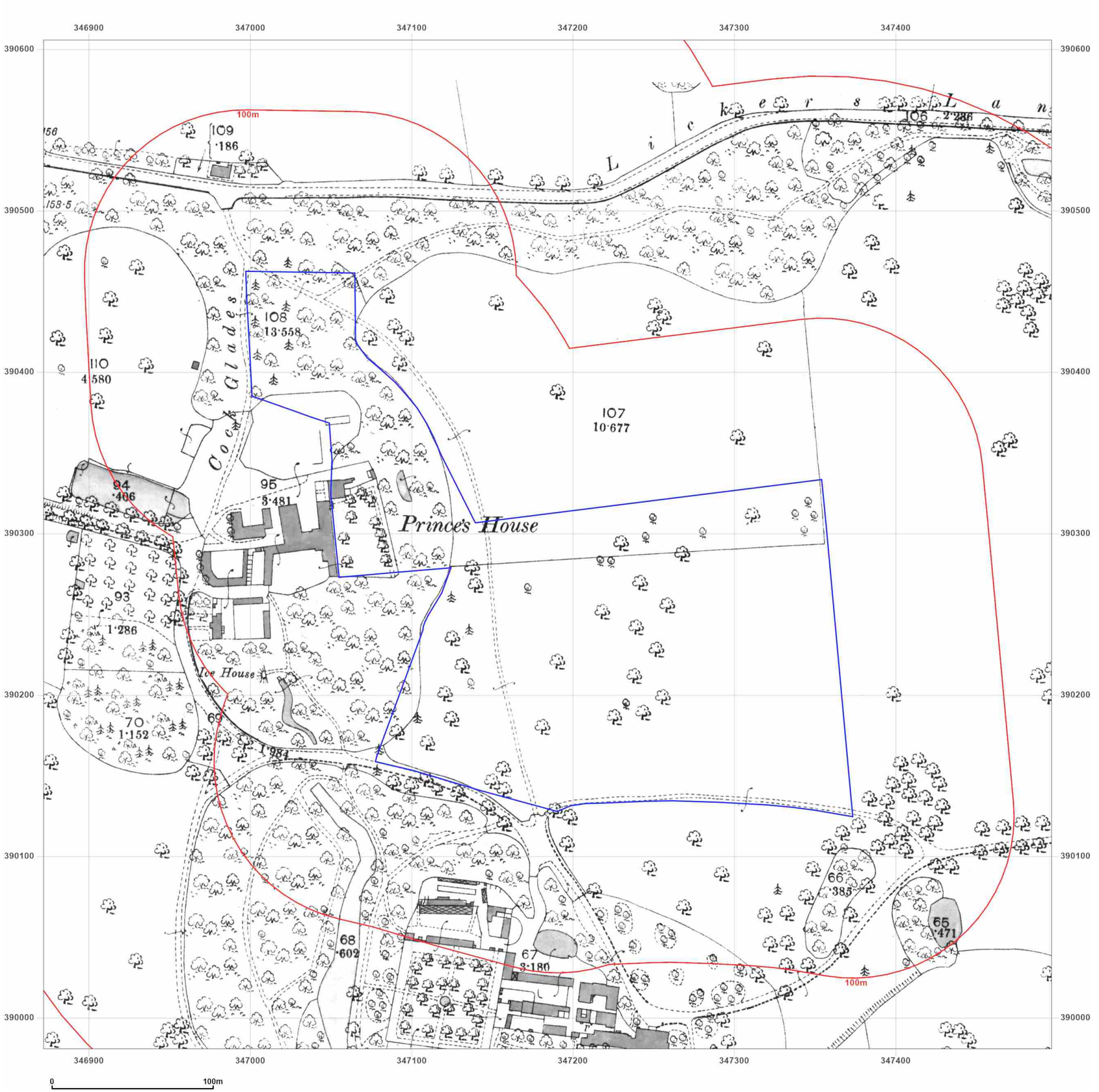
Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Groundsure INSIGHTS

1:1,250 Scale Grid Index

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Groundsure INSIGHTS

Site Details:

Whiston, Prescot, L35 3PW

Client Ref: C5980-6002-SD
Report Ref: GS-QLM-MGF-L3A-EIX_2500
Grid Ref: 347184, 390293

Map Name: County Series

Map date: **1892**

Scale: 1:2,500

Printed at: 1:2,500

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Surveyed 1892
Revised 1892
Edition N/A
Copyright N/A
Levelled N/A

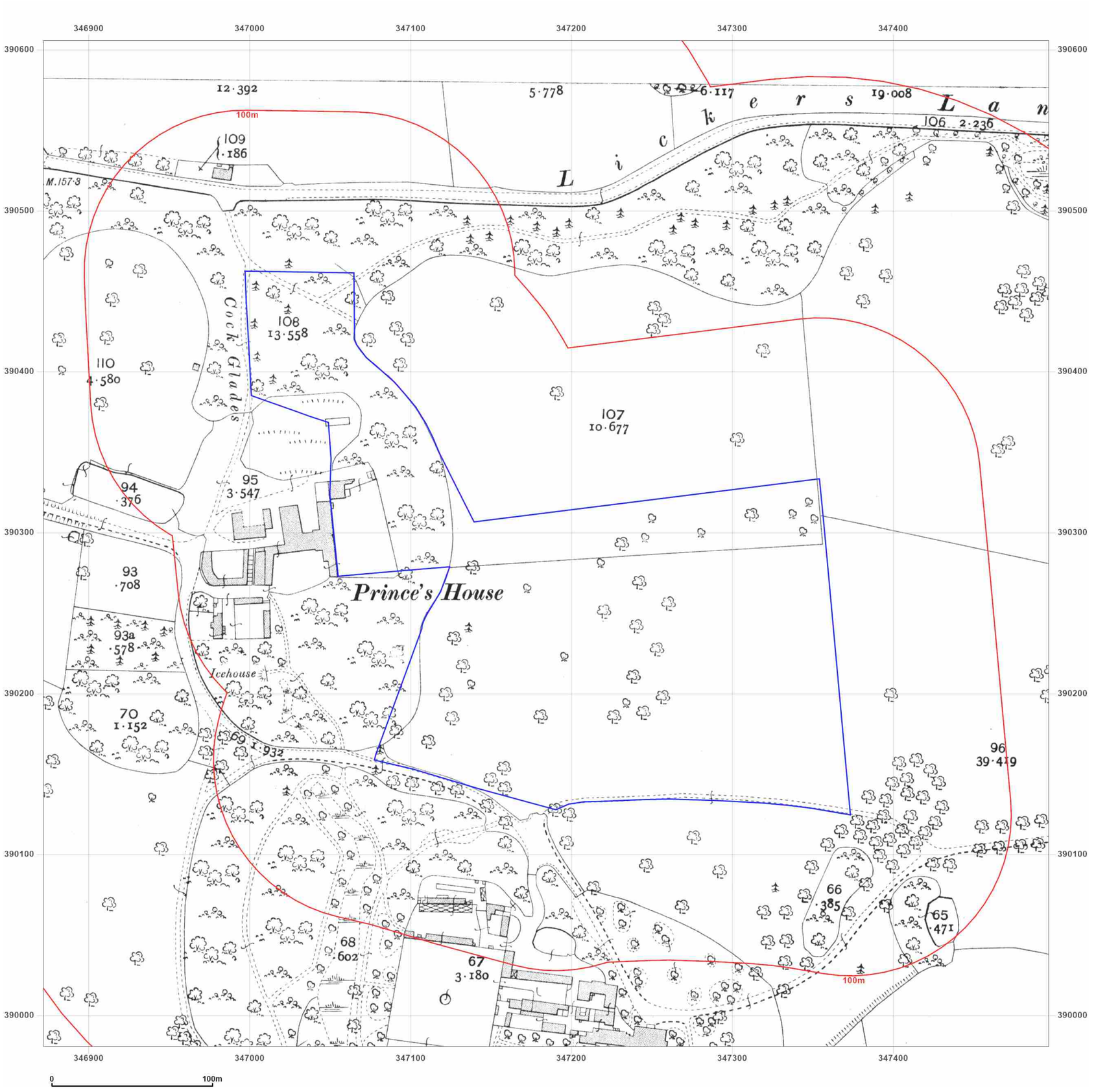
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Site Details:

Whiston, Prescot, L35 3PW

Client Ref: C5980-6002-SD
Report Ref: GS-QLM-MGF-L3A-EIX_2500
Grid Ref: 347184, 390293

Map Name: County Series

Map date: **1907**

Scale: 1:2,500

Printed at: 1:2,500

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Surveyed 1907
Revised 1907
Edition N/A
Copyright N/A
Levelled N/A

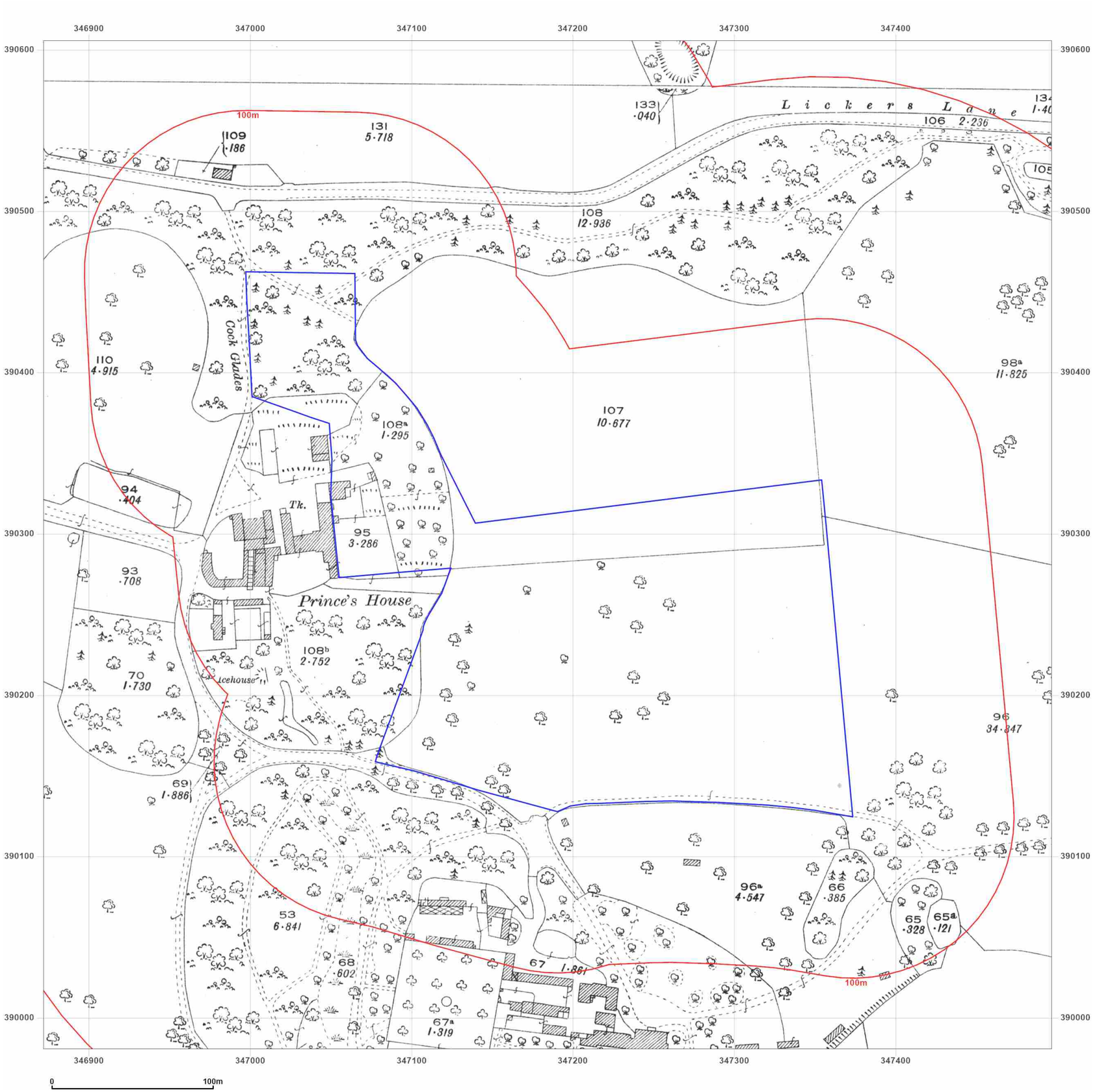
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Client Ref: C5980-6002-SD
Report Ref: GS-QLM-MGF-L3A-EIX_2500
Grid Ref: 347184, 390293

Map Name: County Series

Map date: **1927**

Scale: 1:2,500

Printed at: 1:2,500

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Surveyed 1927
Revised 1927
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1927
Revised 1927
Edition N/A
Copyright N/A
Levelled N/A

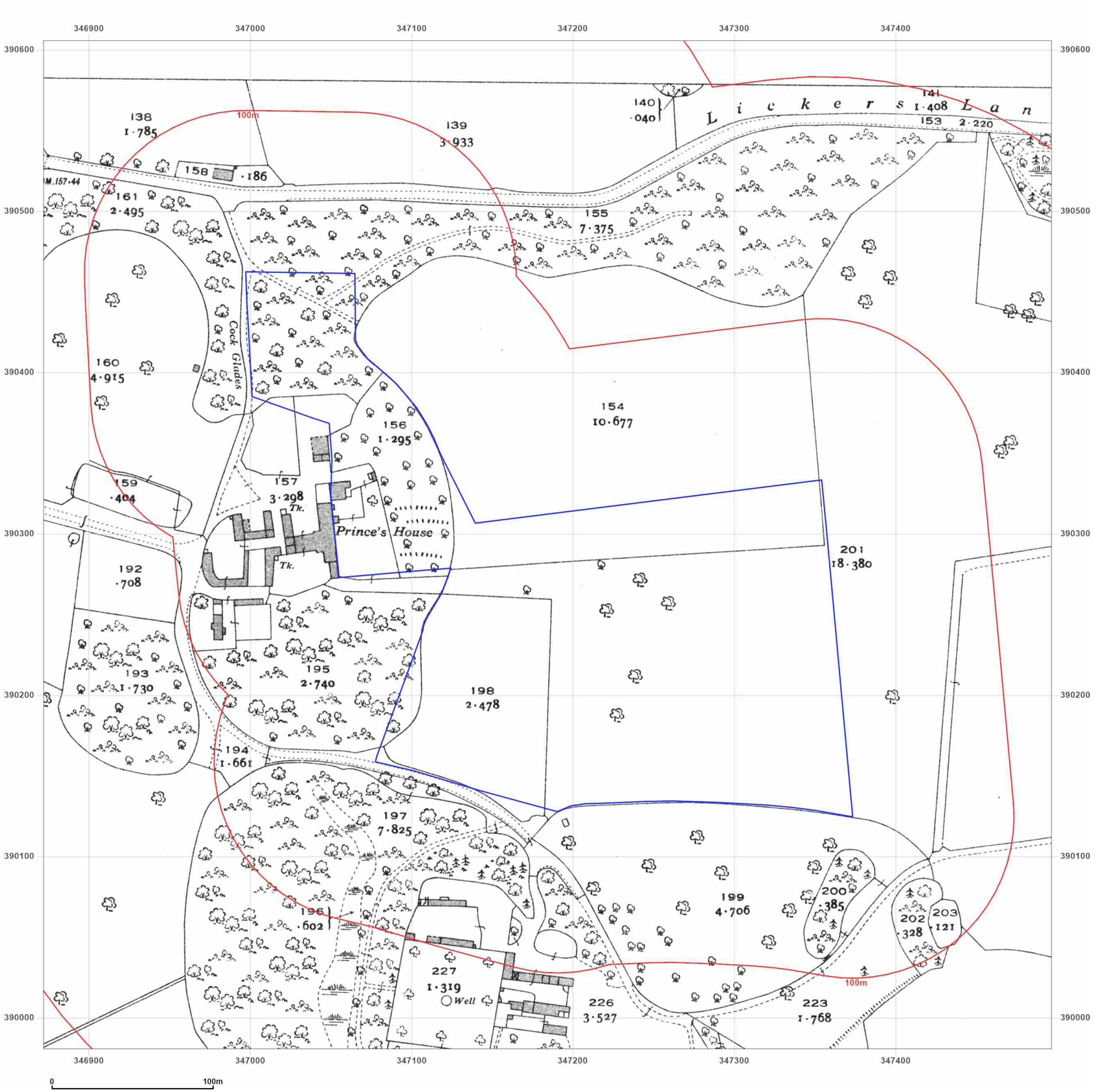
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Site Details:

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Client Ref: C5980-6002-SD
Report Ref: GS-QLM-MGF-L3A-EIX_2500
Grid Ref: 347184, 390293

Map Name: County Series

Map date: **1937**

Scale: 1:2,500

Printed at: 1:2,500

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Revised 1937
Edition N/A
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Site Details:

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Client Ref: C5980-6002-SD
Report Ref: GS-QLM-MGF-L3A-EIX_2500
Grid Ref: 347184, 390293

Map Name: National Grid
Map date: **1959**
Scale: 1:2,500
Printed at: 1:2,500

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Surveyed 1958 Revised 1958 Edition N/A Copyright 1959 Levelled 1926	Surveyed 1958 Revised 1958 Edition N/A Copyright 1959 Levelled 1926
Surveyed 1958 Revised 1958 Edition N/A Copyright 1959 Levelled 1926	Surveyed 1958 Revised 1958 Edition N/A Copyright 1959 Levelled 1957

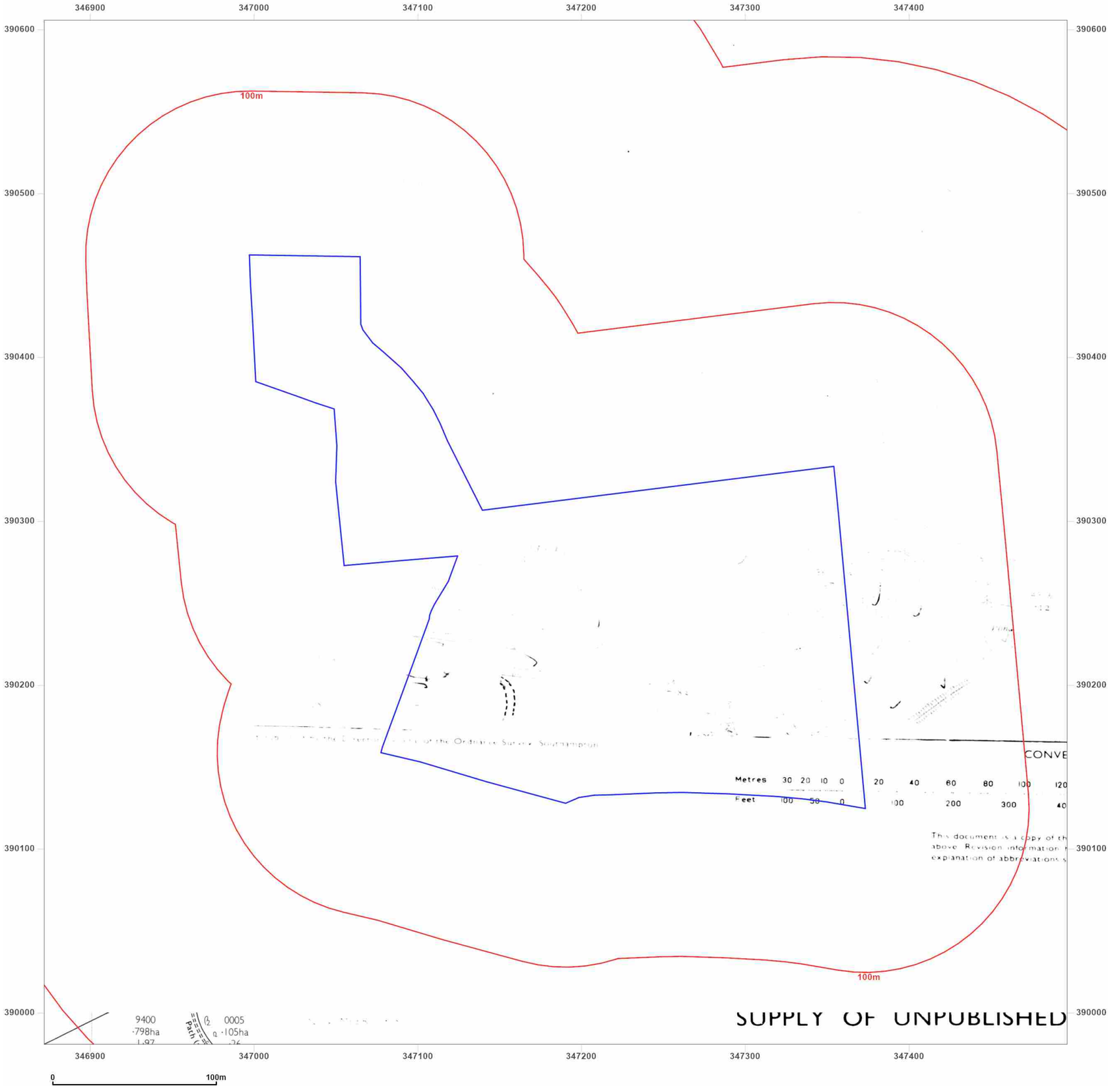
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Production date: 09 January 2025

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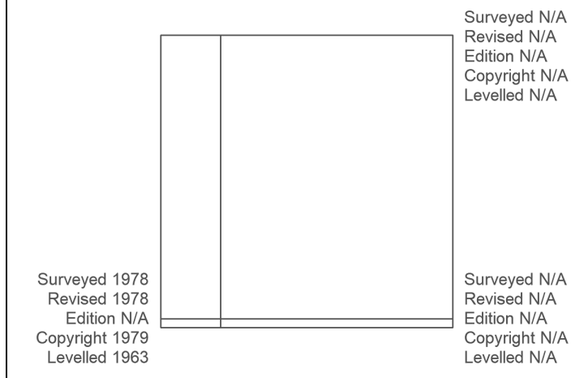
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Client Ref: C5980-6002-SD
Report Ref: GS-QLM-MGF-L3A-EIX_2500
Grid Ref: 347184, 390293

Map Name: National Grid
Map date: **1975-1979**
Scale: 1:2,500
Printed at: 1:2,500

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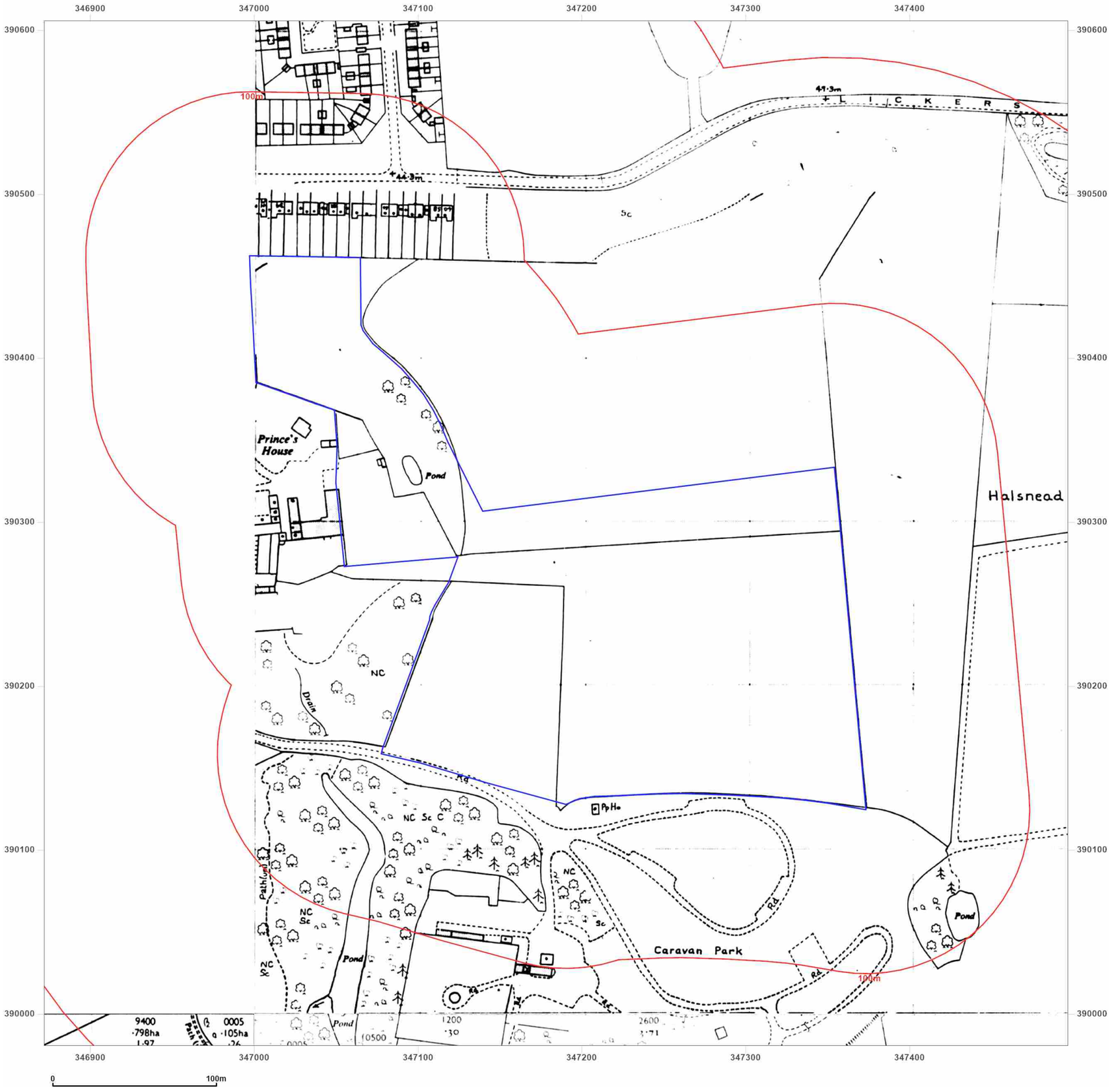
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Site Details:

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Client Ref: C5980-6002-SD
Report Ref: GS-QLM-MGF-L3A-EIX_2500
Grid Ref: 347184, 390293

Map Name: National Grid

Map date: **1980-1985**

Scale: 1:2,500

Printed at: 1:2,500

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Revised 1985
Edition N/A
Copyright 1985
Levelled 1963

Surveyed 1963
Revised 1984
Edition N/A
Copyright 1984
Levelled 1963

Surveyed N/A
Revised N/A
Edition N/A
Copyright 1980
Levelled 1963

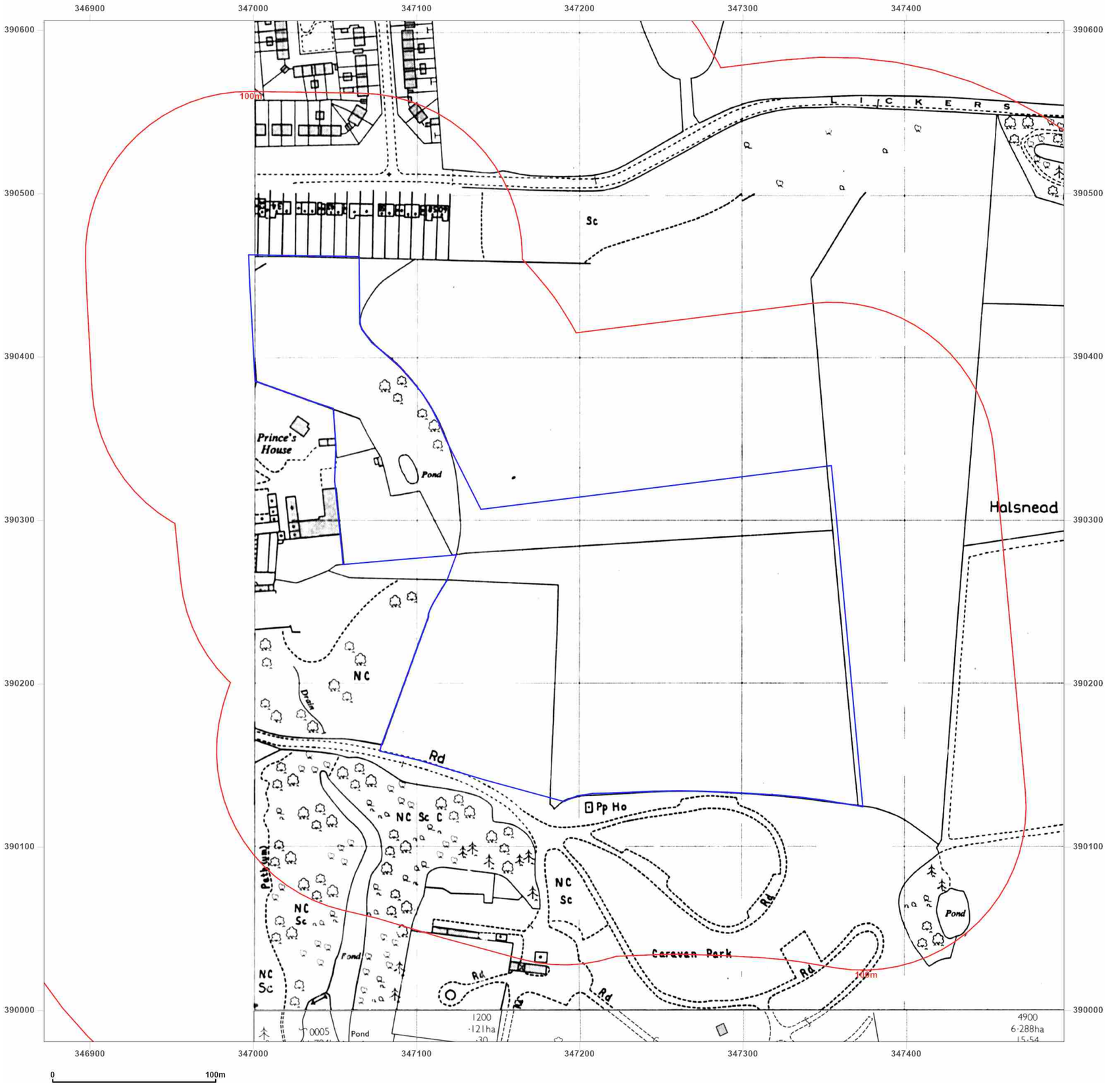
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Site Details:

Whiston, Prescot, L35 3PW

Client Ref: C5980-6002-SD
Report Ref: GS-QLM-MGF-L3A-EIX_2500
Grid Ref: 347184, 390293

Map Name: National Grid

Map date: **1981-1986**

Scale: 1:2,500

Printed at: 1:2,500

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Edition N/A
Copyright 1986
Levelled 1963

Surveyed 1980
Revised 1980
Edition N/A
Copyright 1981
Levelled 1963

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Site Details:

Whiston, Prescot, L35 3PW

Client Ref: C5980-6002-SD
Report Ref: GS-QLM-MGF-L3A-EIX_Landline_1_1
Grid Ref: 347035, 390143

Map Name: LandLine
Map date: **2003**
Scale: 1:1,250
Printed at: 1:1,250

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2003

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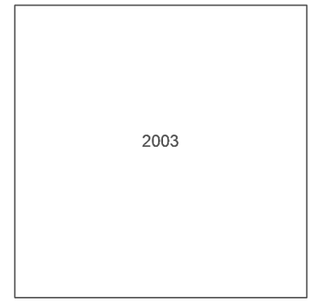
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Whiston, Prescot, L35 3PW

Client Ref: C5980-6002-SD
Report Ref: GS-QLM-MGF-L3A-EIX_Landline_1_2
Grid Ref: 347035, 390443

Map Name: LandLine
Map date: **2003**
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Printed at: 1:1,250

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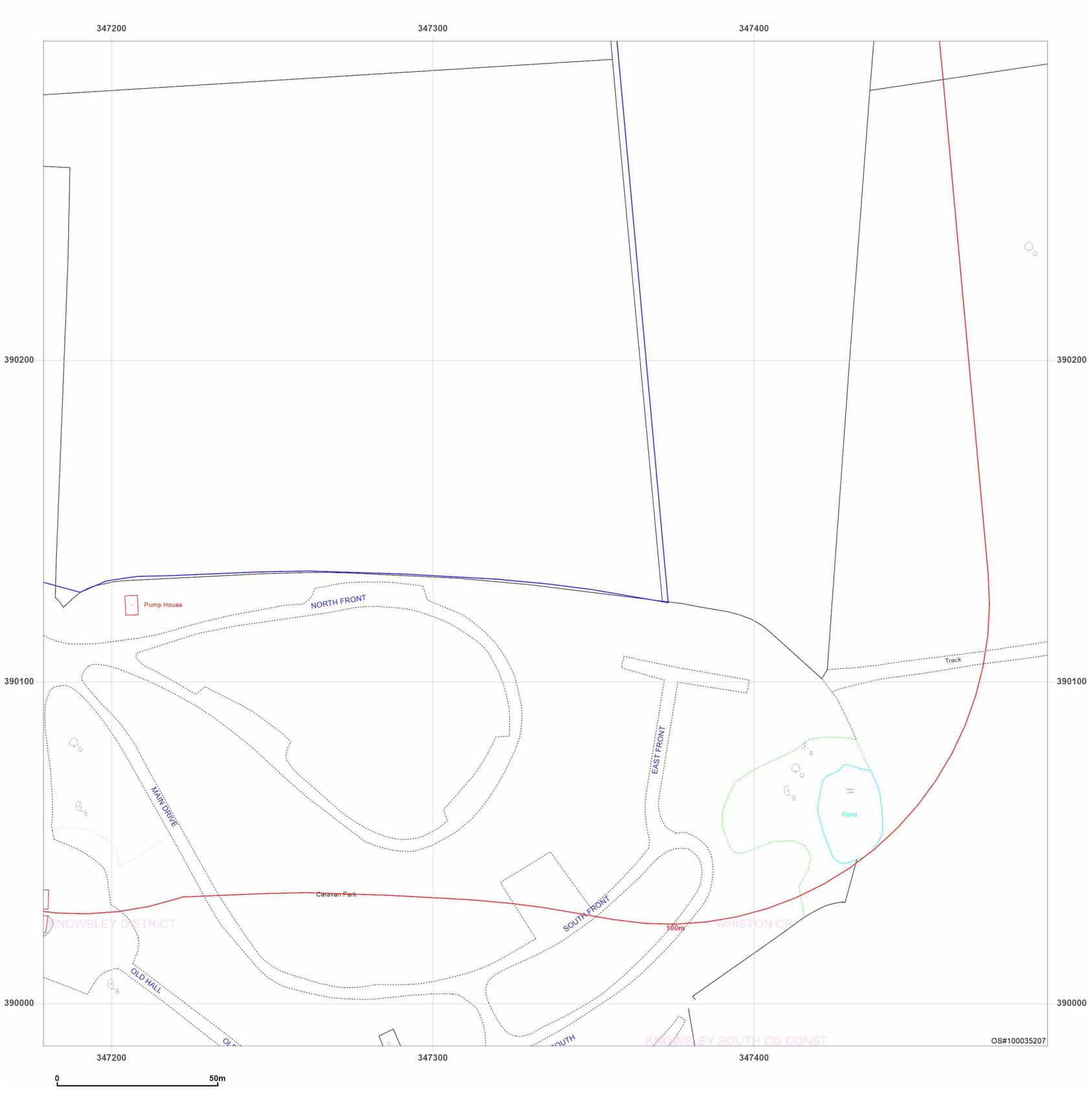
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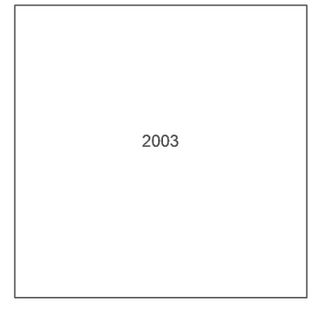
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Whiston, Prescot, L35 3PW

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Report Ref: GS-QLM-MGF-L3A-EIX_Landline_2_1
Grid Ref: 347335, 390143

Map Name: LandLine
Map date: **2003**
Scale: 1:1,250
Printed at: 1:1,250

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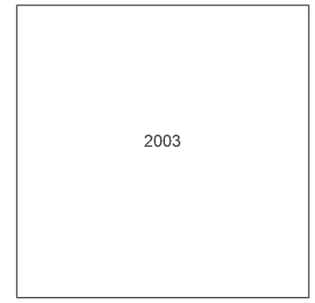
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Report Ref: GS-QLM-MGF-L3A-EIX_Landline_2_2
Grid Ref: 347335, 390443

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Printed at: 1:1,250

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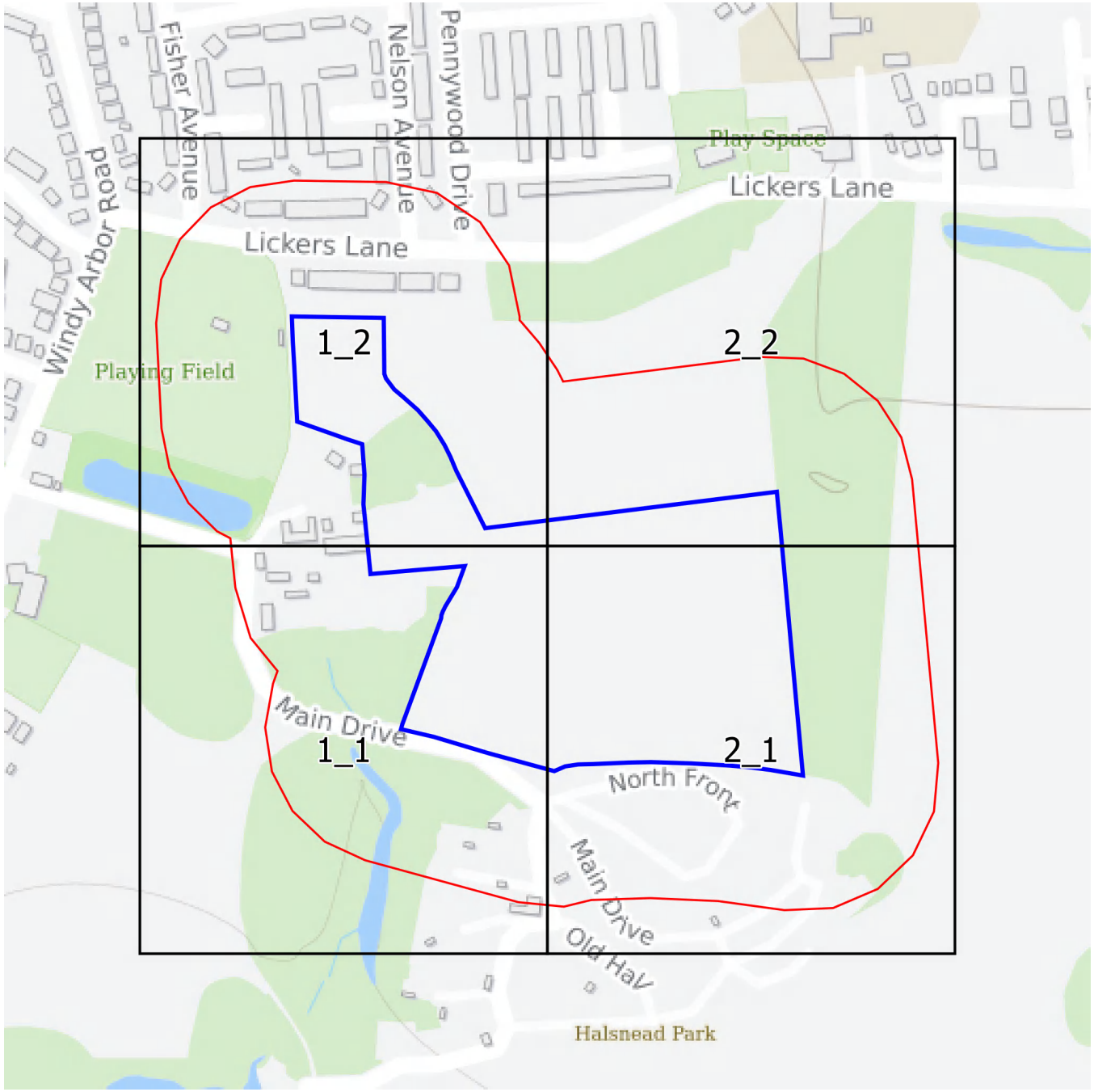
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Groundsure INSIGHTS

Landline Scale Grid Index



APPENDIX C

Geo-Environmental Data Report

Groundsure
LOCATION INTELLIGENCE

Enviro+Geo Insight

Whiston, Prescot, L35 3PW

Order Details

Date: 09/01/2025

Your ref: C5980-6002-SD

Our Ref: GS-6ZX-TZB-AY5-WGC

Site Details

Location: 347199 390255

Area: 6.15 ha

Authority: Knowsley Metropolitan Borough Council ↗



Summary of findings p. 2 >

Aerial image p. 9 >

OS MasterMap site plan p.14 >

Insight User Guide ↗

Contact us with any questions at:
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Certified B Corporation

Summary of findings

Page	Section	Past land use >	On site	0-50m	50-250m	250-500m	500-2000m
15 >	1.1 >	Historical industrial land uses >	0	2	8	40	-
17 >	1.2 >	Historical tanks >	0	4	1	6	-
18 >	1.3 >	Historical energy features >	0	0	5	10	-
19	1.4	Historical petrol stations	0	0	0	0	-
19	1.5	Historical garages	0	0	0	0	-
20	1.6	Historical military land	0	0	0	0	-
Page	Section	Past land use - un-grouped >	On site	0-50m	50-250m	250-500m	500-2000m
21 >	2.1 >	Historical industrial land uses >	0	3	10	44	-
24 >	2.2 >	Historical tanks >	0	5	2	11	-
25 >	2.3 >	Historical energy features >	0	0	8	23	-
26	2.4	Historical petrol stations	0	0	0	0	-
26	2.5	Historical garages	0	0	0	0	-
Page	Section	Waste and landfill >	On site	0-50m	50-250m	250-500m	500-2000m
27	3.1	Active or recent landfill	0	0	0	0	-
27	3.2	Historical landfill (BGS records)	0	0	0	0	-
28 >	3.3 >	Historical landfill (LA/mapping records) >	0	0	0	2	-
28 >	3.4 >	Historical landfill (EA/NRW records) >	0	0	0	4	-
29	3.5	Historical waste sites	0	0	0	0	-
29	3.6	Licensed waste sites	0	0	0	0	-
29 >	3.7 >	Waste exemptions >	0	0	5	6	-
Page	Section	Current industrial land use >	On site	0-50m	50-250m	250-500m	500-2000m
31 >	4.1 >	Recent industrial land uses >	0	1	4	-	-
32	4.2	Current or recent petrol stations	0	0	0	0	-
32	4.3	Electricity cables	0	0	0	0	-
32	4.4	Gas pipelines	0	0	0	0	-
32	4.5	Sites determined as Contaminated Land	0	0	0	0	-

33	4.6	Control of Major Accident Hazards (COMAH)	0	0	0	0	-
33	4.7	Regulated explosive sites	0	0	0	0	-
33	4.8	Hazardous substance storage/usage	0	0	0	0	-
33	4.9	Historical licensed industrial activities (IPC)	0	0	0	0	-
33	4.10	Licensed industrial activities (Part A(1))	0	0	0	0	-
34	4.11	Licensed pollutant release (Part A(2)/B)	0	0	0	0	-
34	4.12	Radioactive Substance Authorisations	0	0	0	0	-
34	4.13	Licensed Discharges to controlled waters	0	0	0	0	-
34	4.14	Pollutant release to surface waters (Red List)	0	0	0	0	-
34	4.15	Pollutant release to public sewer	0	0	0	0	-
35	4.16	List 1 Dangerous Substances	0	0	0	0	-
35	4.17	List 2 Dangerous Substances	0	0	0	0	-
35 >	**4.18 >**	**Pollution Incidents (EA/NRW) >**	0	0	2	0	-
35	4.19	Pollution inventory substances	0	0	0	0	-
36	4.20	Pollution inventory waste transfers	0	0	0	0	-
36	4.21	Pollution inventory radioactive waste	0	0	0	0	-

Page	Section	**Hydrogeology >**	On site	0-50m	50-250m	250-500m	500-2000m
37 >	**5.1 >**	**Superficial aquifer >**	Identified (within 500m)				
39 >	**5.2 >**	**Bedrock aquifer >**	Identified (within 500m)				
41 >	**5.3 >**	**Groundwater vulnerability >**	Identified (within 50m)				
42	5.4	Groundwater vulnerability- soluble rock risk	None (within 0m)				
42	5.5	Groundwater vulnerability- local information	None (within 0m)				
43 >	**5.6 >**	**Groundwater abstractions >**	0	0	0	0	11
46 >	**5.7 >**	**Surface water abstractions >**	0	0	0	0	4
48 >	**5.8 >**	**Potable abstractions >**	0	0	0	0	5
49 >	**5.9 >**	**Source Protection Zones >**	0	0	1	0	-
49	5.10	Source Protection Zones (confined aquifer)	0	0	0	0	-

Page	Section	**Hydrology >**	On site	0-50m	50-250m	250-500m	500-2000m
50 >	**6.1 >**	**Water Network (OS MasterMap) >**	0	3	7	-	-

51 >	6.2 >	Surface water features >	0	2	4	-	-
52 >	6.3 >	WFD Surface water body catchments >	1	-	-	-	-
52 >	6.4 >	WFD Surface water bodies >	0	0	0	-	-
52 >	6.5 >	WFD Groundwater bodies >	1	-	-	-	-

Page	Section	River and coastal flooding	On site	0-50m	50-250m	250-500m	500-2000m
54	7.1	Risk of flooding from rivers and the sea	None (within 50m)				
54	7.2	Historical Flood Events	0	0	0	-	-
54	7.3	Flood Defences	0	0	0	-	-
55	7.4	Areas Benefiting from Flood Defences	0	0	0	-	-
55	7.5	Flood Storage Areas	0	0	0	-	-
56	7.6	Flood Zone 2	None (within 50m)				
56	7.7	Flood Zone 3	None (within 50m)				

Page	Section	Surface water flooding >	
57 >	8.1 >	Surface water flooding >	1 in 30 year, Greater than 1.0m (within 50m)

Page	Section	Groundwater flooding >	
59 >	9.1 >	Groundwater flooding >	Low (within 50m)

Page	Section	Environmental designations >	On site	0-50m	50-250m	250-500m	500-2000m
60	10.1	Sites of Special Scientific Interest (SSSI)	0	0	0	0	0
61	10.2	Conserved wetland sites (Ramsar sites)	0	0	0	0	0
61	10.3	Special Areas of Conservation (SAC)	0	0	0	0	0
61	10.4	Special Protection Areas (SPA)	0	0	0	0	0
61	10.5	National Nature Reserves (NNR)	0	0	0	0	0
62	10.6	Local Nature Reserves (LNR)	0	0	0	0	0
62 >	10.7 >	Designated Ancient Woodland >	0	0	0	1	1
62	10.8	Biosphere Reserves	0	0	0	0	0
62	10.9	Forest Parks	0	0	0	0	0
63	10.10	Marine Conservation Zones	0	0	0	0	0
63 >	10.11 >	Green Belt >	0	0	0	1	2
63	10.12	Proposed Ramsar sites	0	0	0	0	0

63	10.13	Possible Special Areas of Conservation (pSAC)	0	0	0	0	0
64	10.14	Potential Special Protection Areas (pSPA)	0	0	0	0	0
64	10.15	Nitrate Sensitive Areas	0	0	0	0	0
64 >	10.16 >	Nitrate Vulnerable Zones >	1	0	0	0	2
65 >	10.17 >	SSSI Impact Risk Zones >	1	-	-	-	-
66	10.18	SSSI Units	0	0	0	0	0
Page	Section	Visual and cultural designations	On site	0-50m	50-250m	250-500m	500-2000m
67	11.1	World Heritage Sites	0	0	0	-	-
67	11.2	Area of Outstanding Natural Beauty	0	0	0	-	-
67	11.3	National Parks	0	0	0	-	-
67	11.4	Listed Buildings	0	0	0	-	-
68	11.5	Conservation Areas	0	0	0	-	-
68	11.6	Scheduled Ancient Monuments	0	0	0	-	-
68	11.7	Registered Parks and Gardens	0	0	0	-	-
Page	Section	Agricultural designations >	On site	0-50m	50-250m	250-500m	500-2000m
69 >	12.1 >	Agricultural Land Classification >	Grade 3b (within 250m)				
70	12.2	Open Access Land	0	0	0	-	-
70 >	12.3 >	Tree Felling Licences >	0	0	1	-	-
71	12.4	Environmental Stewardship Schemes	0	0	0	-	-
71	12.5	Countryside Stewardship Schemes	0	0	0	-	-
Page	Section	Habitat designations >	On site	0-50m	50-250m	250-500m	500-2000m
72 >	13.1 >	Priority Habitat Inventory >	2	3	12	-	-
73	13.2	Habitat Networks	0	0	0	-	-
73	13.3	Open Mosaic Habitat	0	0	0	-	-
74	13.4	Limestone Pavement Orders	0	0	0	-	-
Page	Section	Geology 1:10,000 scale >	On site	0-50m	50-250m	250-500m	500-2000m
75 >	14.1 >	10k Availability >	Identified (within 500m)				
76	14.2	Artificial and made ground (10k)	0	0	0	0	-
77 >	14.3 >	Superficial geology (10k) >	0	0	1	1	-

78	14.4	Landslip (10k)	0	0	0	0	-
79 >	14.5 >	Bedrock geology (10k) >	0	0	3	3	-
80 >	14.6 >	Bedrock faults and other linear features (10k) >	0	0	4	3	-
Page	Section	Geology 1:50,000 scale >	On site	0-50m	50-250m	250-500m	500-2000m
81 >	15.1 >	50k Availability >	Identified (within 500m)				
82	15.2	Artificial and made ground (50k)	0	0	0	0	-
82	15.3	Artificial ground permeability (50k)	0	0	-	-	-
83 >	15.4 >	Superficial geology (50k) >	1	0	0	1	-
84 >	15.5 >	Superficial permeability (50k) >	Identified (within 50m)				
84	15.6	Landslip (50k)	0	0	0	0	-
84	15.7	Landslip permeability (50k)	None (within 50m)				
85 >	15.8 >	Bedrock geology (50k) >	2	0	3	5	-
86 >	15.9 >	Bedrock permeability (50k) >	Identified (within 50m)				
86 >	15.10 >	Bedrock faults and other linear features (50k) >	7	1	12	6	-
Page	Section	Boreholes	On site	0-50m	50-250m	250-500m	500-2000m
88	16.1	BGS Boreholes	0	0	0	-	-
Page	Section	Natural ground subsidence >					
89 >	17.1 >	Shrink swell clays >	Very low (within 50m)				
90 >	17.2 >	Running sands >	Very low (within 50m)				
91 >	17.3 >	Compressible deposits >	Negligible (within 50m)				
92 >	17.4 >	Collapsible deposits >	Very low (within 50m)				
93 >	17.5 >	Landslides >	Very low (within 50m)				
94 >	17.6 >	Ground dissolution of soluble rocks >	Negligible (within 50m)				
Page	Section	Mining and ground workings >	On site	0-50m	50-250m	250-500m	500-2000m
96 >	18.1 >	BritPits >	0	0	1	3	-
97 >	18.2 >	Surface ground workings >	0	10	26	-	-
99 >	18.3 >	Underground workings >	0	0	0	8	68
102	18.4	Underground mining extents	0	0	0	0	-
102 >	18.5 >	Historical Mineral Planning Areas >	0	0	1	1	-

103 >	18.6 >	Non-coal mining >	0	0	0	0	2
103	18.7	JPB mining areas	None (within 0m)				
103	18.8	The Coal Authority non-coal mining	0	0	0	0	-
104 >	18.9 >	Researched mining >	0	0	0	1	-
104	18.10	Mining record office plans	0	0	0	0	-
104	18.11	BGS mine plans	0	0	0	0	-
104 >	18.12 >	Coal mining >	Identified (within 0m)				
105	18.13	Brine areas	None (within 0m)				
105	18.14	Gypsum areas	None (within 0m)				
105	18.15	Tin mining	None (within 0m)				
105	18.16	Clay mining	None (within 0m)				
Page	Section	Ground cavities and sinkholes	On site	0-50m	50-250m	250-500m	500-2000m
106	19.1	Natural cavities	0	0	0	0	-
106	19.2	Mining cavities	0	0	0	0	0
106	19.3	Reported recent incidents	0	0	0	0	-
106	19.4	Historical incidents	0	0	0	0	-
Page	Section	Radon >					
108 >	20.1 >	Radon >	Less than 1% (within 0m)				
Page	Section	Soil chemistry >	On site	0-50m	50-250m	250-500m	500-2000m
110 >	21.1 >	BGS Estimated Background Soil Chemistry >	3	3	-	-	-
110	21.2	BGS Estimated Urban Soil Chemistry	0	0	-	-	-
111	21.3	BGS Measured Urban Soil Chemistry	0	0	-	-	-
Page	Section	Railway infrastructure and projects	On site	0-50m	50-250m	250-500m	500-2000m
112	22.1	Underground railways (London)	0	0	0	-	-
112	22.2	Underground railways (Non-London)	0	0	0	-	-
112	22.3	Railway tunnels	0	0	0	-	-
112	22.4	Historical railway and tunnel features	0	0	0	-	-
112	22.5	Royal Mail tunnels	0	0	0	-	-
113	22.6	Historical railways	0	0	0	-	-

113	22.7	Railways	0	0	0	-	-
113	22.8	Crossrail 2	0	0	0	0	-
113	22.9	HS2	0	0	0	0	-

Recent aerial photograph



Capture Date: 28/09/2022

Site Area: 6.15ha

Recent site history - 2019 aerial photograph



Capture Date: 22/04/2019

Site Area: 6.15ha

Recent site history - 2009 aerial photograph



Capture Date: 24/06/2009

Site Area: 6.15ha

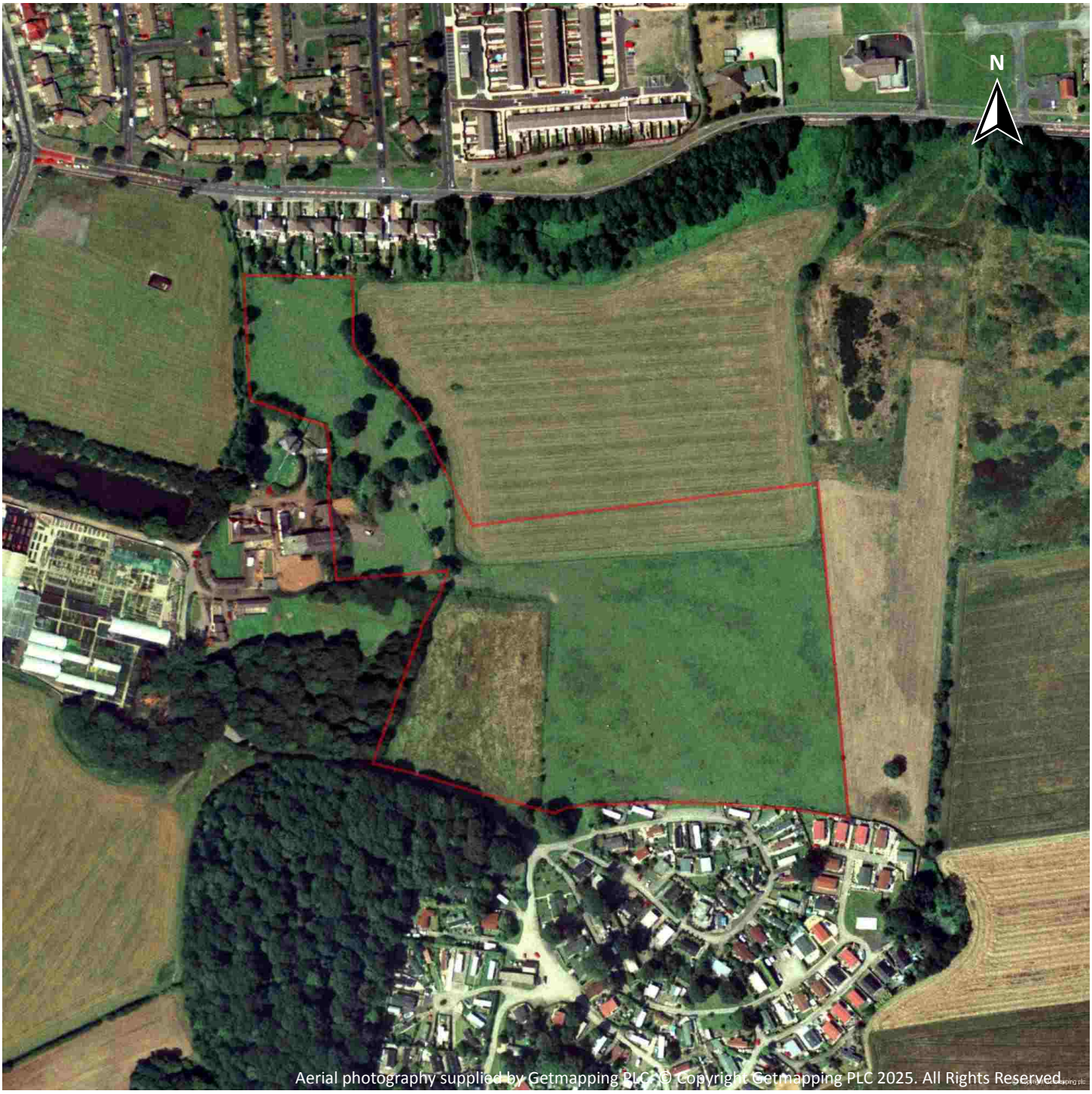
Recent site history - 2005 aerial photograph



Capture Date: 02/09/2005

Site Area: 6.15ha

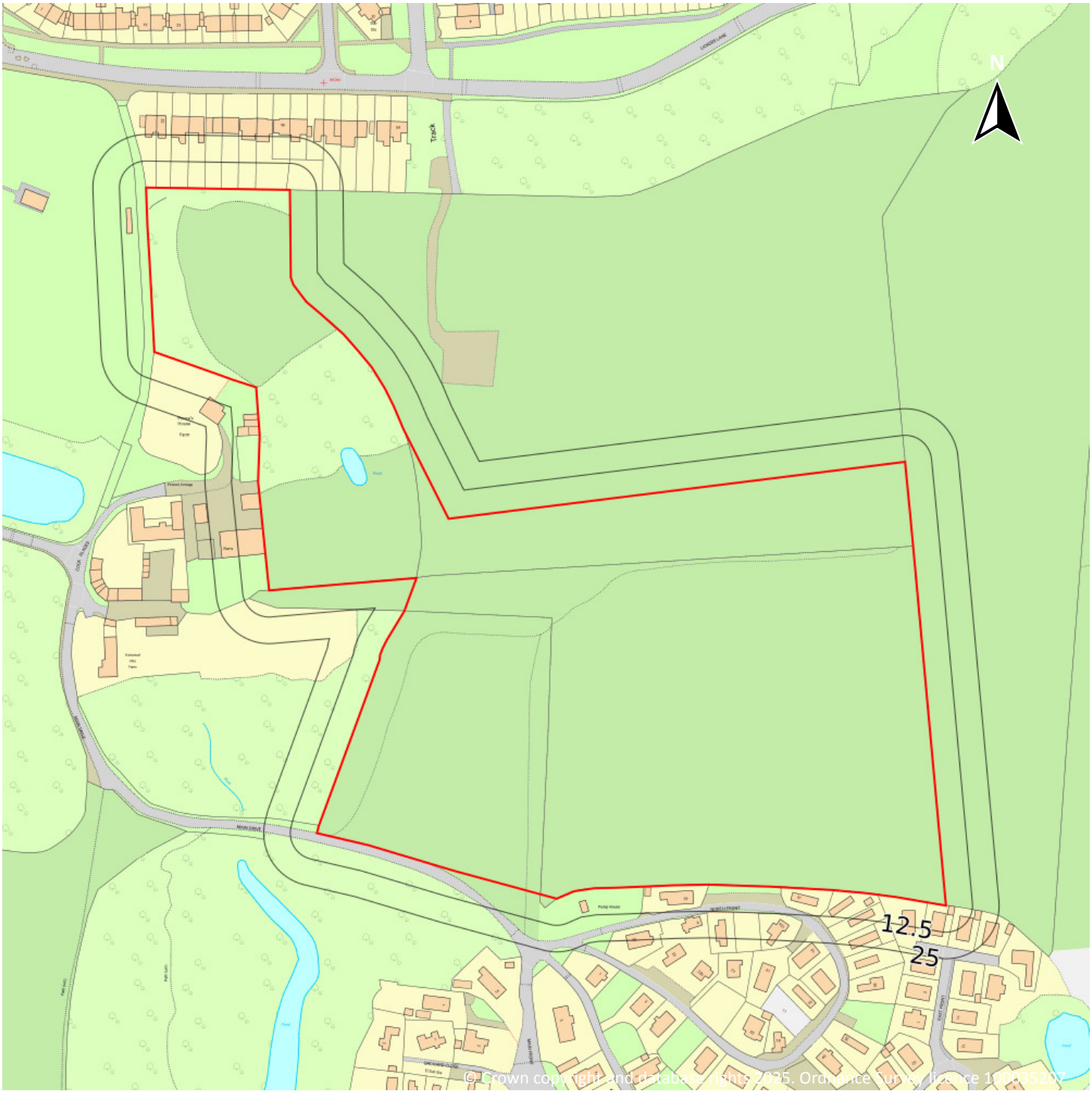
Recent site history - 2000 aerial photograph



Capture Date: 21/07/2000

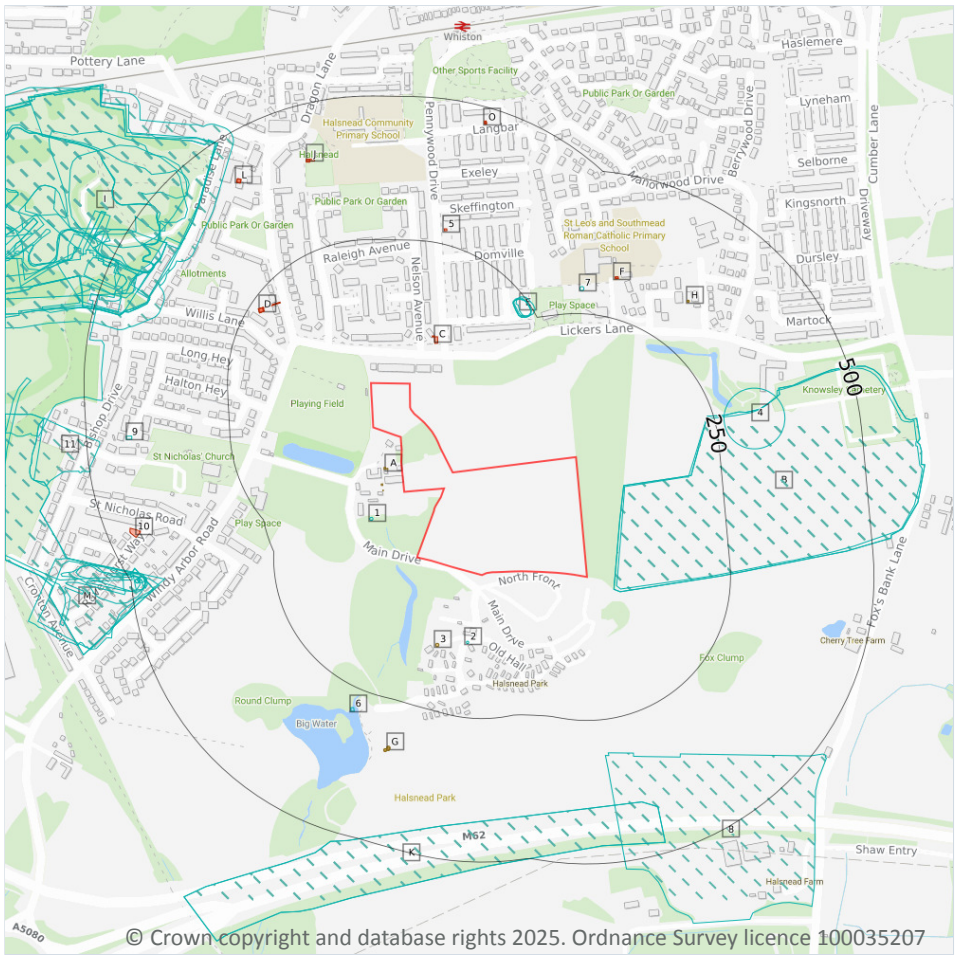
Site Area: 6.15ha

OS MasterMap site plan



Site Area: 6.15ha

1 Past land use



Site Outline

Search buffers in metres (m)

Historical industrial land uses

Historical tanks

Historical energy features

1.1 Historical industrial land uses

Records within 500m	50

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 1:10,560 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 15 >**

ID	Location	Land use	Dates present	Group ID
B	49m SE	Nursery	1956	915647

ID	Location	Land use	Dates present	Group ID
B	49m SE	Nursery	1966 - 1978	991508
B	53m SE	Nursery	1947	966693
1	71m W	Coal Pit	1850	832453
2	118m S	Pump	1850	834680
E	224m N	Unspecified Old Quarry	1891	812872
E	224m N	Unspecified Pit	1947	859893
E	224m N	Unspecified Pit	1906 - 1925	863264
E	226m N	Unspecified Pit	1938	926303
E	230m N	Unspecified Pit	1956	1001242
4	265m E	Unspecified Tank	1966	851501
6	284m SW	Boat House	1906	824647
7	290m NE	Sandstone Quarry	1850	820475
8	309m SE	Nursery	1947 - 1955	971880
I	383m NW	Brick Works	1956	937800
K	401m SE	Cuttings	1989	863456
K	401m SE	Cuttings	1977	937451
I	405m NW	Brick Works	1925	953660
I	408m NW	Brick Works	1947	859970
I	409m NW	Unspecified Works	1966	919078
I	410m NW	Refuse Heap	1990	928900
I	413m NW	Metallic Brick Works	1938	856365
9	421m W	Weighing Machine	1850	832490
I	426m NW	Brick Works	1906	866021
I	427m NW	Unspecified Ground Workings	1947 - 1956	886094
I	428m NW	Unspecified Pits	1925	855984
I	430m NW	Unspecified Pit	1938	996191
I	430m NW	Unspecified Pit	1906	960946
M	442m W	Old Colliery	1891 - 1906	909585

ID	Location	Land use	Dates present	Group ID
I	443m NW	Mineral Railway Sidings	1925	858667
I	446m NW	Unspecified Ground Workings	1966	862086
I	450m NW	Railway Sidings	1938	941955
I	451m NW	Unspecified Disused Pit	1978	856197
M	452m W	Colliery	1850	844685
I	458m NW	Unspecified Disused Works	1978	848701
I	461m NW	Railway Sidings	1906	1004470
N	462m W	Disused Colliery	1947	897393
N	462m W	Disused Colliery	1925	1004148
M	472m W	Unspecified Ground Workings	1925	1002560
M	474m W	Unspecified Heap	1956	994545
I	475m NW	Railway Sidings	1956	1007991
M	475m W	Unspecified Ground Workings	1906	903757
M	476m W	Unspecified Ground Workings	1947 - 1956	910693
M	477m W	Unspecified Disused Shafts	1966	834327
11	477m W	Colliery	1850	844684
M	483m W	Unspecified Old Shaft	1956	823984
M	485m W	Unspecified Heap	1891	905880
M	485m W	Unspecified Old Shafts	1925	869860
M	485m W	Unspecified Old Shafts	1947	973294
N	495m W	Railway Sidings	1850	862742

This data is sourced from Ordnance Survey / Groundsure.

1.2 Historical tanks

Records within 500m	**11**

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 15 >**

ID	Location	Land use	Dates present	Group ID
A	24m W	Unspecified Tank	1927 - 1937	153801
A	28m W	Unspecified Tank	1959	125924
A	36m W	Unspecified Tank	1937	125930
A	36m W	Unspecified Tank	1959	125923
3	135m S	Unspecified Tank	1892 - 1907	127270
G	331m S	Unspecified Tank	1996	141492
G	333m S	Unspecified Tank	1981	152988
H	333m NE	Unspecified Tank	1994 - 1997	151014
H	333m NE	Unspecified Tank	1976	138615
G	337m S	Unspecified Tank	1959 - 1980	147408
G	337m S	Unspecified Tank	1989	155106

This data is sourced from Ordnance Survey / Groundsure.

1.3 Historical energy features

Records within 500m	**15**

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 15 >**

ID	Location	Land use	Dates present	Group ID
C	83m N	Electricity Substation	1995 - 1999	81814
C	90m N	Electricity Substation	1974	66100
D	211m NW	Electricity Substation	1973	79050
D	224m NW	Electricity Substation	1984	92641
D	225m NW	Electricity Substation	1994	73264
5	273m N	Electricity Substation	1995 - 1999	90625

ID	Location	Land use	Dates present	Group ID
F	318m NE	Electricity Substation	1995 - 1999	71719
F	318m NE	Electricity Substation	1974	84629
J	399m NW	Electricity Substation	1973	79581
J	399m NW	Electricity Substation	1984 - 1994	83998
L	416m NW	Electricity Substation	1994	82790
L	417m NW	Electricity Substation	1973 - 1984	78225
10	444m W	Electricity Substation	1973 - 1997	80815
O	471m N	Electricity Substation	1995 - 1999	82113
O	472m N	Electricity Substation	1974	78132

This data is sourced from Ordnance Survey / Groundsure.

1.4 Historical petrol stations

Records within 500m	0

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

1.5 Historical garages

Records within 500m	0

Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

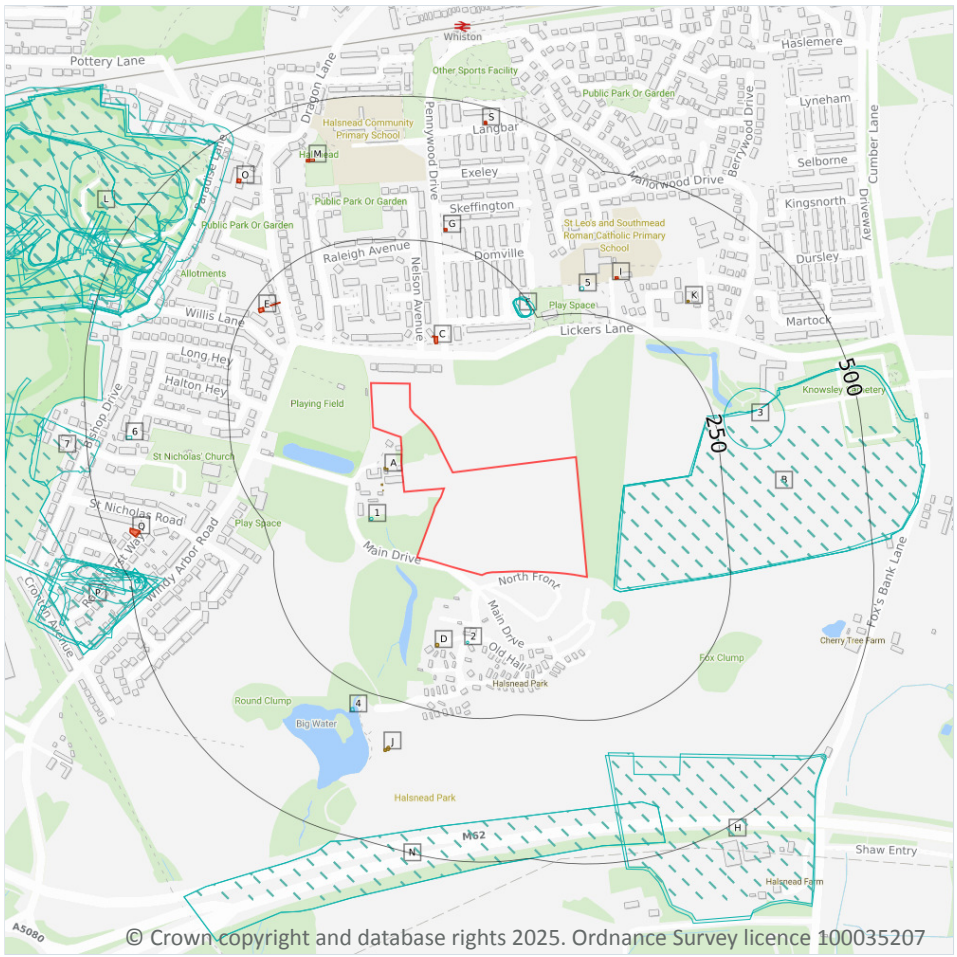
1.6 Historical military land

Records within 500m	0

Areas of military land digitised from multiple sources including the National Archives, local records, MOD records and verified other sources, intelligently grouped into contiguous features.

This data is sourced from Ordnance Survey / Groundsure / other sources.

2 Past land use - un-grouped



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Site Outline

Search buffers in metres (m)

Historical industrial land uses

Historical tanks

Historical energy features

2.1 Historical industrial land uses

Records within 500m	57

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 10,560 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 21 >**

ID	Location	Land Use	Date	Group ID
B	49m SE	Nursery	1956	915647
B	49m SE	Nursery	1978	991508
B	49m SE	Nursery	1966	991508

ID	Location	Land Use	Date	Group ID
B	53m SE	Nursery	1947	966693
1	71m W	Coal Pit	1850	832453
2	118m S	Pump	1850	834680
F	224m N	Unspecified Pit	1947	859893
F	224m N	Unspecified Pit	1925	863264
F	224m N	Unspecified Pit	1906	863264
F	224m N	Unspecified Old Quarry	1891	812872
F	226m N	Unspecified Pit	1938	926303
F	226m N	Unspecified Pit	1938	926303
F	230m N	Unspecified Pit	1956	1001242
3	265m E	Unspecified Tank	1966	851501
4	284m SW	Boat House	1906	824647
5	290m NE	Sandstone Quarry	1850	820475
H	309m SE	Nursery	1955	971880
H	313m SE	Nursery	1947	971880
L	383m NW	Brick Works	1956	937800
N	401m SE	Cuttings	1977	937451
N	401m SE	Cuttings	1989	863456
L	405m NW	Brick Works	1925	953660
L	408m NW	Brick Works	1947	859970
L	409m NW	Unspecified Works	1966	919078
L	410m NW	Refuse Heap	1990	928900
L	413m NW	Metallic Brick Works	1938	856365
6	421m W	Weighing Machine	1850	832490
L	426m NW	Brick Works	1906	866021
L	427m NW	Unspecified Ground Workings	1956	886094
L	428m NW	Unspecified Pits	1925	855984
L	430m NW	Unspecified Ground Workings	1947	886094

ID	Location	Land Use	Date	Group ID
L	430m NW	Unspecified Pit	1938	996191
L	430m NW	Unspecified Pit	1938	996191
L	430m NW	Unspecified Pit	1906	960946
P	442m W	Old Colliery	1906	909585
L	443m NW	Mineral Railway Sidings	1925	858667
L	446m NW	Unspecified Ground Workings	1966	862086
L	450m NW	Railway Sidings	1938	941955
L	451m NW	Unspecified Disused Pit	1978	856197
P	452m W	Colliery	1850	844685
P	453m W	Old Colliery	1891	909585
L	458m NW	Unspecified Disused Works	1978	848701
L	461m NW	Railway Sidings	1906	1004470
R	462m W	Disused Colliery	1947	897393
R	462m W	Disused Colliery	1925	1004148
P	472m W	Unspecified Ground Workings	1925	1002560
P	474m W	Unspecified Heap	1956	994545
L	475m NW	Railway Sidings	1956	1007991
P	475m W	Unspecified Ground Workings	1906	903757
P	476m W	Unspecified Ground Workings	1947	910693
P	477m W	Unspecified Disused Shafts	1966	834327
7	477m W	Colliery	1850	844684
P	483m W	Unspecified Old Shaft	1956	823984
P	485m W	Unspecified Heap	1891	905880
P	485m W	Unspecified Old Shafts	1947	973294
P	485m W	Unspecified Old Shafts	1925	869860
R	495m W	Railway Sidings	1850	862742

This data is sourced from Ordnance Survey / Groundsure.

2.2 Historical tanks

Records within 500m	**18**

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 21 >**

ID	Location	Land Use	Date	Group ID
A	24m W	Unspecified Tank	1927	153801
A	24m W	Unspecified Tank	1937	153801
A	28m W	Unspecified Tank	1959	125924
A	36m W	Unspecified Tank	1937	125930
A	36m W	Unspecified Tank	1959	125923
D	135m S	Unspecified Tank	1892	127270
D	135m S	Unspecified Tank	1907	127270
J	331m S	Unspecified Tank	1996	141492
J	333m S	Unspecified Tank	1981	152988
K	333m NE	Unspecified Tank	1997	151014
K	333m NE	Unspecified Tank	1996	151014
K	333m NE	Unspecified Tank	1994	151014
K	333m NE	Unspecified Tank	1994	151014
K	333m NE	Unspecified Tank	1995	151014
K	333m NE	Unspecified Tank	1976	138615
J	337m S	Unspecified Tank	1980	147408
J	337m S	Unspecified Tank	1989	155106
J	337m S	Unspecified Tank	1959	147408

This data is sourced from Ordnance Survey / Groundsure.

2.3 Historical energy features

Records within 500m	**31**

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 21 >**

ID	Location	Land Use	Date	Group ID
C	83m N	Electricity Substation	1996	81814
C	83m N	Electricity Substation	1995	81814
C	83m N	Electricity Substation	1996	81814
C	83m N	Electricity Substation	1999	81814
C	90m N	Electricity Substation	1974	66100
E	211m NW	Electricity Substation	1973	79050
E	224m NW	Electricity Substation	1984	92641
E	225m NW	Electricity Substation	1994	73264
G	273m N	Electricity Substation	1996	90625
G	273m N	Electricity Substation	1995	90625
G	273m N	Electricity Substation	1996	90625
G	273m N	Electricity Substation	1999	90625
I	318m NE	Electricity Substation	1996	71719
I	318m NE	Electricity Substation	1995	71719
I	318m NE	Electricity Substation	1996	71719
I	318m NE	Electricity Substation	1999	71719
I	318m NE	Electricity Substation	1974	84629
M	399m NW	Electricity Substation	1973	79581
M	399m NW	Electricity Substation	1994	83998
M	401m NW	Electricity Substation	1984	83998
O	416m NW	Electricity Substation	1994	82790
O	417m NW	Electricity Substation	1973	78225
O	417m NW	Electricity Substation	1984	78225

ID	Location	Land Use	Date	Group ID
Q	444m W	Electricity Substation	1973	80815
Q	445m W	Electricity Substation	1997	80815
Q	445m W	Electricity Substation	1984	80815
S	471m N	Electricity Substation	1996	82113
S	471m N	Electricity Substation	1995	82113
S	471m N	Electricity Substation	1996	82113
S	471m N	Electricity Substation	1999	82113
S	472m N	Electricity Substation	1974	78132

This data is sourced from Ordnance Survey / Groundsure.

2.4 Historical petrol stations

Records within 500m	0

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

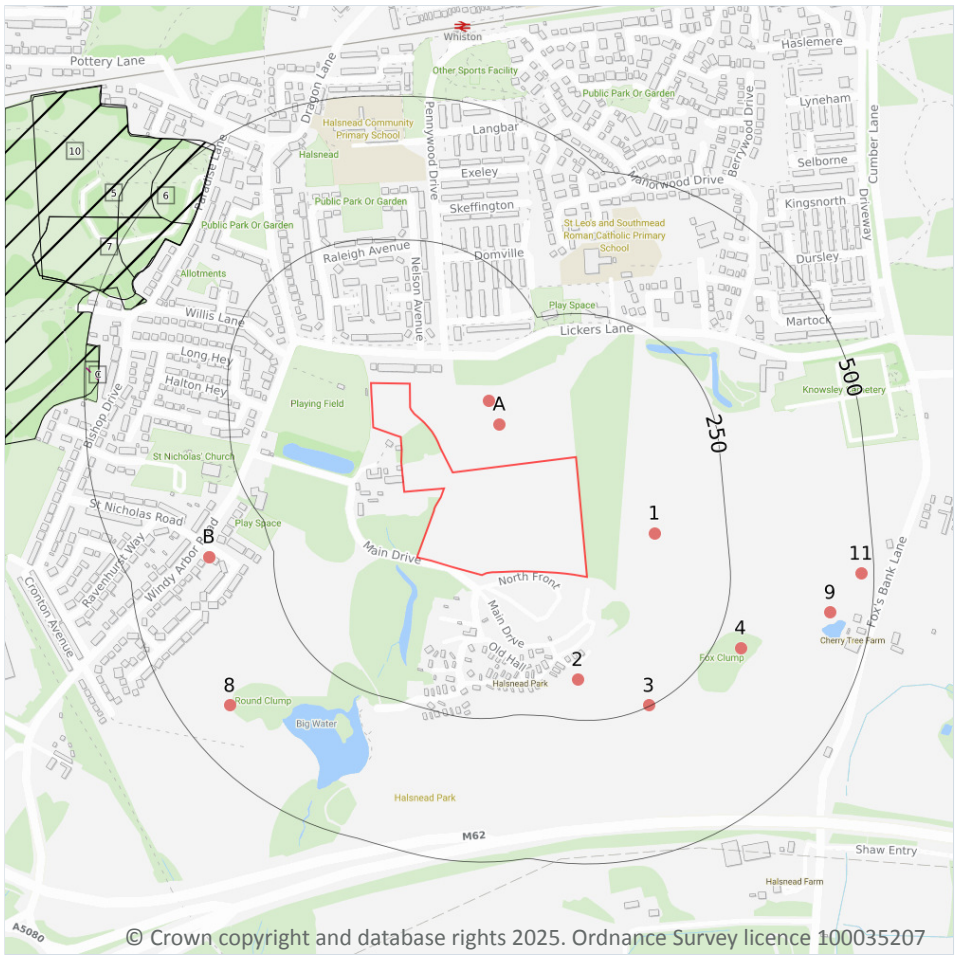
2.5 Historical garages

Records within 500m	0

Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

3 Waste and landfill



3.1 Active or recent landfill

Records within 500m	0

Active or recently closed landfill sites under Environment Agency/Natural Resources Wales regulation.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.2 Historical landfill (BGS records)

Records within 500m	0

Landfill sites identified on a survey carried out on behalf of the DoE in 1973. These sites may have been closed or operational at this time.

This data is sourced from the British Geological Survey.

3.3 Historical landfill (LA/mapping records)

Records within 500m	2

Landfill sites identified from Local Authority records and high detail historical mapping.

Features are displayed on the Waste and landfill map on **page 27 >**

ID	Location	Site address	Source	Data type
C	475m W	Refuse Tip	1997 mapping	Polygon
C	476m W	Refuse Tip	1994 mapping	Polygon

This data is sourced from the Ordnance Survey/Groundsure and Local Authority records.

3.4 Historical landfill (EA/NRW records)

Records within 500m	4

Known historical (closed) landfill sites (e.g. sites where there is no PPC permit or waste management licence currently in force). This includes sites that existed before the waste licensing regime and sites that have been licensed in the past but where a licence has been revoked, ceased to exist or surrendered and a certificate of completion has been issued.

Features are displayed on the Waste and landfill map on **page 27 >**

ID	Location	Details		
5	410m NW	Site Address: Whiston Tip, St Helens, Lancashire Licence Holder Address: -	Waste Licence: - Site Reference: - Waste Type: - Environmental Permitting Regulations (Waste) Reference: - Licence Issue: - Licence Surrender: -	Operator: Central Electricity Generating Board - North Western Region Licence Holder: - First Recorded 07/01/1967 Last Recorded: -
6	410m NW	Site Address: Tushinghams Quarry, Coalgate Lane, Paradise Lane, Stadt-Moers Park, Whiston, Merseyside, Knowsley Licence Holder Address: Bridle Road, Bootle, Merseyside	Waste Licence: Yes Site Reference: 026/01,GDO 020 Waste Type: Commercial Environmental Permitting Regulations (Waste) Reference: - Licence Issue: 27/05/1977 Licence Surrender: -	Operator: W F Doyle and Company Limited Licence Holder: George Wimpey and Company Limited First Recorded 01/04/1976 Last Recorded: 31/12/1979
7	410m NW	Site Address: Coalgate Lane Wimpeym, Tushinghams Quarry, Paradise Lane, Stadt-Moers Park, Knowsley, Merseyside Licence Holder Address: Bridle Road, Bootle	Waste Licence: - Site Reference: GDO M017, 026/01 Waste Type: Industrial Environmental Permitting Regulations (Waste) Reference: - Licence Issue: - Licence Surrender: -	Operator: G Wimpey and Company Limited Licence Holder: G Wimpey and Company Limited First Recorded 31/12/1976 Last Recorded: 01/01/1979

ID	Location	Details		
10	464m NW	Site Address: Coalgate Lane Landfill Site, Ellis Ashton Street, Huyton, Knowsley, Merseyside Licence Holder Address: -	Waste Licence: - Site Reference: R13/01, GDO 017, GDO M019, GDO 020 Waste Type: Inert, Industrial, Commercial, Household, Liquid sludge Environmental Permitting Regulations (Waste) Reference: - Licence Issue: - Licence Surrender: -	Operator: Huyton Urban District Council and Merseyside County Council Licence Holder: Huyton Urban District Council and Merseyside County Council First Recorded 01/01/1972 Last Recorded: 01/01/1983

This data is sourced from the Environment Agency and Natural Resources Wales.

3.5 Historical waste sites

Records within 500m	0

Waste site records derived from Local Authority planning records and high detail historical mapping.

This data is sourced from Ordnance Survey/Groundsure and Local Authority records.

3.6 Licensed waste sites

Records within 500m	0

Active or recently closed waste sites under Environment Agency/Natural Resources Wales regulation.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.7 Waste exemptions

Records within 500m	11

Activities involving the storage, treatment, use or disposal of waste that are exempt from needing a permit. Exemptions have specific limits and conditions that must be adhered to.

Features are displayed on the Waste and landfill map on **page 27 >**

ID	Location	Site	Reference	Category	Sub-Category	Description
A	73m N	Norlands Farm Norlands Lane Widnes Wa8 5at	EPR/FE5748CS/A001	Storing waste exemption	Non-agricultural waste only	Storage of sludge
A	111m N	Halsnead Park, Prescot, L35 3qe	WEX382364	Disposing of waste exemption	Not on a farm	Burning waste in the open

ID	Location	Site	Reference	Category	Sub-Category	Description
1	123m E	Cherry Tree Farm Foxs Bank Lane Prescot Merseyside L35 3ss	EPR/GE5052WJ/A001	Storing waste exemption	Non-agricultural waste only	Storage of sludge
2	181m SE	-	WEX275502	Disposing of waste exemption	Not on a farm	Burning waste in the open
3	249m SE	Cherry Tree Farm Foxs Bank Lane Prescot Merseyside L35 3ss	EPR/KE5352WK/A001	Storing waste exemption	Non-agricultural waste only	Storage of sludge
4	295m SE	-	WEX368667	Using waste exemption	Not on a farm	Use of waste in construction
B	359m W	Halsnead Garden Village, Windy Arbour Road, Whiston, L35 3sf	WEX402949	Using waste exemption	Not on a farm	Use of waste in construction
B	359m W	Halsnead Garden Village, Windy Arbour Road, Whiston, L35 3sf	WEX275530	Using waste exemption	Not on a farm	Use of waste in construction
8	417m SW	Norlands Farm Norlands Lane Widnes Wa8 5at	EPR/CE5048CT/A001	Storing waste exemption	Non-agricultural waste only	Storage of sludge
9	428m E	-	WEX377394	Using waste exemption	Not on a farm	Use of waste in construction
11	477m E	Cherry Tree Farm Foxs Bank Lane Prescot Merseyside L35 3ss	EPR/SE5844ZK/A001	Storing waste exemption	Non-agricultural waste only	Storage of sludge

This data is sourced from the Environment Agency and Natural Resources Wales.

4 Current industrial land use



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Site Outline

Search buffers in metres (m)

Recent industrial land uses

Pollution Incidents (EA/NRW)

4.1 Recent industrial land uses

Records within 250m	5

Current potentially contaminative industrial sites.

Features are displayed on the Current industrial land use map on **page 31 >**

ID	Location	Company	Address	Activity	Category
1	8m S	Pump House	Merseyside, L35	Water Pumping Stations	Industrial Features
2	90m S	Electricity Sub Station	Merseyside, L35	Electrical Features	Infrastructure and Facilities
3	91m N	Electricity Sub Station	Merseyside, L35	Electrical Features	Infrastructure and Facilities

ID	Location	Company	Address	Activity	Category
5	143m NW	Gas Governor	Merseyside, L35	Gas Features	Infrastructure and Facilities
6	230m NW	Electricity Sub Station	Merseyside, L35	Electrical Features	Infrastructure and Facilities

This data is sourced from Ordnance Survey.

4.2 Current or recent petrol stations

Records within 500m	0

Open, closed, under development and obsolete petrol stations.

This data is sourced from Experian.

4.3 Electricity cables

Records within 500m	0

High voltage underground electricity transmission cables.

This data is sourced from National Grid.

4.4 Gas pipelines

Records within 500m	0

High pressure underground gas transmission pipelines.

This data is sourced from National Grid.

4.5 Sites determined as Contaminated Land

Records within 500m	0

Contaminated Land Register of sites designated under Part 2a of the Environmental Protection Act 1990.

This data is sourced from Local Authority records.

4.6 Control of Major Accident Hazards (COMAH)

Records within 500m	0

Control of Major Accident Hazards (COMAH) sites. This data includes upper and lower tier sites, and includes a historical archive of COMAH sites and Notification of Installations Handling Hazardous Substances (NIHHS) records.

This data is sourced from the Health and Safety Executive.

4.7 Regulated explosive sites

Records within 500m	0

Sites registered and licensed by the Health and Safety Executive under the Manufacture and Storage of Explosives Regulations 2005 (MSER). The last update to this data was in April 2011.

This data is sourced from the Health and Safety Executive.

4.8 Hazardous substance storage/usage

Records within 500m	0

Consents granted for a site to hold certain quantities of hazardous substances at or above defined limits in accordance with the Planning (Hazardous Substances) Regulations 2015.

This data is sourced from Local Authority records.

4.9 Historical licensed industrial activities (IPC)

Records within 500m	0

Integrated Pollution Control (IPC) records of substance releases to air, land and water. This data represents a historical archive as the IPC regime has been superseded.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.10 Licensed industrial activities (Part A(1))

Records within 500m	0

Records of Part A(1) installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.11 Licensed pollutant release (Part A(2)/B)

Records within 500m	0

Records of Part A(2) and Part B installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

This data is sourced from Local Authority records.

4.12 Radioactive Substance Authorisations

Records within 500m	0

Records of the storage, use, accumulation and disposal of radioactive substances regulated under the Radioactive Substances Act 1993.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.13 Licensed Discharges to controlled waters

Records within 500m	0

Discharges of treated or untreated effluent to controlled waters under the Water Resources Act 1991.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.14 Pollutant release to surface waters (Red List)

Records within 500m	0

Discharges of specified substances under the Environmental Protection (Prescribed Processes and Substances) Regulations 1991.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.15 Pollutant release to public sewer

Records within 500m	0

Discharges of Special Category Effluents to the public sewer.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.16 List 1 Dangerous Substances

Records within 500m	0

Discharges of substances identified on List I of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.17 List 2 Dangerous Substances

Records within 500m	0

Discharges of substances identified on List II of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.18 Pollution Incidents (EA/NRW)

Records within 500m	2

Records of substantiated pollution incidents. Since 2006 this data has only included category 1 (major) and 2 (significant) pollution incidents.

Features are displayed on the Current industrial land use map on **page 31 >**

ID	Location	Details	
4	123m W	Incident Date: 15/07/2002 Incident Identification: 91608 Pollutant: Pollutant Not Identified Pollutant Description: Not Identified	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
7	238m W	Incident Date: 20/05/2002 Incident Identification: 79877 Pollutant: Specific Waste Materials Pollutant Description: Household Waste	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)

This data is sourced from the Environment Agency and Natural Resources Wales.

4.19 Pollution inventory substances

Records within 500m	0

The pollution inventory (substances) includes reporting on annual emissions of certain regulated substances to air, controlled waters and land. A reporting threshold for each substance is also included. Where emissions fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

4.20 Pollution inventory waste transfers

Records within 500m	0

The pollution inventory (waste transfers) includes reporting on annual transfers and recovery/disposal of controlled wastes from a site. A reporting threshold for each waste type is also included. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

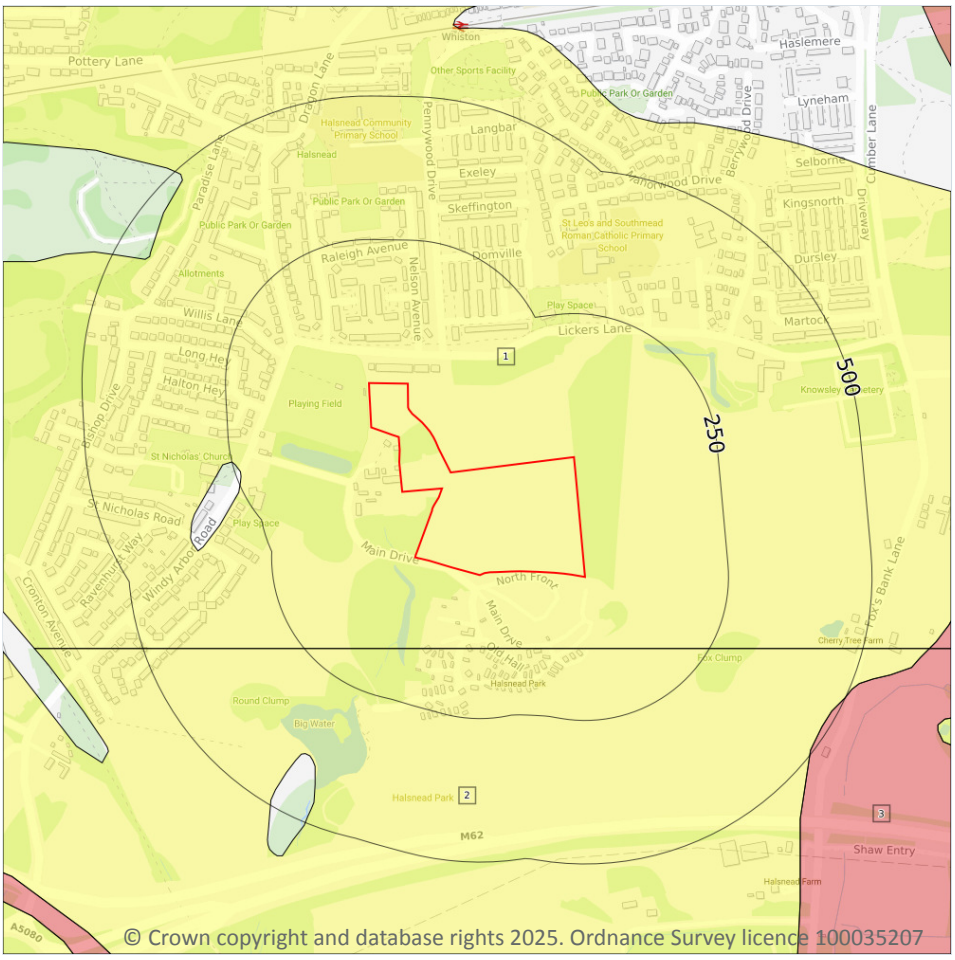
4.21 Pollution inventory radioactive waste

Records within 500m	0

The pollution inventory (radioactive wastes) includes reporting on annual releases of radioactive substances from a site, including the means of release. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

5 Hydrogeology - Superficial aquifer



Site Outline

Search buffers in metres (m)

- Principal
- Secondary A
- Secondary B
- Secondary Undifferentiated
- Unproductive
- Unknown

5.1 Superficial aquifer

Records within 500m	3

Aquifer status of groundwater held within superficial geology.

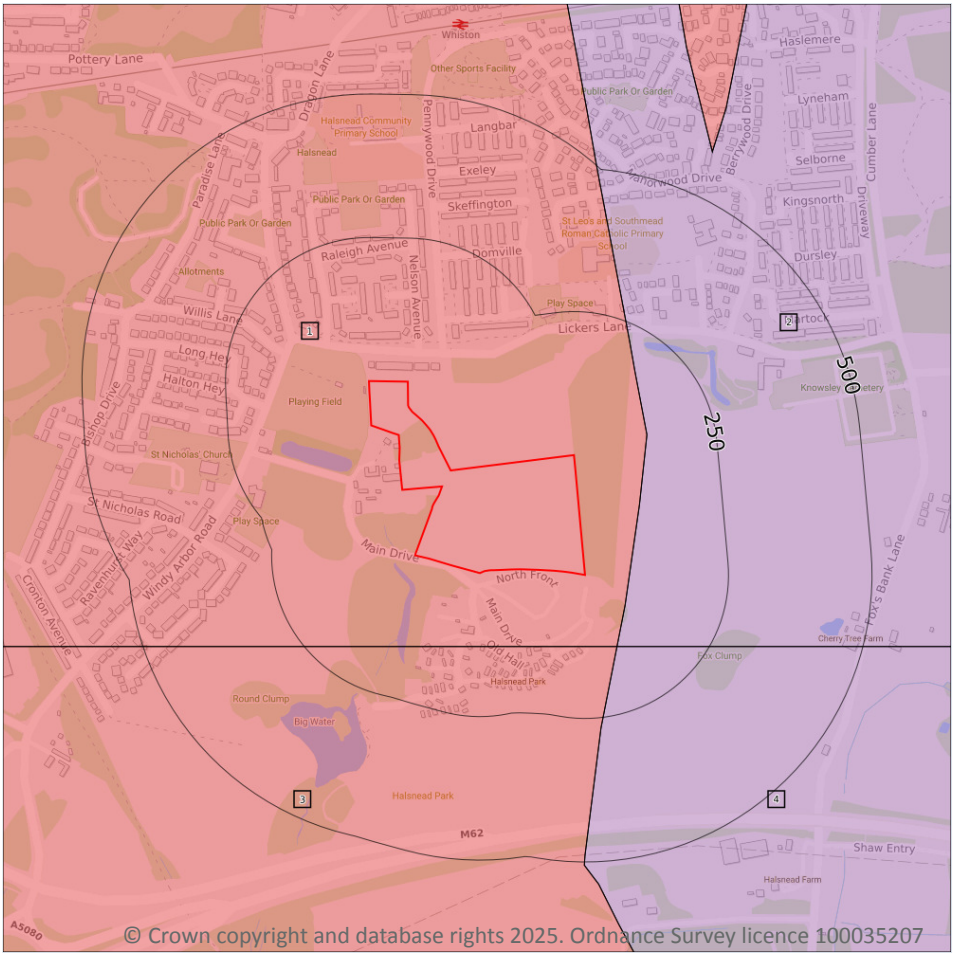
Features are displayed on the Hydrogeology map on **page 37 >**

ID	Location	Designation	Description
1	**On site**	**Secondary Undifferentiated**	**Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type**
2	125m SE	Secondary Undifferentiated	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type

ID	Location	Designation	Description
3	488m SE	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

Bedrock aquifer



5.2 Bedrock aquifer

Records within 500m	4

Aquifer status of groundwater held within bedrock geology.

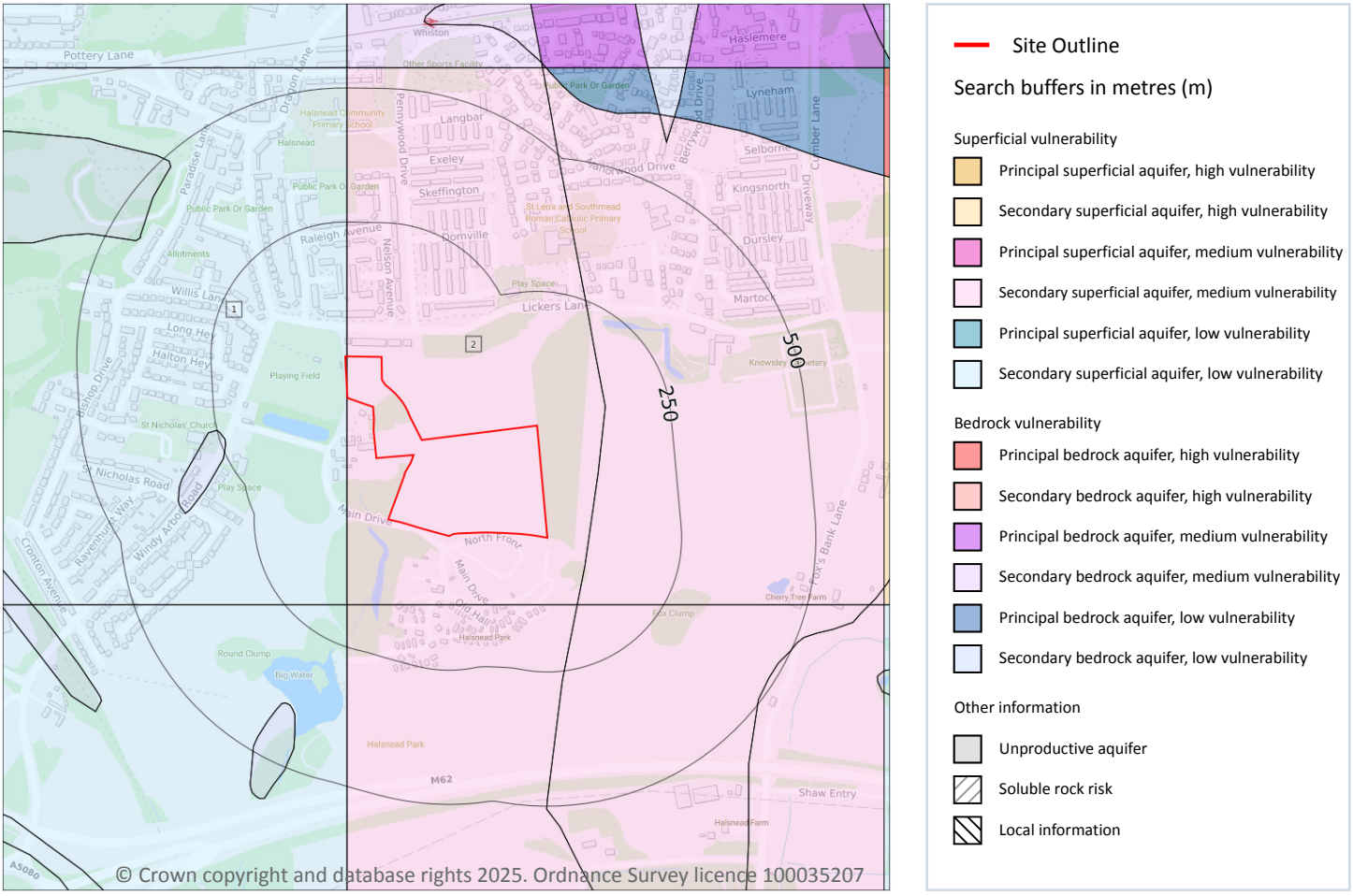
Features are displayed on the Bedrock aquifer map on **page 39 >**

ID	Location	Designation	Description
1	**On site**	**Secondary A**	**Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers**
2	77m SE	Principal	Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers

ID	Location	Designation	Description
3	125m SE	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
4	137m SE	Principal	Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

Groundwater vulnerability



5.3 Groundwater vulnerability

Records within 50m	2

An assessment of the vulnerability of groundwater to a pollutant discharged at ground level based on the hydrological, geological, hydrogeological and soil properties within a one kilometre square grid. Groundwater vulnerability is described as High, Medium or Low as follows:

- High - Areas able to easily transmit pollution to groundwater. They are likely to be characterised by high leaching soils and the absence of low permeability superficial deposits.
- Medium - Intermediate between high and low vulnerability.
- Low - Areas that provide the greatest protection from pollution. They are likely to be characterised by low leaching soils and/or the presence of superficial deposits characterised by a low permeability.

Features are displayed on the Groundwater vulnerability map on **page 41 >**

ID	Location	Summary	Soil / surface	Superficial geology	Bedrock geology
1	On site	Summary Classification: Secondary superficial aquifer - Low Vulnerability Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer	Leaching class: Low Infiltration value: <40% Dilution value: 300-550mm/year	Vulnerability: Low Aquifer type: Secondary Thickness: <3m Patchiness value: >90% Recharge potential: Low	Vulnerability: Low Aquifer type: Secondary Flow mechanism: Well connected fractures
2	On site	Summary Classification: Secondary superficial aquifer - Medium Vulnerability Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer	Leaching class: Low Infiltration value: >70% Dilution value: 300-550mm/year	Vulnerability: Medium Aquifer type: Secondary Thickness: <3m Patchiness value: >90% Recharge potential: Low	Vulnerability: Low Aquifer type: Secondary Flow mechanism: Well connected fractures

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

5.4 Groundwater vulnerability- soluble rock risk

Records on site	0

This dataset identifies areas where solution features that enable rapid movement of a pollutant may be present within a 1km grid square.

This data is sourced from the British Geological Survey and the Environment Agency.

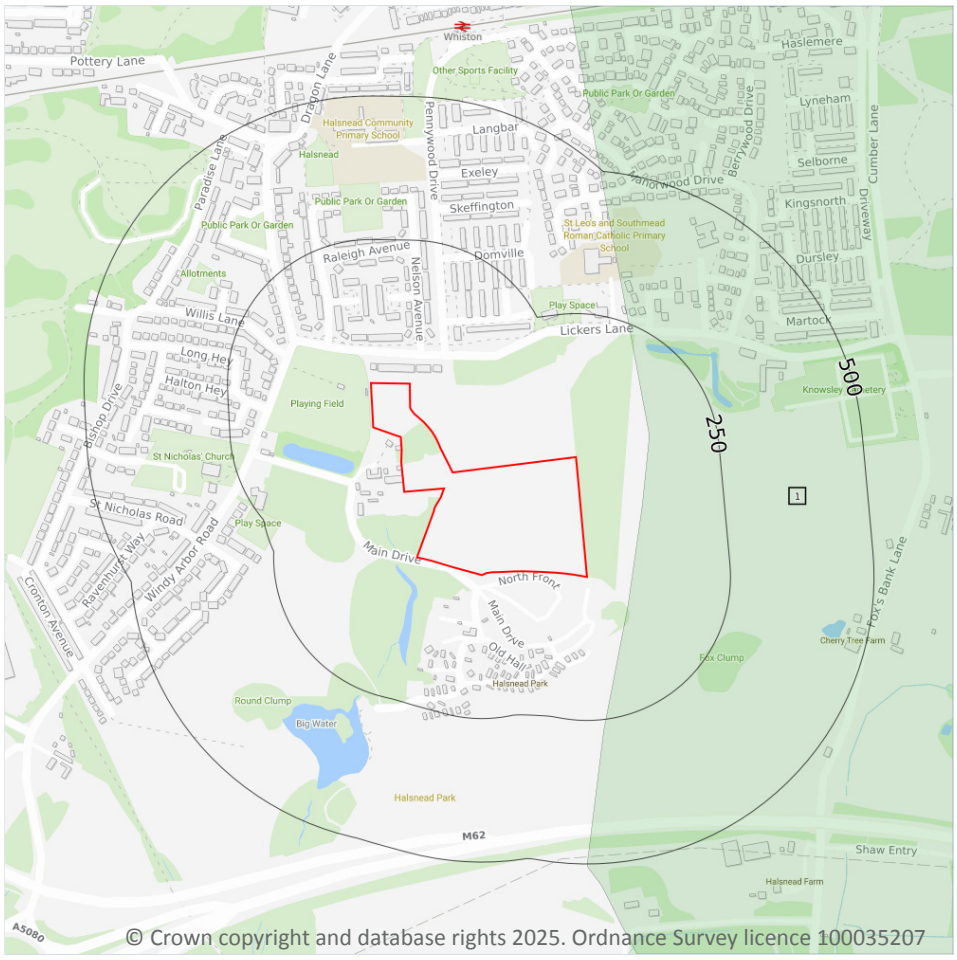
5.5 Groundwater vulnerability- local information

Records on site	0

This dataset identifies areas where additional local information affecting vulnerability is held by the Environment Agency. Further information can be obtained by contacting the Environment Agency local Area groundwater team through the Environment Agency National Customer Call Centre on 03798 506 506 or by email on enquiries@environment-agency.gov.uk ↗.

This data is sourced from the British Geological Survey and the Environment Agency.

Abstractions and Source Protection Zones



Site Outline

Search buffers in metres (m)

- Source Protection Zone 1 — Inner catchment
- Source Protection Zone 2 — Outer catchment
- Source Protection Zone 3 — Total catchment
- Source Protection Zone 4 — Zone of Special Interest
- Source Protection Zone 1c — Inner catchment - confined aquifer
- Source Protection Zone 2c — Outer catchment - confined aquifer
- Source Protection Zone 3c — Total catchment - confined aquifer
- Drinking water abstraction licences
- Drinking water abstraction licences — Polygon features
- Drinking water abstraction licences — Linear features
- Groundwater abstraction licence (point)
- Groundwater abstraction licence (area)
- Groundwater abstraction licence (linear)
- Surface Water Abstractions (point)
- Surface Water Abstractions (area)
- Surface Water Abstractions (linear)

5.6 Groundwater abstractions

Records within 2000m	11

Licensed groundwater abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, between two points (line data) or a larger area.

Features are displayed on the Abstractions and Source Protection Zones map on **page 43 >**

ID	Location	Details	
-	1192m E	Status: Active Licence No: 2569028021 Details: Spray Irrigation - Direct Direct Source: Ground Water - North West Region Point: B/HOLE AT BLUNDELLS HILL GOLF CLUB, BLUNDELLS LANE, RAINHILL Data Type: Point Name: BLUNDELLS HILL GOLF CLUB LTD Easting: 348550 Northing: 390340	Annual Volume (m^3): 21966.87 Max Daily Volume (m^3): 191.81 Original Application No: NPS/WR/029993 Original Start Date: 06/09/1994 Expiry Date: - Issue No: 103 Version Start Date: 07/11/2018 Version End Date: -
-	1192m E	Status: Active Licence No: 2569028021 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: Ground Water - North West Region Point: B/HOLE AT BLUNDELLS HILL GOLF CLUB, BLUNDELLS LANE, RAINHILL Data Type: Point Name: BLUNDELLS HILL GOLF CLUB LTD Easting: 348550 Northing: 390340	Annual Volume (m^3): 21966.87 Max Daily Volume (m^3): 191.81 Original Application No: NPS/WR/029993 Original Start Date: 06/09/1994 Expiry Date: - Issue No: 103 Version Start Date: 07/11/2018 Version End Date: -
-	1192m E	Status: Historical Licence No: 2569028021 Details: "Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services" Direct Source: Ground Water - North West Region Point: "B/HOLE AT BLUNDELLS HILL GOLF CLUB, BLUNDELLS LANE, RAINHILL" Data Type: Point Name: BLUNDELLS HILL GOLF CLUB LTD Easting: 348550 Northing: 390340	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 06/09/1994 Expiry Date: - Issue No: 101 Version Start Date: 19/02/2001 Version End Date: -
-	1192m E	Status: Historical Licence No: 2569028021 Details: Spray Irrigation - Direct Direct Source: Ground Water - North West Region Point: "B/HOLE AT BLUNDELLS HILL GOLF CLUB, BLUNDELLS LANE, RAINHILL" Data Type: Point Name: BLUNDELLS HILL GOLF CLUB LTD Easting: 348550 Northing: 390340	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 06/09/1994 Expiry Date: - Issue No: 101 Version Start Date: 19/02/2001 Version End Date: -

ID	Location	Details	
-	1221m NE	Status: Historical Licence No: 2569028008 Details: Potable Water Supply - Direct Direct Source: Ground Water - North West Region Point: 2 WELLS + CONNECTING B/HOLES, CUMBER LA, WHISTON, MERSEYSIDE Data Type: Point Name: NORTH WEST WATER LTD Easting: 348100 Northing: 391300	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 16/03/1966 Expiry Date: - Issue No: 100 Version Start Date: 16/03/1966 Version End Date: -
-	1302m NE	Status: Active Licence No: 2569028020 Details: Laundry Use Direct Source: Ground Water - North West Region Point: BOREHOLE AT STONEY LANE, RAINHILL Data Type: Point Name: Elis UK Limited Easting: 348100 Northing: 391400	Annual Volume (m^3): 118181.82 Max Daily Volume (m^3): 545.46 Original Application No: NPS/WR/034947 Original Start Date: 01/06/1993 Expiry Date: - Issue No: 103 Version Start Date: 20/01/2021 Version End Date: -
-	1302m NE	Status: Historical Licence No: 2569028020 Details: Laundry Use Direct Source: Ground Water - North West Region Point: "BOREHOLE AT STONEY LANE, RAINHILL" Data Type: Point Name: THE SUNLIGHT SERVICES GROUP LTD Easting: 348100 Northing: 391400	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 01/06/1993 Expiry Date: - Issue No: 101 Version Start Date: 24/10/1996 Version End Date: -
-	1881m NE	Status: Historical Licence No: 2569025072 Details: "Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services" Direct Source: Ground Water - North West Region Point: "TWO BOREHOLES AT WHISTON HOSPITAL, PRESCOT, MERSEYSIDE" Data Type: Point Name: ST HELENS AND KNOWSLEY HOSPITALS Easting: 348000 Northing: 392100	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 13/08/1992 Expiry Date: - Issue No: 100 Version Start Date: 13/08/1992 Version End Date: -

ID	Location	Details	
-	1881m NE	Status: Historical Licence No: 2569025072 Details: General use relating to Secondary Category (Medium Loss) Direct Source: Ground Water - North West Region Point: "TWO BOREHOLES AT WHISTON HOSPITAL, PRESCOT, MERSEYSIDE" Data Type: Point Name: ST HELENS AND KNOWSLEY HOSPITALS Easting: 348000 Northing: 392100	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 13/08/1992 Expiry Date: - Issue No: 100 Version Start Date: 13/08/1992 Version End Date: -
-	1881m NE	Status: Historical Licence No: 2569025072 Details: General use relating to Secondary Category (Medium Loss) Direct Source: Ground Water - North West Region Point: TWO BOREHOLES AT WHISTON HOSPITAL, PRESCOT, MERSEYSIDE Data Type: Point Name: ST HELENS AND KNOWSLEY HOSPITALS Easting: 348000 Northing: 392100	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 13/08/1992 Expiry Date: - Issue No: 100 Version Start Date: 13/08/1992 Version End Date: -
-	1881m NE	Status: Historical Licence No: 2569025072 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: Ground Water - North West Region Point: TWO BOREHOLES AT WHISTON HOSPITAL, PRESCOT, MERSEYSIDE Data Type: Point Name: ST HELENS AND KNOWSLEY HOSPITALS Easting: 348000 Northing: 392100	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 13/08/1992 Expiry Date: - Issue No: 100 Version Start Date: 13/08/1992 Version End Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

5.7 Surface water abstractions

Records within 2000m	**4**

Licensed surface water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

Features are displayed on the Abstractions and Source Protection Zones map on **page 43 >**

ID	Location	Details	
-	1161m SW	Status: Historical Licence No: 2569028018 Details: Spray Irrigation - Direct Direct Source: "Surface, Non-Tidal - North West Region" Point: "OCHRE & DOG CLOG BRKS, TARBOCK HALL FARM, TARBOCK, PRESCOT" Data Type: Line Name: T H CRITCHLEY & SON Easting: 346600 Northing: 389100	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 13/05/1976 Expiry Date: - Issue No: 100 Version Start Date: 01/04/1993 Version End Date: -
-	1161m SW	Status: Historical Licence No: 2569028018 Details: Spray Irrigation - Direct Direct Source: Surface, Non-Tidal - North West Region Point: OCHRE & DOG CLOG BRKS, TARBOCK HALL FARM, TARBOCK, PRESCOT Data Type: Line Name: T H CRITCHLEY & SON Easting: 346600 Northing: 389100	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 13/05/1976 Expiry Date: - Issue No: 100 Version Start Date: 01/04/1993 Version End Date: -
-	1161m SW	Status: Historical Licence No: 2569028018 Details: Spray Irrigation - Direct Direct Source: Surface, Non-Tidal - North West Region Point: OCHRE AND DOG CLOG BROOKS TARBOCK HALL FARM PRESCOT Data Type: Line Name: T H CRITCHLEY & SON Easting: 346600 Northing: 389100	Annual Volume (m^3): 2098 Max Daily Volume (m^3): 636 Original Application No: - Original Start Date: 13/05/1976 Expiry Date: - Issue No: 100 Version Start Date: 01/04/1993 Version End Date: -
-	1700m SW	Status: Historical Licence No: 2569028018 Details: Spray Irrigation - Direct Direct Source: Surface, Non-Tidal - North West Region Point: OCHRE AND DOG CLOG BROOKS TARBOCK HALL FARM PRESCOT Data Type: Line Name: BELPOOL DEVELOPMENTS LTD Easting: 346400 Northing: 388600	Annual Volume (m^3): 2098 Max Daily Volume (m^3): 636 Original Application No: NPS/WR/006330 Original Start Date: 13/05/1976 Expiry Date: - Issue No: 102 Version Start Date: 31/01/2011 Version End Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

5.8 Potable abstractions

Records within 2000m	5

Licensed potable water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

Features are displayed on the Abstractions and Source Protection Zones map on **page 43 >**

ID	Location	Details	
-	1192m E	Status: Active Licence No: 2569028021 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: Ground Water - North West Region Point: B/HOLE AT BLUNDELLS HILL GOLF CLUB, BLUNDELLS LANE, RAINHILL Data Type: Point Name: BLUNDELLS HILL GOLF CLUB LTD Easting: 348550 Northing: 390340	Annual Volume (m^3): 21966.87 Max Daily Volume (m^3): 191.81 Original Application No: NPS/WR/029993 Original Start Date: 06/09/1994 Expiry Date: - Issue No: 103 Version Start Date: 07/11/2018 Version End Date: -
-	1192m E	Status: Historical Licence No: 2569028021 Details: "Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services" Direct Source: Ground Water - North West Region Point: "B/HOLE AT BLUNDELLS HILL GOLF CLUB, BLUNDELLS LANE, RAINHILL" Data Type: Point Name: BLUNDELLS HILL GOLF CLUB LTD Easting: 348550 Northing: 390340	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 06/09/1994 Expiry Date: - Issue No: 101 Version Start Date: 19/02/2001 Version End Date: -
-	1221m NE	Status: Historical Licence No: 2569028008 Details: Potable Water Supply - Direct Direct Source: Ground Water - North West Region Point: 2 WELLS + CONNECTING B/HOLES, CUMBER LA, WHISTON, MERSEYSIDE Data Type: Point Name: NORTH WEST WATER LTD Easting: 348100 Northing: 391300	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 16/03/1966 Expiry Date: - Issue No: 100 Version Start Date: 16/03/1966 Version End Date: -

ID	Location	Details	
-	1881m NE	Status: Historical Licence No: 2569025072 Details: "Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services" Direct Source: Ground Water - North West Region Point: "TWO BOREHOLES AT WHISTON HOSPITAL, PRESCOT, MERSEYSIDE" Data Type: Point Name: ST HELENS AND KNOWSLEY HOSPITALS Easting: 348000 Northing: 392100	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 13/08/1992 Expiry Date: - Issue No: 100 Version Start Date: 13/08/1992 Version End Date: -
-	1881m NE	Status: Historical Licence No: 2569025072 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: Ground Water - North West Region Point: TWO BOREHOLES AT WHISTON HOSPITAL, PRESCOT, MERSEYSIDE Data Type: Point Name: ST HELENS AND KNOWSLEY HOSPITALS Easting: 348000 Northing: 392100	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 13/08/1992 Expiry Date: - Issue No: 100 Version Start Date: 13/08/1992 Version End Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

5.9 Source Protection Zones

Records within 500m	**1**

Source Protection Zones define the sensitivity of an area around a potable abstraction site to contamination.

Features are displayed on the Abstractions and Source Protection Zones map on **page 43 >**

ID	Location	Type	Description
1	78m SE	3	Total catchment

This data is sourced from the Environment Agency and Natural Resources Wales.

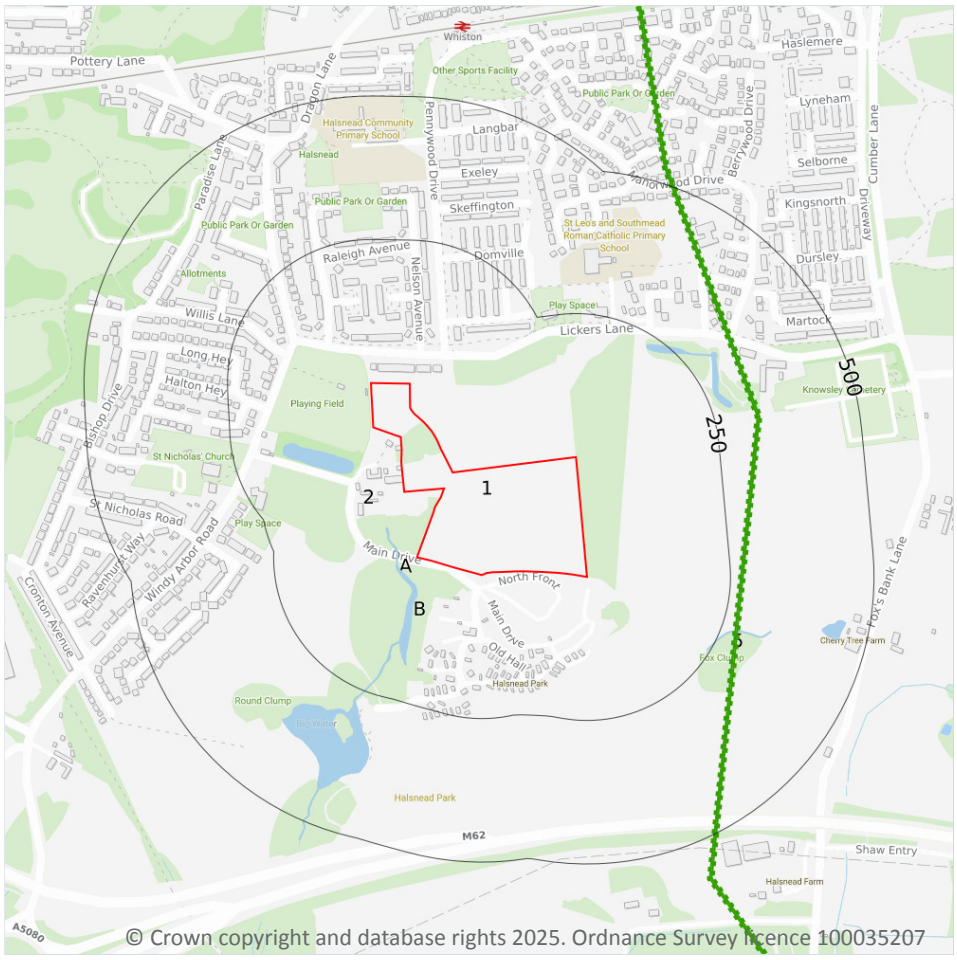
5.10 Source Protection Zones (confined aquifer)

Records within 500m	**0**

Source Protection Zones in the confined aquifer define the sensitivity around a deep groundwater abstraction to contamination. A confined aquifer would normally be protected from contamination by overlying geology and is only considered a sensitive resource if deep excavation/drilling is taking place.

This data is sourced from the Environment Agency and Natural Resources Wales.

6 Hydrology



Site Outline

Search buffers in metres (m)

Water Network (OS MasterMap)

Surface water features (wider than 5m)

Surface water features (narrower than 5m)

WFD River, canal and surface water transfer water bodies

WFD Lake water bodies

WFD Transitional and coastal water bodies

WFD Surface water body catchments boundaries

WFD Groundwater body boundaries

6.1 Water Network (OS MasterMap)

Records within 250m	10

Detailed water network of Great Britain showing the flow and precise central course of every river, stream, lake and canal.

Features are displayed on the Hydrology map on **page 50 >**

ID	Location	Type of water feature	Ground level	Permanence	Name
A	35m SW	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	-

ID	Location	Type of water feature	Ground level	Permanence	Name
A	36m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
B	37m SW	Lake, loch or reservoir.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
B	151m SW	Lake, loch or reservoir.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
B	151m SW	Lake, loch or reservoir.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
B	152m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
B	189m SW	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	-
B	194m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
B	220m SW	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	-
5	245m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-

This data is sourced from the Ordnance Survey.

6.2 Surface water features

Records within 250m	**6**

Covering rivers, streams and lakes (some overlap with OS MasterMap Water Network data in previous section) but additionally covers smaller features such as ponds. Rivers and streams narrower than 5m are represented as a single line. Lakes, ponds and rivers or streams wider than 5m are represented as polygons.

Features are displayed on the Hydrology map on **page 50 >**

This data is sourced from the Ordnance Survey.

6.3 WFD Surface water body catchments

Records on site	1

The Water Framework Directive is an EU-led framework for the protection of inland surface waters, estuaries, coastal waters and groundwater through river basin-level management planning. In terms of surface water, these basins are broken down into smaller units known as management, operational and water body catchments.

Features are displayed on the Hydrology map on **page 50 >**

ID	Location	Type	Water body catchment	Water body ID	Operational catchment	Management catchment
1	**On site**	**River**	**Prescot Brook (Logwood Mill Brook)**	**GB112069060710**	**Ditton**	**Mersey Lower**

This data is sourced from the Environment Agency and Natural Resources Wales.

6.4 WFD Surface water bodies

Records identified	1

Surface water bodies under the Directive may be rivers, lakes, estuary or coastal. To achieve the purpose of the Directive, environmental objectives have been set and are reported on for each water body. The progress towards delivery of the objectives is then reported on by the relevant competent authorities at the end of each six-year cycle. The river water body directly associated with the catchment listed in the previous section is detailed below, along with any lake, canal, coastal or artificial water body within 250m of the site. Click on the water body ID in the table to visit the EA Catchment Explorer to find out more about each water body listed.

Features are displayed on the Hydrology map on **page 50 >**

ID	Location	Type	Name	Water body ID	Overall rating	Chemical rating	Ecological rating	Year
-	888m SW	River	Prescot Brook (Logwood Mill Brook)	GB112069060710 ↗	Poor	Fail	Poor	2019

This data is sourced from the Environment Agency and Natural Resources Wales.

6.5 WFD Groundwater bodies

Records on site	1

Groundwater bodies are also covered by the Directive and the same regime of objectives and reporting detailed in the previous section is in place. Click on the water body ID in the table to visit the EA Catchment Explorer to find out more about each groundwater body listed.

Features are displayed on the Hydrology map on **page 50 >**

ID	Location	Name	Water body ID	Overall rating	Chemical rating	Quantitative	Year
2	**On site**	**Sankey and Glaze Carboniferous aquifers**	**GB41202G100100** ↗	**Poor**	**Poor**	**Good**	**2019**

This data is sourced from the Environment Agency and Natural Resources Wales.

7 River and coastal flooding

7.1 Risk of flooding from rivers and the sea

Records within 50m	0

The chance of flooding from rivers and/or the sea in any given year, based on cells of 50m within the Risk of Flooding from Rivers and Sea (RoFRaS)/Flood Risk Assessment Wales (FRAW) models. Each cell is allocated one of four flood risk categories, taking into account flood defences and their condition. The risk categories for RoFRaS for rivers and the sea and FRAW for rivers are; Very low (less than 1 in 1000 chance in any given year), Low (less than 1 in 100 but greater than or equal to 1 in 1000 chance), Medium (less than 1 in 30 but greater than or equal to 1 in 100 chance) or High (greater than or equal to 1 in 30 chance). The risk categories for FRAW for the sea are; Very low (less than 1 in 1000 chance in any given year), Low (less than 1 in 200 but greater than or equal to 1 in 1000 chance), Medium (less than 1 in 30 but greater than or equal to 1 in 200 chance) or High (greater than or equal to 1 in 30 chance).

This data is sourced from the Environment Agency and Natural Resources Wales.

7.2 Historical Flood Events

Records within 250m	0

Records of historic flooding from rivers, the sea, groundwater and surface water. Records began in 1946 when predecessor bodies started collecting detailed information about flooding incidents, although limited details may be included on flooding incidents prior to this date. Takes into account the presence of defences, structures, and other infrastructure where they existed at the time of flooding, and includes flood extents that may have been affected by overtopping, breaches or blockages.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.3 Flood Defences

Records within 250m	0

Records of flood defences owned, managed or inspected by the Environment Agency and Natural Resources Wales. Flood defences can be structures, buildings or parts of buildings. Typically these are earth banks, stone and concrete walls, or sheet-piling that is used to prevent or control the extent of flooding.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.4 Areas Benefiting from Flood Defences

Records within 250m	0

Areas that would benefit from the presence of flood defences in a 1 in 100 (1%) chance of flooding each year from rivers or 1 in 200 (0.5%) chance of flooding each year from the sea.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.5 Flood Storage Areas

Records within 250m	0

Areas that act as a balancing reservoir, storage basin or balancing pond to attenuate an incoming flood peak to a flow level that can be accepted by the downstream channel or to delay the timing of a flood peak so that its volume is discharged over a longer period.

This data is sourced from the Environment Agency and Natural Resources Wales.

River and coastal flooding - Flood Zones

7.6 Flood Zone 2

Records within 50m	0

Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land between Flood Zone 3 (see next section) and the extent of the flooding from rivers or the sea with a 1 in 1000 (0.1%) chance of flooding each year.

This data is sourced from the Environment Agency and Natural Resources Wales.

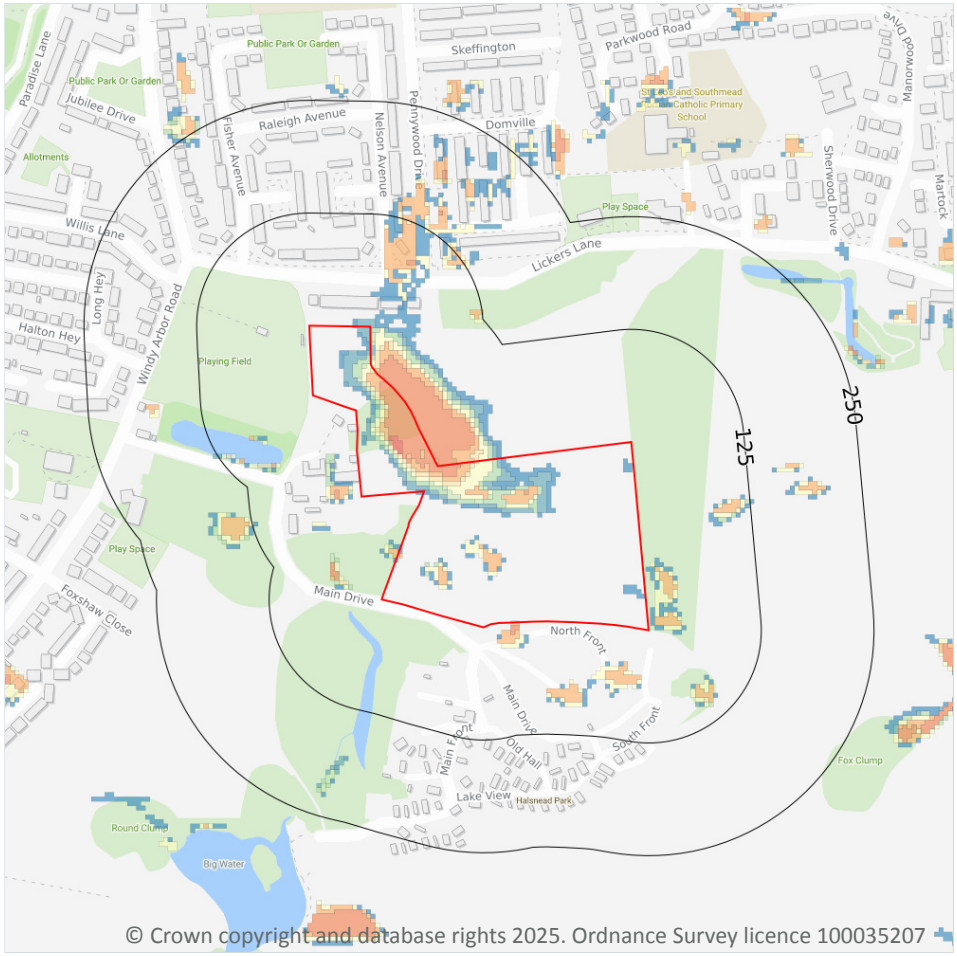
7.7 Flood Zone 3

Records within 50m	0

Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land with a 1 in 100 (1%) or greater chance of flooding each year from rivers or a 1 in 200 (0.5%) or greater chance of flooding each year from the sea.

This data is sourced from the Environment Agency and Natural Resources Wales.

8 Surface water flooding



Site Outline

Search buffers in metres (m)

1 in 1000 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 250 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 100 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 30 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

8.1 Surface water flooding

Highest risk on site	**1 in 30 year, Greater than 1.0m**
Highest risk within 50m	**1 in 30 year, Greater than 1.0m**

Ambiental Risk Analytics surface water (pluvial) FloodMap identifies areas likely to flood as a result of extreme rainfall events, i.e. land naturally vulnerable to surface water ponding or flooding. This data set was produced by simulating 1 in 30 year, 1 in 100 year, 1 in 250 year and 1 in 1,000 year rainfall events. Modern urban drainage systems are typically built to cope with rainfall events between 1 in 20 and 1 in 30 years, though some older ones may flood in a 1 in 5 year rainfall event.

Features are displayed on the Surface water flooding map on **page 57 >**

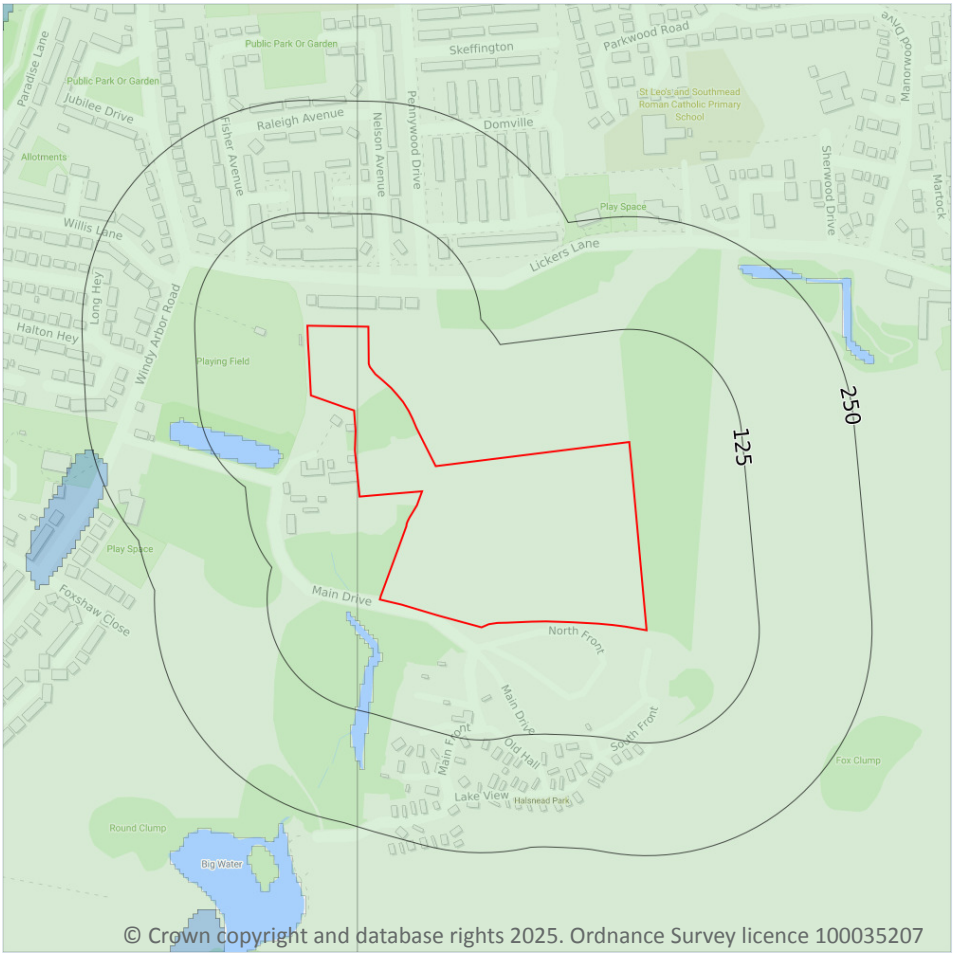
The data shown on the map and in the table above shows the highest likelihood of flood events happening at the site. Lower likelihood events may have greater flood depths and hence a greater potential impact on a site.

The table below shows the maximum flood depths for a range of return periods for the site.

Return period	Maximum modelled depth
1 in 1000 year	Greater than 1.0m
1 in 250 year	Greater than 1.0m
1 in 100 year	Greater than 1.0m
1 in 30 year	Greater than 1.0m

This data is sourced from Ambiental Risk Analytics.

9 Groundwater flooding



Site Outline

Search buffers in metres (m)

- High
- Moderate - High
- Moderate
- Low
- Negligible

9.1 Groundwater flooding

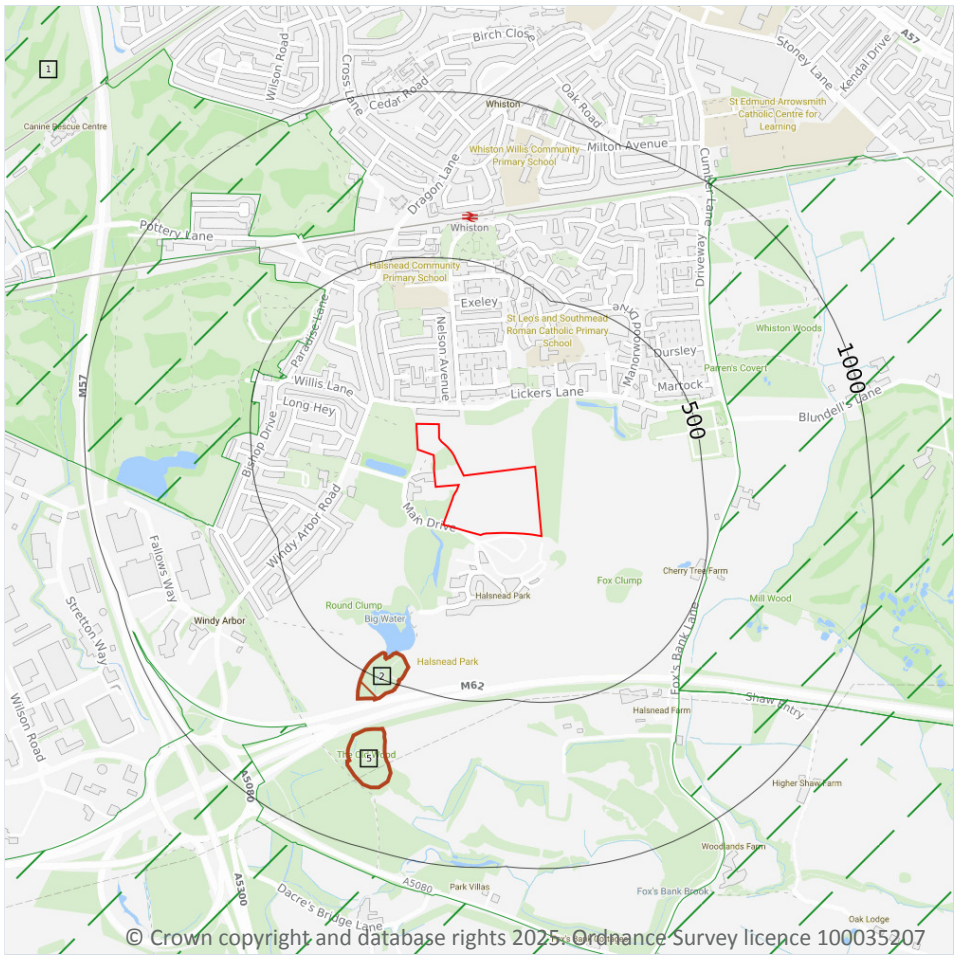
Highest risk on site	**Low**
Highest risk within 50m	**Low**

Groundwater flooding is caused by unusually high groundwater levels. It occurs when the water table rises above the ground surface or within underground structures such as basements or cellars. Groundwater flooding tends to exhibit a longer duration than surface water flooding, possibly lasting for weeks or months, and as a result it can cause significant damage to property. This risk assessment is based on a 1 in 100 year return period and a 5m Digital Terrain Model (DTM).

Features are displayed on the Groundwater flooding map on **page 59 >**

This data is sourced from Ambiental Risk Analytics.

10 Environmental designations



10.1 Sites of Special Scientific Interest (SSSI)

Records within 2000m	0

Sites providing statutory protection for the best examples of UK flora, fauna, or geological or physiographical features. Originally notified under the National Parks and Access to the Countryside Act 1949, SSSIs were re-notified under the Wildlife and Countryside Act 1981. Improved provisions for the protection and management of SSSIs were introduced by the Countryside and Rights of Way Act 2000 (in England and Wales) and (in Scotland) by the Nature Conservation (Scotland) Act 2004 and the Wildlife and Natural Environment (Scotland) Act 2010.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.2 Conserved wetland sites (Ramsar sites)

Records within 2000m	0

Ramsar sites are designated under the Convention on Wetlands of International Importance, agreed in Ramsar, Iran, in 1971. They cover all aspects of wetland conservation and wise use, recognizing wetlands as ecosystems that are extremely important for biodiversity conservation in general and for the well-being of human communities. These sites cover a broad definition of wetland; marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, and even some marine areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.3 Special Areas of Conservation (SAC)

Records within 2000m	0

Areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.4 Special Protection Areas (SPA)

Records within 2000m	0

Sites classified by the UK Government under the EC Birds Directive, SPAs are areas of the most important habitat for rare (listed on Annex I to the Directive) and migratory birds within the European Union.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.5 National Nature Reserves (NNR)

Records within 2000m	0

Sites containing examples of some of the most important natural and semi-natural terrestrial and coastal ecosystems in Great Britain. They are managed to conserve their habitats, provide special opportunities for scientific study or to provide public recreation compatible with natural heritage interests.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.6 Local Nature Reserves (LNR)

Records within 2000m	0

Sites managed for nature conservation, and to provide opportunities for research and education, or simply enjoying and having contact with nature. They are declared by local authorities under the National Parks and Access to the Countryside Act 1949 after consultation with the relevant statutory nature conservation agency.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.7 Designated Ancient Woodland

Records within 2000m	2

Ancient woodlands are classified as areas which have been wooded continuously since at least 1600 AD. This includes semi-natural woodland and plantations on ancient woodland sites. 'Wooded continuously' does not mean there is or has previously been continuous tree cover across the whole site, and not all trees within the woodland have to be old.

Features are displayed on the Environmental designations map on **page 60 >**

ID	Location	Name	Woodland Type
2	410m SW	The Old Wood	Ancient & Semi-Natural Woodland
5	640m SW	The Old Wood	Ancient & Semi-Natural Woodland

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.8 Biosphere Reserves

Records within 2000m	0

Biosphere Reserves are internationally recognised by UNESCO as sites of excellence to balance conservation and socioeconomic development between nature and people. They are recognised under the Man and the Biosphere (MAB) Programme with the aim of promoting sustainable development founded on the work of the local community.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.9 Forest Parks

Records within 2000m	0

These are areas managed by the Forestry Commission designated on the basis of recreational, conservation or scenic interest.

This data is sourced from the Forestry Commission.

10.10 Marine Conservation Zones

Records within 2000m	0

A type of marine nature reserve in UK waters established under the Marine and Coastal Access Act (2009). They are designated with the aim to protect nationally important, rare or threatened habitats and species.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.11 Green Belt

Records within 2000m	3

Areas designated to prevent urban sprawl by keeping land permanently open.

Features are displayed on the Environmental designations map on **page 60 >**

ID	Location	Name	Local Authority name
1	407m NW	Merseyside and Greater Manchester Green Belt	Knowsley
3	508m E	Merseyside and Greater Manchester Green Belt	St. Helens
4	622m SE	Merseyside and Greater Manchester Green Belt	Knowsley

This data is sourced from the Ministry of Housing, Communities and Local Government.

10.12 Proposed Ramsar sites

Records within 2000m	0

Ramsar sites are areas listed as a Wetland of International Importance under the Convention on Wetlands of International Importance especially as Waterfowl Habitat (the Ramsar Convention) 1971. The sites here supplied have a status of 'Proposed' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

10.13 Possible Special Areas of Conservation (pSAC)

Records within 2000m	0

Special Areas of Conservation are areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive. Those sites supplied here are those with a status of 'Possible' having been identified for potential adoption under the framework.

This data is sourced from Natural England and Natural Resources Wales.

10.14 Potential Special Protection Areas (pSPA)

Records within 2000m	0

Special Protection Areas (SPAs) are areas designated (or 'classified') under the European Union Wild Birds Directive for the protection of nationally and internationally important populations of wild birds. Those sites supplied here are those with a status of 'Potential' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

10.15 Nitrate Sensitive Areas

Records within 2000m	0

Areas where nitrate concentrations in drinking water sources exceeded or was at risk of exceeding the limit of 50 mg/l set by the 1980 EC Drinking Water Directive. Voluntary agricultural measures as a means of reducing the levels of nitrate were introduced by DEFRA as MAFF, with payments being made to farmers who complied. The scheme was started as a pilot in 1990 in ten areas, later implemented within 32 areas. The scheme was closed to further new entrants in 1998, although existing agreements continued for their full term. All Nitrate Sensitive Areas fell within the areas designated as Nitrate Vulnerable Zones (NVZs) in 1996 under the EC Nitrate Directive (91/676/EEC).

This data is sourced from Natural England.

10.16 Nitrate Vulnerable Zones

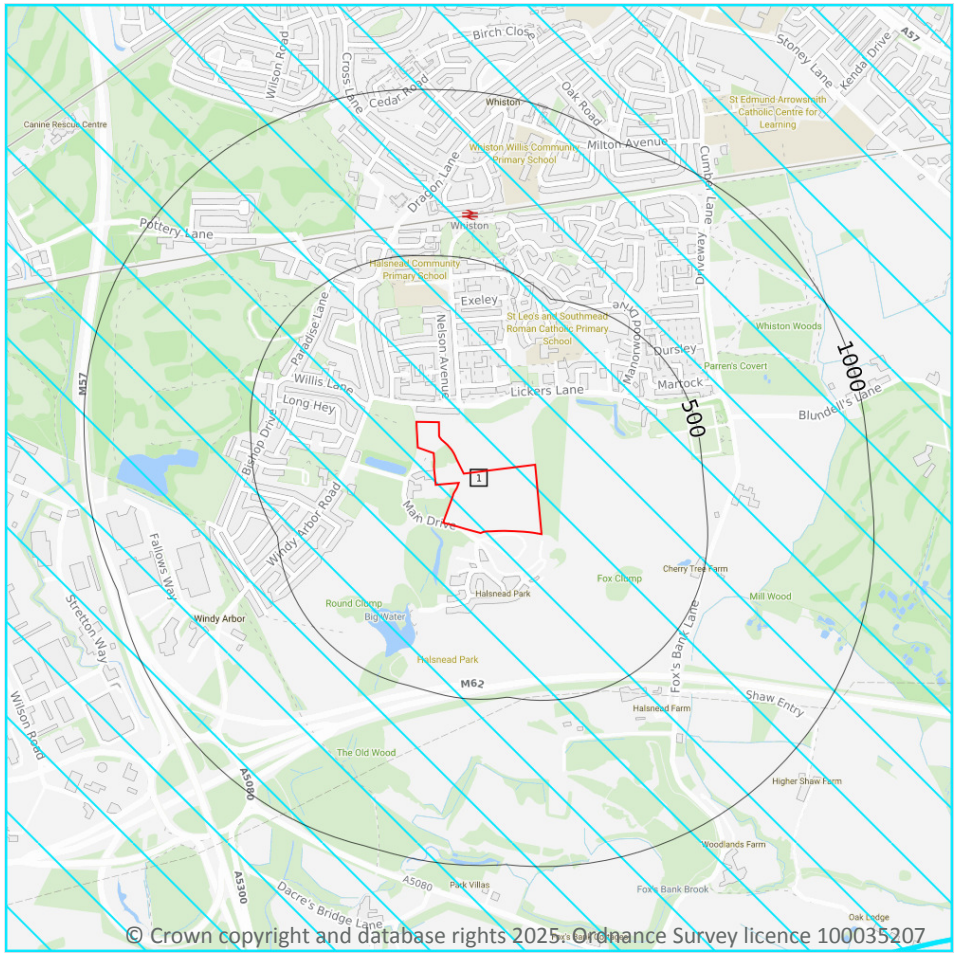
Records within 2000m	3

Areas at risk from agricultural nitrate pollution designated under the EC Nitrate Directive (91/676/EEC). These are areas of land that drain into waters polluted by nitrates. Farmers operating within these areas have to follow mandatory rules to tackle nitrate loss from agriculture.

Location	Name	Type	NVZ ID	Status
On site	**Dittton Brook (Halewood to Mersey Estuary) NVZ**	**Surface Water**	**640**	**Existing**
1656m W	ALT NVZ	Surface Water	642	Existing
1698m E	Sankey Brook (Black Bk to Mersey) NVZ	Surface Water	639	Existing

This data is sourced from Natural England and Natural Resources Wales.

SSSI Impact Zones and Units



10.17 SSSI Impact Risk Zones

Records on site	1

Developed to allow rapid initial assessment of the potential risks to SSSIs posed by development proposals. They define zones around each SSSI which reflect the particular sensitivities of the features for which it is notified and indicate the types of development proposal which could potentially have adverse impacts.

Features are displayed on the SSSI Impact Zones and Units map on **page 65 >**

ID	Location	Type of developments requiring consultation
1	**On site**	**Infrastructure - Airports, helipads and other aviation proposals. Wind and Solar - Solar schemes with footprint > 0.5ha, all wind turbines. Air pollution - Livestock & poultry units with floorspace > 500m², slurry lagoons & digestate stores > 4000m². Combustion - General combustion processes >50MW energy input. Incl: energy from waste incineration, other incineration, landfill gas generation plant, pyrolysis/gasification, anaerobic digestion, sewage treatment works, other incineration/ combustion. Waste - Landfill. Incl: inert landfill, non-hazardous landfill, hazardous landfill. Discharges - Any discharge of water or liquid waste of more than 20m³/day to ground (ie to seep away) or to surface water, such as a beck or stream.**

This data is sourced from Natural England.

10.18 SSSI Units

Records within 2000m	**0**

Divisions of SSSIs used to record management and condition details. Units are the smallest areas for which Natural England gives a condition assessment, however, the size of units varies greatly depending on the types of management and the conservation interest.

This data is sourced from Natural England and Natural Resources Wales.

11 Visual and cultural designations

11.1 World Heritage Sites

Records within 250m	0

Sites designated for their globally important cultural or natural interest requiring appropriate management and protection measures. World Heritage Sites are designated to meet the UK's commitments under the World Heritage Convention.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.2 Area of Outstanding Natural Beauty

Records within 250m	0

Areas of Outstanding Natural Beauty (AONB) are conservation areas, chosen because they represent 18% of the finest countryside. Each AONB has been designated for special attention because of the quality of their flora, fauna, historical and cultural associations, and/or scenic views. The National Parks and Access to the Countryside Act of 1949 created AONBs and the Countryside and Rights of Way Act, 2000 added further regulation and protection. There are likely to be restrictions to some developments within these areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

11.3 National Parks

Records within 250m	0

In England and Wales, the purpose of National Parks is to conserve and enhance landscapes within the countryside whilst promoting public enjoyment of them and having regard for the social and economic well-being of those living within them. In Scotland National Parks have the additional purpose of promoting the sustainable use of the natural resources of the area and the sustainable social and economic development of its communities. The National Parks and Access to the Countryside Act 1949 established the National Park designation in England and Wales, and The National Parks (Scotland) Act 2000 in Scotland.

This data is sourced from Natural England, Natural Resources Wales and the Scottish Government.

11.4 Listed Buildings

Records within 250m	0

Buildings listed for their special architectural or historical interest. Building control in the form of 'listed building consent' is required in order to make any changes to that building which might affect its special interest. Listed buildings are graded to indicate their relative importance, however building controls apply to all buildings equally, irrespective of their grade, and apply to the interior and exterior of the building in its entirety, together with any curtilage structures.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.5 Conservation Areas

Records within 250m	0

Local planning authorities are obliged to designate as conservation areas any parts of their own area that are of special architectural or historic interest, the character and appearance of which it is desirable to preserve or enhance. Designation of a conservation area gives broader protection than the listing of individual buildings. All the features within the area, listed or otherwise, are recognised as part of its character. Conservation area designation is the means of recognising the importance of all factors and of ensuring that planning decisions address the quality of the landscape in its broadest sense.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.6 Scheduled Ancient Monuments

Records within 250m	0

A scheduled monument is an historic building or site that is included in the Schedule of Monuments kept by the Secretary of State for Digital, Culture, Media and Sport. The regime is set out in the Ancient Monuments and Archaeological Areas Act 1979. The Schedule of Monuments has c.20,000 entries and includes sites such as Roman remains, burial mounds, castles, bridges, earthworks, the remains of deserted villages and industrial sites. Monuments are not graded, but all are, by definition, considered to be of national importance.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

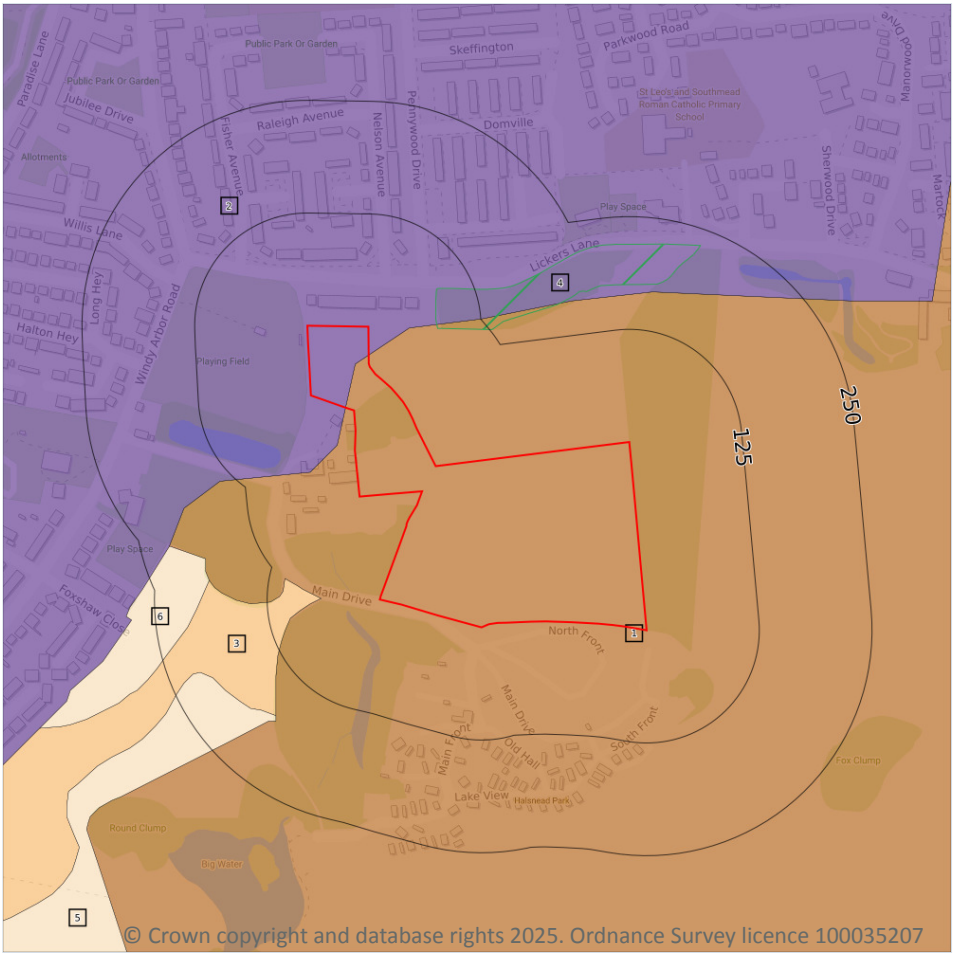
11.7 Registered Parks and Gardens

Records within 250m	0

Parks and gardens assessed to be of particular interest and of special historic interest. The emphasis being on 'designed' landscapes, rather than on planting or botanical importance. Registration is a 'material consideration' in the planning process, meaning that planning authorities must consider the impact of any proposed development on the special character of the landscape.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

12 Agricultural designations



Site Outline

Search buffers in metres (m)

- Grade 1 - excellent quality
- Grade 2 - very good quality
- Grade 3 - good to moderate quality
- Grade 3a - good quality
- Grade 3b - moderate quality
- Grade 4 - poor quality
- Grade 5 - very poor quality
- Non-agricultural land
- Urban land
- Exclusion land
- Tree felling licences
- Open Access land

12.1 Agricultural Land Classification

Records within 250m	5

Classification of the quality of agricultural land taking into consideration multiple factors including climate, physical geography and soil properties. It should be noted that the categories for the grading of agricultural land are not consistent across England, Wales and Scotland.

Features are displayed on the Agricultural designations map on **page 69 >**

ID	Location	Classification	Description
1	**On site**	**Grade 2**	**Very good quality agricultural land. Land with minor limitations which affect crop yield, cultivations or harvesting. A wide range of agricultural and horticultural crops can usually be grown but on some land in the grade there may be reduced flexibility due to difficulties with the production of the more demanding crops such as winter harvested vegetables and arable root crops. The level of yield is generally high but may be lower or more variable than Grade 1.**
2	**On site**	**Urban**	**Non-agricultural/no quality assigned**
3	65m SW	Grade 3a	Good quality agricultural land. Land capable of consistently producing moderate to high yields of a narrow range of arable crops, especially cereals, or moderate yields of a wide range of crops including cereals, grass, oilseed rape, potatoes, sugar beet and the less demanding horticultural crops.
5	173m SW	Grade 3b	Moderate quality agricultural land. Land capable of producing moderate yields of a narrow range of crops, principally cereals and grass or lower yields of a wider range of crops or high yields of grass which can be grazed or harvested over most of the year.
6	184m W	Grade 3b	Moderate quality agricultural land. Land capable of producing moderate yields of a narrow range of crops, principally cereals and grass or lower yields of a wider range of crops or high yields of grass which can be grazed or harvested over most of the year.

This data is sourced from Natural England.

12.2 Open Access Land

Records within 250m	0

The Countryside and Rights of Way Act 2000 (CROW Act) gives a public right of access to land without having to use paths. Access land includes mountains, moors, heaths and downs that are privately owned. It also includes common land registered with the local council and some land around the England Coast Path. Generally permitted activities on access land are walking, running, watching wildlife and climbing.

This data is sourced from Natural England and Natural Resources Wales.

12.3 Tree Felling Licences

Records within 250m	1

Felling Licence Application (FLA) areas approved by Forestry Commission England. Anyone wishing to fell trees must ensure that a licence or permission under a grant scheme has been issued by the Forestry Commission before any felling is carried out or that one of the exceptions apply.

Features are displayed on the Agricultural designations map on **page 69 >**

ID	Location	Description	Reference	Application date
4	75m N	Selective Fell/Thin (Unconditional)	010/120/09-10	17/12/2009

This data is sourced from the Forestry Commission.

12.4 Environmental Stewardship Schemes

Records within 250m	0

Environmental Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment. The schemes identified may be historical schemes that have now expired, or may still be active.

This data is sourced from Natural England.

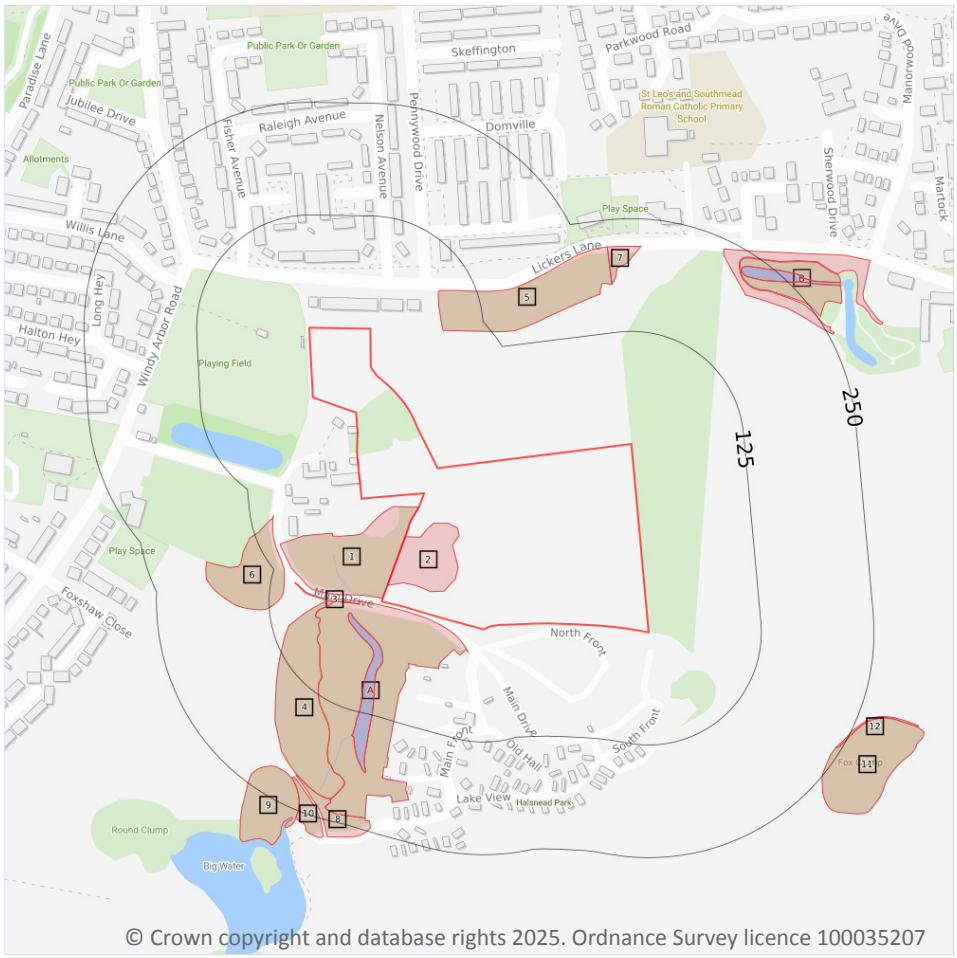
12.5 Countryside Stewardship Schemes

Records within 250m	0

Countryside Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment. Main objectives are to improve the farmed environment for wildlife and to reduce diffuse water pollution.

This data is sourced from Natural England.

13 Habitat designations



13.1 Priority Habitat Inventory

Records within 250m	17

Habitats of principal importance as named under Natural Environment and Rural Communities Act (2006) Section 41.

Features are displayed on the Habitat designations map on **page 72 >**

ID	Location	Main Habitat	Other habitats
1	**On site**	**Deciduous woodland**	**Main habitat: DWOOD (INV > 50%)**
2	**On site**	**Deciduous woodland**	**Main habitat: DWOOD (INV > 50%)**
A	4m SW	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
3	24m SW	Deciduous woodland	Main habitat: DWOOD (INV > 50%)

ID	Location	Main Habitat	Other habitats
A	35m SW	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
4	53m SW	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
5	79m N	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
6	100m W	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
7	178m NE	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
B	208m NE	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
8	214m SW	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
9	217m SW	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
10	217m SW	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
B	220m NE	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
B	226m NE	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
11	243m SE	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
12	244m SE	Deciduous woodland	Main habitat: DWOOD (INV > 50%)

This data is sourced from Natural England.

13.2 Habitat Networks

Records within 250m	**0**

Habitat networks for 18 priority habitat networks (based primarily, but not exclusively, on the priority habitat inventory) and areas suitable for the expansion of networks through restoration and habitat creation.

This data is sourced from Natural England.

13.3 Open Mosaic Habitat

Records within 250m	**0**

Sites verified as Open Mosaic Habitat. Mosaic habitats are brownfield sites that are identified under the UK Biodiversity Action Plan as a priority habitat due to the habitat variation within a single site, supporting an array of invertebrates.

This data is sourced from Natural England.

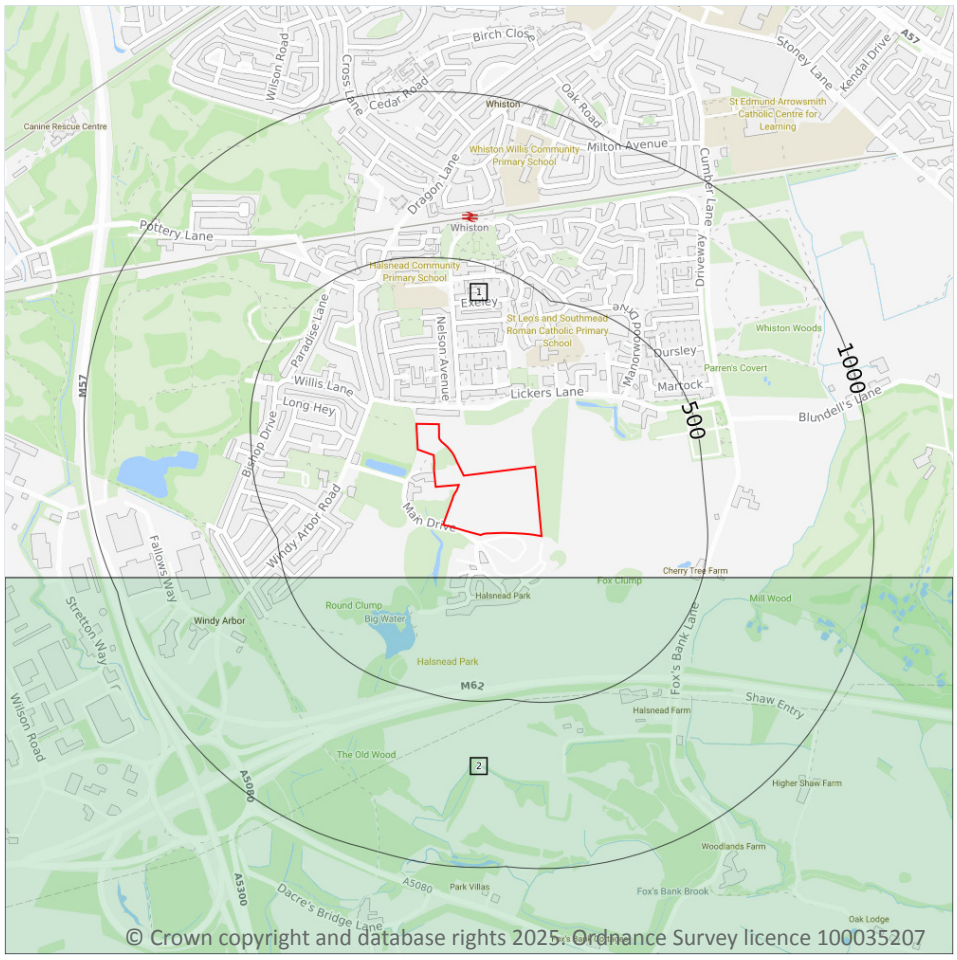
13.4 Limestone Pavement Orders

Records within 250m	0

Limestone pavements are outcrops of limestone where the surface has been worn away by natural means over millennia. These rocks have the appearance of paving blocks, hence their name. Not only do they have geological interest, they also provide valuable habitats for wildlife. These habitats are threatened due to their removal for use in gardens and water features. Many limestone pavements have been designated as SSSIs which affords them some protection. In addition, Section 34 of the Wildlife and Countryside Act 1981 gave them additional protection via the creation of Limestone Pavement Orders, which made it a criminal offence to remove any part of the outcrop. The associated Limestone Pavement Priority Habitat is part of the UK Biodiversity Action Plan priority habitat in England.

This data is sourced from Natural England.

14 Geology 1:10,000 scale - Availability



14.1 10k Availability

Records within 500m	2

An indication on the coverage of 1:10,000 scale geology data for the site, the most detailed dataset provided by the British Geological Survey. Either 'Full', 'Partial' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:10,000 scale - Availability map on **page 75 >**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	**On site**	**No coverage**	**No coverage**	**No coverage**	**No coverage**	**NoCov**
2	125m SE	No coverage	Full	Full	No coverage	SJ48NE

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Artificial and made ground

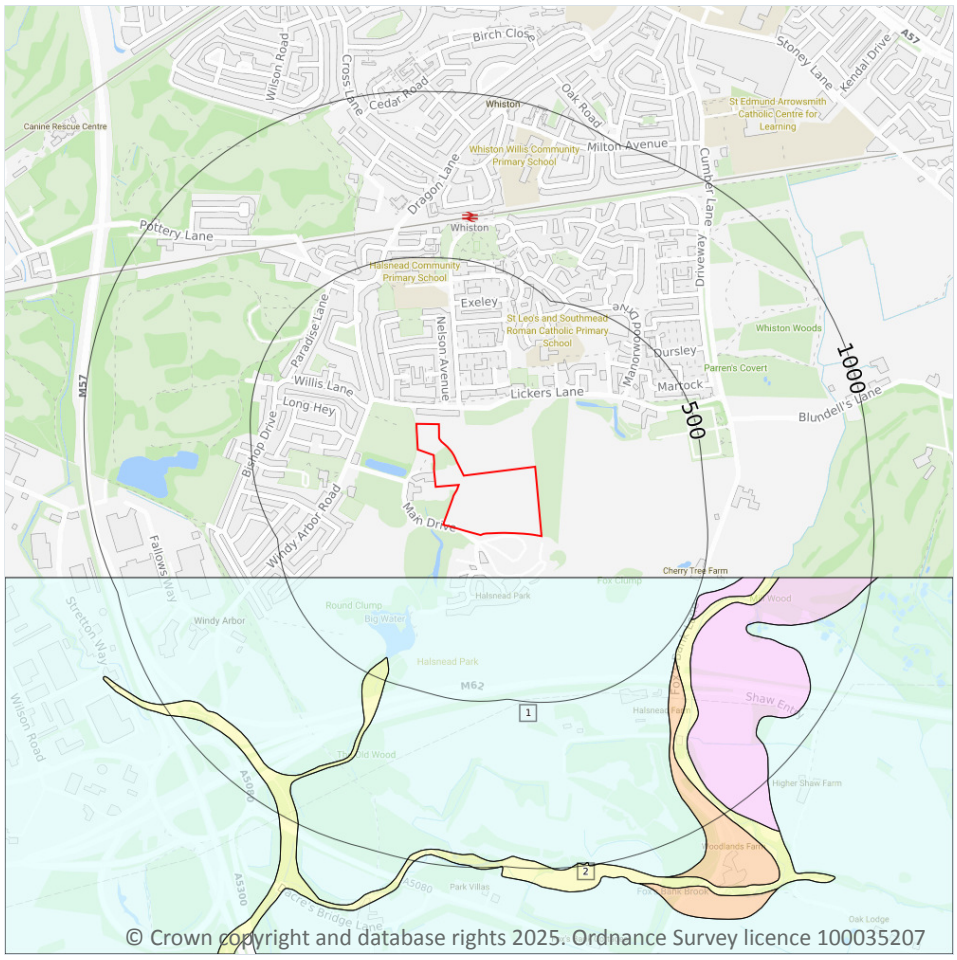
14.2 Artificial and made ground (10k)

Records within 500m	0

Details of made, worked, infilled, disturbed and landscaped ground at 1:10,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Superficial



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Site Outline

Search buffers in metres (m)

Landslip (10k)

Superficial geology (10k)
Please see table for more details.

14.3 Superficial geology (10k)

Records within 500m	2

Superficial geological deposits at 1:10,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

Features are displayed on the Geology 1:10,000 scale - Superficial map on **page 77 >**

ID	Location	LEX Code	Description	Rock description
1	125m SE	TILLD-DMTN	Till, Devensian - Diamicton	Diamicton
2	434m SW	ALV-XCZSV	Alluvium - Clay, Silt, Sand And Gravel	Clay, Silt, Sand And Gravel

This data is sourced from the British Geological Survey.

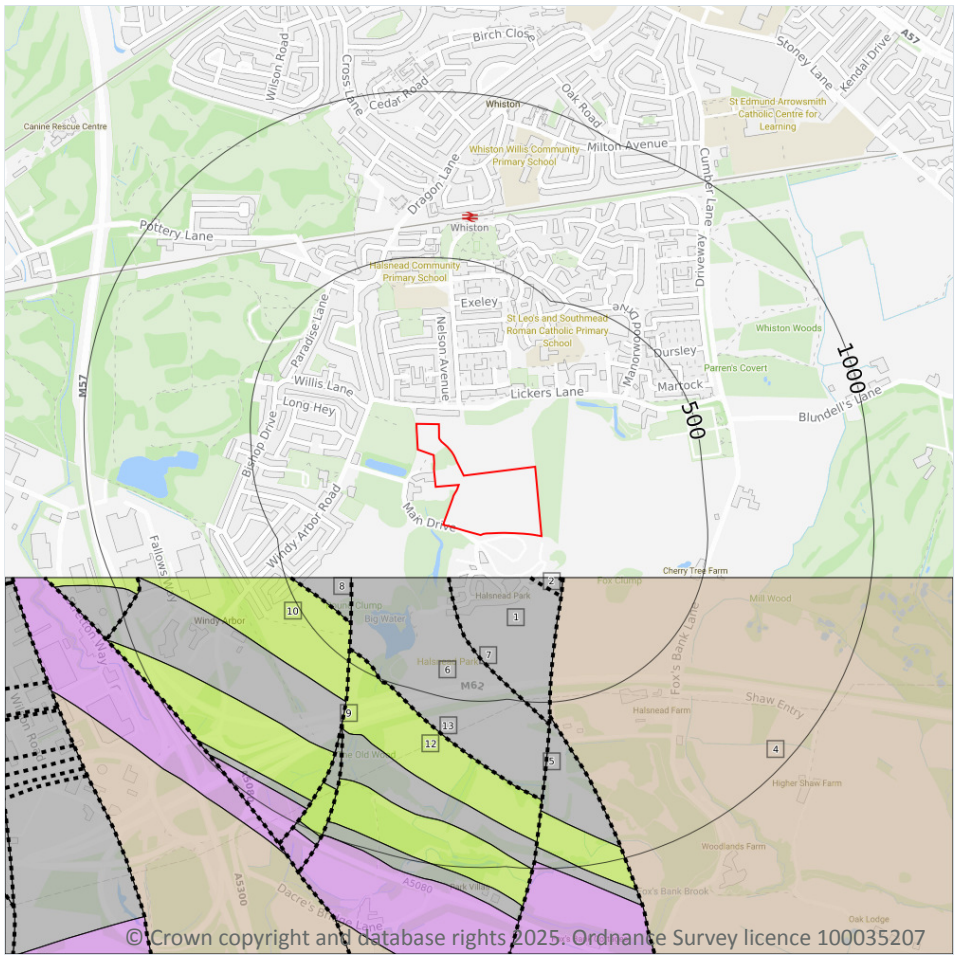
14.4 Landslip (10k)

Records within 500m	0

Mass movement deposits on BGS geological maps at 1:10,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Bedrock



Site Outline

Search buffers in metres (m)

Bedrock faults and other linear features (10k)

Bedrock geology (10k)
Please see table for more details.

14.5 Bedrock geology (10k)

Records within 500m	6

Bedrock geology at 1:10,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:10,000 scale - Bedrock map on **page 79 >**

ID	Location	LEX Code	Description	Rock age
1	125m SE	PMCM-MDSS	Pennine Middle Coal Measures Formation - Mudstone, Siltstone And Sandstone	Bolsovian Sub-age - Duckmantian Sub-age
4	141m SE	KNSF-SDST	Kinnerton Sandstone Formation - Sandstone	Early Triassic Epoch
6	149m SW	PMCM-MDSS	Pennine Middle Coal Measures Formation - Mudstone, Siltstone And Sandstone	Bolsovian Sub-age - Duckmantian Sub-age

ID	Location	LEX Code	Description	Rock age
8	318m SW	PMCM-MDSS	Pennine Middle Coal Measures Formation - Mudstone, Siltstone And Sandstone	Bolsovian Sub-age - Duckmantian Sub-age
10	407m SW	PMCM-SDST	Pennine Middle Coal Measures Formation - Sandstone	Bolsovian Sub-age - Duckmantian Sub-age
12	467m SW	PMCM-SDST	Pennine Middle Coal Measures Formation - Sandstone	Bolsovian Sub-age - Duckmantian Sub-age

This data is sourced from the British Geological Survey.

14.6 Bedrock faults and other linear features (10k)

Records within 500m **7**

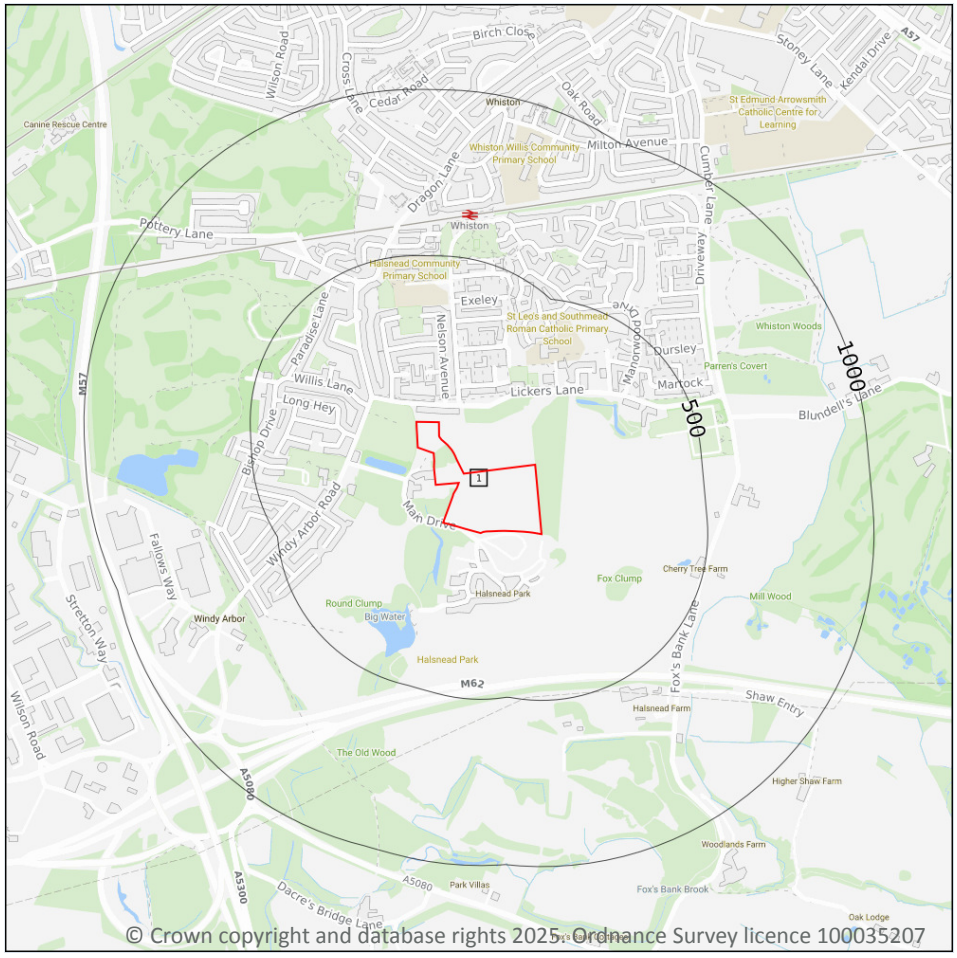
Linear features at the ground or bedrock surface at 1:10,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

Features are displayed on the Geology 1:10,000 scale - Bedrock map on **page 79 >**

ID	Location	Category	Description
2	129m SE	ROCK	Coal seam, inferred (None)
3	135m SE	ROCK	Coal seam, inferred (None)
5	141m SE	FAULT	Normal fault, observed; crossmark on downthrow side
7	149m SW	FAULT	Normal fault, observed; crossmark on downthrow side
9	318m SW	FAULT	Normal fault, observed; crossmark on downthrow side
11	407m SW	ROCK	Coal seam, inferred (Coal_Inf+BedRock)
13	467m SW	ROCK	Coal seam, observed (Coal_Obs+BedRock)

This data is sourced from the British Geological Survey.

15 Geology 1:50,000 scale - Availability



Site Outline

Search buffers in metres (m)

Geological map tile

15.1 50k Availability

Records within 500m	1

An indication on the coverage of 1:50,000 scale geology data for the site. Either 'Full' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:50,000 scale - Availability map on **page 81 >**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	**On site**	**No coverage**	**Full**	**Full**	**No coverage**	**EW097_runcorn_v4**

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Artificial and made ground

15.2 Artificial and made ground (50k)

Records within 500m	0

Details of made, worked, infilled, disturbed and landscaped ground at 1:50,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

This data is sourced from the British Geological Survey.

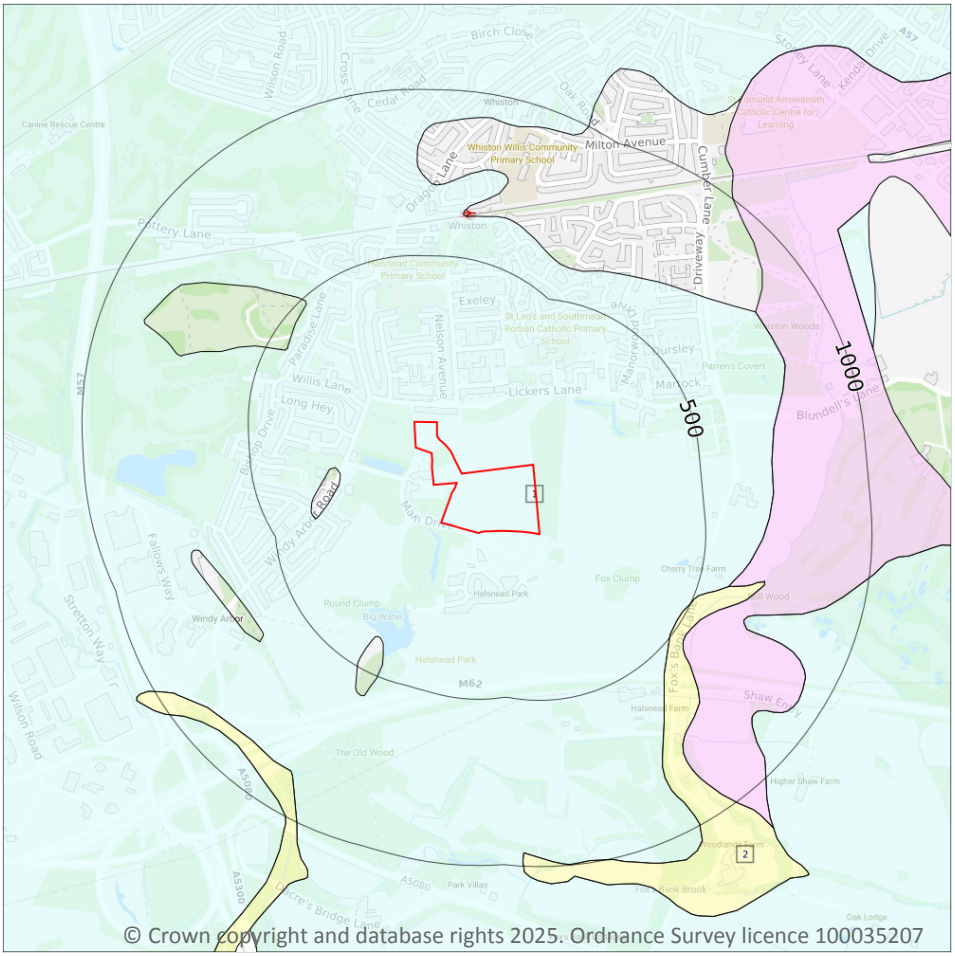
15.3 Artificial ground permeability (50k)

Records within 50m	0

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any artificial deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Superficial



Site Outline

Search buffers in metres (m)

Landslip (50k)

Superficial geology (50k)
Please see table for more details.

15.4 Superficial geology (50k)

Records within 500m **2**

Superficial geological deposits at 1:50,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

Features are displayed on the Geology 1:50,000 scale - Superficial map on **page 83 >**

ID	Location	LEX Code	Description	Rock description
1	**On site**	**TILLD-DMTN**	**TILL, DEVENSIAN**	**DIAMICTON**
2	488m SE	ALV-XCZSV	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL

This data is sourced from the British Geological Survey.

15.5 Superficial permeability (50k)

Records within 50m	1

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any superficial deposits (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	**Mixed**	**High**	**Low**

This data is sourced from the British Geological Survey.

15.6 Landslip (50k)

Records within 500m	0

Mass movement deposits on BGS geological maps at 1:50,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

This data is sourced from the British Geological Survey.

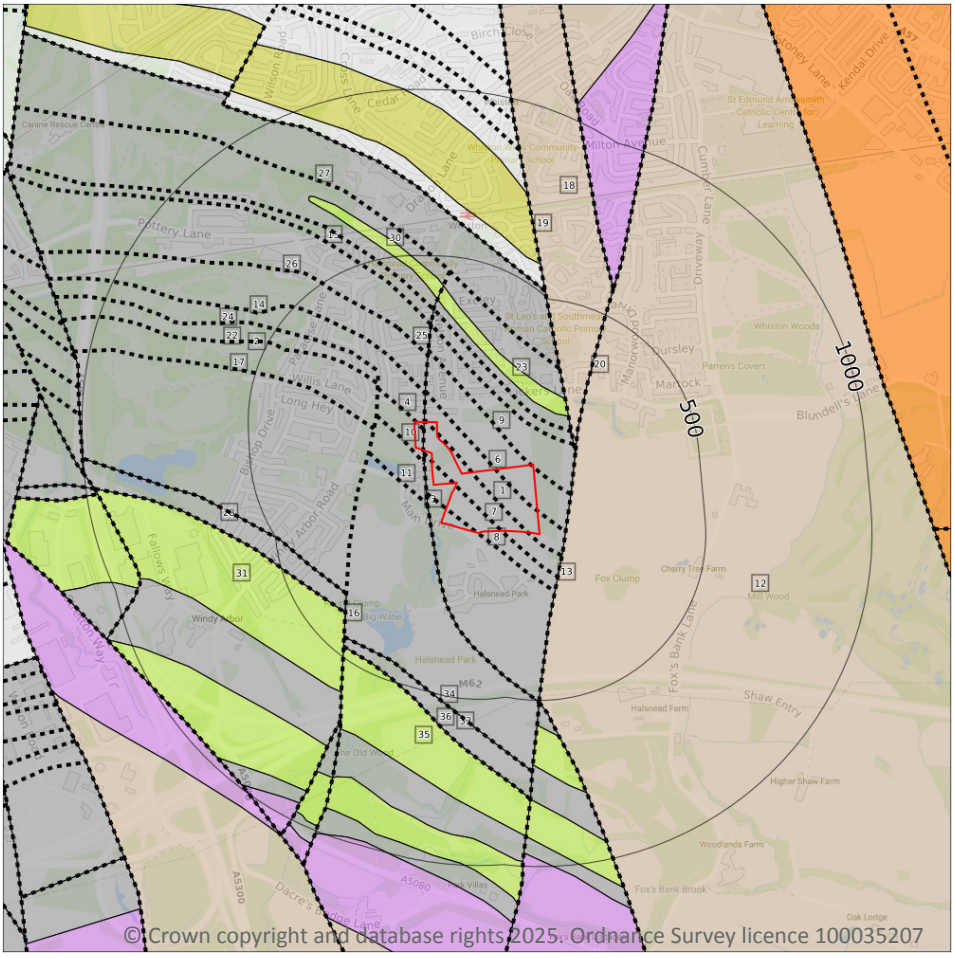
15.7 Landslip permeability (50k)

Records within 50m	0

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any landslip deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Bedrock



Site Outline

Search buffers in metres (m)

Bedrock faults and other linear features (50k)

Bedrock geology (50k)
Please see table for more details.

15.8 Bedrock geology (50k)

Records within 500m	10

Bedrock geology at 1:50,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:50,000 scale - Bedrock map on **page 85 >**

ID	Location	LEX Code	Description	Rock age
1	**On site**	**PMCM-MDSS**	**PENNINE MIDDLE COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE**	**WESTPHALIAN**
2	**On site**	**PMCM-MDSS**	**PENNINE MIDDLE COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE**	**WESTPHALIAN**
12	77m SE	KNSF-SDST	KINNERTON SANDSTONE FORMATION - SANDSTONE	-

ID	Location	LEX Code	Description	Rock age
18	132m E	KNSF-SDST	KINNERTON SANDSTONE FORMATION - SANDSTONE	-
23	168m NE	PMR-SDST	PEMBERTON ROCK - SANDSTONE	WESTPHALIAN
28	356m SW	PMCM-MDSS	PENNINE MIDDLE COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
30	371m N	PMR-SDST	PEMBERTON ROCK - SANDSTONE	WESTPHALIAN
31	396m SW	PMCM-SDST	PENNINE MIDDLE COAL MEASURES FORMATION - SANDSTONE	WESTPHALIAN
33	437m SW	PMCM-MDSS	PENNINE MIDDLE COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
35	470m SW	PMCM-SDST	PENNINE MIDDLE COAL MEASURES FORMATION - SANDSTONE	WESTPHALIAN

This data is sourced from the British Geological Survey.

15.9 Bedrock permeability (50k)

Records within 50m	**1**

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of bedrock (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	**Fracture**	**Moderate**	**Low**

This data is sourced from the British Geological Survey.

15.10 Bedrock faults and other linear features (50k)

Records within 500m	**26**

Linear features at the ground or bedrock surface at 1:50,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

Features are displayed on the Geology 1:50,000 scale - Bedrock map on **page 85 >**

ID	Location	Category	Description
3	**On site**	**FAULT**	**Fault, observed**
4	**On site**	**ROCK**	**Coal seam, inferred**

ID	Location	Category	Description
5	**On site**	**ROCK**	**Coal seam, inferred**
6	**On site**	**ROCK**	**Coal seam, inferred**
7	**On site**	**ROCK**	**Coal seam, inferred**
8	**On site**	**ROCK**	**Coal seam, inferred**
9	**On site**	**ROCK**	**Coal seam, inferred**
10	13m NW	ROCK	Coal seam, inferred
11	57m W	ROCK	Coal seam, inferred
13	77m SE	FAULT	Fault, observed
14	85m NW	ROCK	Coal seam, inferred
15	100m NE	ROCK	Coal seam, inferred
16	115m NW	FAULT	Fault, observed
17	123m NW	ROCK	Coal seam, inferred
19	132m E	FAULT	Fault, observed
20	132m E	FAULT	Fault, observed
21	132m NE	ROCK	Coal seam, inferred
22	159m NW	ROCK	Coal seam, inferred
24	187m NW	ROCK	Coal seam, inferred
25	201m N	ROCK	Coal seam, inferred
26	287m NW	ROCK	Coal seam, inferred
27	300m NE	ROCK	Coal seam, inferred
29	356m SW	FOSSIL_HORIZON	Marine band
32	396m SW	ROCK	Coal seam, inferred
34	437m SW	FOSSIL_HORIZON	Marine band
36	470m SW	ROCK	Coal seam, inferred

This data is sourced from the British Geological Survey.

16 Boreholes

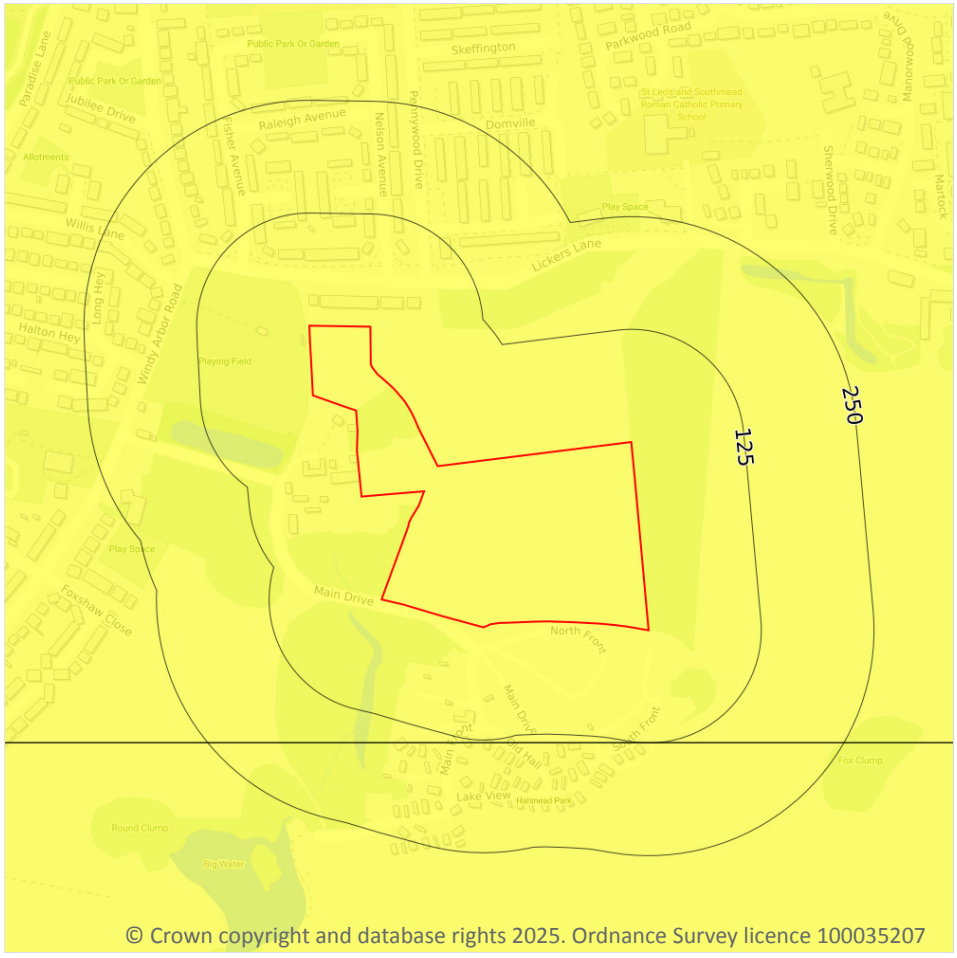
16.1 BGS Boreholes

Records within 250m	0

The Single Onshore Boreholes Index (SOBI); an index of over one million records of boreholes, shafts and wells from all forms of drilling and site investigation work held by the British Geological Survey. Covering onshore and nearshore boreholes dating back to at least 1790 and ranging from one to several thousand metres deep.

This data is sourced from the British Geological Survey.

17 Natural ground subsidence - Shrink swell clays



17.1 Shrink swell clays

Records within 50m	1

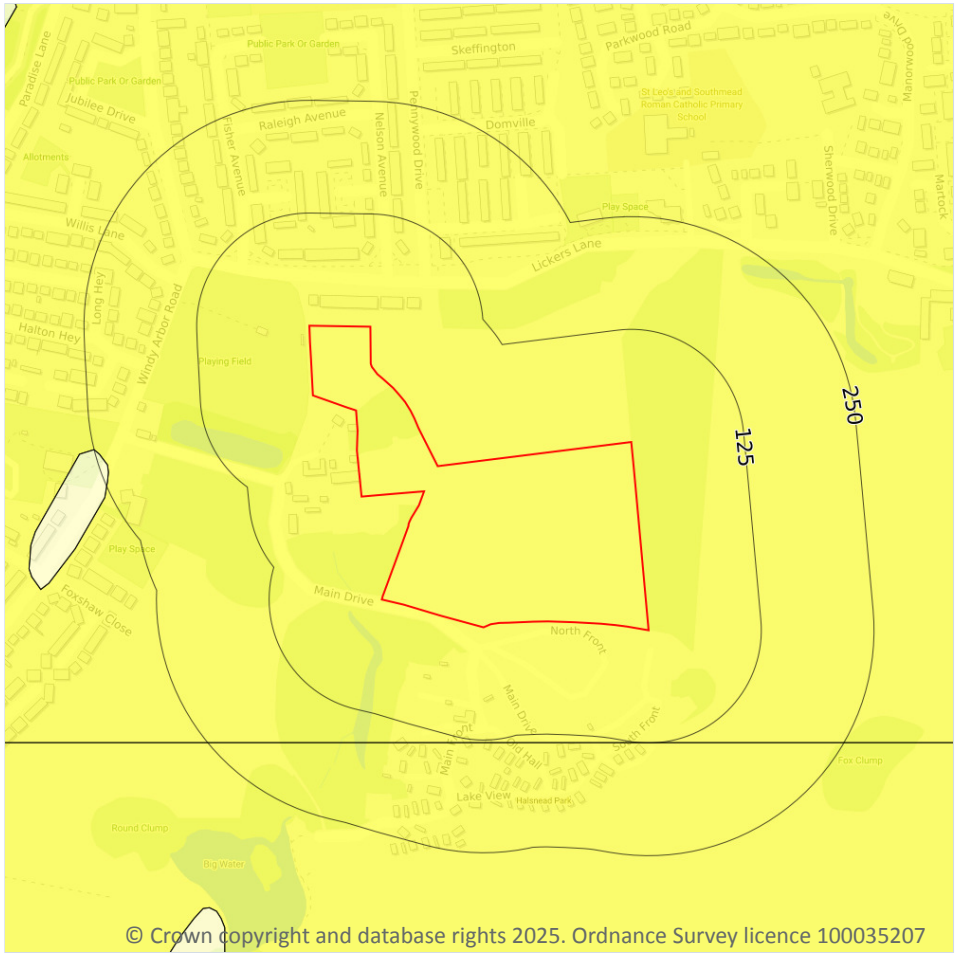
The potential hazard presented by soils that absorb water when wet (making them swell), and lose water as they dry (making them shrink). This shrink-swell behaviour is controlled by the type and amount of clay in the soil, and by seasonal changes in the soil moisture content (related to rainfall and local drainage).

Features are displayed on the Natural ground subsidence - Shrink swell clays map on **page 89 >**

Location	Hazard rating	Details
On site	**Very low**	**Ground conditions predominantly low plasticity.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Running sands



17.2 Running sands

Records within 50m	1

The potential hazard presented by rocks that can contain loosely-packed sandy layers that can become fluidised by water flowing through them. Such sands can 'run', removing support from overlying buildings and causing potential damage.

Features are displayed on the Natural ground subsidence - Running sands map on **page 90 >**

Location	Hazard rating	Details
On site	**Very low**	**Running sand conditions are unlikely. No identified constraints on land use due to running conditions unless water table rises rapidly.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Compressible deposits



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17.3 Compressible deposits

Records within 50m	1

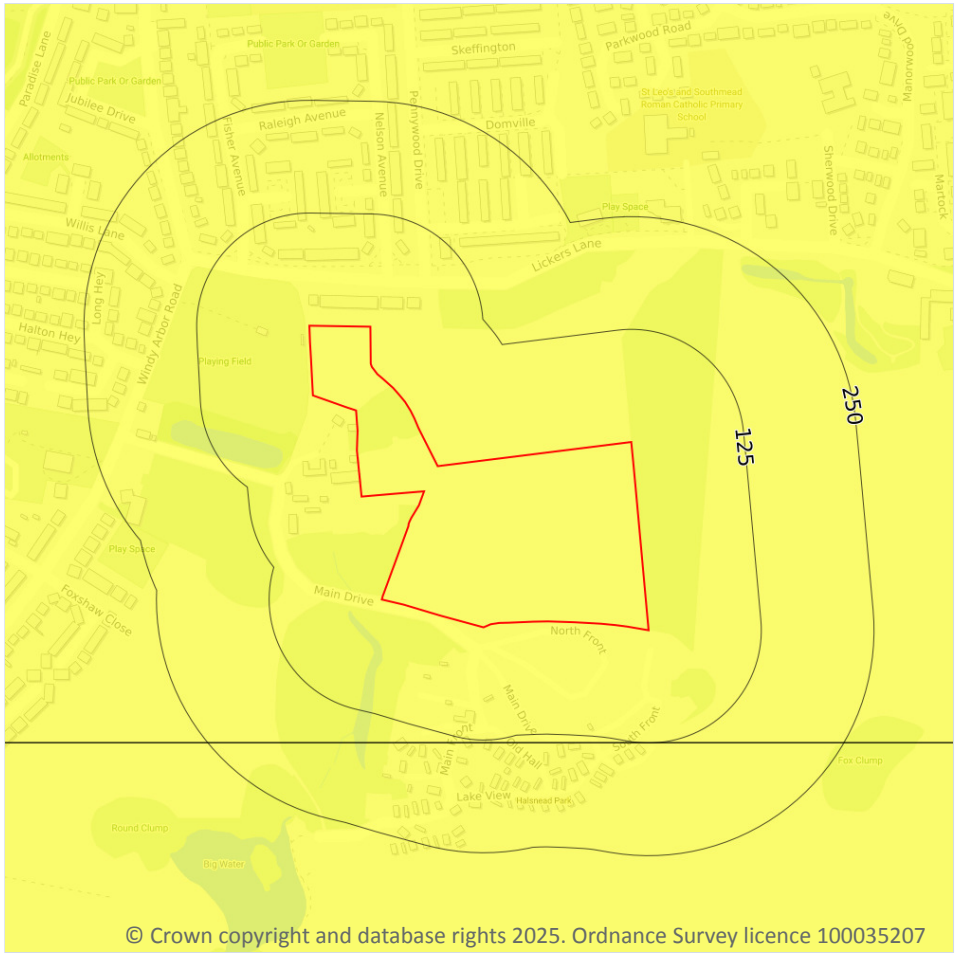
The potential hazard presented by types of ground that may contain layers of very soft materials like clay or peat and may compress if loaded by overlying structures, or if the groundwater level changes, potentially resulting in depression of the ground and disturbance of foundations.

Features are displayed on the Natural ground subsidence - Compressible deposits map on **page 91 >**

Location	Hazard rating	Details
On site	**Negligible**	**Compressible strata are not thought to occur.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Collapsible deposits



17.4 Collapsible deposits

Records within 50m	1

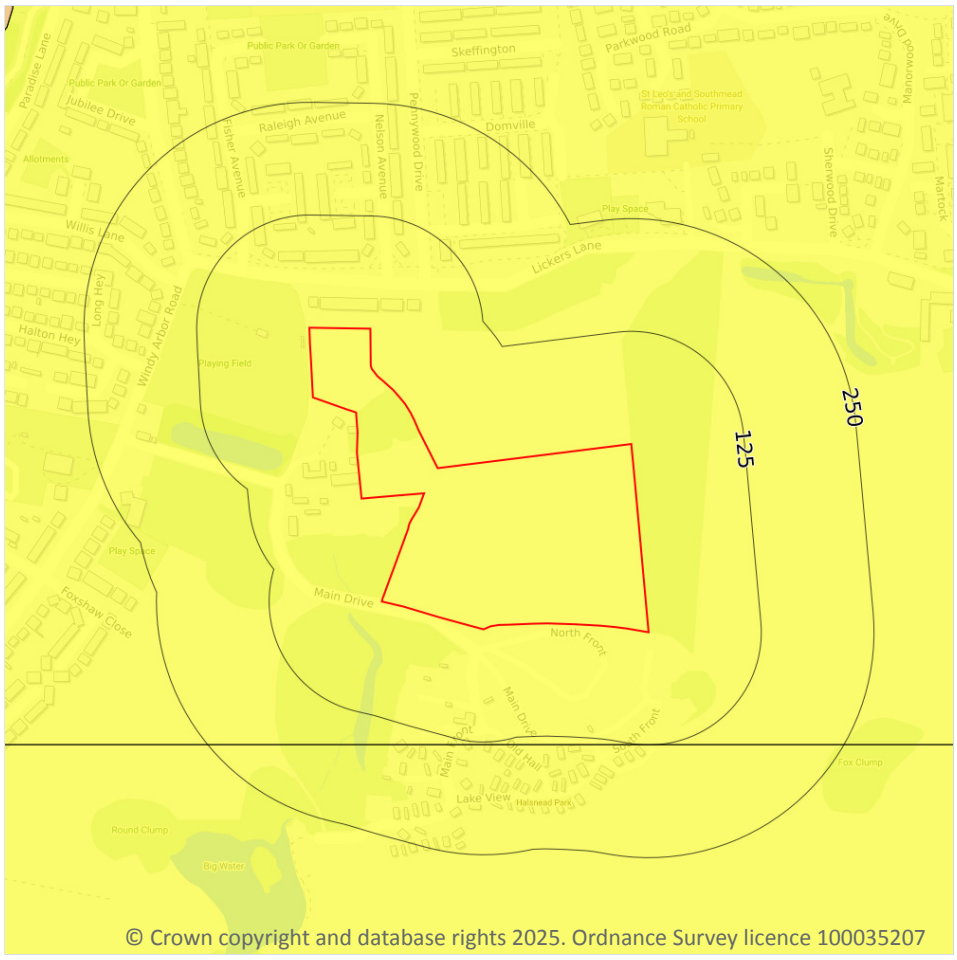
The potential hazard presented by natural deposits that could collapse when a load (such as a building) is placed on them or they become saturated with water.

Features are displayed on the Natural ground subsidence - Collapsible deposits map on **page 92 >**

Location	Hazard rating	Details
On site	**Very low**	**Deposits with potential to collapse when loaded and saturated are unlikely to be present.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Landslides



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.5 Landslides

Records within 50m	1

The potential for landsliding (slope instability) to be a hazard assessed using 1:50,000 scale digital maps of superficial and bedrock deposits, combined with information from the BGS National Landslide Database and scientific and engineering reports.

Features are displayed on the Natural ground subsidence - Landslides map on **page 93 >**

Location	Hazard rating	Details
On site	**Very low**	**Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Ground dissolution of soluble rocks



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17.6 Ground dissolution of soluble rocks

Records within 50m	1

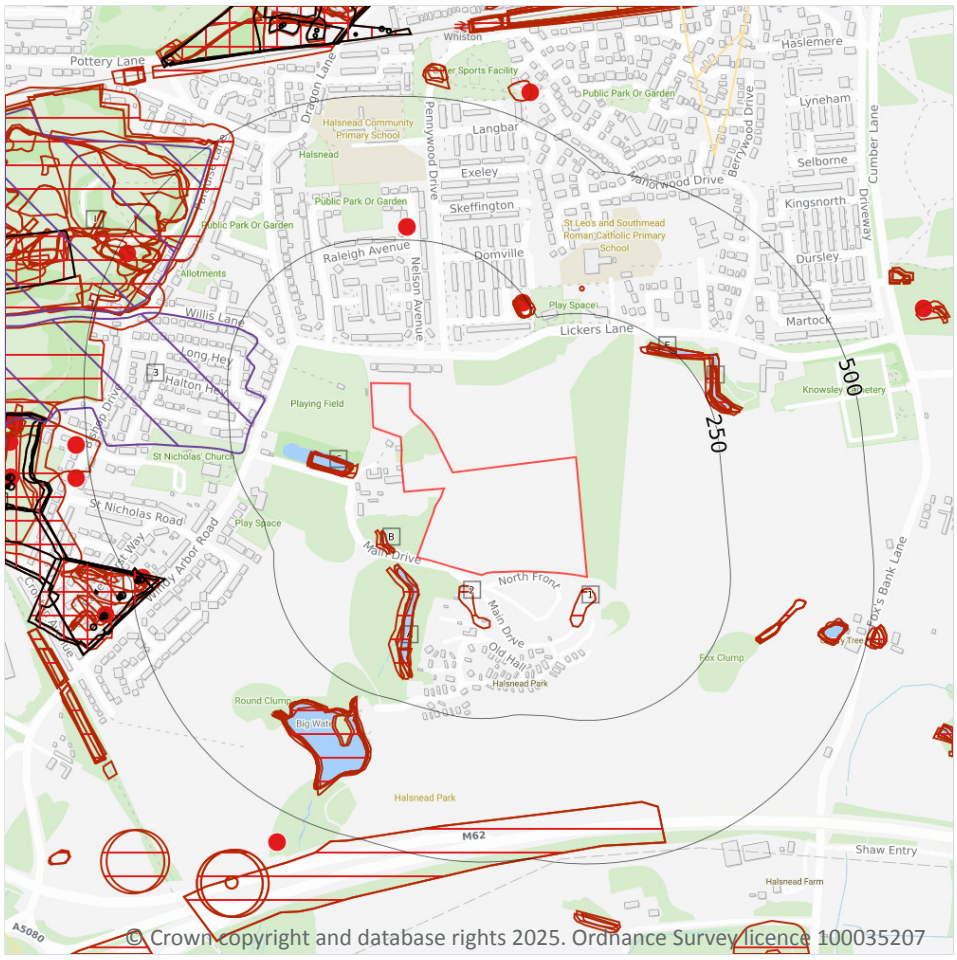
The potential hazard presented by ground dissolution, which occurs when water passing through soluble rocks produces underground cavities and cave systems. These cavities reduce support to the ground above and can cause localised collapse of the overlying rocks and deposits.

Features are displayed on the Natural ground subsidence - Ground dissolution of soluble rocks map on **page 94 >**

Location	Hazard rating	Details
On site	**Negligible**	**Soluble rocks are either not thought to be present within the ground, or not prone to dissolution. Dissolution features are unlikely to be present.**

This data is sourced from the British Geological Survey.

18 Mining and ground workings



Site Outline

Search buffers in metres (m)

- BritPits
- Surface ground workings
- Underground workings
- Underground mining extents
- Historical mineral planning areas
- TCA non-coal mining

Non Coal Mining

- Sporadic underground mining of restricted extent possible
- Localised small scale underground mining possible
- Small scale mining possible
- Underground mining known or likely within or in close proximity
- Underground mining known within or in very close proximity

18.1 BritPits

Records within 500m	4

BritPits (an abbreviation of British Pits) is a database maintained by the British Geological Survey of currently active and closed surface and underground mineral workings. Details of major mineral handling sites, such as wharfs and rail depots are also held in the database.

Features are displayed on the Mining and ground workings map on **page 96 >**

ID	Location	Details	Description
F	242m N	Name: Stone Quarry Plantation Address: Whiston, PRESCOT, Merseyside Commodity: Sandstone Status: Ceased	Type: A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority
4	273m N	Name: Whitson Lane Ends Pit Address: Whiston Lane Ends, Whiston, PRESCOT, Merseyside Commodity: Coal, Deep Status: Ceased	Type: Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots) Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority
M	480m W	Name: Halsnead Colliery, No. 3 Pit Address: Whiston Lane Ends, Whiston, PRESCOT, Merseyside Commodity: Coal, Deep Status: Ceased	Type: Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots) Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority
L	480m NW	Name: Whiston Metallic Brick Works Address: Whiston Lane Ends, Whiston, PRESCOT, Merseyside Commodity: Clay & Shale Status: Ceased	Type: A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority

This data is sourced from the British Geological Survey.

18.2 Surface ground workings

Records within 250m **36**

Historical land uses identified from Ordnance Survey mapping that involved ground excavation at the surface. These features may or may not have been subsequently backfilled.

Features are displayed on the Mining and ground workings map on **page 96 >**

ID	Location	Land Use	Year of mapping	Mapping scale
1	20m SE	Pond	1978	1:10000

ID	Location	Land Use	Year of mapping	Mapping scale
2	25m S	Ponds	1956	1:10560
A	33m SW	Pond	1978	1:10000
A	33m SW	Pond	1990	1:10000
A	33m SW	Pond	1966	1:10560
A	34m SW	Water Body	1850	1:10560
B	40m SW	Pond	1925	1:10560
B	41m SW	Pond	1938	1:10560
A	47m SW	Water Body	1891	1:10560
B	48m SW	Pond	1891	1:10560
C	70m W	Pond	1938	1:10560
C	74m W	Pond	1956	1:10560
C	74m W	Pond	1978	1:10000
C	74m W	Pond	1990	1:10000
C	74m W	Pond	1966	1:10560
C	79m W	Pond	1947	1:10560
C	79m W	Pond	1925	1:10560
C	79m W	Pond	1891	1:10560
C	79m W	Pond	1906	1:10560
C	80m W	Pond	1850	1:10560
A	157m SW	Pond	1989	1:10000
A	159m SW	Pond	1967	1:10560
A	160m SW	Pond	1977	1:10000
D	217m NE	Ponds	1891	1:10560
E	221m NE	Pond	1925	1:10560
E	222m NE	Pond	1938	1:10560
F	224m N	Unspecified Pit	1947	1:10560
F	224m N	Unspecified Pit	1925	1:10560
F	224m N	Unspecified Pit	1906	1:10560

ID	Location	Land Use	Year of mapping	Mapping scale
F	224m N	Unspecified Old Quarry	1891	1:10560
F	226m N	Unspecified Pit	1938	1:10560
F	226m N	Unspecified Pit	1938	1:10560
D	227m NE	Ponds	1978	1:10000
D	227m NE	Ponds	1990	1:10000
D	227m NE	Ponds	1966	1:10560
F	230m N	Unspecified Pit	1956	1:10560

This is data is sourced from Ordnance Survey/Groundsure.

18.3 Underground workings

Records within 1000m	**76**

Historical land uses identified from Ordnance Survey mapping that indicate the presence of underground workings e.g. mine shafts.

Features are displayed on the Mining and ground workings map on **page 96 >**

ID	Location	Land Use	Year of mapping	Mapping scale
M	442m W	Old Colliery	1906	1:10560
M	453m W	Old Colliery	1891	1:10560
O	462m W	Disused Colliery	1947	1:10560
O	462m W	Disused Colliery	1925	1:10560
M	477m W	Unspecified Disused Shafts	1966	1:10560
M	483m W	Unspecified Old Shaft	1956	1:10560
M	485m W	Unspecified Old Shafts	1947	1:10560
M	485m W	Unspecified Old Shafts	1925	1:10560
M	512m W	Unspecified Disused Shafts	1966	1:10560
M	517m W	Unspecified Old Shaft	1956	1:10560
M	520m W	Unspecified Old Shafts	1947	1:10560
M	520m W	Unspecified Old Shafts	1925	1:10560
V	548m NW	Colliery	1891	1:10560

ID	Location	Land Use	Year of mapping	Mapping scale
M	549m W	Unspecified Disused Shafts	1966	1:10560
M	553m W	Unspecified Old Shaft	1956	1:10560
M	556m W	Unspecified Old Shafts	1947	1:10560
M	556m W	Unspecified Old Shafts	1925	1:10560
M	559m W	Unspecified Old Shaft	1956	1:10560
T	568m W	Unspecified Disused Mine	1966	1:10560
M	571m W	Unspecified Disused Shafts	1966	1:10560
T	572m W	Disused Colliery	1906	1:10560
T	583m W	Colliery	1891	1:10560
Z	594m N	Disused Colliery	1925	1:10560
Z	595m N	Disused Colliery	1906	1:10560
Z	595m N	Colliery	1891	1:10560
Z	606m N	Unspecified Old Shafts	1956	1:10560
Z	606m N	Unspecified Disused Shafts	1990	1:10000
AA	608m NW	Disused Colliery	1906	1:10560
Z	610m N	Unspecified Old Shafts	1925	1:10560
Z	610m N	Unspecified Old Shafts	1956	1:10560
Z	613m N	Unspecified Old Shafts	1956	1:10560
Z	619m N	Unspecified Old Shafts	1925	1:10560
Z	623m NW	Unspecified Disused Shafts	1990	1:10000
T	631m W	Unspecified Disused Shaft	1966	1:10560
T	633m W	Unspecified Disused Shaft	1966	1:10560
Z	638m NW	Unspecified Old Shafts	1947	1:10560
Z	638m NW	Unspecified Old Shafts	1925	1:10560
T	638m W	Unspecified Old Shaft	1956	1:10560
Z	639m NW	Unspecified Old Shafts	1956	1:10560
T	639m W	Unspecified Old Shafts	1947	1:10560
T	639m W	Unspecified Old Shafts	1925	1:10560

ID	Location	Land Use	Year of mapping	Mapping scale
T	642m W	Unspecified Old Shaft	1956	1:10560
T	643m W	Unspecified Old Shafts	1947	1:10560
T	643m W	Unspecified Old Shafts	1925	1:10560
-	655m W	Unspecified Shafts	1891	1:10560
-	663m W	Unspecified Old Shaft	1956	1:10560
-	670m S	Unspecified Mine	1967	1:10560
-	703m S	Colliery	1925	1:10560
-	721m S	Colliery	1955	1:10560
-	724m NW	Unspecified Old Shaft	1925	1:10560
-	726m S	Colliery	1947	1:10560
-	744m NW	Colliery	1925	1:10560
-	807m NW	Colliery	1891	1:10560
-	809m W	Disused Colliery	1906	1:10560
-	885m W	Old Colliery	1956	1:10560
-	887m W	Unspecified Disused Mine	1966	1:10560
-	888m W	Old Colliery	1947	1:10560
-	888m W	Old Colliery	1925	1:10560
-	888m W	Old Colliery	1906	1:10560
-	888m W	Old Colliery	1891	1:10560
-	895m NW	Unspecified Old Shafts	1947	1:10560
-	895m NW	Unspecified Old Shafts	1925	1:10560
-	895m NW	Unspecified Disused Shaft	1978	1:10000
-	895m NW	Unspecified Disused Shaft	1990	1:10000
-	897m NW	Unspecified Disused Shaft	1966	1:10560
-	898m NW	Unspecified Old Shafts	1956	1:10560
-	912m NW	Unspecified Old Shafts	1947	1:10560
-	912m NW	Unspecified Old Shafts	1925	1:10560
-	913m NW	Unspecified Disused Shaft	1966	1:10560

ID	Location	Land Use	Year of mapping	Mapping scale
-	915m NW	Unspecified Old Shafts	1956	1:10560
-	915m W	Unspecified Disused Shaft	1966	1:10560
-	918m W	Unspecified Old Shaft	1956	1:10560
-	922m W	Unspecified Old Shaft	1947	1:10560
-	922m W	Unspecified Old Shaft	1925	1:10560
-	925m NW	Unspecified Old Shafts	1956	1:10560
-	953m NW	Unspecified Old Shafts	1947	1:10560

This is data is sourced from Ordnance Survey/Groundsure.

18.4 Underground mining extents

Records within 500m	0

This data identifies underground mine workings that could present a potential risk, including adits and seam workings. These features have been identified from BGS Geological mapping and mine plans sourced from the BGS and various collections and sources.

This data is sourced from Groundsure.

18.5 Historical Mineral Planning Areas

Records within 500m	2

Boundaries of mineral planning permissions for England and Wales. This data was collated between the 1940s (and retrospectively to the 1930s) and the mid 1980s. The data includes permitted, withdrawn and refused permissions.

Features are displayed on the Mining and ground workings map on **page 96 >**

ID	Location	Site Name	Mineral	Type	Planning Status	Planning Status Date
3	187m NW	Whiston	Clay, shale, bricks	Surface mineral working	Valid	7/7/47,25/9/52
I	407m NW	Whiston	Clay, shale, bricks	Surface mineral working	Valid	7/7/47,25/9/52

This data is sourced from the British Geological Survey.

18.6 Non-coal mining

Records within 1000m	2

The potential for historical non-coal mining to have affected an area. The assessment is drawn from expert knowledge and literature in addition to the digital geological map of Britain. Mineral commodities may be divided into seven general categories - vein minerals, chalk, oil shale, building stone, bedded ores, evaporites and 'other' commodities (including ball clay, jet, black marble, graphite and chert).

Features are displayed on the Mining and ground workings map on **page 96 >**

ID	Location	Name	Commodity	Class	Likelihood
7	581m NE	Not available	Vein Mineral	A	Underground mine workings are uncommon, although the geology is similar to that worked elsewhere. Potential for difficult ground conditions are unlikely and are at a level where they need not be considered.
14	945m SW	Not available	Vein Mineral	A	Underground mine workings are uncommon, although the geology is similar to that worked elsewhere. Potential for difficult ground conditions are unlikely and are at a level where they need not be considered.

This data is sourced from the British Geological Survey.

18.7 JPB mining areas

Records on site	0

Areas which could be affected by former coal and other mining. This data includes some mine plans unavailable to the Coal Authority.

This data is sourced from Johnson Poole and Bloomer.

18.8 The Coal Authority non-coal mining

Records within 500m	0

This data provides an indication of the potential zone of influence of recorded underground non-coal mining workings. Any and all analysis and interpretation of Coal Authority Data in this report is made by Groundsure, and is in no way supported, endorsed or authorised by the Coal Authority. The use of the data is restricted to the terms and provisions contained in this report. Data reproduced in this report may be the copyright of the Coal Authority and permission should be sought from Groundsure prior to any re-use.

This data is sourced from The Coal Authority.

18.9 Researched mining

Records within 500m	1

This data indicates areas of potential mining identified from alternative or archival sources, including; BGS Geological paper maps, Lidar data, aerial photographs (from World War II onwards), archaeological data services, websites, Tithe maps, and various text/plans from collected books and reports. Some of this data is approximate and Groundsure have interpreted the resultant risk area and, where possible, specific areas of risk have been captured.

Location	Mineral type
420m W	Metals

This data is sourced from Groundsure.

18.10 Mining record office plans

Records within 500m	0

This dataset is representative of Mining Record Office and/or plan extents held by Groundsure and should be considered approximate. Where possible, plans have been located and any specific areas of risk they depict have been captured.

This data is sourced from Groundsure.

18.11 BGS mine plans

Records within 500m	0

This dataset is representative of BGS mine plans held by Groundsure and should be considered approximate. Where possible, plans have been located and any specific areas of risk they depict have been captured.

This data is sourced from Groundsure.

18.12 Coal mining

Records on site	1

Areas which could be affected by past, current or future coal mining.

Location	Details
On site	**The site is located within a coal mining area as defined by the Coal Authority. A Consultants Coal Mining Report is recommended to further assess coal mining issues at the site. This can be ordered directly through Groundsure or your preferred search provider.**

This data is sourced from the Coal Authority.

18.13 Brine areas

Records on site	0

The Cheshire Brine Compensation District indicates areas that may be affected by salt and brine extraction in Cheshire and where compensation would be available where damage from this mining has occurred. Damage from salt and brine mining can still occur outside this district, but no compensation will be available.

This data is sourced from the Cheshire Brine Subsidence Compensation Board.

18.14 Gypsum areas

Records on site	0

Generalised areas that may be affected by gypsum extraction.

This data is sourced from British Gypsum.

18.15 Tin mining

Records on site	0

Generalised areas that may be affected by historical tin mining.

This data is sourced from Groundsure.

18.16 Clay mining

Records on site	0

Generalised areas that may be affected by kaolin and ball clay extraction.

This data is sourced from the Kaolin and Ball Clay Association (UK).

19 Ground cavities and sinkholes

19.1 Natural cavities

Records within 500m	0

Industry recognised national database of natural cavities. Sinkholes and caves are formed by the dissolution of soluble rock, such as chalk and limestone, gulls and fissures by cambering. Ground instability can result from movement of loose material contained within these cavities, often triggered by water.

This data is sourced from Stantec UK Ltd.

19.2 Mining cavities

Records within 1000m	0

Industry recognised national database of mining cavities. Degraded mines may result in hazardous subsidence (crown holes). Climatic conditions and water escape can also trigger subsidence over mine entrances and workings.

This data is sourced from Stantec UK Ltd.

19.3 Reported recent incidents

Records within 500m	0

This data identifies sinkhole information gathered from media reports and Groundsure's own records. This data goes back to 2014 and includes relative accuracy ratings for each event and links to the original data sources. The data is updated on a regular basis and should not be considered a comprehensive catalogue of all sinkhole events. The absence of data in this database does not mean a sinkhole definitely has not occurred during this time.

This data is sourced from Groundsure.

19.4 Historical incidents

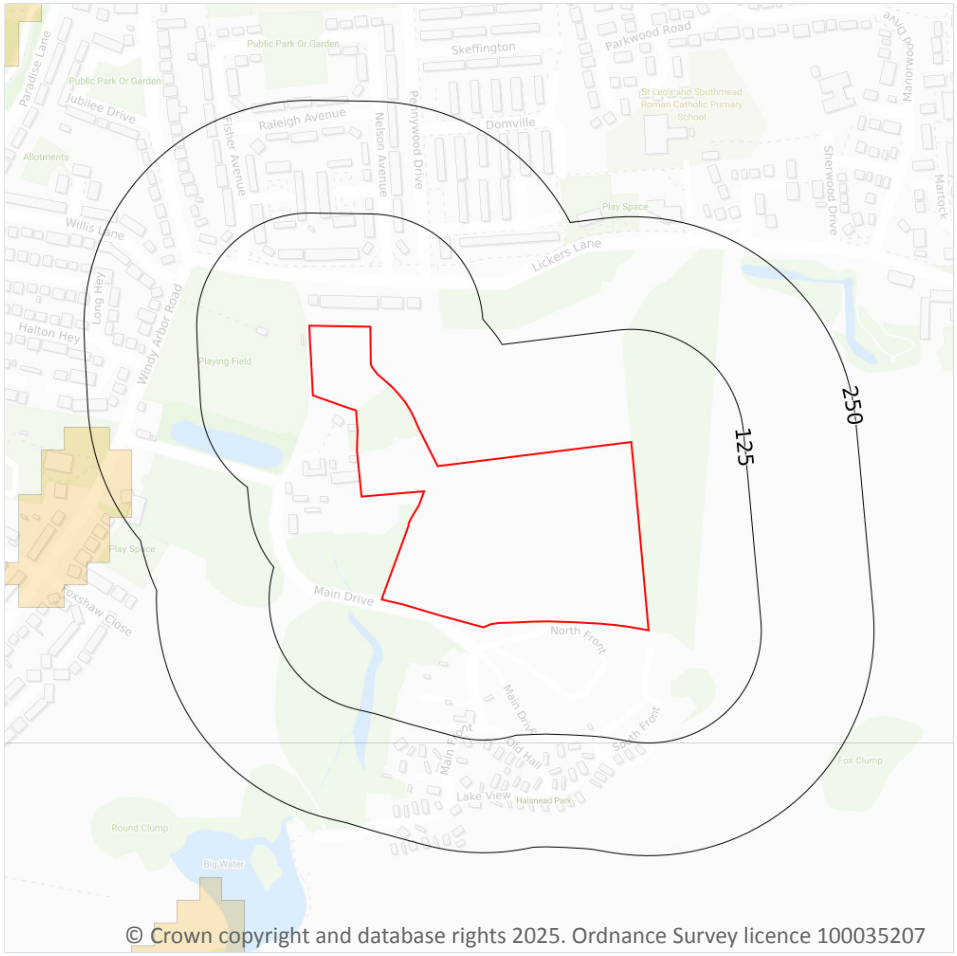
Records within 500m	0

This dataset comprises an extract of 1:10,560, 1:10,000, 1:2,500 and 1:1,250 scale historical Ordnance Survey maps held by Groundsure, dating back to the 1840s. It shows shakeholes, deneholes and other 'holes' as noted on these maps. Dene holes are medieval chalk extraction pits, usually comprising a narrow shaft with a number of chambers at the base of the shaft. Shakeholes are an alternative name for suffusion sinkholes, most commonly found in the limestone landscapes of North Yorkshire but also extensively noted around the Brecon Beacons National Park.

Not all 'holes' noted on Ordnance Survey mapping will necessarily be present within this dataset.

This data is sourced from Groundsure.

20 Radon



Site Outline

Search buffers in metres (m)

- Greater than 30%
- Between 10% and 30%
- Between 5% and 10%
- Between 3% and 5%
- Between 1% and 3%
- Less than 1%

20.1 Radon

Records on site	1

The Radon Potential data classifies areas based on their likelihood of a property having a radon level at or above the Action Level in Great Britain. The dataset is intended for use at 1:50,000 scale and was derived from both geological assessments and indoor radon measurements (more than 560,000 records). A minimum 50m buffer should be considered when searching the maps, as the smallest detectable feature at this scale is 50m. The findings of this section should supersede any estimations derived from the Indicative Atlas of Radon in Great Britain (1:100,000 scale).

Features are displayed on the Radon map on **page 108 >**

Location	Estimated properties affected	Radon Protection Measures required
On site	**Less than 1%**	**None**

This data is sourced from the British Geological Survey and UK Health Security Agency.

21 Soil chemistry

21.1 BGS Estimated Background Soil Chemistry

Records within 50m	6

The estimated values provide the likely background concentration of the potentially harmful elements Arsenic, Cadmium, Chromium, Lead and Nickel in topsoil. The values are estimated primarily from rural topsoil data collected at a sample density of approximately 1 per 2 km^2. In areas where rural soil samples are not available, estimation is based on stream sediment data collected from small streams at a sampling density of 1 per 2.5 km^2; this is the case for most of Scotland, Wales and southern England. The stream sediment data are converted to soil-equivalent concentrations prior to the estimation.

Location	Arsenic	Bioaccessible Arsenic	Lead	Bioaccessible Lead	Cadmium	Chromium	Nickel
On site	**15 mg/kg**	**No data**	**200 - 300 mg/kg**	**120 - 240 mg/kg**	**1.8 mg/kg**	**90 - 120 mg/kg**	**15 - 30 mg/kg**
On site	**15 mg/kg**	**No data**	**200 - 300 mg/kg**	**120 - 240 mg/kg**	**1.8 mg/kg**	**90 - 120 mg/kg**	**15 - 30 mg/kg**
On site	**15 mg/kg**	**No data**	**300 - 600 mg/kg**	**240 - 360 mg/kg**	**1.8 - 2.2 mg/kg**	**90 - 120 mg/kg**	**15 - 30 mg/kg**
37m NW	15 mg/kg	No data	300 - 600 mg/kg	240 - 360 mg/kg	2.2 - 3.0 mg/kg	90 - 120 mg/kg	15 - 30 mg/kg
38m NW	15 mg/kg	No data	200 - 300 mg/kg	120 - 240 mg/kg	1.8 - 2.2 mg/kg	90 - 120 mg/kg	15 - 30 mg/kg
38m NW	15 mg/kg	No data	200 - 300 mg/kg	120 - 240 mg/kg	1.8 - 2.2 mg/kg	90 - 120 mg/kg	15 - 30 mg/kg

This data is sourced from the British Geological Survey.

21.2 BGS Estimated Urban Soil Chemistry

Records within 50m	0

Estimated topsoil chemistry of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc and bioaccessible Arsenic and Lead in 23 urban centres across Great Britain. These estimates are derived from interpolation of the measured urban topsoil data referred to above and provide information across each city between the measured sample locations (4 per km^2).

This data is sourced from the British Geological Survey.

21.3 BGS Measured Urban Soil Chemistry

Records within 50m	0

The locations and measured total concentrations (mg/kg) of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc in urban topsoil samples from 23 urban centres across Great Britain. These are collected at a sample density of 4 per km^2.

This data is sourced from the British Geological Survey.

22 Railway infrastructure and projects

22.1 Underground railways (London)

Records within 250m	0

Details of all active London Underground lines, including approximate tunnel roof depth and operational hours.

This data is sourced from publicly available information by Groundsure.

22.2 Underground railways (Non-London)

Records within 250m	0

Details of the Merseyrail system, the Tyne and Wear Metro and the Glasgow Subway. Not all parts of all systems are located underground. The data contains location information only and does not include a depth assessment.

This data is sourced from publicly available information by Groundsure.

22.3 Railway tunnels

Records within 250m	0

Railway tunnels taken from contemporary Ordnance Survey mapping.

This data is sourced from the Ordnance Survey.

22.4 Historical railway and tunnel features

Records within 250m	0

Railways and tunnels digitised from historical Ordnance Survey mapping as scales of 1:1,250, 1:2,500, 1:10,000 and 1:10,560.

This data is sourced from Ordnance Survey/Groundsure.

22.5 Royal Mail tunnels

Records within 250m	0

The Post Office Railway, otherwise known as the Mail Rail, is an underground railway running through Central London from Paddington Head District Sorting Office to Whitechapel Eastern Head Sorting Office. The line is 10.5km long. The data includes details of the full extent of the tunnels, the depth of the tunnel, and the depth to track level.

This data is sourced from Groundsure/the Postal Museum.

22.6 Historical railways

Records within 250m	0

Former railway lines, including dismantled lines, abandoned lines, disused lines, historic railways and razed lines.

This data is sourced from OpenStreetMap.

22.7 Railways

Records within 250m	0

Currently existing railway lines, including standard railways, narrow gauge, funicular, trams and light railways.

This data is sourced from Ordnance Survey and OpenStreetMap.

22.8 Crossrail 2

Records within 500m	0

Crossrail 2 is a proposed railway linking the national rail networks in Surrey and Hertfordshire via an underground tunnel through London.

This data is sourced from publicly available information by Groundsure.

22.9 HS2

Records within 500m	0

HS2 is a proposed high speed rail network running from London to Manchester and Leeds via Birmingham. Main civils construction on Phase 1 (London to Birmingham) of the project began in 2019, and it is currently anticipated that this phase will be fully operational by 2026. Construction on Phase 2a (Birmingham to Crewe) is anticipated to commence in 2021, with the service fully operational by 2027. Construction on Phase 2b (Crewe to Manchester and Birmingham to Leeds) is scheduled to begin in 2023 and be operational by 2033.

This data is sourced from HS2 ltd.

Data providers

Groundsure works with respected data providers to bring you the most relevant and accurate information. To find out who they are and their areas of expertise see https://www.groundsure.com/sources-reference ↗.

Terms and conditions

Groundsure's Terms and Conditions can be accessed at this link: www.groundsure.com/terms-and-conditions-april-2023/ ↗.

APPENDIX D

BGS Exploratory Hole Records

APPENDIX E

Mining Search Report

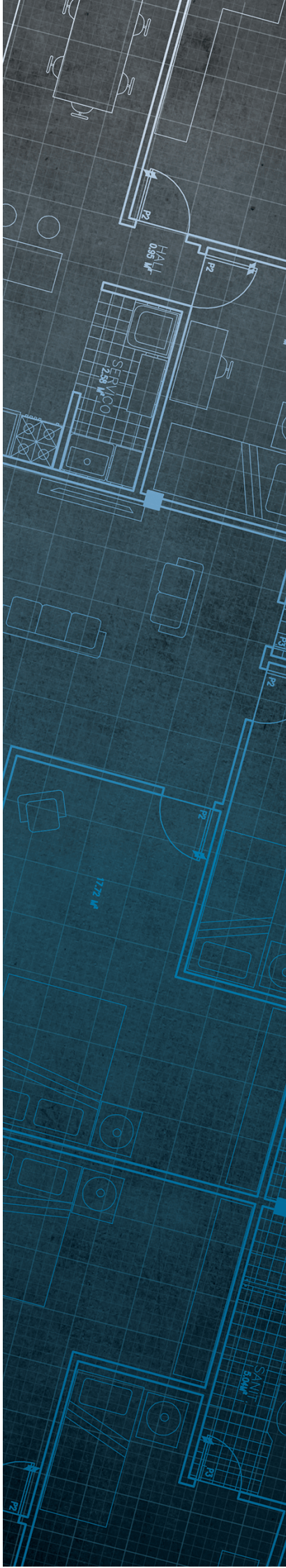
The Coal Authority

Consultants

Coal Mining Report

Whiston, Prescot
Merseyside
L35 3PW

Date of enquiry:	**9 January 2025**
Date enquiry received:	**9 January 2025**
Issue date:	**9 January 2025**
Our reference:	**51003472137001**
Your reference:	**GS-W1O-Y2E-D7G-LMS**



Consultants

Coal Mining Report

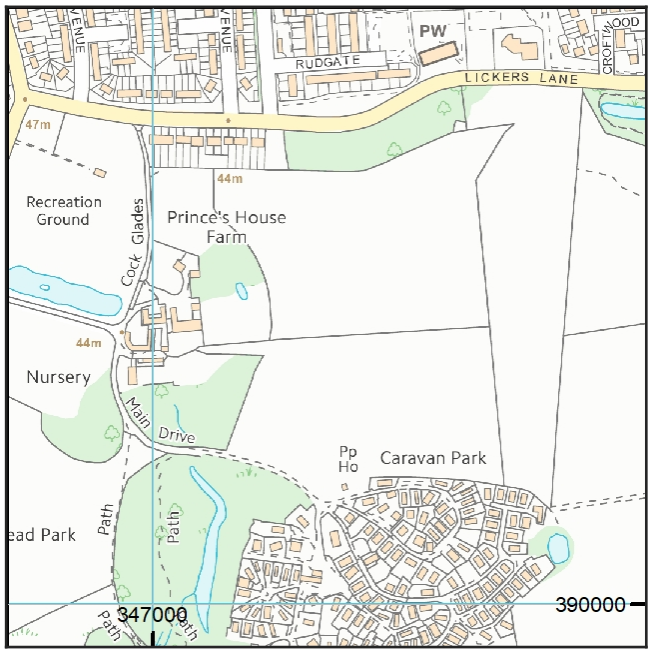
This report is based on and limited to the records held by the Coal Authority at the time the report was produced.

Client name

GROUNDSURE LIMITED

Enquiry address

Whiston, Prescot
Merseyside
L35 3PW



Approximate position of property

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/thecoalauthority

Section 1 – Mining activity and geology

Past underground mining

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
unnamed	WIGAN FOUR FEET	Coal	3002	146	North	11.2	South	160	1900
unnamed	WIGAN TWO FEET	Coal	3007	172	North	11.5	South	80	1903
unnamed	WIGAN FOUR FEET	Coal	3040	184	Beneath Property	11.2	South	160	1902
unnamed	WIGAN FOUR FEET	Coal	3041	186	North-West	11.2	South	160	1900
unnamed	WIGAN TWO FEET	Coal	3045	198	Beneath Property	11.5	South-West	80	1903
unnamed	PLODDER	Coal	304B	234	Beneath Property	9.5	South-West	240	1880
unnamed	PLODDER	Coal	300B	246	North	9.5	South-West	240	1880
unnamed	RUSHY PARK	Coal	300F	365	North	9.4	South	130	1883
unnamed	RUSHY PARK	Coal	304L	384	Beneath Property	13.4	South-West	130	1896
unnamed	RUSHY PARK	Coal	304I	389	Beneath Property	9.5	South	130	1886
unnamed	RUSHY PARK	Coal	304J	391	South-West	12.0	South	130	1889

Probable unrecorded shallow workings

Yes.

Spine roadways at shallow depth

No spine roadway recorded at shallow depth.

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Mine entries

Entry type	Reference	Grid reference	Treatment description	Mineral	Conveyancing details
Shaft	347390-002	347304 390332		Coal	
Shaft	347390-003	347281 390166		Coal	
Shaft	347390-004	347378 390178		Coal	
Shaft	347390-005	347413 390184		Coal	
Shaft	347390-006	347004 390243	this shaft has been proved to be filled and may have been capped to an unknown specification at some time in the past	Coal	
Shaft	347390-007	347031 390542		Coal	
Shaft	347390-008	347053 390541		Coal	

Abandoned mine plan catalogue numbers

The following abandoned mine plan catalogue numbers intersect with some, or all, of the enquiry boundary:

NW849	NW836	14235
NW638	11564	NW535
10958	NW727	PO0

Our records show we have more plans than those shown above which could affect the enquiry boundary.

Please contact us on 0345 762 6848 to determine the exact abandoned mine plans you require based on your needs.

Outcrops

Seam name	Mineral	Seam workable	Distance to outcrop (m)	Direction to outcrop	Bearing of outcrop
CROMBOUKE	Coal	Yes	Within	N/A	131
LONDON DELPH (BIN)	Coal	Yes	Within	N/A	129
RAMS	Coal	Yes	Within	N/A	122
ROGER	Coal	Yes	Within	N/A	127
ROGER	Coal	Yes	Within	N/A	135
ROGER	Coal	Yes	Within	N/A	136
ST. HELENS YARD	Coal	Yes	Within	N/A	132

Geological faults, fissures and breaklines

Please refer to the 'Summary of findings' map (on separate sheet) for details of any geological faults, fissures or breaklines either within or intersecting the enquiry boundary.

Fault under or close to the property recorded.

Opencast mines

Please refer to the “Summary of findings” map (on separate sheet) for details of any opencast areas within 500 metres of the enquiry boundary.

Coal Authority managed tips

None recorded within 500 metres of the enquiry boundary.

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Section 2 – Investigative or remedial activity

Please refer to the 'Summary of findings' map (on separate sheet) for details of any activity within the area of the site boundary.

Site investigations

Distance to site investigation (m)	Direction
0.1	East
Within	N/A

See Section 4 for further information.

Remediated sites

None recorded within 50 metres of the enquiry boundary.

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.

Mine gas

None recorded within 500 metres of the enquiry boundary.

Mine water treatment schemes

None recorded within 500 metres of the enquiry boundary.

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Section 3 – Licensing and future mining activity

Future underground mining
None recorded.

Coal mining licensing
None recorded within 200 metres of the enquiry boundary.

Court orders
None recorded.

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

Withdrawal of support notices
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.

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.

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Section 4 – Further information

The following potential risks have been identified and as part of your risk assessment should be investigated further.

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 500m of 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.

Development advice

The site is within an area of historical coal mining activity. Should you require advice and/or support on understanding the mining legacy, its risks to your development or what next steps you need to take, please contact us.

Site investigations

The site is within an area of previous interest. It is close to where the Coal Authority has received information relating to past site investigations.

The site requires further investigation and may influence how you approach your risk assessment.

For further information on specific site or ground investigations in relation to any issues raised in Section 4, please call us on 0345 762 6848 or email us at groundstability@coal.gov.uk.

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Section 5 – Data definitions

The datasets used in this report have limitations and assumptions within their results. For more guidance on the data and the results specific to the enquiry boundary, please **call us on 0345 762 6848** or **email us at groundstability@coal.gov.uk.**

Past underground coal mining

Details of all recorded underground mining relative to the enquiry boundary. Only past underground workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination, will be included.

Probable unrecorded shallow workings

Areas where the Coal Authority believes there to be unrecorded coal workings that exist at or close to the surface (less than 30 metres deep).

Spine roadways at shallow depth

Connecting roadways either, working to working, or, surface to working, both in-seam and cross measures that exist at or close to the surface (less than 30 metres deep), either within or within 10 metres of the enquiry boundary.

Mine entries

Details of any shaft or adit either within, or within 100 metres of the enquiry boundary including approximate location, brief treatment details where known, the mineral worked from the mine entry and conveyance details where the mine entry has previously been sold by the Authority or its predecessors British Coal or the National Coal Board.

Abandoned mine plan catalogue numbers

Plan numbers extracted from the abandoned mines catalogue containing details of coal and other mineral abandonment plans deposited via the Mines Inspectorate in accordance with the Coal Mines Regulation Act and Metalliferous Mines Regulation Act 1872. A maximum of 9 plan extents that intersect with the enquiry boundary will be included. This does not infer that the workings and/or mine entries shown on the abandonment plan will be relevant to the site/property boundary.

Outcrops

Details of seam outcrops will be included where the enquiry boundary intersects with a conjectured or actual seam outcrop location (derived by either the British Geological Survey or the Coal Authority) or intersects with a defined 50 metres buffer on the coal (dip) side of the outcrop. An indication of whether the Coal Authority believes the seam to be of sufficient thickness and/or quality to have been worked will also be included.

Geological faults, fissures and breaklines

Geological disturbances or fractures in the bedrock. Surface fault lines (British Geological Survey derived data) and fissures and breaklines (Coal Authority derived data) intersecting with the enquiry boundary will be included. In some circumstances faults, fissures or breaklines have been known to contribute to surface subsidence damage as a consequence of underground coal mining.

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Opencast mines
Opencast coal sites from which coal has been removed in the past by opencast (surface) methods and where the enquiry boundary is within 500 metres of either the licence area, site boundary, excavation area (high wall) or coaling area.

Coal Authority managed tips
Locations of disused colliery tip sites owned and managed by the Coal Authority, located within 500 metres of the enquiry boundary.

Site investigations
Details of site investigations within 50 metres of the enquiry boundary where the Coal Authority has received information relating to coal mining risk investigation and/or remediation by third parties.

Remediated sites
Sites where the Coal Authority has undertaken remedial works either within or within 50 metres of the enquiry boundary following report of a hazard relating to coal mining under the Coal Authority's Emergency Surface Hazard Call Out procedures.

Coal mining subsidence
Details of alleged coal mining subsidence claims made since 31 October 1994 either within or within 50 metres of the enquiry boundary. Where the claim relates to the enquiry boundary confirmation of whether the claim was accepted, rejected or whether liability is still being determined will be given. Where the claim has been discharged, whether this was by repair, payment of compensation or a combination of both, the value of the claim, where known, will also be given.

Details of any current 'Stop Notice' deferring remedial works or repairs affecting the property/site, and if so the date of the notice.

Details of any request made to execute preventative works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991. If yes, whether any person withheld consent or failed to comply with any request to execute preventative works.

Mine gas
Reports of alleged mine gas emissions received by the Coal Authority, either within or within 500 metres of 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.

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Mine water treatment schemes
Locations where the Coal Authority has constructed or operates assets that remove pollutants from mine water prior to the treated mine water being discharged into the receiving water body.

These schemes are part of the UK's strategy to meet the requirements of the Water Framework Directive. Schemes fall into 2 basic categories: Remedial – mitigating the impact of existing pollution or Preventative – preventing a future pollution incident.

Mine water treatment schemes generally consist of one or more primary settlement lagoons and one or more reed beds for secondary treatment. A small number are more specialised process treatment plants.

Future underground mining
Details of all planned underground mining relative to the enquiry boundary. Only those future workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination will be included.

Coal mining licensing
Details of all licenses issued by the Coal Authority either within or within 200 metres of the enquiry boundary in relation to the under taking of surface coal mining, underground coal mining or underground coal gasification.

Court orders
Orders in respect of the working of coal under the Mines (Working Facilities and Support) Acts of 1923 and 1966 or any statutory modification or amendment thereof.

Section 46 notices
Notice of proposals relating to underground coal mining operations that have been given under section 46 of the Coal Mining Subsidence Act 1991.

Withdrawal of support notices
Published notices of entitlement to withdraw support and the date of the notice. Details of any revocation notice withdrawing the entitlement to withdraw support given under Section 41 of the Coal Industry Act 1994.

Payment to owners of former copyhold land
Relevant notices which may affect the property and any subsequent notice of retained interests in coal and coal mines, acceptance or rejection notices and whether any compensation has been paid to a claimant.

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The Coal Authority

Summary of findings

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The map highlights any specific surface or subsurface features within or near to the boundary of the site.

Key

- Approximate position of the enquiry boundary shown
- Disused mine shaft
- Outcrop (Conjectured)
- Geological faults
- Unlicensed opencast site
- Site investigations



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APPENDIX F

UXO Screening Map

UNEXPLODED BOMB RISK MAP

SITE LOCATION

Location: L35 3PW,
Map Centre: 347063,390489



This map principally indicates a hazard from Unexploded Bombs (UXB) due to WWII bombardment. Other sources of Unexploded Ordnance (UXO) may be present. It should be noted that this map does not represent UXO risk and should not be reported as such when reproduced.

LEGEND

- **High:** Areas indicated as having a bombing density of 50 bombs per 1000acre or higher.
- **Moderate:** Areas indicated as having a bombing density of 15 to 49 bombs per 1000acre.
- **Low:** Areas indicated as having 15 bombs per 1000acre or less.

Miltary | **Industry** | **UXO find** | **Other**
Transport | **Docks** | **Luftwaffe targets**
Utilities | **Bombing decoy** | **Airfields**

How to use your Unexploded Bomb (UXB) risk map?

This map indicates the potential for UXBs to be present because of World War Two (WWII) bombing. It can be incorporated into a technical report, such as a Phase 1 Desk Study, or similar document as an indication of the potential for UXO encounter on a Site. Other sources of UXO may also be indicated, although note that these are not comprehensive and more detailed research is required to confirm their presence.

What if my Site is in a moderate or high density area?

We typically recommend that a detailed UXO desk study and risk assessment is undertaken for sites in an area with a moderate or high bombing density.
Additionally, if your site is in close proximity to a strategic target, military establishment, airfield or bombing decoy, then additional detailed research is recommended.

If my site is in a low risk area, do I need to do anything?

If both the map and other research confirm that there is a low potential for UXO to be present on your site, then, subject to your own comfort and risk tolerance, works can proceed with no special precautions.

If you are unsure whether other sources of UXO may be present, you can request one of our pre-desk study assessments (PDSA) by emailing a site boundary and location to pdsa@zetica.com.

You should never plan site work or undertake a risk assessment using these maps alone. More detail is required, to include an assessment of the likelihood of a source of UXO hazard from other military activity not reflected on these maps.

If I have any questions, who do I contact?

tel: +44 (0) 1993 886682 **email:** uxo@zetica.com **web:** www.zeticauxo.com

The information in this UXB risk map is derived from a range of sources and should be used with the accompanying notes on our website.

Zetica cannot guarantee the accuracy or completeness of the information or data used and cannot accept any liability for any use of the maps. These maps can be used as part of a technical report or similar publication, subject to acknowledgement. The copyright remains with Zetica Ltd.

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APPENDIX B – PHASE 2 SITE INVESTIGATION REPORT

BROWNFIELD SOLUTIONS LTD

GEO-ENVIRONMENTAL ENGINEERING EXCELLENCE

UNITED LIVING

Halsnead Gardens

Phase II Geo-Environmental Assessment Report

MAS/C5980/13951 Rev A

May 2025

EXECUTIVE SUMMARY	
Location and Brief Site Description	The site measures circa 7.30 hectares and is largely open fields with thick vegetation. There are some existing structures in the northwestern area of the site. Three buildings are still occupied, and another appears to be derelict farm buildings.
Ground Conditions	Generalised ground conditions from the ground investigation comprise (top down): • Made ground topsoil encountered from ground level to between 0.70m and 1.00m bgl. • Made ground encountered from 0.30m to between 0.70m and 2.10m bgl. • Natural strata encountered from 0.30m bgl to between 0.50m and 4.50m bgl. • Solid geology encountered from 0.80m bgl to 40.00m bgl. • Groundwater recorded between 0.70m and 3.90m bgl.
Human Health - Soils Contamination	• Localised exceedances in the form of arsenic and lead were encountered within WS103. • No further exceedances were identified across the remainder of the site.
Controlled Waters – Surface and Groundwater Contamination	• The overall risk to controlled waters is considered very low to low.
Ground Gas	Based on the monitoring results, the site is classified as CS1 – no protection is required from made ground and natural gas sources, though mine gas will still need considering at the drill and grout remedial stage.
Outline Remedial Strategy	Subject to regulatory approval, the following outline remedial strategy is recommended: • Removal of heavy metal hotspot at WS103, or incorporation of localised clean cover system. • Verification of the above with validation reports produced.
Waste	Made ground –classified as non-hazardous. Natural – classified as non-hazardous.
Foundations and Floor Slabs	Strip foundations are considered the most suitable for this development. Based on the medium volume change potential, foundations should be placed at a minimum of 0.90m bgl into the natural cohesive deposits and deepened near trees and hedges. Allowable bearing capacities are 230 kN/m^2 at 0.90m bgl, increasing to 300 kN/m^2 from 1.50m bgl. This adopts a factor of safety of 3 which should limit settlements to within acceptable limits. Localised granular sand strata were encountered in eight locations across the site as detailed in section 5.4. In these locations, the sand was found to be directly underlain by solid bedrock. Therefore, foundations in these locations should be placed upon the granular sand strata, where unacceptable differential settlement would not be anticipated. At 0.80m bgl, an allowable bearing capacity not exceeding 150 kN/m^2 may be assumed. This adopts a factor of safety of 3 which should limit settlements to within acceptable limits. Suspended or ground bearing floor slabs may be adopted.
Concrete Classification	Made ground and Solid Geology – DS-1 AC-1s conditions prevail. Natural Superficial – DS2 AC-1s conditions prevail.
Highways Design	Made Ground CBR – 5% Superficial Strata CBR – cohesive/fine soils– 5% The above should be confirmed by in-situ testing at formation level by a specialist geotechnical engineer during construction.
Site Drainage	Drainage to soakaways is considered unsuitable for this site due to no drainage during testing.
Mining Risk	In accordance with CIRIA C758 and the 10t criterion, there is a risk on the site from historic coal mining activities. Drilling and grouting will be required to enable development across the site, along with the suitable capping or grouting, or both, of the two onsite mine shafts.
Further Work	The following further works will be required to progress to the construction phase: • Tree survey by a qualified arboriculturist. • Demolition survey, if required. • Design of the Drill and Grout specification. • Detailed foundation design, including foundation zonation plan and depth schedule. • Design of Remedial Strategy and confirmation with the Local Authority, NHBC, and the Mining Remediation Authority, if required. • Production of Materials Management Plan (MMP) under the CL:AIRE DoWCoP, if required. • Implementation of the Drill and Grout Specification, and verification reporting upon completion. • Implementation of the Remedial Strategy and verification of the remedial works, if required.

This executive summary should be read in conjunction with the full report, reference MAS/C5980/13951 Rev A and not as a standalone document. Report template version 4.5.

PROJECT QUALITY CONTROL DATA SHEET

Site Name:	Halsnead Gardens		
Document Name:	Phase II Geo-Environmental Assessment Report		
Reference:	MAS/C5980/13951 Rev A		
Status:	-	28/03/2025	Final.
	Rev A	14/05/2025	Updates following completion of ground gas monitoring programme.

Issued By:	**Client:**	**Engineer**
Brownfield Solutions Ltd William Smith House 173 – 183 Witton Street Northwich Cheshire CW9 5LP Tel: 01606 334 844 brownfield-solutions.com	United Living Building 4 Clearwater Lingley Green Avenue Warrington Cheshire WA5 3UZ	
	Contact: Christian Cockerline	Contact:

Written by:



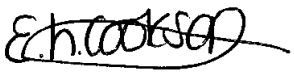
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Checked by:



J Mather
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Senior Project Engineer

Approved by:



L Cookson
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Drawing Number	Rev	Title
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C5980/01	A	Site Location Plan
C5980/02	-	Site Features Plan
C5980/03	-	Exploratory Hole Location Plan

APPENDICES

Appendix	Title
Photographs	Mine Shaft Investigation Photoboard
Appendix A	BSL Methodology and Guidance
Appendix B	Exploratory Hole Logs
Appendix C	Chemical Testing Results
Appendix D	Geotechnical Testing Results
Appendix E	Monitoring Results
Appendix F	Waste Assessment Report

1.0 INTRODUCTION

1.1 Context

This report describes a Phase II Geo-Environmental Assessment carried out by Brownfield Solutions Limited (BSL) for United Living on a site off Main Drive, Whiston, Prescot, and has been completed in general accordance with the following guidance:

- Environment Agency guidance - Land Contamination: Risk Management (LCRM).
- BS 10175:2011+A2:2017 Investigation of Potentially Contaminated Sites.
- BS5930: 2015+A1:2020 Code of Practice for Ground Investigations.
- BS EN 1997-1:2004+A1:2013 Eurocode 7. Geotechnical design. General rules plus UK National Annex.
- BS EN 1997-2:2007 Eurocode 7 Geotechnical design. Ground investigation and testing plus UK National Annex.
- NHBC Standards. Chapter 4.1: Land Quality - Managing Ground Conditions.

Definitions of terms and acronyms used within this report is presented in Section 11.0.

1.2 Proposed Development

The proposed development is for a residential end use comprising 235 residential houses, containing a mix of two storey semi-detached and detached dwellings along with 2.5 storey townhouses and mews, with associated private gardens, highways, public open space (POS) areas and infrastructure as shown on the proposed development plan, drawing No. 23076/255 provided to BSL by the client.

1.3 Previous Reports

This report should be read in conjunction with the BSL Phase I Geo-Environmental Assessment Report (ref: JL/C5980/13829) issued in January 2025.

1.4 Objectives and Scope

The objectives of this report are to determine the geo-environmental setting and ground conditions of the site, highlighting potential risks and areas of concern that may govern the development under the current planning regime.

The factual and interpretive Phase II sections of this report are produced in general accordance with the recommendations for a Tier 2 Generic Quantitative Risk Assessment as described in LCRM guidance. This assessment is also intended to fulfil the requirements of a Ground Investigation Report (GIR) as detailed in BS EN 1997-2:2007.

Following the Desk Study, an exploratory intrusive investigation was undertaken to confirm the findings of the preliminary CSM and risk assessment and meet any objectives that had not been satisfied. The exploratory investigation was undertaken using trial pitting, window sampling, rotary drilling, ground gas and groundwater monitoring, laboratory chemical and geotechnical testing, with reporting on the findings.

A summary of previous investigations carried out at the site has also been undertaken.

1.5 Limitations

This assessment has been prepared in accordance with the relevant current legislative framework, guidance and risk assessment methodology as outlined in Appendix A. BSL is not liable for any subsequent changes in the guidance and legislation.

The findings and opinions conveyed via this report are based on information obtained from a number of sources as detailed within this report, BSL have assumed this information is correct and reliable. Nevertheless, BSL cannot and does not guarantee the authenticity or reliability of the information it has relied upon.

BSL have used reasonable skill, care and diligence for the investigation of the site and the production of this report. There may be other conditions prevailing on the site which are outside the scope of work and have not been highlighted by this assessment and therefore have not been considered by this report. Responsibility cannot be accepted for such site conditions not revealed by the assessment.

This report has been prepared for the sole use and reliance of the Client, United Living. No other third parties may rely upon or reproduce the contents of this report without the written permission of Brownfield Solutions Ltd (BSL). If any unauthorised third party comes into possession of this report, they rely on it at their own risk and BSL do not owe them any Duty of Care. This report may not be relied upon by the client or submitted to a third party for their reliance for the purposes of valuation, mortgage, insurance and regulatory approval, until all invoices have been settled in full.

The investigation carried out on the site has been conducted to provide the best information on the ground conditions within site access and budgetary constraints. The inherent variation of ground conditions allows only for definition of the actual conditions at the locations and depths of exploratory locations at the time of the investigation. Different ground conditions may exist that have not been identified within this investigation.

The recommendations in this report assume that ground levels will remain as existing, unless stated otherwise within the report. If there is to be any re-profiling (e.g. to create development platforms or flood defences) then the recommendations may not apply.

The groundwater results described are only representative of the dates on which they were recorded, and levels may vary seasonally (e.g. due to changes in weather).

This assessment has been based on the proposed planning layouts provided. Any subsequent change to the planning layout may have an impact on the validity of recommendations made within this report. Furthermore, new information, changed practices or new legislation may necessitate revised interpretation of the report after the date of its submission.

Although every effort has been made to position exploratory holes in the least sensitive areas of the site, exploratory hole positions were located approximately as part of this investigation and no guarantee can be given as to their accuracy. Consideration should be given to the possibility that exploratory holes excavated as part of this investigation and indeed any previous ground investigation work by others may be encountered beneath or within the influence of individual foundations. BSL cannot be held responsible for structural failures caused by the location of foundations of any form of structure within the influence of exploratory holes.

Where it has not been possible to reasonably use an EC7 compliant investigation technique, a practical alternative has been adopted to obtain indicative soil parameters and any interpretation is based upon engineering experience, local precedent where applicable and relevant published information.

The chemical testing carried out for this report was not scoped to comply with the requirements of the water supply company and further work may be required, unless otherwise stated.

Notwithstanding site observations concerning the presence or otherwise of archaeological issues, asbestos-containing materials (ACM) or invasive weeds (e.g. Japanese knotweed), this report does not constitute a formal survey of these potential issues.

Asbestos in structures was not covered in this report. It should be noted that an asbestos demolition survey will be required prior to any demolition of structures. If asbestos is present in soils, these will need to be dealt with in accordance with the Control of Asbestos Regulations (CAR) 2012.

The site plans enclosed in this report should not be scaled off. Any site boundary line depicted on plans does not imply legal ownership of land.

Any recommendations made in this report should be confirmed with the Regulatory Authorities prior to implementation to ensure compliance.

2.0 THE SITE

2.1 Location

The site is located off Main Drive, Whiston, L35 3QF, centred on National Grid Reference 347186, 390306 as shown on the Site Location Plan, Drawing No. C5980/01.

2.2 Site Description

A site reconnaissance survey was carried out at the site on the 14th January 2025. The main site features and potential issues identified are detailed below and are shown on the Site Features Plan, Drawing No. C5980/02. A selection of photographs from the site walkover are presented to the rear of this report.

Feature	Description
Site Area	The site is approximately 7.30 hectares.
Site Access	Access to the site is gained via open access off Main Drive to the south.
Current Land Use and Site Features	The site is largely comprised of open fields with thick vegetation present in the south-west corner and in the centre of the western portion of site. There is a shallow pond approximately 4m by 8m, located within the north-west of the site. Evidence of underground services onsite includes two water chambers / above ground manholes present in the western area of the site and spray paint indicating the potential presence of underground services was seen to be running along the southern border of the site, parallel to the road. A suspected mine shaft was noted toward the south-east of the site, evidenced by a slight depression in the field in the approximate location of a recorded mine shaft. A number of gas monitoring wells were noted toward the west of the site. There are some existing structures in the north-western area of the site. Three buildings are still occupied, and another appears to be a derelict farm building.
Potential Sources of Gross Contamination	No potential sources of gross contamination were identified.
Vegetation / Ecology	The site is generally covered with grass. There are semi-mature and mature trees throughout the south-west and north-west of the site and sporadically along the sites north, south and eastern boundaries. In addition, there are patches of dense brambles in the north-west and along the sites southern border.
Topography	The site generally slopes from the south-west to the north-east with a gentle gradient. While the north-west section of the site is mostly flat, access to this area is only possible from the southern portion of the site. The southern area includes a steep slope running from the south-east to the north-west, near to the existing pond. The site generally resides at circa 47m AOD.
Site Boundaries	The north the site is bound by wooden fencing separating the site from residential gardens, and heras fencing, separating the site from a construction site on the other side. To the east and west the site is bound by a mix of dense vegetation, metal wire fencing, and heras fencing. The south of the site is bordered by Main Drive.
Surrounding Area	The site is set within a residential area. A construction site is present to the north and east for the development of a residential housing estate. Residential homes are present to the south and playing fields present to the west, with homes beyond these.

3.0 SUMMARY OF PREVIOUS REPORTS

A summary of the relevant points from the Desk Study completed by BSL (reference JL/C5980/13829) is presented below:

- The site has had minimal previous developments since the earliest map of 1850 comprising of residential dwellings, agricultural outbuildings, and two mine shafts. The majority of the site has largely remained undeveloped, comprising open fields, with some ponds present across historical mapping records.
- A pump house, tanks, ponds, and electrical substation were in close proximity of the site.
- Geology comprises Glacial Till deposits (Secondary Aquifer – Undifferentiated) over Pennine Middle Coal Measures Formation (Secondary A Aquifer).
- A fault is shown to traverse the northwestern corner of the site in a north to south direction. However, any movements associated with this fault should now have stopped.
- The site is located within a Coal Mining Area, formerly worked for coal. The property is in a surface area that could be affected by underground mining in 4 seams of coal at 146m to 391m depth, last worked in 1903. Any movement in the ground due to coal mining activity should have stopped. The property is in an area where the Authority believe there is coal at or close to the surface and may have been worked at some time in the past.
- The site is in an area of former shallow coal mine workings.
- The nearest watercourse is unnamed, located circa 35m south-west of the site.
- There is a potential for groundwater flooding on site, with a low risk rating.
- The risk to human health is considered to be low to moderate / low.
- The risk from ground gas is considered to be moderate / low to moderate and the site is not located in an area requiring radon protection measures.
- The risk to controlled waters is low.
- The site is located in the UXO low risk zone.
- Recommendations were for an appropriate Phase II ground investigation to be carried out to confirm the identified risks and obtain information for preliminary design.

4.0 METHOD OF INVESTIGATION

4.1 Objectives

To confirm the risks to the identified receptors and confirm the ground conditions in respect to the identified geotechnical and geo-environmental risks, an appropriate intrusive investigation was undertaken as per the recommendations of the Phase I Desk Study Assessment.

The aim of the fieldwork was to:

- Investigate ground conditions on the site and the potential need for detailed investigation.
- Install standpipes to allow future monitoring.
- Undertaking soil infiltration rate testing.
- Assess the potential contamination on the site and obtain samples for contamination screening.
- Assess the potential impact of any contamination on controlled waters.
- Obtain geotechnical information on the ground conditions at the site for preliminary foundation design and preliminary pavement design purposes.
- Give an assessment of the geo-environmental risks associated with redevelopment of the site.
- Assess the potential for instability caused by historical coal extraction.

4.2 Site Works

The following site works have been undertaken as part of the intrusive investigation between the dates of 27th January and 12th February 2025.

Method	No.	Range Depths (m bgl)	Purpose
Trial pits – Tracked excavator	30	1.90 – 4.00	Establish general ground conditions and gain good coverage. Undertake hand shear vanes in cohesive strata to determine soil strengths for preliminary foundation design.
Trial trench – Tracked excavator	2	2.30 – 5.50	Establish general ground conditions and gain good coverage. Investigate the presence and depths of coal seams and potential mine entries / shafts.
Window sample boreholes – Tracked WS rig	13	2.28 – 4.38	Establish general ground conditions on site. Allow Standard Penetration Tests (SPTs) to be carried out and obtain samples for contamination and geotechnical and testing. Determine soil strengths/densities for preliminary foundation design. Installation of ground gas and water monitoring wells.
Lightweight Deflectometer (LWD)	18	-	Obtain indicative CBR values for highways/pavement design.
Infiltration tests (in Trial Pits)	2	1.30 – 3.00	Obtain infiltration rates for drainage design.
Rotary open boreholes	16	10.20 – 40.00	Establish deeper ground conditions and gain good coverage. Investigate the presence and depths of coal seams and potential mine workings. Installation of ground gas and water monitoring wells.

The surveyed locations of the exploratory holes are indicated on the Exploratory Hole Location Plan, Drawing No C5980/03. The exploratory hole logs are presented in Appendix B.

The exploratory holes were logged by an experienced geo-environmental engineer in general accordance with the following guidance:

- BS 5930:2015+A1:2020 Code of Practice for Site Investigations.
- BS EN 14688-1:2018 Geotechnical Investigation and Testing – Identification and classification of soil.
- BS EN ISO 14689:2018 Geotechnical investigation and testing – Identification and classification of rock.

4.3 Sampling Strategy

Representative samples were taken from exploratory holes at regular intervals to assist in the identification of the soils and to allow subsequent laboratory testing. They were stored and transported in general accordance with BS 10175:2011+A2:2017.

The type of sample was dependent upon the stratum and the purpose of analysis in accordance with current environmental and geotechnical guidance. The distribution of samples taken across the site is recorded on the exploratory logs.

Investigatory hole locations were determined by reference to the conditions identified in the preliminary risk assessment. Certain specific features such as mine shafts were targeted for specific investigation, but a reasonably even spacing was used for the remainder of the site. No specific sampling statistics or grid were utilised in this instance.

4.4 Laboratory Testing

As part of the initial assessment for potential contamination of the site, selected samples were taken for the purpose of chemical contamination testing.

In the absence of particularly contaminative processes on site and the lack of visual evidence of potential hydrocarbon impaction representative soil samples were screened for the following general suite of determinands at a UKAS approved laboratory:

Determinand	No of Samples
BSL Default Soil Suite: Arsenic, Cadmium, Chromium (III), Chromium (VI), Copper, Nickel, Mercury, Lead, Zinc, Selenium, speciated polycyclic hydrocarbons (PAH 16), water soluble sulphate (2:1 Extract), soil organic matter (SOM) and pH.	15
Petroleum Hydrocarbons (TPH CWG) inc BTEX and MTBE.	5
Asbestos Screen and ID.	5
Waste Acceptance Criteria (WAC).	2
Calorific Value by Bomb Calorimeter	2
Loss On Ignition (LOI)	2

The Chemical Laboratory Testing Results are presented in Appendix C.

Representative disturbed samples were obtained for all soil types encountered. Selected samples were scheduled for testing at an approved laboratory in accordance with BS 1377 'Method of Test for Soils for Civil Engineering Purposes' and BS EN ISO 17892- Parts 1-12:2018 'Geotechnical investigation and testing. Laboratory testing of soil'.

The following tests were scheduled for geotechnical purposes:

Description	No of Samples
Plasticity Index Analysis.	10
pH & Water Soluble Sulphate (2:1 Extract)	10
SD1 BRE Full Suite	5

The Geotechnical Laboratory Testing Results are presented in Appendix D.

4.5 Monitoring

Ground gas and ground water monitoring standpipes were installed in a number of boreholes as detailed in the table further below.

6 monitoring visits have been undertaken to date out of 6 proposed as part of the current scope, in line with the recommendations of BS8485.

All gas monitoring was undertaken using either a GA5000 or GFM436 infrared gas meter with integral electronic flow analyser.

Flow measurements on each standpipe (l/hr) were taken. Measurements of the percentage volume in air (%v/v) of oxygen (O_2), carbon dioxide (CO_2) and methane (CH_4) were recorded in addition to the percentage Lower Explosive Limit (%LEL) of methane (Note: 100% LEL equates to 5% by volume), the atmospheric pressure (mb) and average temperature during the visit (°C).

Standpipes were constructed in general accordance with the relevant guidance. A summary of the installation construction is presented in the table below:

Location	Internal Diameter Pipe	Response Zone (m bgl)	Targeted Strata	Purpose
WS101	35mm PVC	0.60 – 3.60	Clay	Ground Gas & Groundwater
WS103	35mm PVC	1.50 – 3.00	Clay	Ground Gas & Groundwater
WS105	35mm PVC	0.50 – 2.50	Clay and Mudstone	Ground Gas & Groundwater
WS106	35mm PVC	0.50 – 2.50	Clay, Sand, and Sandstone	Ground Gas & Groundwater
WS108	35mm PVC	0.50 – 2.50	Clay and Mudstone	Ground Gas & Groundwater
WS109	35mm PVC	0.50 – 2.00	Clay and Sandstone	Ground Gas & Groundwater
RO103	50mm HDPE	5.00 – 10.00	Mudstone	Ground Gas & Groundwater
RO114	50mm HDPE	5.00 – 9.00	Mudstone	Ground Gas & Groundwater

The gas monitoring visits recorded peak and steady state conditions. Peak results are those that occur on opening the valve on the borehole tap. Steady state conditions are those that occur a period of time afterwards when the initial (accumulated) gases have been purged from the borehole.

Ground gas monitoring results are presented in Appendix E of this report.

5.0 GROUND CONDITIONS

5.1 Summary

A brief summary of the ground conditions encountered is presented in the table below:

Stratum	Range Depths - Top (m bgl)	Range Depths - Bottom (m bgl)	Range Thickness' (m)	Brief Description
Made Ground	0.30 – 1.00	0.70 – 2.10	0.30 – 1.40	Sandy gravelly CLAY.
Made Ground Topsoil	GL	0.30 – 0.70	0.30 – 0.70	Sandy gravelly CLAY.
	GL	0.60 – 1.00	0.60 – 1.00	Sandy GRAVEL.
Natural Topsoil	GL	0.30 – 0.70	0.30 – 0.70	CLAY with minor constituents of sands and gravels.
Natural Superficial Strata	0.30 – 3.90	0.50 – 4.50	0.10 – 4.20	CLAY with minor constituents of sands and gravels.
	0.40 – 0.80	0.60 – 1.90	0.20 – 1.30	SANDS.
Solid Geology	0.80 – 38.40	1.90 – 39.10	0.20 – 3.00	COAL.
	3.50 – 24.30	5.20 – 26.40	1.70 – 3.00	SILTSTONE.
	0.80 – 3.30	2.00 – 13.10	0.20 – 9.80	SANDSTONE.
	1.50 – 39.10	2.00 – 40.00	0.05 – 16.20	MUDSTONE.
	2.60 – 17.30	2.80 – 18.40	0.20 – 1.10	SHALE.
	11.20 – 15.70	23.10 – 30.00	7.40 – 18.80	MUDSTONE and SILTSTONE.

Details are provided in the logs in Appendix B and the individual strata are described in the sections below.

5.2 Made Ground

Made Ground – Topsoil
Made ground topsoil was encountered across the site in 15 No. of the 45 No. exploratory hole locations. The made ground topsoil did not appear to have a pattern and generally comprised either clays with minor constituents of sands and gravels, or sandy gravel. Clays were encountered from ground level to between 0.30 – 0.70m bgl, though generally less than 0.40m in thickness. Sandy gravel was encountered from ground level to between 0.60 – 1.00m bgl. Made Ground Topsoil contained organic roots and anthropogenic inclusions of gravels of brick, ceramic, metal, and coal.

WS102 and WS103 contained sandy gravel with inclusions of gravel sized clinker, which was not encountered in the wider site area.

Sandstone flagstones and sub-angular to rounded brick cobbles were encountered within the made ground topsoil in TP111 between 0.10 – 0.20m bgl.

Made Ground – General
Made ground was encountered within 4 of the 45 exploratory hole locations, being observed from 0.30 – 1.00m bgl to depths between 0.70 – 2.10m bgl.

Composition of the made ground in WS102 and WS103, located within existing gardens, comprised of slightly gravelly sandy clay with gravels of brick, coal, mudstone and occasional clinker, encountered to depths between 1.20m and 1.30m bgl. The composition of the made ground in TP136 was similar, comprising of slightly gravelly slightly sandy clay with brick and coal, encountered to 0.70m bgl.

Deeper made ground was also encountered in TP107, adjacent to derelict farm buildings, up to 2.10m bgl (though the base of this strata was not proven). This was comprised of slightly sandy slightly gravelly clay with gravels of brick, shale, ceramic, coal, and plastic.

Sub-angular to sub-rounded brick cobbles were encountered at varying depths within the made ground.

5.3 Natural Topsoil

Topsoil was encountered across the majority of the site from ground level to between 0.30m and 0.70m bgl, generally comprising brown clays with minor constituents of sands and gravels. Topsoil was generally encountered to depths between 0.30m and 0.40m bgl.

For the purpose of this assessment, topsoil is defined as the upper darker and more fertile layer of the soil profile which is a product of natural chemical, physical, biological and environmental processes. This does not imply compliance with BS 3882:2015.

5.4 Natural Superficial Strata

The natural strata underlying the site was generally firm to stiff clay with varying amounts of sand and gravel as minor constituents. This was interpreted to represent Glacial Till deposits. Shear vane readings in the cohesive soils indicate the clays are generally firm to stiff (high strength).

Sands were encountered in eight locations across the site:

Location	Depth (m)	Strata
RO113	0.40 – 0.80	SAND.
TP109	0.40 – 1.60	Slightly clayey SAND.
TP127	0.50 – 0.90	Clayey SAND.
TP128	0.80 – 1.40	Clayey SAND.
WS106	0.60 – 1.90	Gravelly SAND.
WS107	0.70 – 1.60	Slightly gravelly slightly clayey SAND.
WS110	0.40 – 0.60	Slightly gravelly slightly clayey SAND.
WS111	0.80 – 1.90	Slightly clayey gravelly SAND.

5.5 Solid Geology

Destructured bedrock was typically encountered across the site within the shallow exploratory hole locations (trial pits, trial trenches and window sample boreholes), generally comprising sandstone, mudstone, and coal. The shallowest depth at which bedrock was encountered was 0.80m bgl and the strata is interpreted to dip gently to the south south-west. The greatest depth at which bedrock was encountered was 3.70m in RO101.

The deeper solid geology encountered in the rotary boreholes comprised a series of interbedded mudstones, siltstones, sandstones and coal seams of varying thicknesses.

The solid geology was interpreted to represent the Pennine Middle Coal Measures Formation.

Coal and broken ground encountered within the rotary holes is outlined below:

Location	Seam	Depth	Thickness	Intact / Non-intact
RO101	Discovery	12.70 – 14.60	1.90	Broken ground
RO102	Discovery	9.50 – 11.20	1.70	Intact coal
	Yard	15.20 – 17.20	2.00	Intact coal
	Earthy Delf	20.70 – 22.20	1.50	Intact coal

Location	Seam	Depth	Thickness	Intact / Non-intact
	Higher Florida	28.00 – 29.00	1.00	Intact coal
RO103	Discovery	18.40 – 20.30	1.90	Intact coal
	Yard	24.00 – 25.80	1.80	Intact coal
RO104	Discovery	9.70 – 9.90	0.20	Intact coal
	Yard	18.20 – 20.00	1.80	Intact coal
	Earthy Delf	23.20 – 26.20	3.00	Intact coal
RO105	Discovery	19.20 – 20.40	1.20	Intact coal
	Yard	24.90 – 26.20	1.30	Intact coal
RO106	Yard	5.80 – 7.40	1.60	Soft drilling
RO107	Earthy Delf	6.50 – 6.70	0.20	Intact coal
	Earthy Delf	6.70 – 8.20	1.50	Broken ground
RO107A	Earthy Delf	3.90 – 5.20	1.30	Intact coal
	Higher Florida	12.30 – 13.40	1.10	Intact coal
	Lower Florida	23.10 – 24.50	1.40	Intact coal
	Cheshire Mine	38.40 – 39.10	0.70	Intact coal
RO109	Pastures	7.60 – 10.20	2.60	Intact coal
	Discovery	20.40 – 22.00	1.60	Intact coal
	Yard	27.20 – 28.30	1.10	Intact coal
RO110	Yard	8.20 – 10.50	2.30	Soft drilling
RO111	Yard	8.00 – 9.30	1.30	Intact coal
	Earthy Delf	16.50 – 17.80	1.30	Intact coal
RO112	Pastures	21.80 – 23.50	1.70	Intact coal
RO113	Discovery	17.10 – 18.80	1.70	Broken ground
	Yard	18.80 – 19.40	0.60	Soft drilling
RO114	Discovery	0.80 – 2.10	1.30	Intact coal
	Yard	9.30 – 11.00	1.70	Broken ground
RO115	Yard	13.30 – 14.80	1.50	Intact coal
	Earthy Delf	26.00 – 27.30	1.30	Broken ground

Full flush returns were typically recorded in the rotary boreholes, indicating intact coal, with the exception of 5 rotary locations where broken ground and 100% loss of flush was encountered, indicating the likely presence of mine workings at these locations. The majority of coal encountered was intact.

5.6 Groundwater

The depths to groundwater and locations present during site works are shown in the table below:

Location	Depth During Site Works (m)	Comments
WS103	1.20	-
WS109A	2.00	-
WS110	1.90	-
WS112	1.90	-
TP103	2.00	Small seepage
TP107	1.60	Small seepage
TP113	1.80	Medium seepage
TP121	3.90	Small seepage
TP125	0.70	Small seepage
TP133	2.00	Small seepage

NGW – No Groundwater Encountered

Post site works monitoring has revealed the following depths to groundwater:

Location	Depth During Monitoring Period (range) (m)	
	Min	Max
Overall min/max	1.20	9.56
WS101	1.22	2.36
RO103	7.00	9.56
WS103	1.83	2.71
WS105	NGW	NGW
WS106	NGW	NGW
WS108	NGW	NGW
WS109	1.47	2.20
RO114	6.64	8.56

5.7 Observations

Contamination
During the works undertaken by BSL, observations for both visual and olfactory evidence of contamination were undertaken.

With the exception of brick, ceramic, metal, and coal observed as a minor constituent in the made ground soils, no other evidence of contamination was observed at the site.

Running Sands
Localised pockets of running sands were observed in two trial pits during site works, as outlined below:

Location	Depth During Site Works (m)	Comments
TP120	1.60	Running sands
TP129	1.40	Running sands

Stability of Excavations/Boreholes
The sides of the trial pits were generally stable, with the exception to the running sands noted above. The stiff nature of the clay across the site proved difficult to excavate at depth.

The borehole sidewalls were generally stable, and window sampling progressed without the need to install casing.

The rotary boreholes were generally stable and achieved target depths. Collapses or encountering solid ground were the main drivers in terminations, as outlined in the table below:

Location	Depth (m bgl)	Reason for termination
RO101	16.60	Solid ground conditions.
RO106	10.40	BH collapse.
RO107	10.20	Solid ground conditions.
RO110	12.50	BH collapse.
RO113	24.00	Solid ground conditions.
RO114	15.00	Solid ground conditions.

6.0 TEST RESULTS

6.1 Geotechnical Laboratory Testing

Plasticity Index Analysis
Plasticity index results ranged between 8% and 26%. Associated water contents ranged between 14.9% and 26.1%.

After modification of particle size in accordance with NHBC Chapter 4.2 the modified plasticity indices are in the range 8% to 22% indicating the clays to be of low to medium volume change potential.

6.2 Aggressive Ground Conditions – Geotechnical Chemical Testing

The test results for the assessment of aggressive ground conditions are presented in Appendix D. The results are summarised and assessed within Section 7.0 of this report.

6.3 In Situ Geotechnical Testing

In Situ Hand Shear Vane Tests
Hand shear vane tests were carried out on suitable cohesive soils where possible. Each shear vane result recorded represents the mean value of three tests undertaken at the specified depth.

The results and distribution of the hand shear vane tests are recorded in kPa on the Exploratory Hole Logs which are presented in Appendix B.

In Situ Standard Penetration Tests
Standard Penetration Tests (SPTs) were carried out within the window sample boreholes at regular 1.0m intervals. The results of the individual blows and the N-values are recorded on the Exploratory Hole Logs in Appendix B.

All SPT N values are uncorrected. Density and strength descriptors are reported in accordance with the guidelines stated in BS 5930:2015+A1:2020, incorporating requirements of BS EN ISO 14688-1:2002, BS EN ISO 14688-2:2004 and BS EN ISO 14689-1:2003.

Soil Infiltration Test Results
Soil infiltration tests were undertaken within 2 No. trial pits, a summary of the results is presented in the table below. These were carried out in general accordance with BRE Digest 365 (BRE 2016) where infiltration rates allow three test runs during a working day (or where there is no infiltration), but where low infiltration rates were encountered the available time may not have been sufficient to fully comply with the BRE test method.

Where less than three tests were possible in a particular location the results provided should be considered as indicative only. Further discussion concerning the suitability of infiltration testing at the site is provided in Section 8.0.

Location	Stratum Type	Depth (m)	Infiltration Rate (m/sec)		
			Test 1	Test 2	Test 3
SA101	Clay to 2.40m then destructured sandstone to base	3.00	Unable to calculate rate due to no infiltration	-	-
SA102	Slightly sandy gravelly CLAY.	1.30	Unable to calculate rate due to no infiltration	-	-

The full test results are presented in Appendix D.

In Situ CBR Testing
The in situ CBR testing results are summarised in the table below:

Method	Location	Stratum Type	CBR (%)	Modulus Subgrade Reaction K^{762} ($kN/m^2/mm$)
Lightweight Deflectometer (LWD)	LWD101 – 0.20m	Sl sandy sl gravelly CLAY	0.2	6.06
	LWD102 – 0.30m	Sl sandy sl gravelly CLAY	0.3	6.67
	LWD103 – 0.30m	Sl sandy sl gravelly CLAY	0.6	10.99
	LWD104 – 0.20m	Sl sandy sl gravelly CLAY	0.2	5.54
	LWD105 – 0.20m	Sl sandy sl gravelly CLAY	0.3	7.49
	LWD106 – 0.30m	Sl sandy sl gravelly CLAY	0.4	8.21
	LWD107 – 0.30m	Sl sandy sl gravelly CLAY	0.2	6.37
	LWD108 – 0.20m	Sl sandy sl gravelly CLAY	0.3	7.49
	LWD110 – 0.30m	Sl sandy sl gravelly CLAY	0.2	5.95
	LWD111 – 0.30m	Sl sandy sl gravelly CLAY	0.2	5.34
	LWD112 – 0.30m	Sl sandy sl gravelly CLAY	0.2	6.06
	LWD113 – 0.30m	Sl sandy sl gravelly CLAY	0.2	5.24
	LWD114 – 0.30m	Sl sandy sl gravelly CLAY	0.2	6.37
	LWD115 – 0.30m	Sl sandy sl gravelly CLAY	0.2	5.54
	LWD116 – 0.20m	Sl sandy sl gravelly CLAY	0.2	5.24
	LWD118 – 0.30m	Sl sandy sl gravelly CLAY	0.2	5.13
	LWD119 – 0.30m	Sl sandy sl gravelly CLAY	0.2	5.24
	LWD120 – 0.30m	Sl sandy sl gravelly CLAY	0.2	5.34

The full test results are presented in Appendix D.

6.4 Geo-Environmental Testing

Chemical Laboratory Testing
The chemical test results for soils are presented in Appendix C. The results are summarised and assessed within Section 8.0 of this report.

Ground Gas Monitoring
Ground gas monitoring results are presented in Appendix E and are summarised and assessed within Section 8.0 of this report.

7.0 GEOTECHNICAL ASSESSMENT

7.1 Ground Model

The majority of the site is currently comprised of open fields with some existing buildings in the north-western area. There are two known mine shafts on site associated with the former coal mining activities. There is also very small pond located in the north-west area of the site.

The ground conditions can be summarised as below (top down):

- Made ground generally comprising sandy gravelly clay from ground level to between 0.70m and 2.10m bgl.
- Natural superficial deposits comprising clays proven from 0.30m – 3.90m bgl and encountered to depths between 0.50m and 4.50m bgl. Localised granular sand deposits were also encountered in seven exploratory hole locations from 0.40m – 0.80m bgl and encountered to depths between 0.60m – 1.90m bgl.
- Solid geology was found to comprise predominantly mudstone, with sandstone in RO103. Bedrock was encountered at shallow depths across the site, generally within the top 4.00m, to depths ranging between 2.00m – 40.00m bgl. Sandstone was proven from 0.80m – 3.30m bgl to depths ranging between 2.00m – 13.10m bgl.
- Multiple coal seams were encountered beneath the site, between 0.20m and 3.00m in thickness.
- Groundwater levels ranging between 0.70m and 3.90m bgl during site works.
- Post site works monitoring levels ranging between 1.20m and 9.56m bgl.

Evidence of underground services onsite includes two water chambers/ above ground manholes present in the western area of the site and spray paint indicating the potential presence of underground services was seen to be running along the southern border of the site, parallel to the road.

Deeper made ground was also encountered in TP107, adjacent to derelict farm buildings, up to 2.10m bgl (though the base of this strata was not proven).

A low UXO risk zone spans across the entire site.

The site lies within a low groundwater flood risk area.

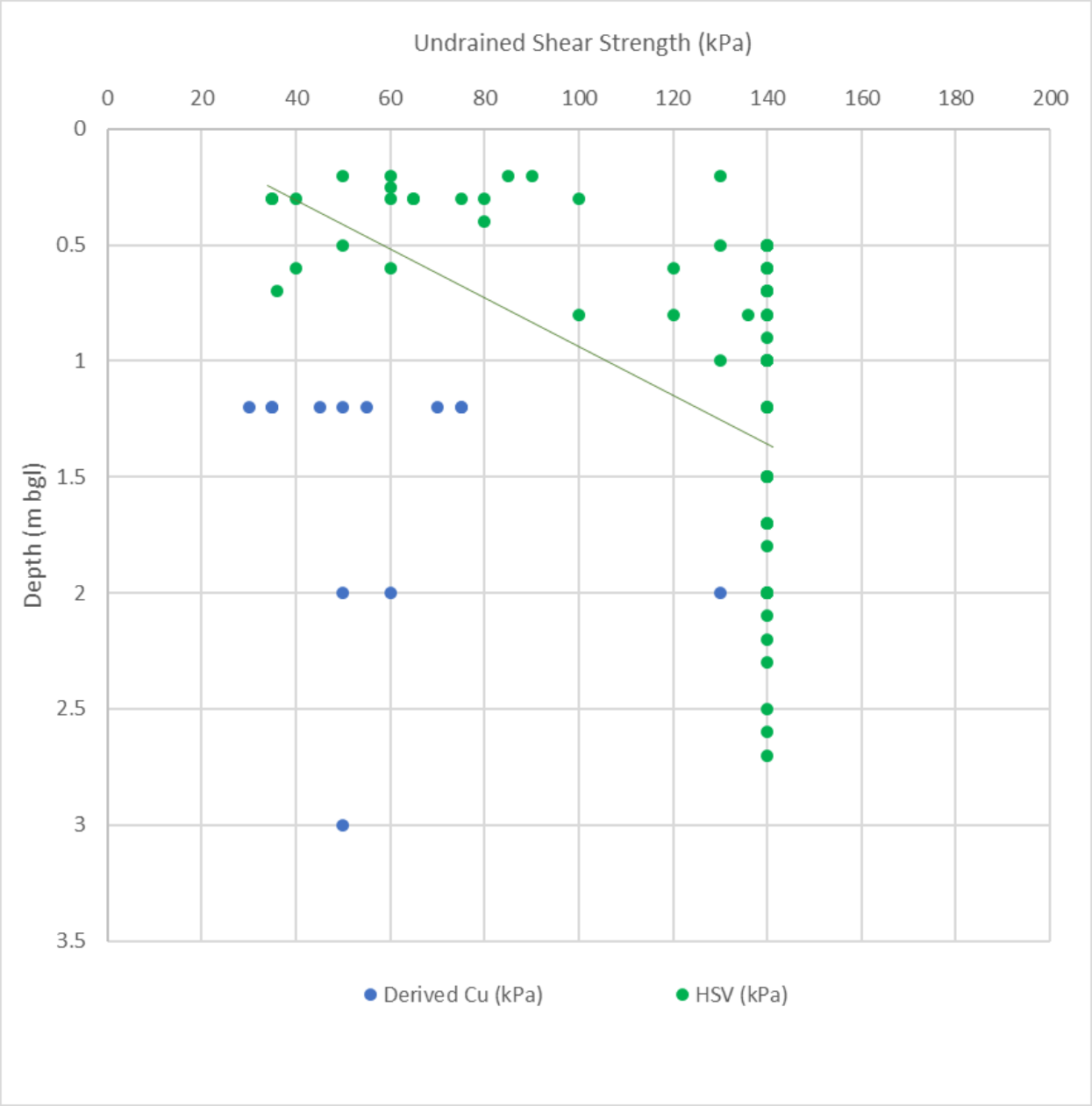
7.2 Design Soil Parameters

The relevant test results from the prior section have been evaluated to derive geotechnical soil parameters for the site.

For cohesive (fine) soils, the equivalent approximate undrained shear strengths (Cu) have been calculated from the recorded SPT N values, adopting f1 values based on the correlation of Stroud (1975) and the 'average' plasticity.

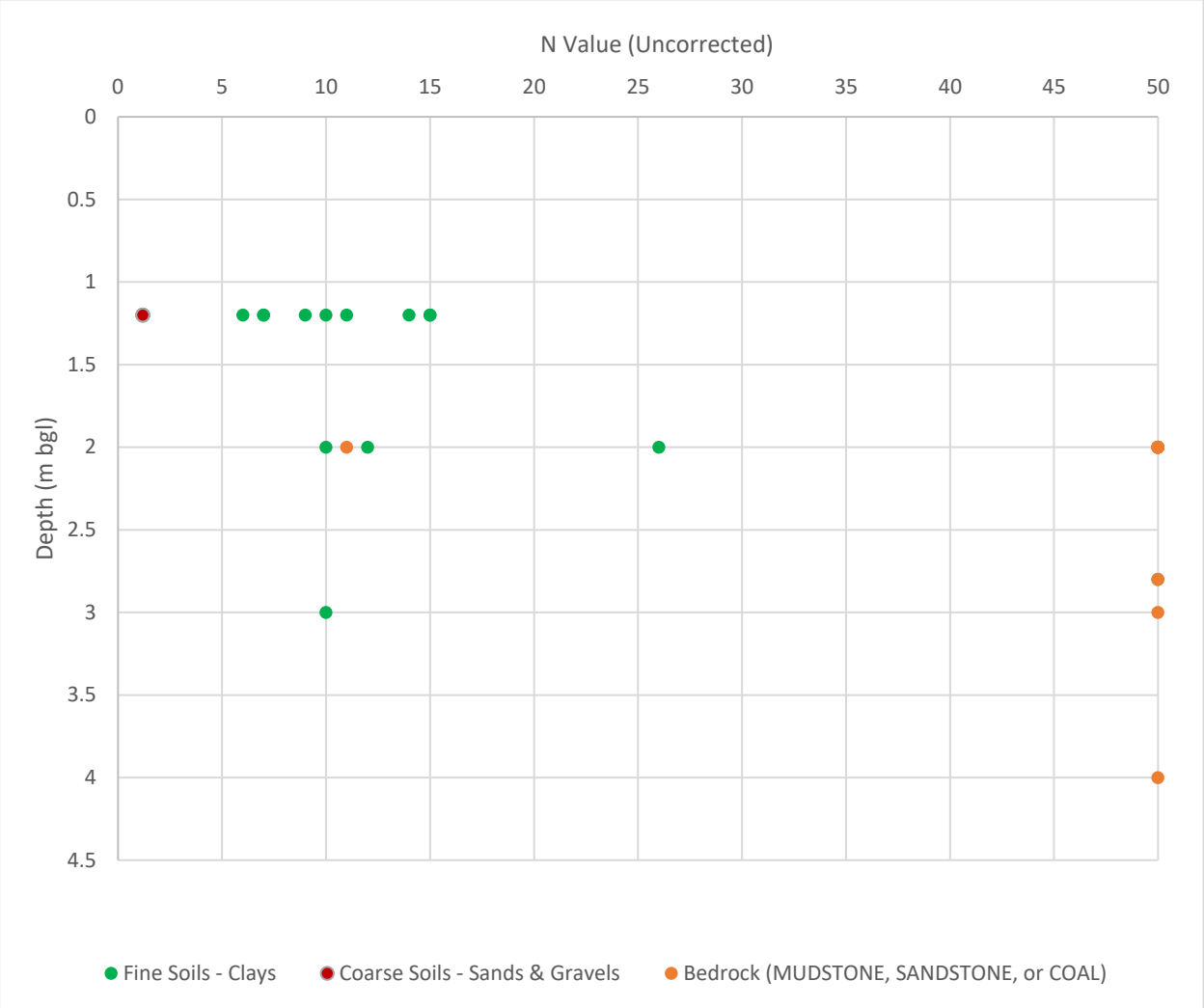
The angle of shearing resistance (ϕ') of the granular (coarse) soils has been derived from the uncorrected SPT N value data and the correlation of Hatanaka and Uchida (1996).

A depth (m bgl) vs derived shear strength (Cu) graph is provided below to provide a profile of the cohesive soils underlying the site:



The above graph shows a general increase in soils strengths as depth increases.

A depth (m bgl) vs SPT N value graph is also provided below to provide a profile of the granular materials underlying the site.



The above graph shows a general increase in soils strengths as depth increases.

Characteristic Values

Characterisation of the geotechnical parameters above has been undertaken to obtain characteristic values, which are a cautious estimate of the values affecting the occurrence of the limit state, taking into consideration typical minimum foundation depths for cohesive and granular soils.

Characteristic values for made ground are not presented due to the heterogeneity of the deposits and that they are not typically considered to be a suitable bearing stratum without some form of ground improvement.

The derived shear strength values taken from the window sample boreholes appear to show localised softer spots within the clay, however, the hand shear vane readings are considered to be more reliable and representative of the strength of the cohesive material because they provide a direct, undisturbed and immediate measurement of the soils shear strength properties. Therefore, the characteristic values are calculated predominately from hand shear vane data.

Based on the low to medium volume change of the cohesive soils, foundations should be placed at a minimum depth of 0.90m bgl, therefore characteristic values are presented for this approximate depth.

The characteristic value for undrained shear strength (Cu) as read from the depth vs Cu graph above in cohesive deposits at 0.90m bgl is interpreted to be 100kN/m^2, increasing to 150kN/m^2 from 1.50m bgl.

Note that made ground was encountered deeper than 0.90m bgl in just three locations, WS102 (1.30m bgl), WS103 (1.20m bgl) and in TP107 (2.20m bgl +) and this will be unsuitable to found in.

The characteristic ϕ' value in the granular deposits has been extrapolated from the SPT 'N' value data and visual descriptions of the ground conditions and at a depth of 0.80m bgl is interpreted to be 30° for Ultimate Limit State conditions.

A characteristic ϕ' value of 40° for the bedrock across the site has been extrapolated from the SPT 'N' value data and visual descriptions of the ground conditions within the Pennine Lower Coal Measures bedrock. However, note the depth to this stratum is variable across the site.

7.3 Foundations

The development will comprise traditional 2 and 2.5 storey residential housing and is considered to be classed as Geotechnical Category 2 in accordance with Eurocode 7.

Preliminary design by calculation has been undertaken to determine the design resistance of the bearing strata in the following section. Note that the made ground noted in section 7.2 above is not considered to be a suitable bearing stratum.

No proposed structural loads were available at the time of writing; therefore, the following recommendations are provisional and should be reviewed at the detailed design stage. For the purpose of this assessment a typical load of 50kN has been assumed per storey.

This assessment is based on the existing ground levels and does not take into consideration any cut/fill exercise, which should be considered at the detailed design stage

The below also assumes that any historical mine workings below the site will be stabilised via a drill and grout scheme.

Shallow Foundations – Strip
The most suitable foundations for the proposed residential homes across the majority of the site are considered to be strip foundations.

Based on the medium volume change potential, foundations should be placed at a minimum depth of 0.90m bgl into the natural cohesive deposits and deepened near trees and hedges in accordance with NHBC Chapter 4.2.

Whilst the minimum founding depth of 0.90m bgl will be suitable for the vast majority of the site, foundations will need to be deepened locally to found in more competent strata due to localised made ground deposits encountered in WS102, WS103 and TP107. Where footings are placed below the minimum founding depths, they should extend a minimum of 100mm into the specified bearing stratum.

At 0.90m bgl, an allowable bearing capacity not exceeding 230 kN/m^2 may be assumed. This increases to 300kN/m^2 from 1.50m bgl. This adopts a factor of safety of 3 which should limit settlements to within acceptable limits.

Trees are noted within and close to the areas proposed for development. Depending on their size, type and maturity, the required depth of founding based on the recommendations of NHBC Chapter 4.2 may exceed 2.5m. Should this prove to be the case, then piled foundations should be considered as a potentially more economical solution, unless it can be proven that the soils are not desiccated.

Note where foundations require deepening to greater than 2.5m below ground level, they must be designed by an engineer, as specified in NHBC Technical Requirement R5. Consideration of grouted horizons is also required.

Localised granular sand strata were encountered in eight locations across the site as detailed in section 5.4. In these locations, the sand was found to be directly underlain by solid bedrock. Therefore, foundations in these locations should be placed upon the granular sand strata, where unacceptable differential settlement would not be anticipated. At 0.80m bgl, an allowable bearing capacity not exceeding 150 kN/m^2 may be assumed. This adopts a factor of safety of 3 which should limit settlements to within acceptable limits.

General Advice for Shallow Foundations
The bearing stratum should be inspected for 'soft spots' within the natural clay strata, resulting for instance from localised groundwater perched within the overlying fill materials. If unsuitable soft soils are encountered, then foundations will need to be deepened to found on suitable strata or soft or loose zones should be excavated and replaced with well compacted suitable granular fill or lean mix concrete. The stratum should also be inspected for 'hard spots" which may require removal.

If the ground conditions encountered during the construction phase differ significantly to the conditions encountered during construction, work should cease and BSL contacted for further advice.

During the construction phase supervision should be on a continuous basis to check the design assumptions are correct and construction conforms to design. Supervision should include inspections, Control Ground Investigations and monitoring.

7.4 Building Near Trees

The clay soils on site are of medium volume change potential. Where foundation excavations (or piles if adopted) encounter cohesive strata in the vicinity of existing, proposed or recently removed trees, foundations should be adjusted in full accordance with NHBC Standards Chapter 4.2. All foundations should be deepened below roots of greater than 5mm diameter during excavations for footings.

A survey of all trees and hedges on the site and within influencing distance of the site boundary should be undertaken to identify tree species and heights by a qualified arboriculturist in accordance with BS 5837:2012 and NHBC Standards. This information will be required in order to assess the effects of trees on the cohesive strata.

Where foundation depths due to trees already present or recently removed exceeds 1.50m, there is a possibility for heave to occur on removal of the tree and guidance states that compressible material or void former is required against the inside face of the foundation, unless it can be satisfied that the soil is not desiccated.

7.5 Floor Slabs

Given the thickness of topsoil and localised made ground present, suspended floor slabs should be adopted at the site in accordance with NHBC standards.

Where foundation depths due to trees already present in cohesive (shrinkable) strata exceeds 1.50m, there is a possibility for heave to occur on removal of the tree, unless it can be satisfied the soils are not desiccated. In this instance, NHBC Guidance states that either a precast concrete floor (i.e. beam and block), a suspended timber or a cast in-situ concrete floor must be used. We recommend the former, where the required void size for beneath floor slabs on this site is 250mm based on the medium volume change potential clays.

Ground bearing slabs may also be adopted providing the following criteria are satisfied:

- Any other compressible or unsuitable materials (topsoil containing vegetation and organic matter, including tree roots, are excavated and either improved or removed and replaced with suitable materials.
- The foundation depth (such as due to the influence of trees) is less than 1.5m.
- It is demonstrated that desiccation in cohesive soils is not present.
- Any fill beneath the slab is suitable, well-compacted granular material placed in an appropriate thickness in accordance with a suitable specification (e.g. NHBC Standards) designed and supervised by an appropriately qualified engineer, with the end performance validated.
- The slab is adequately reinforced.
- Regular construction joints and ties are provided to allow for differential settlement.

The final floor slab design should be of sufficient thickness and sufficiently reinforced to accept the envisaged applied loads, without unacceptable total or differential movement.

Vertical elements within the structure, such as columns and walls will need to be isolated from the ground bearing slab in order to allow for the slab to expand against them without resulting in cracking.

Prior to the placement of the founding materials and the construction of a ground bearing floor slab, the sub-formation and formation will need to be inspected and checked by a geotechnical engineer to ensure the ground conditions are as expected. If soft spots or hard spots are identified at the formation level, they should be reported to the Geotechnical Engineer immediately and remedial actions agreed.

Incorporation of geogrid reinforcement at formation level, before granular material is placed and compacted, will likely minimise required excavation depths and help provide a suitable foundation for the ground bearing slab.

7.6 Site Preparation and Construction

The existing structures will need to be demolished, and relict foundations / infrastructure grubbed out. Topsoil and subsoil should be removed from beneath all proposed buildings and hardstanding areas.

There are a number of services crossing the site, including two water chambers / above ground manholes in the west, and spray markers indicating a service to the south of the site parallel to the road. There is also a marked United Utilities service in the south-eastern site area. To allow remediation and construction, all services will need to be disconnected, and any suspected dead services are confirmed as dead by testing.

Instability of excavations through natural soils is not anticipated provided they are not exposed to adverse weather conditions for any substantial period of time. Instability of the made ground should be allowed for. All excavations should be carried out in accordance with CIRIA Report 97 'Trenching Practice'.

Excavation depths should generally be readily achieved using conventional plant (JCB or similar) although high specification plant (tracked 360° or similar) is recommended to maintain the build programme.

Calorific values were determined for two soil samples of backfill material from the two historic onsite mine shafts. The results were 9.92MJ/kg (MS03) and 8.53MJ/kg (MS06), with the presence of coal noted in both locations. Reference to the ICRCL guidance notes on the fire hazards of contaminated land (Ref. 20) indicates the two samples have results greater than 7MJ/kg, identified as an unacceptable risk of smouldering (Ref. 20), but they are not greater than 10MJ/kg, which is considered almost certainly

combustible. Further assessment should be undertaken at detailed design stage, when it has been established how colliery material present on site will be re-used. Although combustion and propagation of flames within coal seams and workings is possible it is highly unlikely due to the low oxygen concentrations likely to be present within underground coal seams and abandoned mine workings, and slow smouldering is a more realistic, although still unlikely, possibility. Given that the majority of the site, including the areas of encountered mine shafts, is overlain by a minimum of 2.00m of superficial deposits, this may be considered to act as a non-combustible, inert cap. In addition, the high groundwater table on site is likely to reduce the risks to acceptable levels.

The likelihood of the material to propagate flame is further dependent on its porosity, moisture content and temperature. Whilst the material is deemed suitable for use as the calorific values lie below the 'unacceptable risk' threshold, it is recommended that a minimum density / level of compaction is established for the material and any material identified below this limit should be improved in areas of residential development or a suitable capping layer is placed. It is likely that improvement for geotechnical purposes within the footprint of structures will be adequate to achieve the required density, however if ground improvement is achieved using vibro-stone columns, these may allow air into the colliery spoil and this may preclude their use, this should be discussed with a specialist sub-contractor.

It should be noted that undertaking treatment locally or using deepened foundations (i.e. focussing only on the footprint of structures) means that the surrounding areas (roads, gardens and landscaping) are likely to settle relative to the structures if disturbed. This risk can be mitigated by undertaking more widespread ground improvement through techniques such as dynamic compaction, surcharging or excavation and re-compaction.

To protect against the effects of heave, new drainage in costive soils should be designed to take account of potential ground movement, including where pipes and services which pass through substructure walls or foundations. The volume change potential on this site is medium and the potential ground movements that need to be considered for design are 100mm.

Recorded post site works groundwater levels ranged between 1.20m and 9.56m bgl and therefore are likely to be encountered within likely excavation depths. Based on the exploratory holes logs and monitoring, it is considered that methods such as sump pumping are likely to be sufficient to deal with anticipated flows. Further guidance is provided in CIRIA C750 "Groundwater Control: Design and Practice". It should be noted that groundwater levels will vary seasonally, and the timing of construction may influence requirements.

7.7 Mine Workings and Entries

Based on the Coal Mining Risk Assessment undertaken by BSL in March 2025 (ref KB/C5980/13837), a risk to the proposed development was identified from unrecorded mine workings and recorded and unrecorded mine entries. This report concluded that based on the indicated dip directions and outcrop patterns from the available geological mapping, the underlying strata are indicated to dip 11-12 degrees south south-west.

Mine Workings
Evidence of coal mine workings can be represented by voids, broken ground and/or loss of flush with evidence of potential workings indicated by intact coal of a suitable workable thickness and quality. An assessment should be made based on all the available evidence.

During site investigations, coal was encountered in 11 of the 16 rotary boreholes, encountered from 0.80m – 38.40m bgl to depths ranging between 1.90m – 39.10m bgl. The thicknesses of the seams ranged from 0.20m to 3.00m thick.

Broken ground was encountered in 5 of the 16 rotary boreholes, suggesting that the coal has been previously worked. This was encountered from 6.70m – 26.00m bgl, to depths ranging between 8.20m – 17.30m bgl. The thicknesses of the broken ground ranged from 1.30m to 8.70m thick. This is detailed in the table below:

Location	Depth	Thickness	Depth to Bedrock
RO101	12.70 – 14.60	1.90	3.70
RO106	5.80 – 7.40	1.60	2.90
RO107	6.70 – 8.20	1.50	2.60
RO110	8.20 – 10.50	2.30	2.90
RO113	17.10 – 18.80	1.70	0.80
	18.80 – 19.40	0.60	
RO114	9.30 – 11.00	1.70	2.10
RO115	26.00 – 27.30	1.30	2.60

Given the presence of coal workings beneath the site, further assessment is required and is discussed further in Section 7.8.

Mine Entries

The Coal Mining Risk Assessment stated that two recorded mine entries are present onsite, one in the west and one in the south-east area of the site. The two recorded mine shafts have reference numbers 347390-003 (MS003) and 347390-006 (MS006) respectively. One further mine shaft, reference 347390-004, is indicated to be present offsite but within 20m of the eastern boundary. Trial trenches were excavated to determine the precise location of the on-site mine shafts, allowing dimensions and backfill material to be recorded and tested.

A circular depression was visible from ground level in the vicinity of MS003 in the eastern site area, but MS006 had no evidence at ground level of any subsidence.

MS003 was identified in the location indicated by the surface depression and at the location of the MRA coordinates. It was encountered at the top of the bedrock at 2.00m bgl, within the destructured mudstone and coal.

MS003 was observed to be backfilled with 'Grey and orangish brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of coal and mudstone'. The material was interpreted to be natural site won arisings associated with the historical mining activity. The mine shaft was exposed to a maximum depth of 5.50m bgl with the excavator.

MS006 was identified in the soft landscaping 6m to the east of the MRA coordinates. It was encountered at the top of the bedrock at 2.20m bgl, within the destructured mudstone.

MS006 was observed to be backfilled with 'MADE GROUND: Grey and black gravelly clay. Gravel is angular to sub-rounded fine to coarse of brick, coal, mudstone, sandstone, and chert'. The material was interpreted to be site won arisings associated with the historical mining activity. The feature was exposed to a maximum depth of 2.50m bgl.

Mine shaft MS003 was located at grid reference 347271, 390169 and measured approximately 2.00m in diameter. Mine shaft MS006 was located at grid reference 347001, 390243 and measured 1.53m in diameter. Based on the narrow diameter, both shafts are interpreted to have been utilised for ventilation purposes. Images taken during the investigation are shown on the Mine Shaft Investigation Photo Board drawings (ref. C5980/MS003, and C5980/MS006), and the trial trench logs are presented in Appendix B. Neither mine shaft was observed to contain any capping, grouting or plugging.

The presence or absence of mine shaft MS004, which lies offsite from the south-eastern boundary, was investigated by means of TP131, which extended to the boundary of the site. No evidence of an historic mine shaft were noted within this area, indicating that the mine shaft is unlikely to be present within the site boundary. Furthermore, the positions of the two recorded mine shafts onsite were very accurate in relation to the MRA provided coordinates.

Guidance on the potential zone of influence from a theoretical collapse of a mine shaft can be found in CIRIA C758 'Abandoned Mine Workings Manual' and it is recommended that all shafts within influencing distance of proposed structures are stabilised prior to development. It is envisaged that this can be undertaken in conjunction with bulk infilling of mine workings.

Where mine shafts lie offsite there may be significant practical difficulties associated with gaining access to undertake stabilisation works. It must be cautioned that recorded shaft locations can vary significantly from the true positions and there is a high risk of unrecorded mine shafts being present.

It is recommended that the proposed layout is developed with consideration of the location and stability of the known mine shafts. At present, MS003 is indicated to be located in a proposed highway, whilst MS006 is indicated to be located in an area of Public Open Space (POS).

Where mine shafts are present it will be necessary to install a cap to a structural specification. The design will require agreement with building control, the Mining Remediation Authority and the NHBC. It is recommended that the positioning of structures over shafts is avoided, including within a specified standoff zone.

Possible Unidentified Mining Features

Given the extent of the exploratory hole coverage, and the significant mining related history onsite, there is a possibility that some mining features (unrecorded mine shafts) may exist beneath the site that have not been identified in the ground investigation. Therefore, it is imperative that a detailed watching brief is carried out for all excavations and earthworks that occur onsite. The recorded mine shafts were easily identified during the trial trenching, with the infilled material being highly varied from the surrounding superficial and bedrock material, with clear dividing lines between the feature and the surrounding undisturbed ground. Further drilling investigation works may be required if unidentified anomalies are identified in the foundation excavations.

7.8 Treatment of Mine workings

Mine Entries

Guidance on the potential zone of influence from a theoretical collapse of a mine shaft can be found in CIRIA C758 'Abandoned Mine Workings Manual' and it is recommended that all shafts within influencing distance of proposed structures are stabilised prior to development. Rockhead is located at circa 2.00m bgl at Mine shaft 003, and at circa 2.20m bgl at Mine shaft 006. The theoretical zone of instability surrounding each mine shaft would be a radius of 2.00m from the edge of Mine shaft 004, and 2.20m at Mine shaft 006.

Due to the nature of the fill, which has already exhibited potential to settle due to subsidence at the surface prior to site works, it is recommended that the shafts will need to be suitably remediated prior to the proposed development commencing on this site. Remediation is suggested to be either the installation of a suitable reinforced concrete cap over the shaft, or alternatively the grouting of the shaft to stabilise the existing backfill material and surrounding area. Prior to remediation, the design will require agreement with building control, the Mining Remediation Authority and the NHBC. The Mining Remediation Authority will also need to undertake an Options Appraisal for the proposed treatment. Whilst infilled material was encountered within the mine shafts at near-surface, there exists the possibility that the shaft is capped at

a certain distance below ground level, beyond which the remainder of the shaft is voided. However, the specific investigation into this was beyond the scope of this report.

In areas of soft landscaping, highways and car parking, a suitable geogrid should also be installed within the zone of influence of mine features, in addition to the plugging / capping, to prevent against any unacceptable levels of subsidence.

The below table details the estimated diameter of the identified mine shaft features, based on the empirical evidence noted during the site works, and the depths to competent strata in these locations.

Mine shaft	Diameter (m)	Depth to competent Strata (m bgl)	Diameter of Plug (based on 45˚ angle)
347390-003	2.00	2.00	6.00
347390-006	1.53	2.20	5.93

It is recommended that the proposed layout is developed in conjunction with consideration of the location and stability of the known mine shafts. It is recommended that where possible the positioning of structures over shafts is avoided.

Mine Workings
Guidance within CIRIA C758 'Abandoned Mine Workings Manual' indicates that a void will not migrate to the surface where there is more than ten times the seam thickness of rock cover (10t criterion, Piggott and Eynon 1978). Up to this depth, the void will begin to choke with rock from the roof, which is represented by broken ground.

Beyond 10 times the seam thickness, the upwards migration of the void would be expected to 'choke out', due to bulking of the collapsed materials (i.e. there will be acceptable cover over the workings to prevent void migration to the surface).

The results during site works are outlined below:

Location	Ground type	Ground depth (m bgl)	Broken ground thickness (m bgl)	Depth to competent bedrock	Thickness of competent cover required	10T Achieved?
RO101	Broken ground	12.70 – 14.60	1.90	3.70	19.0	No
RO106	Soft drilling	5.80 – 7.40	1.60	2.90	16.0	No
RO107	Broken ground	6.70 – 8.20	1.50	2.60	15.0	No
RO110	Soft drilling	8.20 – 10.50	2.30	2.90	23.0	No
RO113	Broken ground	17.10 – 18.80	1.70	0.80	17.0	No
	Soft drilling	18.80 – 19.40	0.60			No
RO114	Broken ground	9.30 – 11.00	1.70	2.10	17.0	No
RO115	Broken ground	26.00 – 27.30	1.30	2.60	13.0	Yes

The shallowest coal seam was encountered at 0.80m bgl, and thicknesses ranged from 0.20m – 3.00m. The shallowest seam is interpreted to be the Discovery seam, though it should be noted that five seams in total sub-crop beneath the site. Broken ground was encountered in 5 rotary locations, encountered from depths between 6.70 – 26.00m bgl up to 8.20 – 27.30m bgl. These are interpreted to represent historical workings within the following seams of coal: Discovery, Yard and Earthy Delf. No evidence of workings was identified in the Pastures seam, Higher Florida or Lower Florida.

Based on CIRIA guidance there is insufficient solid rock cover for both seams to prevent upward migration of collapses affecting the future development and mitigation measures are required in the form of drilling and grouting

A drill and grout specification will be required to enable a contractor to carry out the works. It is recommended that the works are reviewed by BSL as they progress and as the ground conditions require. It should be noted that the scope of the investigation undertaken to date may not have identified all potential workings within the site boundary and additional investigation may be required to verify the design of the mine stabilisation scheme. As stated above, this could be undertaken prior to or concurrently with the drilling and grouting operation.

It would also be prudent to extend a selected number of boreholes undertaken as part of the grouting works to greater depth to verify the absence of deeper workings in the underlying strata. Alternatively, drill holes could be terminated upon the satisfaction of the supervising engineer that an appropriate thickness of solid drilling has been proven to discount the risk of instability due to workings in deeper seams.

It will be necessary to continue treatment to a satisfactory distance outside of the footprint of proposed dwellings to ensure stability in the occurrence of collapse of adjacent ground that has not been subject to treatment. This may extend up to 3m beyond the proposed footprint, subject to confirmation from the Mining Remediation Authority. Consideration should also be given to the stabilisation of site access roads.

A licence will be required from the Mining Remediation Authority to undertake the drilling and grouting works, this typically takes 3-4 weeks to obtain. The Mining Remediation Authority may have requirements in respect of control of emissions of gas and mine water as a condition of issue of a licence. The Mining Remediation Authority terms and conditions may pose restrictions on the choice of drilling flushing medium in response to recent public safety issues.

Upon completion of drilling and grouting a validation report will be required for presentation to the regulators detailing hole locations, seams targeted, grout takes etc.

It should be noted that as large areas of the site lie within a High-Risk Development Area, the Mining Remediation Authority is likely to be a statutory consultee as part of the planning process or may be consulted by the Local Authority. The findings of this assessment should be confirmed with the Local Authority, and Mining Remediation Authority if necessary, prior to any irrevocable action at the site

7.9 Concrete Classification

The soluble sulphate and pH test results have been assessed in accordance with BRE Special Digest 1 “Concrete in aggressive ground” 2005. The Design Sulphate (DS) classification and the Aggressive Chemical Environment for Concrete (ACEC) classification are presented in the table below.

For the purposes of this assessment, the groundwater has been classified as static given the site is underlain by low permeability deposits.

Stratum	No. Samples	Characteristic SO_4 (g/l)	Characteristic pH	DS Class	ACEC Class
Made Ground	6	77	6.1	DS-1	AC-1s
Natural Superficial Strata	13	500	6.3	DS-2	AC-1s
Solid Geology – Sandstone	1	2.7	2.3	DS-1	AC-1s

Based on the above, the results of laboratory pH and sulphate content, alongside the BRE full suite tests, indicate that the made ground and solid geology (sandstone) sulphate class is DS-1 and ACEC Class AC-1s conditions prevail in accordance with BRE Special Digest 1 "Concrete in aggressive ground" 2005.

The natural superficial strata class is DS-2 and ACEC Class AC-1s.

The specific concrete mixes (the Design Concrete Class) to be used on site will be determined by the site-specific concrete requirements in terms of the durability and structural performance. These are assessed in terms of the Structural Performance Level (SPL) and any need for Additional Protective Measures (APM) detailed in Part D of BRE Special Digest 1 with further guidance in Pt E and F.

7.10 Highways

Based on the test results, equilibrium CBR values of 2% or more are not likely to be achieved in natural clays soils for pavement design purposes, unless proven otherwise by in-situ testing at formation level by a specialist geotechnical engineer. Equilibrium CBR values are likely to be 2% within the made ground.

Where the CBR is found to be less than 2%, the sub-grade is unlikely to be suitable for both the trafficking of site plant and as a permanent highway foundation without improvement of the soils.

To achieve the required design CBR value, improvement works should be carried out in accordance with DMRB IAN 73/06 Rev 1 Chapter 5 and may include proof rolling, excavation and re-engineering / replacement of weaker soils, the inclusion of a geogrid or use of stabilisation techniques such as the addition of hydraulic binders (e.g. cement/lime).

Based on the fines content of the soils, they are considered to be frost susceptible, therefore highway construction should be a minimum thickness of 450mm to mitigate against the risk.

Care should be taken to ensure the stratum at formation level is protected against inclement weather, as this is likely to lead to surface deterioration and a decrease in soils strengths.

7.11 Site Drainage

The use of sustainable drainage systems, such as traditional soakaways within the natural ground, is not likely to be feasible due to the presence of low permeability cohesive strata underlying the site, and the lack of calculatable drainage rates obtained from the soakaway testing.

8.0 GEO-ENVIRONMENTAL RISK ASSESSMENT

8.1 Introduction

The samples were tested for an assessment of the chemical contamination that may pose a risk to human health. The results were examined with reference to a selection of guidance documents as detailed in Appendix A. In this case the LQM/CIEH S4ULs and DEFRA C4SLs for a residential end use with homegrown produce have been adopted as Tier 1 generic screening values.

The apparent exceedance of the relevant screening value is taken as indicating further detailed assessment or remedial action is required.

A summary assessment sheet is presented in Appendix C alongside the chemical test results. Results are discussed in detail in the sections below.

8.2 Soils Test Results and Risk Assessment – Human Health

Metals
The following elevated metals were detected:

Exploratory Hole	Depth (m)	Stratum	Metal	Concentration (mg/kg)	Adopted Screening Value (mg/kg)
WS103	0.10 – 0.60	Made Ground	Arsenic	38	37
			Lead	980	200

Asbestos
No asbestos fibres have been detected in any of the 5 samples screened.

No visual evidence of asbestos contamination was noted during the investigation, which was undertaken by an engineer with asbestos awareness and NNLW qualifications.

Poly Aromatic Hydrocarbons (PAHs)
No PAHs have been detected above the adopted screening criteria.

Total Petroleum Hydrocarbons (TPH CWG)
No petroleum hydrocarbons have been identified above the adopted screening criteria.

BTEX and MTBE
No BTEX or MTBE compounds have been identified above the adopted screening criteria.

Volatile Organic Compounds (VOCs)
No VOCs have been identified above the adopted screening criteria.

8.3 Summary – Human Health Risk Assessment

Based on the testing and assessment undertaken there is localised contamination within the made ground in the form of metals (Arsenic and Lead), with exceedances found in WS103 between 0.10 – 0.60m bgl. Arsenic concentrations exceeded the adopted screening value by 1mg/kg, whereas Lead concentrations were greatly elevated at 980mg/kg (compared to the adopted screening value of 200mg/kg).

The above pose a risk to human health and will require further consideration prior to redevelopment.

8.4 Soil Test Results – Controlled Waters

Soils

Based on the testing and assessment undertaken, there is localised contamination within the made ground in the form of heavy metals (Arsenic and Lead), with exceedances found in WS103 between 0.10 – 0.60m bgl. No further elevated concentrations of contaminants were identified in soils as an indicator of potential impaction on groundwater.

8.5 Controlled Waters Risk Assessment

Groundwater/surface water testing has not been carried out based on the preliminary CSM risk assessment and the site is not considered to pose a significant risk to controlled water for the following reasons:

- No significant gross or mobile contamination has been identified on site in soils based on the results obtained as a potential indicator of groundwater contamination.
- There is no indication under present conditions of significant pollution of controlled waters and conditions following development of the site will not be any worse, indeed they may improve with increased hard cover and water retaining imported soft landscaping soils.
- For the made ground, the preparation of samples for leachability analysis has not been undertaken as this is an aggressive methodology and provides theoretical values which are unlikely to be representative of existing site conditions, real site leaching concentrations will be reduced significantly from that indicated by the laboratory testing, furthermore this would not be representative of post construction conditions, which will significantly reduce infiltration.
- The site is underlain by low permeability clays which will inhibit lateral and vertical contaminant migration.
- The site does not lie within 1000m of an SPZ.
- There are no groundwater abstractions within 1000m.

8.6 Permanent Ground Gas and Vapours Results

A total of 6 No. ground gas monitoring visits have been carried out to date. Results are summarised in the table below:

	CH_4 (%)		CO_2 (%)		O_2 (%)		CO (ppm)		H_2S (ppm)		Steady Flow (l/hr)	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Peak	0.1	0.7	0.1	8.6	0.3	21.3	0.0	0.0	0.0	0.0	0.0	3.3
Steady	0.1	0.2	0.1	4.8	7.4	21.6					0.0	0.2

Notes: CH_4 = Methane; CO_2= Carbon dioxide; O_2= Oxygen; CO= Carbon Monoxide; H_2S= Hydrogen Sulphide; TVOC (PID)= Total Volatile Organic Compounds (as measured with Photo Ionisation Detector); ppm= Parts Per Million.

The highest methane levels were recorded in RO103 on the first monitoring visit (0.7% v/v).

The highest carbon dioxide levels were recorded in WS109 on the penultimate visit (8.6% v/v).

A maximum flow of 3.3 l/hr was recorded in RO103 on the third visit, though the next highest flow was 0.2 l/hr, with the remainder all being below the limit of detection (0.1 l/hr)

The atmospheric pressure ranged between 1000mb and 1025mb over the monitoring period. The first three visits were conducted over rising pressure trends, and the final three visits were conducted over falling pressure trends.

No groundwater levels were recorded above the response zones, but they were recorded within the response zones in WS101, RO103, and WS103 in all 6 monitoring visits. It was also encountered within the response zone of WS109 and RO114 on 4 visits.

8.7 Ground Gas Risk Assessment

Basis of Assessment
In order to assess the ground gas situation and the requirement for ground gas precautionary measures at the site, guidance was taken from BS8485:2015+A1:2019 'Code of Practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings' and CL:AIRE Technical Bulletin TB17 'Ground Gas Monitoring and 'Worst-Case' Conditions'. For sites influenced by mine workings, the CL:AIRE guidance 'Good Practice for Risk Assessment for Coal Mine Gas Emissions' has been utilised.

Rationale and Suitability of Dataset
As per the Phase 1 Desk Study, in accordance with BS8485 and as set out in Appendix A of this report, the ground gas generation potential is considered to be **very low** (sources as made ground and underground historic mine workings). The sensitivity of the development is **high** on account of the proposed residential end use.

In line with current guidance, it is recommended gas monitoring should comprise 6 visits over a 3-month period. Gas monitoring is now complete.

Assessment of Data
Derivation of a Gas Screening Values (GSV) has been undertaken based on the guidance with BS8485 using the following equation: (max gas concentration / 100) x maximum steady flow.

The peak flow recorded in RO103 (3.3 l/h) during the third visit do not appear to be typical of the site or location, and they quickly fell back to below detection limits of the instrument used (i.e. 0.1 l/hr). These flows appear to be driven by rises in groundwater levels (causing a piston effect). Rises in groundwater levels was observed in RO103 from the first visit, with groundwater levels at 7.00m during the first visit to 9.56m by the final visit, therefore a maximum steady flow of 0.20l/hr has been used to derive the worst credible GSVs.

The GSV's for the site are presented below:

Ground Gas	Adopted Typical Steady Flow Rate (l/hr)	Max Concentration (% v/v)	Worst Credible GSV (l/h)	Classification based on GSV	Typical Threshold Concentration Exceeded
Methane	0.2	0.7	0.0014	CS1	No – CS1
Carbon Dioxide	0.2	8.6	0.0172	CS1	Yes – CS2

The GSVs place the site the site into Characteristic Situation 1 (CS1), however due to concentrations of carbon dioxide greater than 5% v/v being recorded at the site then guidance states ***consideration*** should be given to increasing the site classification as part of assessment.

Glacial Till is not generally considered to be a source of ground gases due to the very low concentrations of organic material typically present within such soils. it is likely the excess concentrations of gas are attributable to microbial respiration as opposed to any other obvious generation source.

In order to further increase confidence in this assessment and adopting a lines of evidence approach, reference has been made to the 2018 paper by Wilson et al (Ambience and EPG Ltd) "Using ternary plots for interpretation of ground gas monitoring results" and NHBC NF94 "Hazardous Ground Gas".

The paper states that carbon dioxide is widespread in the sub surface environment and is generated by microbial and geochemical processes. If there is any organic, carbonate or pyrite content in the soils or rocks then carbon dioxide could potentially be present at concentrations up to 21% v/v. Soils in the UK where carbon dioxide is present commonly include glacial Till and made ground.

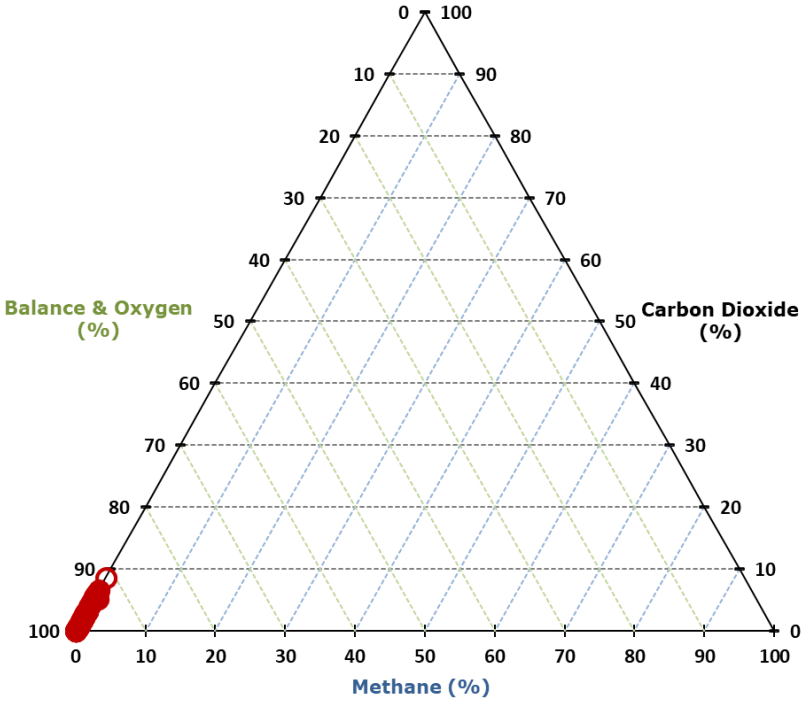
When monitoring wells are installed in these materials, the small volumes of organic material are exposed to oxygen. This can result in biological respiration or oxidation of the material resulting in the production of carbon dioxide.

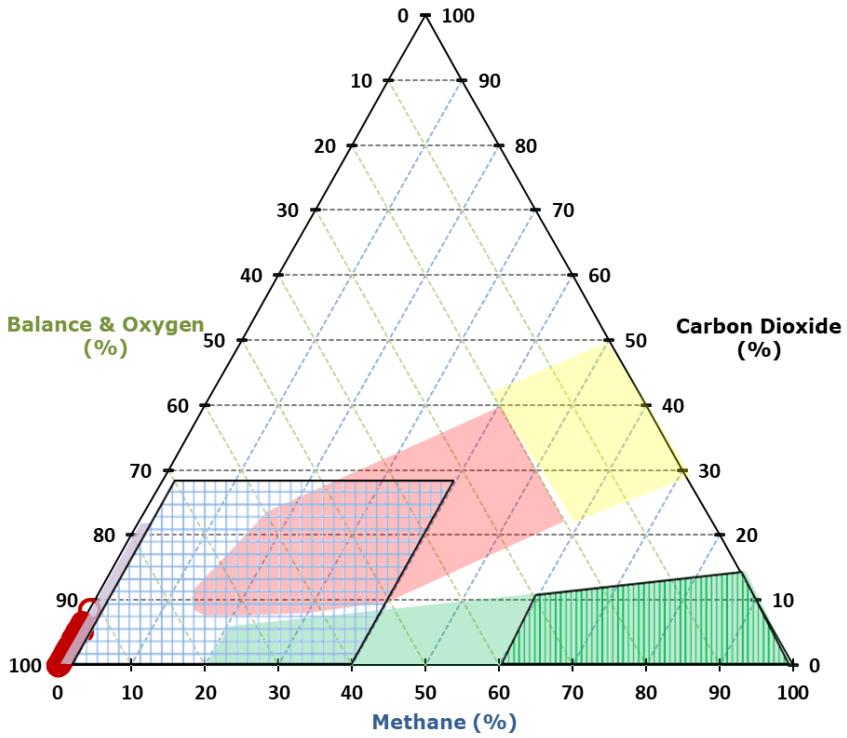
Low volumes of organic material in made ground can also degrade aerobically to produce carbon dioxide or may locally be degrading anaerobically with the process being so slow that the methane completely oxides to carbon dioxide before reaching the well headspace. In all these cases the carbon dioxide is generated so slowly that it will not be emitted from the ground surface in quantities or at a rate that is sufficient to pose a risk to overlying development.

The screening approaches used in the UK for ground gas have a requirement to **consider** increasing the characterisation of a site identified as Characteristic Situation CS1 based on the Gas Screening Value, if carbon dioxide concentrations exceeding 5% have been recorded.

This increase in characterisation is **not** a mandatory requirement in any of the guidance documents. The distribution of elevated concentrations and the source of the gas should be considered before deciding whether the increase is appropriate. The paper goes on to state that in most cases there will not be any need to increase the classification if the carbon dioxide is caused by biological respiration of small quantities of organic material. Increasing the characteristic situation is only likely to be a requirement if the gas source is one of the high-risk sources (landfills, open mine workings, flow of acidic mine water through rocks).

Based on the methodology described in the paper, a ternary plot has been produced using the results from the continuous monitoring data and is presented below:





The distribution of the gas concentrations over the monitoring period fall within the area associated with microbial respiration of organic matter in soils in accordance with Wilson et. al.

Where gas monitoring results plot in the zone for microbial respiration, there is no requirement to increase the characteristic situation simply because the carbon dioxide concentration exceeds 5%. This, as the paper recommends, is supported by other data and lines of evidence such as the site conceptual model and continuous monitoring data.

Assessment Summary

In summary, based on a lines of evidence approach, we consider that the site should be placed within CS1 classification with regards to made ground and natural strata sources, and ground gas protection measures are not required within structures at the development for these, subject to agreement with the Local Authority, based on the following rationale:

- It is considered that the ground gas concentrations and flows have been monitored to enable a predication of "worst case" conditions; rapid and short pressure decreases are within the dataset.
- The typical threshold concentrations of 5% have been exceeded on several occasions within just RO103, WS109, and WS105.
- The "worst case" data has been plotted on a ternary diagram, which indicates the carbon dioxide concentrations are likely due to microbial respiration, where there is no requirement to increase the characteristic situation simply because the carbon dioxide concentration exceeds 5%.
- CL:AIRE Research Bulletin RB17 states the minimum level of ventilation required to deal with condensation is capable of dealing with quite onerous ground gas regimes. In addition, the requirements of Part L of the building regulations relating to the air tightness of buildings also leads to the need for a well-sealed floor slab (NHBC Foundation, 2009).
- Therefore, the structures on the development will also have an inherent level of ground gas protection, thus adding an additional layer of mitigation to the already low assessed level of risk.

The above ground gas risk assessment does not however include the potential mine gas source, however, this source (as discussed in the CSM table) is indicated to be of very low generational potential.

Furthermore, no elevated gases have been detected in either of the two response zones installed within the Coal Measures, and any potential gas is highly unlikely to migrate upwards to the surface due to the impermeable clay deposits encountered.

8.8 Qualitative Risk Assessment

The CSM has been revised based on the findings of the site investigation and laboratory testing results and these are presented overleaf. Unless stated otherwise, in respect to off-site sources, only risks that are assessed as moderate and above within the preliminary CSM have been carried forward to this section, or where a previously unidentified potential source, pathway and / or receptor has been identified from the recent site works.

Human Health						
Potential Source	Potential Pathway	Potential Receptor	Likelihood	Severity	Level of Risk	Justification
On site Made Ground Metals, PAH's, asbestos	Root uptake, ingestion, direct contact, inhalation of dusts	End-users	Low likelihood	Medium	Moderate/ Low	The site has been subject to limited development throughout its history. Made ground deposits were localised and generally thin, with only three very localised areas of deeper made ground in the north-western areas of the site. Chemical testing of soils from WS103 showed exceedances in heavy metals (Arsenic and Lead), though no other sample showed any exceedance. If mitigation measures are undertaken in these areas, such as removing the localised contaminated, or incorporating a clean cover system, the risk would be reduced to low. The risk is considered moderate to low at this stage.
On site Made Ground Metals and organic contamination	Migration into/chemical attack of water supply pipelines	Water Pipelines / End users	Unlikely	Medium	Low	Contaminants within the soil/groundwater are unlikely to attack the clean potable water supply pipe. Contaminants should be assessed in accordance with the relevant guidance to determine the correct pipe material and level of precautions required.
On Site Made Ground Ground Gas (carbon dioxide and methane)	Migration into confined spaces, inhalation and asphyxiation/ explosion	End-users / property / structures	Unlikely	Medium	Low	No significant elevations of methane, VOCs, carbon monoxide or hydrogen sulphide were detected during the gas monitoring programme and there is not considered to be a credible risk of explosion. Carbon dioxide levels were slightly elevated, which should be considered during works, but is not expected to pose a large risk. The maximum steady flow rate was 0.2l/hr, and the site was underlain by low permeability clay deposits. This will inhibit migration of ground gas to the surface. The overall risk following the ground gas risk assessment is considered to be low.
On Site Made Ground Mine Gas	Migration into confined spaces, inhalation	End-users / property / structures	Unlikely	Severe	Moderate/ Low	The mine shafts encountered on site were noted as backfilled, reducing risk of ground gas generation and migration. However, due to the presence of broken ground and workings across the site, further consideration is needed. The broken ground encountered at varying depths may hold mine gases, which can migrate through the voids. However, due to the low permeability clays across the site, the migration will largely be inhibited. It is advised that structures are not built above the mine shafts, and that these are stabilised prior to site development. Drilling and grouting to stabilise the ground across site is necessary, which will fill the voids and inherently reduce the available space for ground gas generation and migration. Due to this, the overall risk is considered moderate/low.

Controlled Waters						
Potential Source	Potential Pathway	Potential Receptor	Likelihood	Severity	Level of Risk	Justification
Made Ground PAH's, Metals	Overland flow, / migration through saturated zone	Unnamed river 35m SW (surface waters)	Unlikely	Medium	Low	It is considered that any contaminants associated with the made ground and other previous uses are unlikely to impact the river. This is due to the small quantity of made ground encountered onsite, a lack of any potential contaminants onsite and the low permeability clays across the site which would inhibit any potential contaminant migration. Though one location had heavy metal exceedances (WS103), it is unlikely that the contaminants would migrate and affect surface waters. Furthermore, the proposed developments include gardens which would minimise overland flow to the river, as well as developing roadways to channel water away. Therefore, a low risk is posed.
	Leaching through unsaturated zone / Migration through saturated zone	Secondary Superficial Undifferentiated Aquifer (Ground-water)	Unlikely	Medium	Low	Significant contamination is not present onsite, with only the localised area of WS103 demonstrating heavy metal exceedances. Contaminants are unlikely to be transmitted in the low permeability strata encountered beneath the entire site, and migration of groundwater will be limited. The Secondary undifferentiated aquifer is not considered to be a significantly sensitive receptor. The site is not located within an SPZ and there are no groundwater abstractions for potable water supply within 1km of the site. New roadways with drainage are proposed as part of the development, however, areas of gardens and soft landscaping are also planned. By virtue of the development taking place, this should contribute to an overall "betterment" of groundwater quality. The overall risk is low.
	Migration through saturated zone	Secondary A Bedrock Aquifer (Ground-water)	Unlikely	Medium	Low	There are no groundwater abstraction licences or Source Protection Zones within 1km of the site. New roadways with drainage are proposed as part of the development, however, areas of gardens and soft landscaping are also planned. As stated above, the site is underlain by low permeability deposits, which will inhibit vertical migration, with a new surface water drainage system installed which will further reduce the risk to controlled waters, and by virtue of the development taking place, it should contribute to an overall "betterment" of groundwater quality.

8.9 Outline Remedial Measures

One source of contamination has been identified on site, within the localised made ground in WS103. It is recommended that this material is removed. No other sources of contamination have been identified on site, therefore, no specific remedial measures would then be required for soils in respect to human health for the proposed end use.

Chemical analysis of the natural clay drift deposits has identified these soils to be acceptable for use as subsoil within the proposed garden areas, however further chemical validation samples will be required to confirm this. There is a suitable source of topsoil available on the site.

Alternatively, for the area localised to WS103 only, and where gardens or soft landscaping are present a cover of "clean" subsoil and topsoil should be provided to break the pathway to site end users as described in CIRIA Special Publication 124 - Barriers, liners and cover systems for containment and control of land contamination. This should be 600mm thick in private garden areas and 450mm in soft landscaping areas (Public Open Space – POS). This will allow plants to be grown and prevent undesirable soils mixing or being brought to the surface.

Utilities
The level of protection for the clean potable water supply pipes should be determined using the local water company risk assessment criteria in accordance with UKWIR.

As areas of the site are brownfield, there is the assumption that barrier pipe would be utilised, although requirements should be confirmed by risk assessment and with the water supply company.

Ground Gas Protection Systems
Following the completion of the ground gas monitoring programme, results indicate the site is classified as CS1. The ground gas risk assessment does not however include the potential mine gas source, however, this source is indicated to be of very low generational potential. Furthermore, no elevated gases have been detected in either of the two response zones installed within the Coal Measures, and any potential gas is highly unlikely to migrate upwards to the surface due to the impermeable clay deposits encountered.

As part of any enabling or remedial works, it is recommended that all boreholes with monitoring installations are decommissioned in line with EA guidance in order to remove preferential pathways for ground gas migration.

General
It is recommended that the approval of the Regulators (Local Authority /NHBC / Environment Agency / Mining Remediation Authority) is obtained in regard to the above prior to any irrevocable action is taken at the site.

Once the above bodies have approved the above outline remedial proposals, a Remedial Strategy and a Verification Plan for Ground Gas Protection Measures (if required based on the full ground gas risk assessment) will need to be produced to meet planning requirements and submitted to the regulatory authorities for approval. This will also give guidance to enable a suitably qualified contractor to carry out the works.

In addition, the writing and approval of a Materials Management Plan (MMP) or suitable exemptions/permits will be required to allow re-use of suitable material at the site.

A watching brief is recommended during groundworks for any unidentified sources of contamination. If any gross contaminated material is encountered works should cease in that area and BSL consulted.

Once remediation is complete, verification reports will need to be produced by a suitably qualified independent geo-environmental engineer, such as BSL, in order to achieve regulatory sign off.

8.10 Health and Safety Issues

During the reclamation and construction phases of the site development it will be necessary to protect the health and safety of site personnel. The risk to construction and ground workers is assessed in the table below:

Potential Source	Potential Pathway	Potential Receptor	Likelihood	Severity	Level of Risk
Made Ground (heavy metals)	Ingestion, direct contact, inhalation of dusts.	Construction Workers	Unlikely	Medium	Low
Asbestos	Ingestion, direct contact, inhalation of dusts.	Construction Workers	Unlikely	Medium	Low
Ground gas	Inhalation in confined spaces/trenches	Construction Workers	Low likelihood	Medium	Moderate / Low

The risk from made ground will be mitigated by standard PPE including gloves. Welfare facilities should be made available to wash before hand to mouth activities.

It is noted that concentrations of carbon dioxide (an asphyxiant) in the soil exceed HSE Workplace Exposure Limits for personnel in the working environment of 1.5% for short term (15 minutes) exposure and/or 0.5% for long term exposure. Furthermore, soil concentrations of oxygen are below the HSE recommendations of 18%.

Soil gas concentrations are not necessarily reflected by those in the breathing zone, all contractors and maintenance workers should be made aware of the possible presence of carbon dioxide and should take all necessary health and safety precautions when working in trenches or confined spaces.

General guidance on these matters is given in the Health and Safety Executive (HSE) document "Protection of Workers and the General Public during the Redevelopment of Contaminated Land". In summary, the following measures are suggested to provide a minimum level of protection:

- All ground workers should be issued with the relevant protective clothing, footwear and gloves. These protective items should not be removed from the site and personnel should be instructed as to why and how they are to be used.
- Hand-washing and boot-washing facilities should be provided.
- Good practices relating to personal hygiene should be adopted on the site.
- The contractor shall satisfy the Health and Safety Executive with regard to any other matters concerning the health, safety and welfare of persons on the site.

8.11 Asbestos

The investigation of asbestos issues within structures was beyond the scope of this report. However, guidance from UK Government indicates that asbestos should be assumed to be present in buildings unless proven otherwise.

Any asbestos within structures will require removal prior to re-development. This will need to be done by a suitably qualified experienced and licensed contractor, who ensures that adequate PPE is provided to operatives, and that all the relevant legislation is adhered to.

Though not encountered during site works or in chemical testing, the presence of any asbestos within the ground will require, a safe system of work to be set up on site to deal with the asbestos risk from the made ground. This may include but be not limited to:

- The use of qualified personnel where required.
- Careful segregation of stockpiles on site.
- Defining transport routes.
- Cleaning down of machinery in designated areas.
- Decontamination unit for ground workers.
- Damping down of soils to prevent dust migration.

Excavations in soils containing asbestos should comply with the CL:AIRE publication 'Interpretation for Managing and working with Asbestos in Soil and Construction and Demolition Materials' (CARSOIL) and CAR 2012. All such works will need to be agreed with the regulatory bodies (HSE and/or LA).

Additional guidance is provided within the BSL methodology Guidance Note in Appendix A.

9.0 WASTE SOIL CLASSIFICATION & ASSESSMENT

9.1 Summary

BSL have undertaken a preliminary assessment of potential excavation waste to arise from the site during redevelopment to:

- Classify the excavation waste to arise as either hazardous or non-hazardous.
- Identify the most sustainable options for the wastes to arise in accordance with the waste hierarchy.
- Provide a written description of the waste required as part of the Duty of Care.
- Provide details of "hazardous properties" to complete hazardous waste consignment note (where applicable).
- Be able to provide a basic classification report to a landfill operator (where waste is destined for landfill disposal).

It should be noted that testing requirements for contaminated land risk assessment differ to those for waste classification purposes. Unless otherwise stated, the assessment in this section has been carried out to provide initial indications in respect to disposal of waste soils, however this may not be fully compliant with waste testing requirements or frequencies, with further testing potentially required.

9.2 Soils Waste Classification Procedure

As described in the 'Waste Duty of Care Code of Practice (2016)' any substance or object that the holder discards, intends to discard or is required to discard is a waste. It is the responsibility of the waste producer to classify this waste. The classification process is described in the 'Guidance on the classification and assessment of waste' WM3 and aims to determine whether the waste is Hazardous or Non-Hazardous to human health and the environment.

Waste classification should be based on soils analyses that are representative of the actual waste load. At the stage of ground investigation, the materials that will become waste have generally not been defined yet, however test data can provide a useful guide to the likely waste classification before it is generated.

Further guidance is provided in Appendix A.

The Landfill Directive (Directive 1999/31/EC on the landfilling of waste, Decision 2003/33/EC and Landfill Regulations 2005) led to the establishment of a methodology for classifying wastes. Wastes first need to be classified based on their total concentrations and classified as either hazardous or non-hazardous waste. WAC testing is only required if the end disposal route is a landfill and WAC analysis must not be used for waste classification.

Wastes can only be accepted at a landfill if they meet the relevant Waste Acceptance Criteria (WAC) for that type of landfill. A waste must comply with the WAC limits for the relevant landfill, otherwise the soil will need to be pre-treated. There are three different WAC criteria, these are:

- Inert waste.
- Stable Non-Reactive Hazardous Waste (SNRHW).
- Hazardous waste.

Details of how material should be classified for waste disposal are presented in the BSL Methodology and Guidance in Appendix A and are summarised in the table below:

	PRIOR TO LEAVING SITE			
Classification based on Total Concentrations[1]	**Non-Hazardous Waste**		**Hazardous Waste**	
	IF SOILS CANNOT BE RE-USED ELSEWHERE AND MUST GO TO LANDFILL			
WAC testing	Below inert WAC limit values	Above inert WAC limit values	Below hazardous WAC limit values[4]	> WAC limit values
Landfill requirements	INERT landfill	NON-HAZARDOUS landfill[2]	HAZARDOUS landfill	PRE-TREATMENT[3]

1 Total concentrations are defined as tests results on solids as opposed to leachate (i.e. a liquid).
2 Individual sites may have certain limit values pre-determined in their licence.
3 After pre-treatment the material characteristics may have changed to an extent that allow the soil to be re-classified.
4 Possibility that wastes could be classified as stable Nonreactive HAZARDOUS waste in non-hazardous Landfill (e.g. soils containing low concentrations of asbestos, gypsum or sulphate bearing soils).

Inert Waste
The possibility of automatic inert classification of the naturally occurring "clean" soils should be explored in accordance with Section 4.3 of the EA guidance document. See Appendix A for further guidance.

9.3 Waste Classification and Waste Acceptance Criteria (WAC)

We have reviewed the testing results and assessed them through a waste classification database (HazwasteOnline™) which allows users to code and classify waste as defined in the EWC (European Waste Catalogue) based on EC Regulation 1272/2008 on the Classification, Labelling and Packaging of Substances and Mixtures (CLP) and latest Environment Agency guidance (WM3 "Guidance on the classification and assessment of waste -Technical Guidance").

The samples tested were screened against assessment criteria within WM3 using the HazWasteOnline tool to assess whether they contained any contaminants in the hazardous range.

The Waste Classification Report results are presented in Appendix F Locations of hazardous soils are presented in the table below, alongside the WAC analysis test results.

Based on the waste classification database assessment, all tested soils have been classified as **non-hazardous.**

Note that further testing of the soils (WAC testing) may be required on the actual arisings in order to satisfactorily categorise the soil for its suitability for disposal to landfill.

Waste Containing Asbestos
Should soils contain asbestos, the concentration and type of asbestos identified, in addition to the chemical composition (i.e. hazardous or non-hazardous detailed above), will determine which waste code is applicable to the soils and which landfill will accept it as summarised below:

Waste	Conc. by Weight (%)	EWC 2002 Catalogue Entry Code	Waste Disposal Route
Non-hazardous containing asbestos fibres	<0.001 - <0.1%	17 05 04 (soil and stones other than those mentioned in 17 05 03*)	Non-hazardous landfill subject to achieving Waste Acceptance Criteria (WAC) for a stable non-reactive hazardous landfill site.
Hazardous containing asbestos fibres	<0.001 - <0.1%	17 05 03* (soil and stones containing dangerous substances)	Hazardous landfill subject to achieving Waste Acceptance Criteria (WAC) for a hazardous landfill site.
Non-hazardous soils containing asbestos fibres	<0.1%	17 05 03* (soil and stones containing dangerous substances)	Hazardous landfill authorised to receive asbestos, or in a stable non-reactive hazardous waste cell at a non-hazardous landfill authorised to receive asbestos.

Waste	Conc. by Weight (%)	EWC 2002 Catalogue Entry Code	Waste Disposal Route
Non-hazardous Soils containing ACM (Mechanically separable)	>0.1%	17 06 05 (construction material containing asbestos) 17 05 04 (soil and stones other than those mentioned in 17 05 03*)	ACMs disposed of at a hazardous landfill authorised to receive asbestos, or in a stable non-reactive hazardous waste cell at a non-hazardous landfill authorised to receive asbestos. Soils should be disposed of at a non-hazardous landfill subject to achieving Waste Acceptance Criteria (WAC) for a stable non-reactive hazardous landfill site.
Hazardous soils containing ACM	>0.1%	17 05 03* (soil and stones containing dangerous substances)	Hazardous landfill subject to achieving Waste Acceptance Criteria (WAC) for a hazardous landfill site.

General
Following the classification of waste materials, the options available for the waste can be considered in the context of the waste hierarchy as below:

- Onsite re-use (with or without prior treatment) under suitable exceptions/permits.
- Offsite processing for recycling or recovery e.g. screening.
- Offsite disposal (with or without prior treatment) i.e. landfill.

Where feasible, efforts should be made to retain soils for onsite re-use to minimise costs and maximise the sustainability of projects.

If any gross hydrocarbon contaminated material is encountered during the construction phase, it is possible that this may be classified as hazardous and testing should be undertaken at that time.

Where it is necessary to dispose material off site it is recommended that materials are segregated and sufficient time is allowed to further classify the actual soil arisings that constitute the waste, including discussion with landfill sites and waste transfer stations to find the best disposal route. It is illegal to dilute and mix soils without a suitable permit.

Where possible, the option that the soils could be recycled at a suitable local waste treatment plant or transfer station rather than a landfill disposal route should be explored.

9.4 Re-use of Soils

By definition in law, any material excavated from the ground becomes waste at the moment of excavation. If that soil (now a “waste”) is then placed on another part of the development site (or used on another development site) without an appropriate materials management plan, permit or exemption being in place, by law this material is defined as “illegally deposited waste”.

In order to comply with UK legislation and avoid excessive costs, if the re-use of soils is proposed on site, this should be done in accordance with the relevant exemptions or permits in place.

Soils Re-use Under DoWCoP
One of the main industry mechanisms for allowing the re-use of soils in construction is the CL:AIRE “Development Industry Code of Practice for the Definition of Waste” (CL:AIRE DoWCoP) also known as a Materials Management Plan (MMP). Further guidance is provided in the BSL Methodology and Guidance in Appendix A.

In order to re-use soils under the DoWCoP, there are four key criteria that need to be met:

- The aims and objectives of the project meet the requirements of the Waste Framework Directive (does not harm human health or the environment).
- The soils can be demonstrated to be suitable for use (backed up by chemical/geotechnical testing and assessment).
- There is certainty of use (planning consents are in place alongside materials tracking, which should be in place as part of good site practice in any case).
- Quantity (the quantity of materials used should be known).

Information on existing site levels, proposed levels, volumes generated (e.g. foundation / drainage excavation arisings) would need to be known in order to complete the MMP.

If the DoWCoP is the chosen route, the MMP should be in place and declared by a Qualified Persons (QP) before works commence, otherwise excavated soils could constitute an illegal deposit of waste and enforcement action could be taken by the EA and HMRC.

Once the project is complete, a verification report detailing soils re-use/import will need to be produced and submitted to CL:AIRE, which may be subject to a random audit process. Sites found to be non-complaint with the CoP can be referred to the EA for further investigation.

Note that for re-use of landfilled materials or mining wastes, the DoWCoP may not apply and a Waste Recovery Permit (or others) may be required. Liaison with the Environment Agency would be needed on a case by case basis to determine the best option.

Re-use of soils containing asbestos should comply with the CL:AIRE publication 'Interpretation for Managing and working with Asbestos in Soil and Construction and Demolition Materials' (CAR-SOIL™) and CAR 2012.

In terms of the re-use of brick/concrete crush materials, the DoWCoP does cover aggregates, but only on the site of origin, and the EA WRAP aggregate Quality Protocol might best apply to ensure quality standards, which are discussed further below.

Soils Re-use under Exemptions and Permits
Other potentially suitable re-use mechanisms may include U1 Exemptions, WRAP quality protocols (for aggregates) or Waste Framework Directive (WFD) Exclusions, amongst other mechanisms. Further details are provided in Appendix A.

10.0 CONCLUSIONS

10.1 Geo-Environmental

Geo-Environmental – Human Health – Soils
Testing of the made ground at the site revealed two localised exceedances of heavy metals (Arsenic and Lead) within the made ground at WS103. This is considered to pose a potential risk to human health, and remedial measures are required either in the form of source removal or a clean cover system.

Geo-Environmental – Ground Gases and Vapours
Following the completion of the ground gas monitoring programme, results indicate the site is classified as CS1. The ground gas risk assessment does not however include the potential mine gas source, however, this source is indicated to be of very low generational potential. Furthermore, no elevated gases have been detected in either of the two response zones installed within the Coal Measures, and any potential gas is highly unlikely to migrate upwards to the surface due to the impermeable clay deposits encountered.

Geo-Environmental – Controlled Waters
The overall risk to controlled waters is considered to be low to very low and no further action is required.

Waste
Waste classification at the site has revealed all tested soils to be non-hazardous.

10.2 Geotechnical

Foundations
Strip foundations are considered the most suitable for this development. Based on the medium volume change potential, foundations should be placed at a minimum of 0.90m bgl into the natural cohesive deposits and deepened near trees and hedges. Allowable bearing capacities are 230 kN/m^2 at 0.90m bgl, increasing to 300 kN/m^2 from 1.50m bgl. This adopts a factor of safety of 3 which should limit settlements to within acceptable limits.

Localised granular sand strata were encountered in eight locations across the site as detailed in section 5.4. In these locations, the sand was found to be directly underlain by solid bedrock. Therefore, foundations in these locations should be placed upon the granular sand strata, where unacceptable differential settlement would not be anticipated. At 0.80m bgl, an allowable bearing capacity not exceeding 150 kN/m^2 may be assumed. This adopts a factor of safety of 3 which should limit settlements to within acceptable limits.

Floor slabs
Both suspended and ground bearing floor slabs may be adopted.

Concrete classification
Made ground and solid geology (Sandstone) are classed as DS-1 and AC-1s, and natural superficial strata are classed as DS-2 and AC-1s.

Highways
CBR values are likely to be <2% within both natural clays and made ground on site.

Drainage (SuDS)
The use of sustainable drainage systems, such as traditional soakaways within the natural ground, is not likely to be feasible due to the presence of low permeability cohesive strata underlying the site, and lack of drainage rates obtained from soakaway testing.

Mining

In accordance with CIRIA C758 and the 10t criterion, there is a risk on the site from historic coal mining activities. Drilling and grouting will be required to enable development across the site, along with the suitable capping or grouting, or both, of the two onsite mine shafts.

10.3 Further Work

The following further work is considered necessary to progress the site to construction phase:

- Tree survey by a qualified arboriculturist.
- Demolition survey, if required.
- Design of the Drill and Grout specification.
- Detailed foundation design, including foundation zonation plan and depth schedule.
- Design of Remedial Strategy and confirmation with the Local Authority, NHBC, and the Mining Remediation Authority, if required.
- Production of Materials Management Plan (MMP) under the CL:AIRE DoWCoP, if required.
- Implementation of the Drill and Grout Specification, and verification reporting upon completion.
- Implementation of the Remedial Strategy and verification of the remedial works, if required.

11.0 ABBREVIATIONS AND DEFINITIONS

GLOSSARY	
Term / Abbreviation	**Definition**
AST	Above Ground Storage Tank.
B(a)P	Benzo (a) Pyrene.
BGS	British Geological Survey.
BRE	Building Research Establishment.
BS	British Standard.
BSL	Brownfield Solutions Ltd.
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes.
CBR	California Bearing Ratio (used in pavement/highways design).
CAR 2012	Control of Asbestos Regulations (2012).
CBCB	Cheshire Brine Compensation Board.
CBCD	Cheshire Brine Compensation District.
CBR	California Bearing Ratio.
CIEH	Chartered Institute of Environmental Health.
CIRIA	Construction Industry Research Association.
CL:AIRE	Contaminated Land: Applications in Real Environments.
CLEA	Contaminated Land Exposure Assessment.
CLO	Contaminated Land Officer.
COMAH	Control of Major Accident Hazards.
Contamination	Presence of a substance which is in, on or under land, and which has the potential to cause significant harm or to cause significant pollution of controlled water. There is no assumption in this definition that harm results from the presence of the contamination. Naturally enhanced concentrations of harmful substances can fall within this definition of contamination. Contamination may relate to soils, surface water, groundwater or ground gas.
Controlled Waters	Inland freshwater (any lake, pond or watercourse above the freshwater limit), water contained in underground strata and any coastal water between the limit of highest tide or the freshwater line to the three-mile limit of territorial waters.
CPT	Cone Penetration Test.
CSM	Conceptual Site Model. A schematic hypothesis of the nature and sources of contamination, potential migration pathways (including description of the ground and groundwater) and potential receptors, developed on the basis of the information from the preliminary investigation and refined during subsequent phases of investigation and which is an essential part of the risk assessment process. The conceptual site model is initially derived from the information obtained by the preliminary investigation (i.e. the Phase I Desk Study). This conceptual model is used to focus subsequent investigations, where these are considered to be necessary, in order to meet the objectives of the investigations and the risk assessment. The results of intrusive investigations can provide additional data that can be used to further refine the conceptual site model.
DCP	Dynamic Cone Penetrometer.
DNAPL	Dense Non-Aqueous Phase Liquid.
DoWCoP	Definition of Waste Code of Practice.
DWS	Drinking Water Standard.
EA	Environment Agency.
EHO	Environmental health Officer.
EQS	Environmental Quality Standard.

GLOSSARY	
Term / Abbreviation	**Definition**
GAC	Generic Assessment Criteria.
GDR	Geotechnical Design Report.
GFR	Geotechnical Feedback Report.
GIR	Ground Investigation Report.
GSV	Gas Screening Value.
Harm	Adverse effect on the health of living organisms, or other interference with ecological systems of which they form part, and, in the case of human health, including property/structures and water supply pipelines.
Hazard	Inherently dangerous quality of a substance, procedure or event.
HDPE	High Density Polyethylene.
HSV	Hand Shear Vane.
K	Modulus of Subgrade Reaction.
LCRM	Land Contamination: Risk Management (EA guidance).
LNAPL	Light Non-Aqueous Phase Liquid (petrol, diesel, kerosene).
LOD	Limit of Detection (for particular method adopted).
MMP	Materials Management Plan.
Mv	Modulus of Volume of Compressibility.
ND	Not Detected.
NHBC	National House Building Council.
NR	Not Recorded.
OS	Ordnance Survey.
PAH	Polycyclic Aromatic Hydrocarbon.
Pathway	Mechanism or route by which a contaminant comes into contact with, or otherwise affects, a receptor.
PCB	Poly-Chlorinated Biphenyl.
PCSM	Preliminary Conceptual Site Model.
pH	Scale used to specify how acidic or basic a water-based solution is.
PHC	Petroleum Hydrocarbons.
PID	Photo Ionisation Detector.
PNEC	Predicted No-Effect Concentration.
Precision	Level of agreement within a series of measurements of a parameter.
PSD	Particle Size Distribution.
PVC	Polyvinyl Chloride.
Receptor	Human health, living organisms, ecological systems, controlled waters (surface waters and groundwater within aquifers), atmosphere, structures and utilities that could potentially be adversely affected by contaminant(s).
Risk	Probability of the occurrence, magnitude and consequences of an unwanted adverse effect on a receptor.
Risk Assessment	Process of establishing, to the extent possible, the existence, nature and significance of risk.
Sampling	Methods and techniques used to obtain a representative sample of the material under investigation.
SOM	Soil Organic Matter.
Source	Location from which contamination is, or was, derived. This could possibly be the location of the highest soil, groundwater or gas concentration of the contaminant(s).
SPT	Standard Penetration Test.
SVOCs	Semi Volatile Organic Compounds.
TOC	Total Organic Carbon.

GLOSSARY	
Term / Abbreviation	**Definition**
TPH CWG	Total Petroleum Hydrocarbon (Criteria Working Group).
TVOCs	Total volatile organic compounds.
UCS	Unconfined Compressive Strength.
Uncertainty	Parameter, associated with the result of a measurement that characterises the dispersion of the values that could reasonably be attributed to the measurement.
UST	Underground Storage Tank.
UXO	Unexploded Ordnance.
VCCs	Vibro Concrete Columns.
VSCs	Vibro Stone Columns
VOCs	Volatile Organic Compounds.
WAC	Waste Assessment Criteria.
WFD (in waste context)	Waste Framework Directive.
WFD (in water context)	Water Framework Directive.
Units	**Definition**
°	Degrees
Φ	Phi angle (in degrees)
g/l	Grams per Litre
Km	Kilometres
kPa	Kilo Pascal (Equivalent to kN/m^2)
$KN/m^2/mm$	Kilo Newton per metered squared per millimeter
kN/m^2	Kilo Newtons per metre squared
kPa	Kilo Pascal (Equivalent to kN/m^2)
l/hr	Litres per hour
MJ/kg	Mega joule per kilogram
MN	Mega Newton
M^2/MN	Mega Newton per metre squared
M	Metres
m bgl	Metres Below Ground Level
m OD	Metres Ordnance Datum (sea level)
µg/l	Micrograms per Litre (parts per billion)
µm	Micrometre
mb	Millibars (atmospheric pressure)
mg/kg	Milligrams per kilogram (parts per million)
mg/m^3	Milligram per metre cubed
mm	Millimetre
ppb	Parts Per Billion
Ppm	Parts Per Million

12.0 REFERENCES

References used in the production of this report are listed below; note not all of the below are relevant to the subject site and may not have been utilised.

Association of Ground Investigation Specialists. 'Guidelines for Good Practice in Site Investigation'. Issue 2, March 2006.

Association of Ground Investigation Specialists. 'Description Of Anthropogenic Materials– A Practitioners' Guide'. 2018.

Black, W.P.M. & Lister, N.W. The strength of clay fill subgrades, its prediction in relation to road performance Report LR889, TRRL. 1979.

BRE Special Digest 1: 'Concrete in Aggressive Ground' 3rd Ed 2005.

BRE Report BR211, Scivyer, C. 'Radon – Guidance on protective measures for new buildings' 2023 Edition.

BRE Digest, vols. 240 and 241 'Low-rise buildings on shrinkable clay soils'. 1993.

BRE Digest 298 'The influence of trees on house foundations in clay soils'. 1999.

BRE Digest 365 'Soakaway Design'. 2016.

BRE Report 391 "Specifying vibro stone columns". 2000.

BRE Report 414. 'Protective measures for housing on gas contaminated land. Building Research Establishment Report'. 2011.

BRE Report 470 'Working platforms for tracked plant: good practice guide to the design, installation, maintenance and repair of ground-supported working platforms'. 2004.

British Geological Survey Technical Report WD/97/34. 312pp. Environment Agency R&D Publication 8. 'The physical properties of major aquifers in England and Wales'. 1997.

British Geological Survey Technical Report WD/00/04. 234pp. Environment Agency R&D Publication 68 'The physical properties of minor aquifers in England and Wales'.

British Geological Survey 'The advanced soil geochemical atlas of England and Wales'. 2012.

BS 1377 'Method of Test for Soils for Civil Engineering Purposes'. 1990.

BS EN 1997-1. 'Eurocode 7 – Geotechnical design - Part 1: General rules'. Plus associated UK National Annex. 2004.

BS EN 1997-2. 'Eurocode 7 – Geotechnical design - Part 2: 'Geotechnical investigation and testing'. Plus associated UK National Annex. 2007.

BS 3882: 'Specification for topsoil'. 2015.

BS 5837: 'Trees in relation to design, demolition and construction Recommendations'. 2012.

BS 5930+A1:2020: 'Code of Practice for Site Investigations'. 2020.

BS 6031: 'Code of practice for earthworks'. 2009.

BS 8004: 'Code of practice for foundations'. 2015.

BS 8485+A1: 'Code of practise for the design of protective measures for methane and carbon dioxide ground gases for new buildings'. 2019.

BS 8500-1 AMD 2. Concrete. Complementary BS to BS EN 206. Part 1. 'Method of specifying and guidance for the specifier'. 2018.

BS 8576 'Guidance on investigations for ground gas – Permanent gases and Volatile Organic Compounds (VOCs)'. 2013.

BS 10175:2011+A2 'Investigation of Potentially Contaminated sites - code of practice'. 2017.

BS 10176:2020 'Taking soil samples for determination of volatile organic compounds (VOCs)'. 2020.

BS EN ISO 14688 'Geotechnical investigation and testing – Identification and classification of soil'. 2018.

BS EN ISO 14689 'Geotechnical investigation and testing – Identification and classification of rock'. 2018.

BS EN ISO 17892 'Geotechnical investigation and testing. Laboratory testing of soil.' Parts 1-12 :2018.

BULL ET AL. Promoting the Use of B(a)P as a Marker for PAH Exposure in UK Soils. February 2013.

CIRIA Special Publication SP32, PSA Civil Engineering Technical Guide 34, 'Construction over abandoned mine workings'. 1984.

CIRIA Special Publications 101-112, 'Remedial Treatment for Contaminated Land'. 1998.

CIRIA Special Publication 124, 'Barriers, liners and cover systems for containment and control of land contamination'. 1996.

CIRIA R143, 'The Standard Penetration Test (SPT): methods and use'. 1995.

CIRIA 149 'Protecting Development from Methane'. 1995.

CIRIA 150 'Methane Investigation Strategies'. 1995.

CIRIA 151 'Interpreting Measurements of Gas in the Ground'. 1995.

CIRIA 152 'Risk assessment for Methane and Other Gases from the Ground'. 1995.

CIRIA 552 'Contaminated Land Risk Assessment – A guide to good practice'. 2001.

CIRIA C574 'Engineering in Chalk'. 2002.

CIRIA C659 'Assessing risks posed by hazardous ground gases to buildings.' 2006.

CIRIA C665 'Assessing Risks Posed by Hazardous Ground Gases to Buildings'. 2007.

CIRIA C681 'Unexploded Ordnance (UXO) A guide for the construction industry'. 2009.

CIRIA C716 'Remediating and mitigating risks from volatile organic compound (VOC) vapours from land affected by contamination'. 2012.

CIRIA C733 'Asbestos in Soil And Made Ground: A Guide To Understanding And Managing Risks'. 2014.

CIRIA C735 'Good Practice on The Testing and Verification of Protection Systems for Buildings Against Hazardous Ground Gases'. 2014.

CIRIA C748 'Guidance on the Use of Plastic Membranes as VOC Vapour Barriers'. 2014.

CIRIA C750 'Groundwater control: design and practice, second edition". 2016.

CIRIA C753 'The SuDS Manual'. 2015.

CIRIA C758 'Abandoned Mine Workings Manual'. 2019.

CL:AIRE and CIEH. 'Guidance on Comparing Soil Contamination Data with a Critical Concentration'. May 2008.

CL:AIRE 'The Definition of Waste: Development Industry Code of Practice'. Version 2. March 2011.

CL:AIRE RB17 'A Pragmatic Approach to Ground Gas Risk Assessment'. 2012.

CL:AIRE TB17 'Ground Gas Monitoring and 'Worst-Case' Conditions'. 2018.

CL:AIRE TB18 'Continuous Ground-Gas Monitoring and the Lines of Evidence Approach to Risk Assessment'. 2019.

CL:AIRE TB19 'Managing Risks and Liabilities associated with Per and Polyfluoroalkyl Substances (PFASs)'. 2019.

CL:AIRE TB22 'An overview of the uses of PFAS to assist with identification of sites of concern'. 2023.

CL:AIRE SP1010 'Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination'. Rev 2 2014.

CL:AIRE 'Interpretation for Managing and Working with Asbestos in Soil and Construction and Demolition Materials – CAR-SOILTM'. 2016.

CL:AIRE 'Petroleum Hydrocarbons in Groundwater: Guidance on assessing petroleum hydrocarbons using existing hydrogeological risk assessment methodologies' Version 1. March 2017.

CULP, S.J., ET AL., A comparison of the tumours induced by coal tar and benzo[a]pyrene in a 2-year bioassay. Carcinogenesis. 1998.

DEFRA and the Environment Agency, CLR10 'Soil Guideline Value Reports for Individual Soil Contaminants'. 2002-2004.

DEFRA and the Environment Agency, CLR Report No 11 'Model Procedures for the Management of Contaminated Land'. 2004. [Withdrawn 2019.]

Department of the Environment, CLR Report No 1 'A framework for assessing the impact of contaminated land on groundwater and surface water'. 1994.

Department of the Environment, CLR Report No 2 'Guidance on Preliminary Site Inspection of Contaminated Land'. 1994.

Department of the Environment, CLR Report No 3 'Documentary research on Industrial Sites'. 1994.

Department of the Environment, CLR Report No 4 'Sampling Strategies for Contaminated Land'. 1994.

Department of the Environment Waste Management Paper No. 27. 'Landfill Gas: A Technical Memorandum Providing Guidance on the Monitoring and Control of Landfill Gas'. 1992.

Department of the Environment. 'Industry Profiles' - 48 separate publications available from The Stationery Office, London. 1995.

DETR. Circular: Contaminated Land. 2006.

EC Regulation 1272/2008 'The Classification, labelling and packaging of substances and mixtures (CLP)' 2008.

Environment Agency guidance - Land Contamination: Risk Management (LCRM). 2020.

Environment Agency 'Using Soil Guideline Values'. 2009.

Environment Agency, 'Updated Technical Background to the CLEA model'. 2009.

Environment Agency, 'Human health toxicological assessment of contaminants in soil'. 2009.

Environment Agency Hazardous Waste: 'Guidance on the classification and assessment of waste' WM3 ver 1.1 May 2018.

Environment Agency. 'Remedial Targets Methodology. Hydrogeological Risk Assessment for Land Contamination'. 2006.

Environment Agency & NHBC. R&D Publication 66. 'Guidance for the Safe Development of Housing on Land Affected by Contamination'. 2008.

Environment Agency. R&D Publication 20. 'Methodology for the Derivation of Remedial Targets for Soil and Groundwater to Protect Water Resources'. 1999.

Environment Agency Technical Guidance Note 01. Hydrogeological Risk Assessment for Landfills. [Withdrawn Feb 2016. Replaced with below].

Environment Agency and DEFRA 'Landfill developments: groundwater risk assessment for leachate'. 2016.

Environment Agency Petroleum Hydrocarbons in Groundwater 'Supplementary Guidance for Hydrogeological Risk Assessment'. 2009.

Environment Agency 'Groundwater protection: Principles and practice (GP3)'. 2013. [Superseded 2017 by www.gov.uk online guidance].

Environmental Permitting Guidance: version 3.1 'The Landfill Directive for the Environmental Permitting (England and Wales) Regulations'. 2010.

Environmental Quality Standards. 2008.

European Parliament Directive 2008/98/EC of the Council of 19 November 2008 on waste and repealing certain Directives. 2008.

European Parliament. Directive 2014/955/EU: Commission Decision of 18 December 2014 amending Decision 2000/532/EC on the list of waste pursuant to Directive 2008/98/EC.

Ground Engineering. Wilson & Card 'Proposed method classifying gassing sites' /1999.

Hazardous Waste (England and Wales) Regulations. 2005.

Health & Safety Executive (HSE). 'Protection of Workers & the General Public during the Development of Contaminated Land'. 1991.

Health and Safety Executive (HSE). Control of Asbestos Regulations (CAR). 2012.

Highways Agency. Design Guidance for Road Pavement Foundations (Draft HD25). Interim Advice Note 73/06. Rev 1. Highway Agency, London. 2009. [Withdrawn 30th May 2017].

ICE Thomas Telford 'Applications of Dynamic Cone Penetrometer testing in East Anglia'. 1989.

Land Quality Press, Nathanail, C. P., McCaffrey, C., Gillett, A., Ogden, R. C. and Nathanail, J.F. 'The LQM/CIEH S4ULs for Human Health Risk Assessment.' 2015.

Landfill Directive 'Directive 1999/31/EC on the landfilling of waste'. 1999.

Japanese Geotechnical Society. Hatanaka and Uchida 'Empirical correlation between penetration resistance and effective friction of sandy soil'. Soils & Foundations, 36 (4), 1-9. 1996.

Manual of Contract Documents for Highway Works, Specification for Highway Works: Volume 1, Amendment August 2014. [Withdrawn 30th May 2017].

Manual of Contract Documents for Highway Works, Specification for Highways Works – Series 600 Earthworks November 2006. [Withdrawn 30th May 2017, Replacement unknown].

National Planning Policy Framework (NPPF). 2023.

National Planning Policy Framework - Technical Guidance. March 2012.

NHBC Standards, Part 1 'Introduction and Technical Requirements.'

NHBC Standards, Part 4 'Foundations.'

NHBC Standards. Chapter 4.1: Land Quality - Managing Ground Conditions.

NHBC. 'Hazardous Ground Gas - An essential guide for housebuilders'. May 2023.

Public Health England (PHE). Contaminated land information sheet: risk assessment approaches for polycyclic aromatic hydrocarbons (PAHs). September 2017.

Total Petroleum Hydrocarbon Criteria Working Group Volume 1 'Analysis of Petroleum Hydrocarbons in Environmental Media'. 1999.

Total Petroleum Hydrocarbon Criteria Working Group Volume 2 Composition of Petroleum Mixtures. May 1998.

Total Petroleum Hydrocarbon Criteria Working Group Volume 3 'Selection of Representative TPH Fractions Based on Fate and Transport Considerations'. July 1997.

Total Petroleum Hydrocarbon Criteria Working Group Volume 4 'Development of Fraction Specific Reference Doses (RfDs) and Reference Concentrations (RfCs) for Total Petroleum Hydrocarbons (TPH)'. 1997

Total Petroleum Hydrocarbon Criteria Working Group Volume 5 'Human Health Risk-Based Evaluation of Petroleum Release Sites: Implementing the Working Group Approach' June 1999.

SEPA 'Land remediation and waste management guidelines' publication date unknown.

UK Drinking Water Standards: Water Supply (Water Quality) Regulations 1989 (SI 1989/1147) and Water Supply (Water Quality) Regulations 2000 (SI 2000/3184).

UKTAG. Updated recommendations on environmental standards. River Basin Management (2015-21). UK Technical Advisory Group on the Water Framework Directive. November 2013 (updated January 2018).

UKTAG-WFD. UKTAG River & Lake Assessment Method, Specific Pollutants (Metals), Metal Bioavailability Assessment Tool (M-BAT). Water Framework Directive – United Kingdom Technical Advisory Group. 2014.-

UKWIR Report 10/WM/03/21 2010 'Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites' 2010.

Water Framework Directive, 2000.

Water UK HBF. Contaminated Land Assessment Guidance. Water UK and the Home Builders Federation.

DRAWINGS

Windy Arbor Road, Halsnead

Schedule Of Accommodation

Name	Description	Beds	SqFt	Sqm	No.	Footage		%
NDS-42	1 Bed Cottage Flat (GF)	1B2P	555	51.6	8	4440	SqFt	5%
	2 Bed Cottage Flat (FF)	2B3P	727	67.6	8	5816	SqFt	5%
NDS-33	2 Bed Semi Detached	2B4P	868	80.62	38	32984	SqFt	25%
NDS-37	3 Bed Corner Semi	3B5P	1022	94.96	10	10220	SqFt	7%
NDS-31	3 Bed Semi Detached	3B5P	1021	94.84	33	33693	SqFt	22%
NDS-13	3 Bed Detached Dual Aspect	3B5P	1021	107.92	10	10210	SqFt	7%
NDS-13	3 Bed Semi Dual Aspect	3B5P	1021	107.92	6	6126	SqFt	4%
NDS-15	3 Bed Semi Mews (Ginnel)	3B5P	1020	94.76	8	8160	SqFt	5%
NDS-19	4 Bed Detached	4B6P	1162	107.92	8	9296	SqFt	5%
NDS-06	4 Bed 2.5 storey Townhouse	4B6P	1243	115.49	22	27346	SqFt	15%
					151	**148291**	**SqFt**	**100%**
F114	2 Bed Semi / Mews	2B	781		21	16401	SqFt	20%
F113	3 Bed Semi Dual Aspect	3B	907		10	9070	SqFt	10%
F113	3 Bed Detached Dual Aspect	3B	907		1	907	SqFt	1%
F112	3 Bed Semi / Mews	3B	907		58	52606	SqFt	56%
F115	3 Bed mews with ginnel	3B	921		14	12894	SqFt	13%
BTR TOTAL					**104**	**91878**	**SqFt**	**100%**
Total					**255**	**240169**		

GIFA

Gross Site Area	0.00 Acres
Nett Site Area	0.00 Acres
Nett Footage	#DIV/0! SqFt / A
Nett Density	#DIV/0! Units / A

Titles Key:

Stockley - MS328384
39.487 SqM
9.75 Acres
52.3%

Stockley - MS337466
11,576 SqM
2.86 Acres
15.4%

Williamson - MS202647
13,544 SqM
3.34 Acres
18%

Fantin - MS610818
10,838 SqM
2.67 Acres
14.3%

Total - 75,445 SqM
18.62 A

Titles below excluded from total area as they are part of Stockley - MS328384

Richardson - MS340245
711 SqM
0.17 Acres

Stockley - MS577597
906 SqM
0.22 Acres

1:1000
20m 0 20m 40m 60m 80m 100m

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- For the avoidance of doubt all dimensions are measured to wall structure and not the finishes unless otherwise stated.
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Rev	Date	Revision	Initial

+ Client: united living new homes

+ Drawing Title: SKETCH LAYOUT

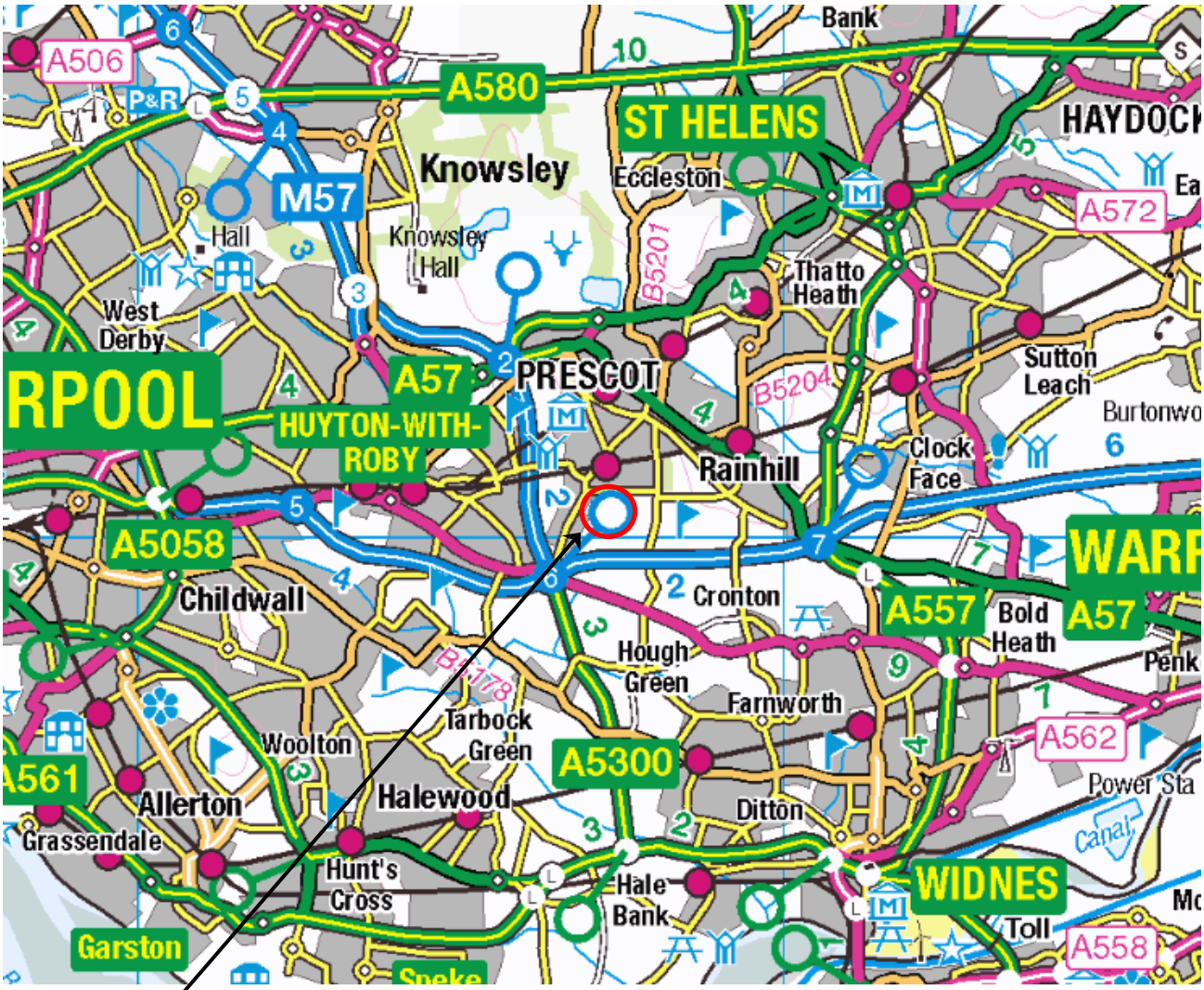
+ Project: Halsnead Garden Village
Windy Arbor Road, Halsnead

Job No	Drg No	Drawn	Rev
23076	255	mpsl	
Scale	**Date**	**Stage**	
1:1000 @ A1	10.09.2024	DRAFT SKETCH	

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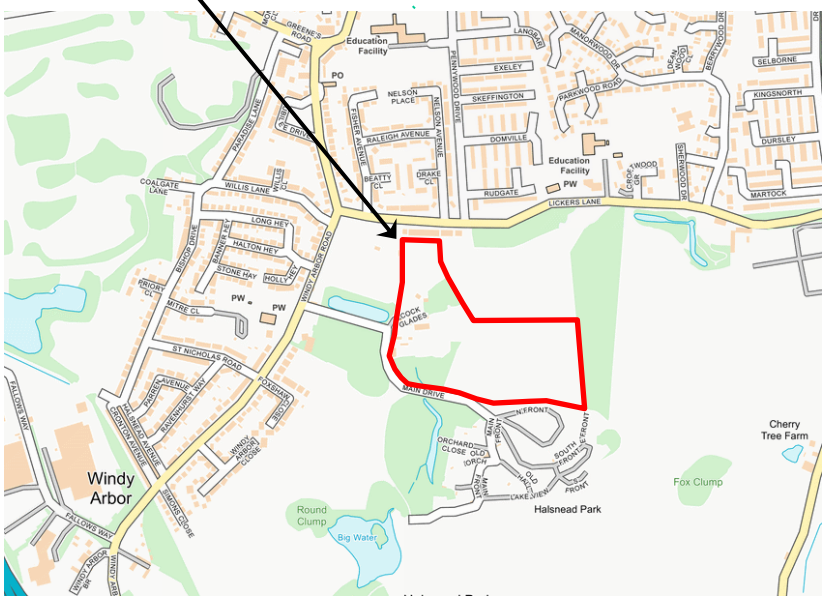
DRAFT FOR DISCUSSIONS



SITE LOCATION

NEAREST POSTCODE: L35 3PW

SITE ENTRANCE WHAT3WORDS: ///GATES.MAYBE.SWEEP



REV	DATE	DESCRIPTION	BY	CKD
A	07/02/25	PLAN CHANGE	SD	

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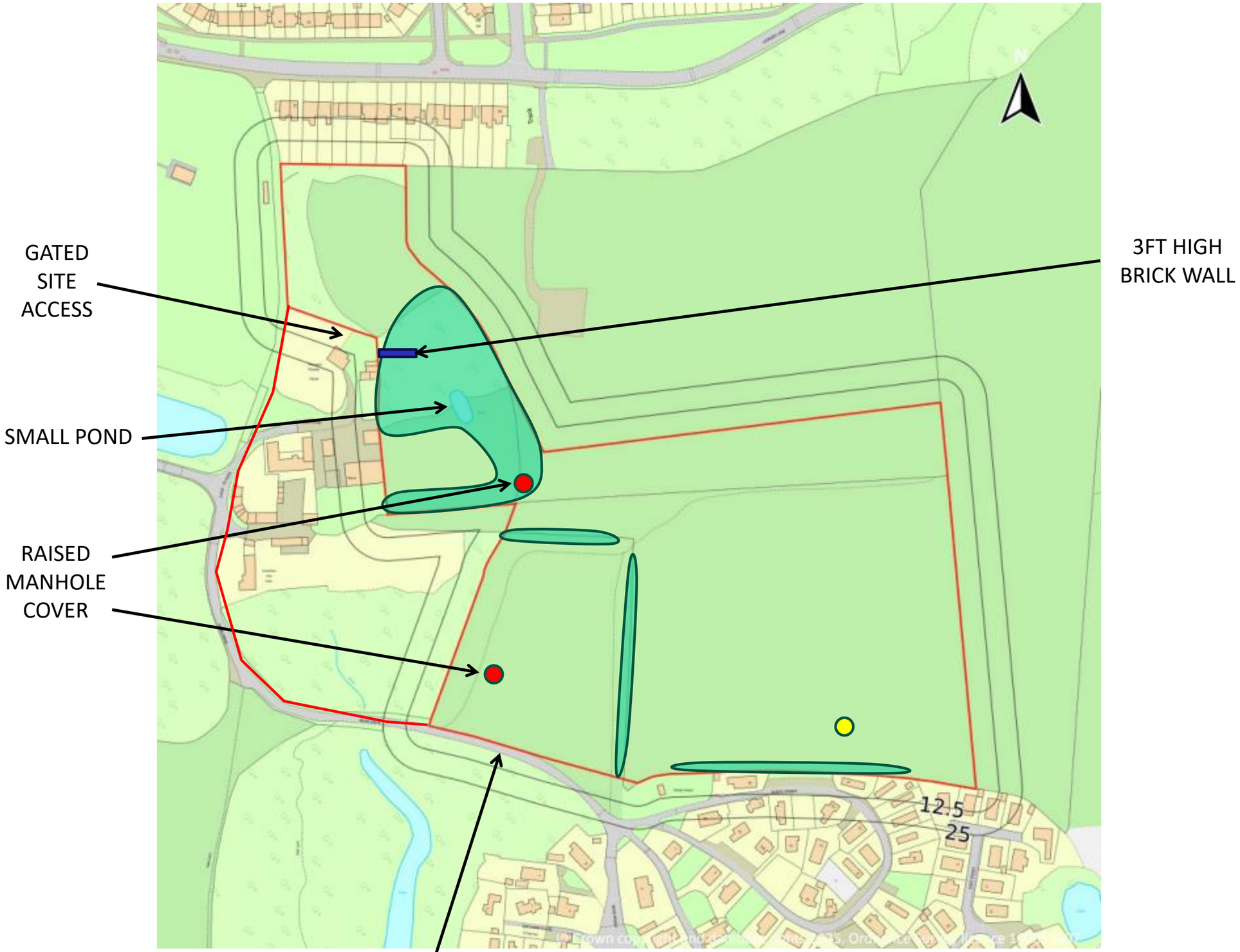
CLIENT
UNITED LIVING

PROJECT TITLE
HALSNEAD GARDENS PHASE 1

DRAWING TITLE
SITE LOCATION PLAN

DRAWING No.	REVISION	SCALE	DATE
C5980/01	-	NTS	10/01/25

DRAWN BY	CHECKED BY
SD	JM



KEY

- APPROXIMATE SITE BOUNDARY
- DENSE VEGETATION
- BRICK WALL
- RAISED MANHOLE COVERS
- SUSPECTED MINE SHAFT

NOTES

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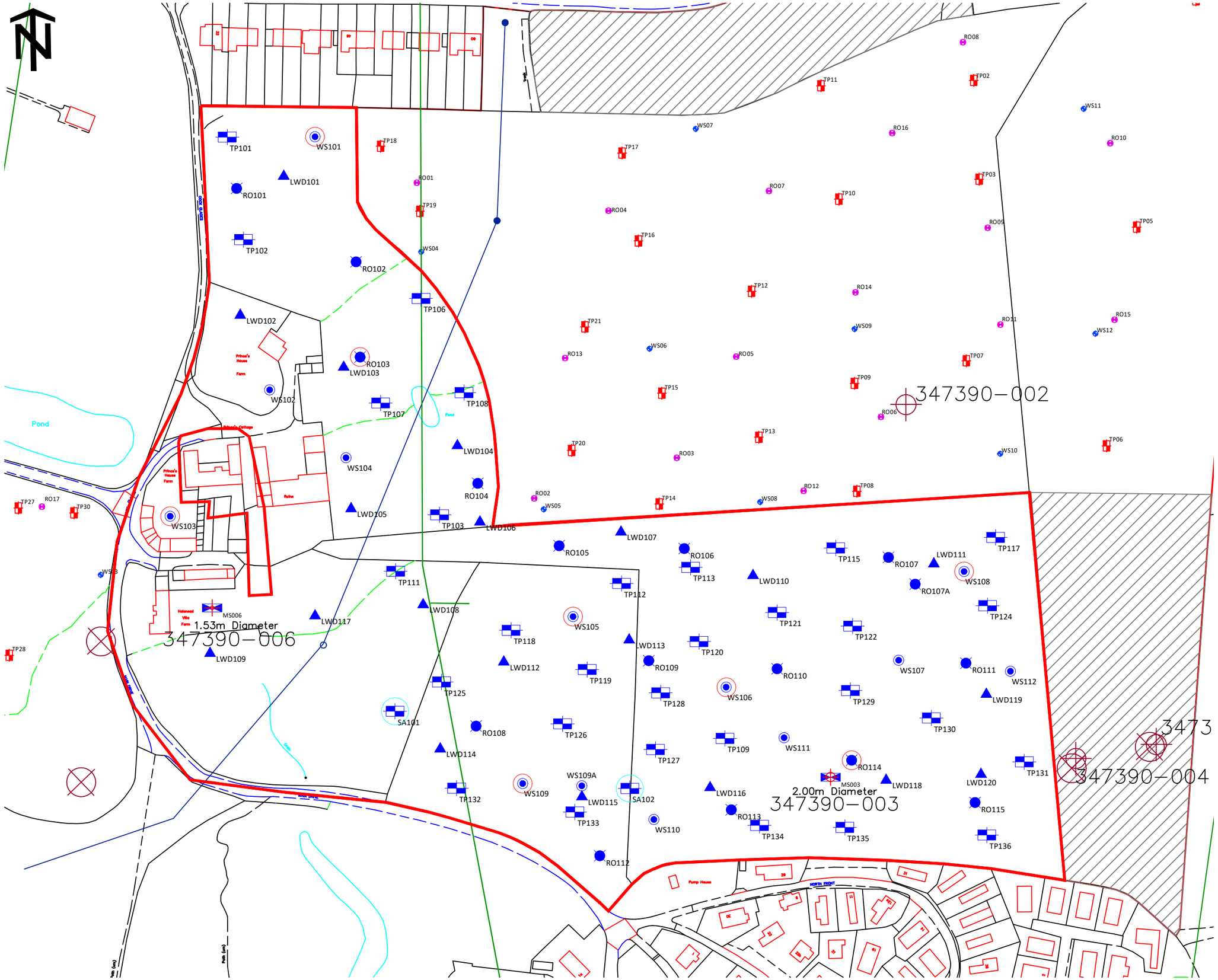
CLIENT
UNITED LIVING

PROJECT TITLE
HALSNEAD GARDENS PHASE 1

DRAWING TITLE
SITE FEATURES PLAN

DRAWING No.	REVISION	SCALE	DATE
C5980/02	-	NTS	14/01/25

DRAWN BY	CHECKED BY
JL	JEM



KEY	
	APPROXIMATE SITE BOUNDARY
TPXX	TRIAL PIT
TTXX	TRIAL TRENCH
WSXX	WINDOW SAMPLE BOREHOLE
ROXX	ROTARY OPEN BOREHOLE
LWDXX	LIGHT WEIGHT DEFLECTOMETER
	BOREHOLE INSTALLATION
	FAULT LINE
	SOAKWAY TEST
	RECORDED MINE ENTRY

BSL (2017)	
	PREVIOUS SI BOUDARY
TPXX	TRIAL PIT
WSXX	WINDOW SAMPLE BOREHOLE
ROXX	ROTARY OPEN BOREHOLE

NOTES

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PROJECT TITLE

HALSNEAD PHASE 1

DRAWING TITLE

EXPLORATORY HOLE LOCATION PLAN

DRAWING No.	REVISION	SCALE	DATE
C5980/03	-	NTS	03/03/25

DRAWN BY	CHECKED BY
MAS	JM

PHOTOGRAPHS



PHOTO 1

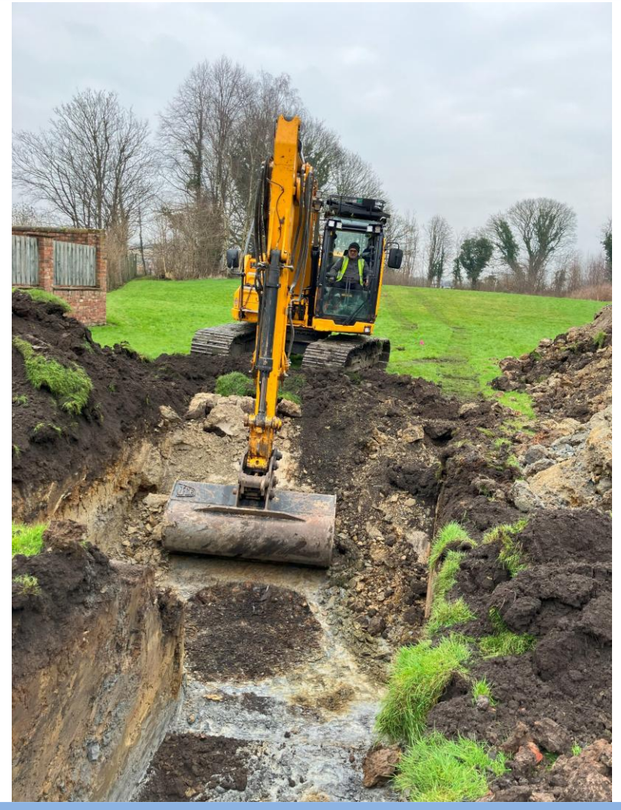


PHOTO 2



PHOTO 3



PHOTO 4

Photo Descriptions

PHOTO NO.	DETAILS
1	Overview photo of shaft investigation
2	Shaft discovery
3	Shaft backfill
4	Shaft diameter close up

REV	DATE	DESCRIPTION	BY	CKD

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UNITED LIVING

PROJECT TITLE
HALSNEAD GARDENS

TITLE
MINE SHAFT INVESTIGATION MS003

Associated Document Ref No.
MAS/C5980/13951

PAGE
1 of 1

COMPLIED BY
MAS

CHECKED BY
JM

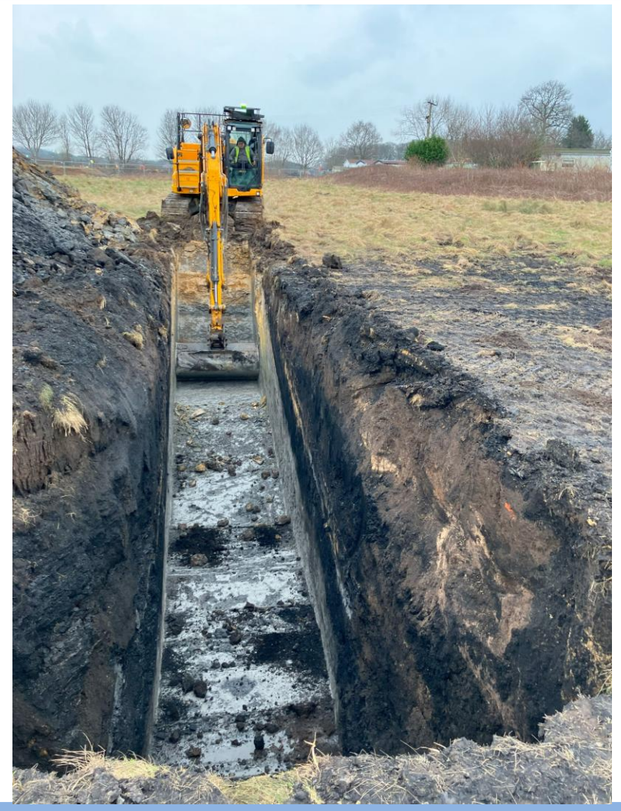


PHOTO 1



PHOTO 2



PHOTO 3

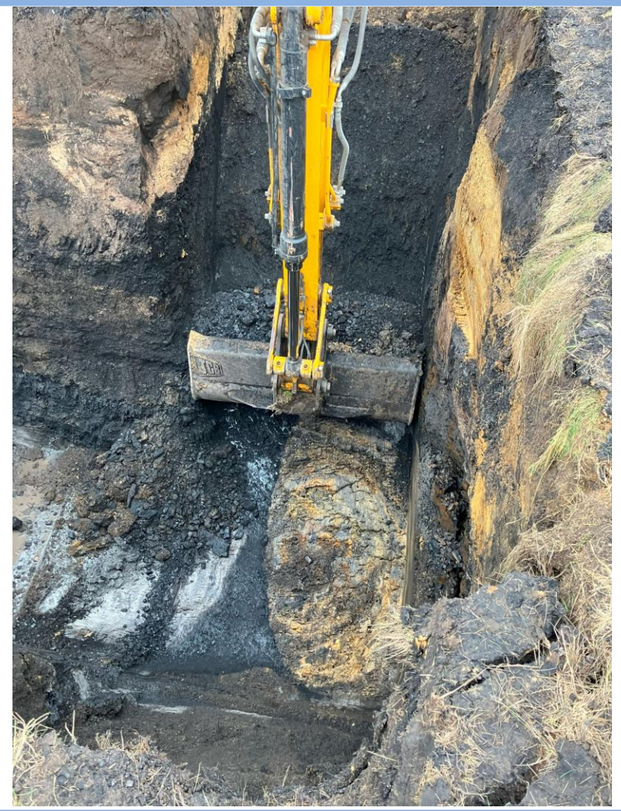


PHOTO 4

Photo Descriptions

PHOTO NO.	DETAILS
1	TRENCH IN SUBSIDENCE AREA
2	CHANGE IN GROUND CONDITIONS
3	SHAFT OUTLINE
4	SHAFT OUTLINE

REV	DATE	DESCRIPTION	BY	CKD

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CLIENT
UNITED LIVING

PROJECT TITLE
HALSNEAD GARDENS

TITLE
MINE SHAFT INVESTIGATION MS006

Associated Document Ref No.	PAGE
MAS/C5980/13951	1 of 1
COMPLIED BY: MAS	CHECKED BY: JM

APPENDIX A

BSL Methodology and Guidance

BSL Phase I & II Geo-Environmental Assessment Reports - Methodology and Guidance

Background

This Appendix provides information on the approaches, methods and guidance used by Brownfield Solutions Ltd in the preparation of this report.

The term 'geo-environmental' is used to describe aspects relating to ground-related environmental issues (such as potential soils and groundwater contamination). The term 'geotechnical' is used to describe aspects relating to the physical nature of the site (such as foundation requirements). It should be noted that this is an integrated investigation and these two main aspects are related, unless otherwise specified within the report.

Phase I reports are written in general accordance with the description of a Preliminary Investigation as defined in BS10175:2011+A2:2017 and are also produced in general accordance with the recommendations for a Tier 1 Preliminary Risk Assessment as described in LCRM guidance.

The first stage of the investigation and assessment of a site is the Preliminary Investigation/Tier 1 Preliminary Risk Assessment, often referred to as a Phase 1 Desk Study, comprising a desk study and walk-over survey and collation of desk-based searches, which culminates in the Preliminary Risk Assessment and the development of a preliminary/initial **Conceptual Site Model (CSM)**. From this are identified any potential geotechnical and geo-environmental hazards and the qualitative degree of risk associated with them. In the case of the geotechnical hazard identification, this is referred to as the **Ground Model.**

From the geo-environmental perspective, the hazard Identification process uses professional judgement to evaluate all the hazards in terms of possible contaminant linkages (of source-pathway-receptor). Possible contaminant linkages are potentially unacceptable risks in terms of the current contaminated land regime legal framework and require either remediation or further assessment. These are normally addressed via intrusive ground investigation and generic risk assessment as part of Phase II investigations and reports.

The second stage is the Ground Investigation, Generic Risk Assessment and Geotechnical Interpretation. This represents the further assessment mentioned above. The Ground Investigation comprises field work and laboratory testing based on the findings of the Preliminary Risk Assessment, to reduce uncertainty in the geotechnical and geo-environmental hazard identification. This may include an exploratory, a detailed or/and supplementary Investigations as described in BS 10175:2011+A2:2017. Phase II Assessments are produced in general accordance with the recommendations for a Tier 2 Generic Quantitative Risk Assessment as described in LCRM guidance and are also intended to fulfil the requirements of a Ground Investigation Report (GIR) as detailed in BS EN 1997-2:2007.

Contaminated Land - Legislative Background

Land contamination can be addressed in several ways, e.g. during planning, under Part 2A, following an incident, during an investigation into environmental damages, or during the application of an environmental permit, or its surrender.

For the planning process the key test is **as a minimum the site cannot be determined as contaminated land**, e.g. there is not significant harm, significant possibility of significant harm to human health or that there is not significant harm to, or the significant possibility that the pollution of controlled waters will occur.

Environmental liabilities and risks have been evaluated in terms of a source -pathway - target relationship in accordance with the approach set out in:

- The 1995 Environment Act.
- The Contaminated Land Statutory Guidance, DEFRA – April 2012.
- The Contaminated Land (England) Regulations 2006.
- The Contaminated Land (England) Amendment Regulations 2012.
- Water Resources Act.
- Water Framework Directive.
- Environmental Damage Regulations.
- Environment Agency (EA) - Land Contamination Risk Management (LCRM) 2019.

Contaminated land is defined within the legislative framework as land which is in such condition by reason of substances in, on or under the land that:

1) Significant harm is being caused or there is a significant possibility of such harm being caused.
2) Significant pollution of controlled waters is being or is likely to be caused.

The potential for harm is based on the presence of three factors:

Source - substances that are potential contaminants or pollutants that may cause harm.
Pathway - a potential route by which contaminants can move from the source to the receptor, and the impact of that migration on the source e.g. attenuation.
Receptor - a receptor that may be harmed, for example the water environment, humans and water, considering the sensitivity of the receptor.

Where a source, pathway and target are all present a pollutant linkage exists and there is potential for harm to be caused.



Where any one of the “pollution linkages” between the above is absent there is deemed to be no risk.

The presence of a source does not automatically imply that a contamination problem exists, since contamination must be defined in terms of pollutant linkages and unacceptable risk of harm. The nature and importance of both pathways and receptors are site specific and will vary according to the intended end use of the site, its characteristics and its surroundings.

The key principle which supports the S-P-R approach is ‘suitable for use’ criteria. This requires remedial action only where contamination is considered to pose unacceptable actual or potential risks to health or the environment and, taking into account the proposed use of the site.

Relevant Guidance Documents
This report has been prepared in accordance with the list of guidance below, however the list is not exhaustive:

- DETR: Circular 02/2000: Environmental Protection Act 1990: Part IIA: Contaminated land. 2012.
- Environment Agency technical advice to third parties on Pollution of Controlled Waters for Part IIA of the EPA1990, May 2002.
- BS 10175:2011+A2:2017.
- Environment Agency (EA) - Land Contamination Risk Management (LCRM). 2019.
- Groundwater Protection https://www.gov.uk/government/collections/groundwater-protection
- UK Technical Advisory Group (UKTAG) - Water Framework Directive
- Incidents and their classification: the Common Incident Classification Scheme (CICS) – Used by the Environment Agency to classify pollution incidents.

Relevant Legislative Documents
The following is a non-exhaustive list of legislative framework documents that has been considered in the production of this report:

- The Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance (2012).
- The Environment Protection Act (1990).
- The Water Resources Act (1991).
- The Environment Act (1995).
- The Contaminated Land (England) Act (2000).
- The Pollution Prevention and Control (England and Wales) Regulations (2000).
- The Landfill Regulations (England and Wales) Regulations (2002).
- The Landfill (England and Wales) (Amendment) Regulations (2004).
- Contaminated Land (England) Regulations (2012).
- The Environmental Damage (Prevention and Remediation) Regulations (2009).
- Environmental Permitting Regulations (England and Wales) Regulations (2010).
- The Water Environment (Water Framework Directive) (England and Wales) Regulations (2017).
- Health and Safety at Work Act.
- National Planning Policy Framework (NPPF) – latest version.

Contaminated Land Risk Assessment Approach

Contaminated Land Risk Assessment is a technique that identifies and considers the associated risk, determines whether the risks are significant and whether action needs to be taken. The four main stages of risk assessment are:



LCRM outlines the framework to be followed for risk assessment in the UK. The framework is designed to be consistent with UK legislation and policies including planning. The starting point of the risk assessment is to identify the context of the problem and the objectives of the process. Under LCRM, three tiers of risk assessment exist – Stage/Tier Preliminary Risk Assessment, Stage 2 Generic Quantitative and Stage 3 Detailed Quantitative.

Further information can be found at the below site:
https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm

Formulating and developing a conceptual model for the site is an important requirement of risk assessment, this supports the identification and assessment of pollutant linkages. Development of the conceptual model forms the main part of preliminary risk assessment, and the model is subsequently refined or revised as more information and understanding is obtained through the risk assessment process.

Risk is a combination of the likelihood of an event occurring and the magnitude of its consequences. Therefore, both the likelihood and the consequences of an event must be taken into account when assessing risk.

The risk assessment process needs to take into account the degree of confidence required in decisions. Identification of uncertainties is an essential step in risk assessment.

The likelihood of an event is classified on a four-point system using the following terms and definitions from CIRIA C552, with reference to Incidents and their classification: the Common Incident Classification Scheme (CICS), Environmental Protection Act 1990: Part 2A – Contaminated Land Statutory Guidance 2012 and other guidance as appropriate which will be detailed within the main body of the report if applied.

The likelihood of a given receptor being impacted is related to a number of factors, e.g. the geology which could inhibit contaminant migration. For example, a site with a significant thickness of clay between it and a receptor may reduce migration of contamination via the subsurface, which will reduce the likelihood of a given receptor being impacted. The geology or drainage for example could offer a preferential pathway e.g. mines shafts/faults increasing the likelihood and potential magnitude of an impact. The depth of contamination will also affect the exposure pathway, for example petroleum hydrocarbons at depth are unlikely to reach a receptor via dermal contact but could via vapour pathways which will influence the likelihood of an impact being felt e.g. if there are no buildings on site.

The terms and definitions used for the assessment of the likelihood are provided below:

High likelihood: There is a pollution linkage and an event appears very likely in the short term and almost inevitable over the long term, or there is evidence at the receptor of harm or pollution.
Examples - Extensive areas with concentrations above saturation limits for mobile contamination e.g. petroleum hydrocarbons within the water table.

Likely: There is a pollution linkage and all the elements are present and in the right place, which means it is probable that an event will occur. Circumstances are such that the event is not inevitable, but possible in the short term and likely over the long term.
Examples – Localised areas of contaminants with concentrations above saturation limits for mobile contamination e.g. localised petroleum hydrocarbons within the water table; shallow contamination above relevant human health generic assessment criteria is present with little or no hardstanding,

Low likelihood: There is a pollution linkage and circumstances are possible under which an event could occur. However, it is by no means certain even over a longer period such event would take place, and is less likely in the short term.
Examples - A thickness/distance of low permeability deposits preventing contaminant migration to a receptor is present; a site is mostly covered hard standing preventing exposure to soil contamination.

Unlikely: There is a pollution linkage but circumstances are such that it is improbable the event would occur even in the long term.
Examples – A site is underlain by a substantial thickness of low permeability clays, between the source and potential receptors which will inhibit significantly, but not completely rule out migration to sensitive receptors.

The severity is also classified using a system based on CIRIA C552, with reference to Incidents and their classification: the Common Incident Classification Scheme (CICS), Environmental Protection Act 1990: Part 2A – Contaminated Land Statutory Guidance 2012 and other guidance as appropriate which will be detailed within the main body of the report, if applied. The terms and definitions are:

Severe: Short term (acute) risk to human health likely to result in 'significant harm' as defined by the Environment Protection Act 1990, Part IIA. Short-term risk of pollution of sensitive water resources. Catastrophic damage to buildings or property. A short-term risk to a particular ecosystem or organism forming part of that ecosystem (note definition of ecosystem in 'Draft Circular on Contaminated Land', DETR 2000);

Examples – High concentrations of contaminant on surface of recreation area, major spillage of contaminants from site into controlled waters, explosion causing building to collapse.

Medium: Chronic damage to human health ('significant harm' as defined in DETR 2000). Pollution of sensitive water resources. A significant change in a particular ecosystem or organism forming part of that ecosystem (note definition of ecosystem in 'Draft Circular on Contaminated Land', DETR 2000);
Examples - Concentrations of contaminants exceed the generic assessment criteria, leaching of contaminants from a site to a Principal or Secondary Aquifer, death of species within a designated nature reserve.

Mild: Pollution of non-sensitive water resources. Significant damage to crops, buildings, structures and services ('significant harm' as defined in 'Draft Circular on Contaminated Land', DETR 2000). Damage to sensitive buildings, structures, services or the environment.
Examples – Pollution of non-classified groundwater or damage to buildings rendering it unsafe to occupy.

Minor: harm, not necessarily significant harm, which may result in financial loss or expenditure to resolve. Non-permanent health effects to human health (easily prevented by use of personal protective clothing etc). Easily repairable effects of damage to buildings, structures and services.
Examples – Presence of contaminants at such concentrations PPE is required during site work, loss of plants in landscaping scheme or discolouration of concrete.

Once the likelihood and severity have been determined, a risk category can be assigned using the table below.

		Consequences			
		Severe	Medium	Mild	Minor
Probability	Highly likely	Very high	High	Moderate	Moderate/low
	Likely	High	Moderate	Moderate/low	Low
	Low likelihood	Moderate	Moderate/low	Low	Very low
	Unlikely	Moderate/low	Low	Very Low	Very low
	Negligible	Negligible Risk / No Linkage			

Definitions of the risk categories obtained from the above table are as follows together with an assessment of the further work that might be required:

Very high: There is a high probability that severe harm could arise to a designated receptor from an identified hazard or there is evidence that severe harm is currently happening. This risk, if realised, could result in substantial liability. Urgent investigation and remediation are likely to be required.

High: Harm is likely to arise to a designated receptor from an identified hazard. 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 arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, or if any harm were to occur it would be more likely to be relatively mild. Investigation is normally required to clarify the risk and determine the liability. Some remedial works may be required in the longer term.

Low: It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild.

Very Low: There is a low possibility that harm could arise to a receptor. In the event of such harm being realised, it is not likely to be severe.

Some linkages may be identified which constitutes a theoretical connection between a source and a receptor, but professional judgement shows them not to be possible for some reason. These are labelled 'negligible risk' and 'no linkage' in the summary table, which give rise to an overall **negligible** risk category and no further action is required.

Contaminated Land Screening Values

In assessing the potential for contamination Brownfield Solutions Limited (BSL) follows UK guidance and current best practice.

General
The purpose of using generic Tier 1 screening levels is to have a simple means of assessing the potential contamination of a site and to inform decisions on whether further investigation is warranted or whether an option to undertake remedial action based on the data to hand is cost effective.

Human Health
Current UK guidance on risks to human health is provided by DEFRA and the Environment Agency (EA). Under the land use planning system where the aim is to demonstrate 'suitability for use' the key will usually be to confidently determine that the level of contamination of the land is low relative to some appropriate measure of risk at a particular critical connection.

Publications forming part of the guidance include the CLEA Model and toxicological reports collectively referred to as the CLEA Guidance. The CLEA Guidance has included a number of publications which have provided initial screening values or Generic Assessment Criteria (GACs) for soils contamination based on standard land uses and soil assumptions. The critical concentrations referred to above can be the relevant GAC.

CLEA guidance has gone through a number of revisions over time. Tier 1 generic S4UL values (or GACs) have been published using the CLEA 1.06 Model by CIEH/LQM. These are the third set of generic assessment criteria generated by CIEH and replace the previous two sets of GACs. The revised S4UL values are based on greater knowledge of relevant toxicology and further consideration of exposure frequencies.

C4SL values for six determinands including lead were published by DEFRA/CL:AIRE in December 2014. Additional determinands were added in 2021. They represent a low risk as opposed to minimal risk, however they are still strongly precautionary. These screening values were published by DEFRA for Part 2A use, although DEFRA have also confirmed acceptability for use under planning. However, S4ULs remain the first reference point for BSL due to the broader range of end uses scenarios and the availability of a wide array of determinands with various soil organic contents.

As part of Tier 1 assessments, the following data sources are used in the order of preference given below, unless further justification is provided to adopt less conservative criteria:

- CIEH S4UL values (derived by CIEH/LQM).
- DEFRA/CL:AIRE C4SL's https://www.claire.co.uk/projects-and-initiatives/category-4-screening-levels
- CL:AIRE GAC values.
- Guidance from other European countries.
- Guidance from the outside Europe.

Dependent on requirements, test results may be divided into representative data sets for assessment against the above referenced screening criteria, based on the conceptual model and taking into account such characteristics as variation in soil properties, historical, existing or proposed land uses. The soils in these areas are considered likely to form the ground cover in critical receptor areas (e.g. gardens, soft landscaping etc)

where pathways may exist. The critical part of the soil column is typically taken as the upper metre in terms of contact with end users of a development site for the purposes of initial assessment.

The screening criteria adopted by BSL are presented overleaf.

Further Assessment
When screening values are exceeded then further consideration is required. This could include further additional detailed investigation and assessment to further define the risk or to design appropriate remedial measures to either remove the source or break the pathway. In some cases, dependant on the Conceptual Site Model (CSM), no action may be required.

PAHs and B(a)P as a Surrogate Marker for Adoption of C4SLs
As stated above, S4ULs remain the first reference point as screening levels unless further justification is provided. In order to determine if the C4SL can be adopted, benzo(a)pyrene (B(a)P), the following guidance within SP1010 Appendix E for B(a)P and Public Heath England (PHE) may be adopted with our assessments where appropriate.

Guidance states that benzo(a)pyrene is considered to be one of the most potent PAHs, and it would be appropriate to assume the cancer risk in a mixture is proportional to the concentration of a surrogate marker PAH (benzo(a)pyrene) in the mixture. The ratio of PAHs within the mixture can be assessed to ensure that the profile is similar to that seen for the test material (coal tar mixtures) in the toxicological study by Culp et al. The International Programme on Chemical Safety (IPCS) considered that the PAH profile of the soil sample may deviate from the average profile by about an order of magnitude (up or down).

A more recent study by Bull et al (2013) which analysed PAH concentrations in soil samples from 274 sites, showed that the levels of PAH relative to B(a)P showed little variability and were similar to that recorded for the coal tar mix used in the Culp et al study. Given this, it was concluded that benzo(a)pyrene is a suitable surrogate marker to represent mixtures of PAH in soil.

In order to risk assess the PAH mixture for site specific soil samples using human health guideline values, notably the C4SLs, as detailed in SP10101 the ratio of the seven genotoxic PAHs as shown below, relative to B(a)P, should be calculated to ensure it is similar to the test material used in the Culp study (PHE 2010). To be considered sufficiently similar, the ratio relative to B(a)P should fit within the upper and lower limits (representing an order of magnitude above and below the mean ratio to B(a)P of test material used in the Culp et al study). In such cases B(a)P is considered an adequate surrogate marker and the Low Level of Toxicological concern (LLTC) for B(a)P (i.e., the C4SL) may be used in the risk assessment.

Statistical Analysis on Soils
Guidance on the use of statistics is taken from the CL:AIRE publication "Comparing Soil Contamination Data with a Critical Concentration" 2020, the basis of which in statistics is termed Central Limit Theorem (CLT), which says "*The distribution of sample means converges to a normal distribution as the sample size increases*".

If the critical concentrations have been exceeded, as part of a further assessment, statistical analysis may be undertaken on a dataset to demonstrate that the mean concentration on the site (or a particular area) is actually below the critical concentration. The true mean concentration of a contaminant is never known because all the site soil has not been tested. An estimation of the true mean can be obtained from the samples tested during the investigation. The greater the number of samples tested, the closer the mean of these values is to the true mean.

As discussed above, test results are typically divided into representative data sets for assessment and may be referred to as 'averaging areas' to which statistics can be applied, although several statements need to be satisfied before applying the guidance:

- Averaging areas have been defined based on the CSM.
- Sample locations – random/grid sampling adopted as opposed to targeted investigation.
- Samples are evenly spread and not clustered.

- Analysis do not suggest a hotspot/outlier or cluster established by histogram or other means.
- Samples are of same/similar depth and taken from one population (e.g. just topsoil).
- Analyses do not show a spatial trend or other spatial pattern across that zone.
- The number of samples has been shown to be sufficient for statistical analysis.

Once the above have been satisfied, when undertaking statistical analysis, the question "*are mean soil concentrations within the averaging area equal to, or greater than, the GAC*?" is being asked. Typically, outliers or "hotspots" are treated as separate zones or averaging areas. The sampling strategy and assessment should also take into account uncertainty (for example, spatial heterogeneity) in contaminant concentrations. There is the assumption that sampling was random or stratified and systematic (e.g. on a grid) and not targeted at specific sources; data from such targeted areas should be omitted from the statistical analysis. Data should be from one population (i.e. the same materials).

The statistical test that is carried out is used to demonstrate that there is a certain probability that the true mean falls below the critical concentration (typically the GAC in a screening exercise). The main tool used to draw conclusions based on the 2020 guidance is a comparison of a 2-way confidence interval with the critical concentration. A confidence interval consists of two sets of numbers; an interval i.e. a range of values plus a pre-determined level of confidence e.g. 80%. A common interpretation of a confidence interval of say 80% is that "*there is an 80% chance that the true mean concentration level of the contaminant in a sampling zone lies between X concentration and Y concentration*".

The current guidance for planning says that the site has to be "safe" which suggests we should use a large confidence interval such as 95% or higher to make a decision. This means that there is a 95% chance of the true mean concentration lying in this interval, there is also a 5% chance it lies outside this interval. One could then conclude that the requirements of planning have been met if the 95% confidence interval lies below the critical concentration.

The guidance recommends that at least two confidence levels are used such as 90% and 99% or 80% and 95%. By using two differing confidence intervals, we can use the smaller confidence interval (e.g. 80% confidence interval) to say "*we think the mean is most likely to be inside this range*" and the larger confidence interval (e.g. 95% confidence interval) to say "*we think the mean is most unlikely to be outside this range*".

If the confidence interval extends to above the critical concentration, then further action may be required.

Controlled Waters

The European Water Framework Directive (WFD) became UK law in December 2003. It was created to ensure that European countries manage their rivers, groundwater and lakes so that they stay healthy for people and for wildlife.

This is achieved by the use of chemical standards (Water Quality Targets – WQTs) for surface waters and groundwater. These values describe concentrations of chemicals that are not expected to cause harm to environmental organisms or human health, provided they are not exceeded. The same chemical may have several standards for different environmental regimes, and for different protection objectives.

Statutory Standards are set in legislation and if exceeded, this constitutes non-compliance with statutory obligations. European Directives are implemented in England and Wales by corresponding statutory instruments (i.e. regulations- The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015 and The Private Water Supplies (England) Regulations 2016. SI 2016 / 618). In Scotland, the Public Water Supplies (Scotland) Regulations 2014 apply. The statutory instruments can be the exact same standards as they appear in the Directive or be more stringent.

A number of non-statutory standards also exist, these are set by various organisations (including the EA) for chemicals that are considered to be of concern, but are not covered by any specific legislation.

The chemical standards used in the UK to control impaction of contamination on controlled waters are Environmental Quality Standards (EQS). These cover a large number of compounds. EQS are available for inland surface waters (freshwater) and other surface waters (transitional and marine).

Several EQS are based on bioavailable metal proportions (i.e. copper, lead, manganese, nickel and zinc). A software tool (M-BAT) is available from the Water Framework Directive - UK TAG website for calculating the bioavailable fraction. Where this tool has been used, the bioavailability has been taken into account by calculating site-specific $PNEC_{dissolved}$ (Predicted No Effect Concentration) values. These enable the dissolved concentration data to be compared with the PNEC as if it were an EQS.

UK Drinking Water Standards (DWS) apply to waters abstracted for human consumption. Where no UK or EU drinking water standard exists, reference is made to the World Health Organisation criteria (2011).

The DWS apply to groundwater or to surface water used for abstraction and the EQS apply to surface water where the aquatic ecosystem is the receptor. Where the most appropriate water quality target cannot be determined with certainty, the lowest one is adopted in line with the precautionary principle.

In some instances, the laboratory detection limits (LODs) may be greater than the water quality target it is being screened against, but it should be noted that these comparisons are an initial screening assessment. It may be the case that lower LODs could be obtained using a more specialised technique, but it would be disproportionately expensive to adopt the more costly specialist technique for initial screening exercises.

The preference of BSL is to have testing carried out on actual samples of ground/surface water rather than theoretical values obtained from leachate testing, which is considered to often be highly conservative. Data from water samples obtained or from leachate analysis is then compared against the screening criteria adopted by BSL, which are presented overleaf.

When screening values are exceeded then further consideration is required. This could include further additional detailed investigation and detailed quantitative risk assessment (DQRA) to further define the risk or to design appropriate remedial measures to either remove the source or break the pathway.

Ground Gas Risk Assessment

BS8485:2015+A1:2019, BS 8576:2013, CL:AIRE RB17, and NHBC 'Hazardous Ground Gas - An essential guide for housebuilders' 2023, are the current guidance which gives up-to-date advice on all aspects of permanent ground gas risk. BS8576 alongside CIRIA C682 also provides guidance on assessment of hydrocarbon vapour intrusion.

The CL:AIRE publication 'Good Practice for Coal Mine Gas Emissions" 2021 provides guidance on the assessment of risks from mine gas sources.

The above all outline good practice in investigation, the collection of relevant data and monitoring programmes in a risk-based approach to ground gas contamination. The aim of the guidance is for a consistent approach to decision making, particularly relating to the scope of protective design measures on a site-specific basis.

Legislative Framework
BS8485:2015+A1:2019, BS 8576:2013 and CIRIA C665 provides technical guidance, however they also recognise the context into which the guidance has to be employed. Government policy is based upon a "suitable for use approach", which is relevant to both the current and proposed future use of land. When considering the current use of land, Part IIA of the Environment Protection Act 1990 provides the regulatory regime. The presence of hazardous ground gases could provide the "source" in a "pollutant linkage" which could lead the regulator to determine that considerable harm or there is a significant possibility of such harm being caused. Under such circumstances, the regulator would determine the land to be "contaminated land" under the provisions of the Act, setting out the process of remediation as described in the DETR Circular 02/2000 *Statutory guidance on contaminated land.*

Generation Potential of Sources

BS 8576:2013 Figure 6 provides a basis for assessing the generation potential from sources identified as part of the Phase I Assessment. These are summarised below:

Generation Potential	Typical Sources
Very Low	• Natural carbonate soil and strata, e.g. chalk and limestone. • Natural soil strata with a low degradable organic content, e.g. alluvium, peat. • In-filled pond less than 15 m diameter, in-filled before 1930s to 1940s. • Made ground with low degradable organic content (e.g. up to 5% organic material such as pieces of wood, pieces of paper, rags, etc. with a high proportion of ash and no food or other easily degradable waste). • Mine workings shallow or shaft (where there is clear evidence that they are flooded). • Inert landfill sites (and pre -1945 landfills).
Low	• Natural soil strata with a high degradable organic content (DOC). • Made ground with total organic carbon (TOC) up to 6% (e.g. dock silt, no food or other easily degradable waste). • Foundry sand (includes phenolic binders, rags and wood that decay, albeit at low rates). • Landfill 1945 to mid 1960s (see also Moderate below).
Moderate	• Sewage sludge. • Mine workings – unflooded, more than 50 years since last worked (gas is liberated from coal when mine workings are excavated; this continues for up to about 50 years). • Landfill 1945 to mid 1960s (this could also be “low” or, if disturbed, “high”).
High	• Landfill mid 1960s to early 1990s. • Mine workings – unflooded – less than 50 years since last worked.
Very High	• Municipal landfill sites. • Landfill early 1990s onward.

Frequency and Duration of Monitoring

BS8576 notes to determine where and how to monitor ground gases requires consideration of credible pathways of possible exposure of the receptors, taking into account what is known about the geology and hydrogeology, building construction and services layout, foreseeable events such as flooding, changes in groundwater level, climate change, extreme weather conditions, the closure of mines, and possible changes to the gas regime caused by future development.

The monitoring period for a specific site should cover the “worst case” scenario. A “worst case” scenario will typically occur during falling atmospheric pressure and, in particular, weather conditions such as rainfall, frost and dry weather.

The benefits of additional information and whether it is likely to change the scope of gas protection should be considered, as are the consequences of failing to characterise adequately pollutant linkages. Investigations concerned with ground gas are required to provide monitoring data sufficient to allow prediction of worst case conditions enabling the confident assessment of risk and subsequent design of appropriate gas protection schemes. Monitoring programmes should not be an academic exercise in data collection. CL:AIRE publication TB17 “Ground Gas Monitoring and ‘Worst-Case’ Conditions” provides further guidance.

Below are matrices that will aid in determining an appropriate number of gas monitoring visits and the length of monitoring period.

Typical/idealised periods of monitoring

		Generation of Potential Source				
		Very Low	Low	Moderate	High	Very High
Sensitivity of Development	Low (Commercial)	1 month	2 months	3 months	6 months	12 months
	Moderate (Apartments)	2 months	3 months	6 months	12 months	24 months
	High (Low rise Residential)	3 months	6 months	6 months	12 months	24 months

Typical/idealised frequency of monitoring/Number of Visits Required

		Gas Generation of Potential Source				
		Very Low	Low	Moderate	High	Very High
Sensitivity of Development	Low (Commercial)	4	6	6	12	12
	Moderate (Apartments)	6	6	9	12	24
	High (Low rise Residential)	6	9	12	24	24

Notes

1 Generation potential of sources based on descriptions within BS 8576:2013.

2 At least two sets of readings should be at low and falling atmospheric pressure (but not restricted to periods below <1000 mb) known as worst case conditions. Historical data can be used as part of the data set (Table 5.5b).

It is recommended that newly installed monitoring wells are left for 24 hours to allow the soil gas to reach equilibrium. It should be recognised, however, that some soil gas regimes could take considerably longer (up to seven days). Interpretation of any initial readings should take this equilibrium process into account.

Gas Risk Assessment

Within BS8485:2015+A1:2019 a semi-quantitative method is set out for the assessment of risk.

This method (Modified Wilson and Card) uses the concept of Gas Screening Values (GSVs) and typical threshold concentrations of carbon dioxide and methane to identify levels of risk. Sites are then classified into a 'Characteristic Situation' or 'CS' from CS1 where no mitigation is required and CS2 increasing up to CS6 where protection measures are required.

The NHBC guide 'Hazardous Ground Gas - An essential guide for housebuilders' 2023 provides further assessment tools for ground gas monitoring data, including the use of ternary plots to determine ground gas sources.

A separate approach to assessment without monitoring data is discussed under the RB17 header further below.

CIRIA C682 and BS 8576:2013 provide guidance on assessment of VOC intrusion risk.

Ground Gas Mitigation

Where a risk is determined to be present by assessment, BS8485:2015+A1:2019 provides guidance for the design of protection systems based on a points scoring system depending on the characteristic situation, structure type, structural barrier types, ventilation and a gas resistant membrane. Source removal can also be considered.

The design requires the structures to be categorised into one of four building types: Type A, Type B, Type C or Type D, related to the construction and end use of the building, together with the control of future structural changes and maintenance.

CIRIA C748 provides advice on the use of membranes as VOC vapour barriers.

CIRIA C735 sets out the approach for verification of installed mitigation measures. Note that if a membrane is installed it must be verified in accordance with CIRIA C735 or it will score zero points and assumed to not afford any protection.

RB17 Approach
CL:AIRE RB17 (Card et al 2012) is a pragmatic approach to ground gas risk assessment and was developed because gas concentration, pressure and flow rate measured in a well headspace may not be representative of the conditions in the surrounding formation.

In these low-risk situations, the approach is to use the conceptual site model and the estimation of the likely gas generation from a source to identify where or if gas monitoring is required to better define the risks.

Under this approach, for sites with natural soils only with no credible methane source, then no action is required (no monitoring or gas protection measures) as this represents Characteristic Situation 1 (CS1).

Radon
Advice on radon protection in England is provided by the UK Health Security Agency, https://www.ukradon.org/information/ukmaps and by the BRE (BR 211 (Scivyer 2023).

Areas of the country can be categorised according to the percentage of existing homes where radon is present above the Action Level:

- 0-1% lower probability.
- 1-3% and 3-10% intermediate probability.
- >10% higher probability.

Basic radon protection measures are required in new buildings and extensions in areas of England and Wales where 3-10% of properties exceed the Action Level and full radon protection measures where >10% exceed the Action Level.

Unexploded Ordnance (UXO) Guidance

Clients have a legal duty under the CDM 2015 Regulations to provide designers and contractors with project-specific health and safety information needed to identify hazards and risks. This includes the possibility of unexploded ordnance (UXO) being encountered on the site. Further details are given in CIRIA report C681.

BSL carry out non-specialist UXO screening exercises by considering any evidence of UK defence activities on or near the site evident from gathered desk study information and the unexploded aerial delivered bomb (UXB) online risk maps produced by Zetica. Other data sources are available, but as a first stage screening exercise the freely available online Zetica maps have been used. The level of risk stated is that determined by Zetica, a company experienced and considered competent in the assessment of UXO.

Geotechnical Guidance

A preliminary risk assessment of geotechnical hazards is carried out at the desk study stage and confirmed (or amended) at the ground investigation stage.

The CD 622 'Managing Geotechnical Risk' guidance document defines the technical approval and certification procedures to be used to ensure that the risk associated with the geotechnical activities are appropriately managed.

The desk-based stage may also include the requirements for a Coal Mining Risk Assessment (CMRA) which specifically assesses the risks from mining induced instability and related issues in high risk development areas: https://www.gov.uk/guidance/planning-applications-coal-mining-risk-assessments.

In order to establish the requirements of a project, the Geotechnical Category which is based on a consideration of project complexity, proposed geotechnical activities, presence of geo-hazards and severity of geotechnical risks, shall also be considered. These range from Category 1 (small/simple structures) to Category 3 (very large, unusual or complex activities/structures, such as tunnels). It is envisaged most projects typically fall into Category 2, including conventional types of geotechnical structures, earthworks and activities.

In the case of the geotechnical hazard identification at the intrusive investigation stage, this is referred to as the **ground model**.

The geotechnical sections of the report contain the factual information on the geology and relevant site data, including both in situ and laboratory testing, with a geotechnical evaluation of the information stating the assumptions made in the interpretation of the data.

Derived values of geotechnical parameters are obtained from test results by theory (book values), correlation or empiricism in general accordance with BS EN 1997-2:2007 (EC7).

Where derived geotechnical parameters are to be used in designs in accordance with EC7, the selection of characteristic values for geotechnical parameters using the derived values is carried out by well-established experience.

The characteristic value is a cautious estimate of the value affecting the occurrence of the limit state. For any particular material type there may be more than one characteristic value for each parameter because there may be more than one limit state.

The second stage is the selection of design values. The design values are either derived from the characteristic value by applying the relevant partial factors or assessed directly. Similarly, there can be several design values for the same material type.

In the event that geotechnical designs are included in this report, selection of the characteristic and design values is included. Otherwise, it is the duty of the geotechnical designer to determine these within a separate design report (a GDR).

Where it has not been possible to reasonably use an EC7 compliant technique, a practical alternative has been adopted to obtain indicative soil parameters and any interpretation is based upon engineering experience, local precedent where applicable and relevant published information.

In addition to the above:

- Assessments for highways designs are based on CD 622 Managing Geotechnical Risk.
- The assessment of sustainable drainage is based on BRE365 and CIRIA C753 'The SuDS Manual'.
- Earthworks Assessments are based on SHW Series 600 and BS6031.
- Risks from mining (both at the desk based and intrusive stages) are assessed adopting guidance from CIRIA C758.

Re-Use of Waste Soils Guidance

Definition of Waste
The Environment Agency considers waste to be "*...any material that is discarded, or intended to be discarded...*" this includes any soil from drainage trenches, foundation arisings, site strips etc. It is no longer required in its original location, therefore it is considered to be waste. Without an appropriate materials management plan, permit or exemption in place, by law this material is defined as "illegally deposited waste".

Landfill tax rules allow HM Revenue & Customs (HMRC) to recover landfill tax on illegally deposited waste on construction sites. This could lead to excessive costs without the correct documentation in place. In addition, a

person who makes, knowingly causes or knowingly facilitates a disposal to be made at an unauthorised site is also liable to pay Landfill Tax.

CL:AIRE: Code of Practice
Where materials are excavated for construction purposes, wherever possible these should be retained on site for engineering purposes if they are suitable for use. This can be implemented under the CL:AIRE "Development Industry Code of Practice for the Definition of Waste" (CL:AIRE DoWCoP), also commonly referred to as a "Materials Management Plan".

https://www.claire.co.uk/projects-and-initiatives/dow-cop

Developers and contractors are advised to complete all works under the DoWCoP where applicable.

To implement the DoWCoP (for Route A), there is a requirement to notify the Environment Agency and Local Authority of the intention to use the code of practice in principle, after which there is a 21-day notice period for their response.

In order to re-use soils under the DoWCoP, there are four key criteria that need to be met:

- The aims and objectives of the project meet the requirements of the Waste Framework Directive (does not harm human health or the environment).
- The soils can be demonstrated to be suitable for use (backed up by chemical/geotechnical testing and assessment).
- There is certainty of use (planning consents are in place alongside materials tracking, which should be in place as part of good site practice in any case).
- Quantity (the quantity of materials used should be known).

Potential scenarios where soils may be able to be re-used:

- Material capable of being used in another place on the same site without treatment.
- Material capable of being used in another place on the same site following ex-situ treatment on site.
- Material capable of being used in another development site without treatment (Direct Transfer).
- Material capable of being used in another development site following ex-situ treatment on another site e.g. Hub site.

In order to satisfy these requirements, the following are required:

i) Consultation/approval with Local Authority & Environment Agency to confirm they have no objections to the proposed re-use of waste soils, or the risk assessments for the site.
ii) Risk Assessments to demonstrate that the site does not present an Environmental Hazard.
iii) Remediation Strategy for contaminated sites (or Design Statement for non-contaminated sites).
iv) Materials Management Plan (MMP) which details material generated stockpiles and the end use.
v) Volume calculations.
vi) Planning permission for the development.
vii) Contractual details to be clear, regarding who steps in is a contractor goes into administration/liquidation.

The use of the CoP is effectively industry regulated, there is a requirement to appoint an independent Qualified Person (QP) who checks all the requirements have been met and registers the documentation with the Environment Agency. This person must not have had any involvement with the preparing of the risk assessments or remedial strategy on the site.

Soils which require treatment on site (e.g. bioremediation, stabilisation etc) may require an Environmental Permit for treatment, together with justification and validation to prove, once treated, this material is suitable for use.

Construction activities carried out on uncontaminated soils solely for the purpose of improving geotechnical properties are not generally regarded as waste treatment operations and do not require a permit.

Site management procedures need to be in place to ensure that material is tracked through from excavation stockpiling, treatment and remediation processes. Should the process of material tracking be considered non-robust, or not adhered to, this may fail the test whether excavated materials may be considered non-waste.

Any declared MMP should be amended as new import sources are added.

Regardless of implementing re-use under the code of practice or not, all sites should have some form of materials tracking in place in compliance with current legislation. Any re-use scheme should also be designed to minimise disposal costs. Note that for re-use of landfilled materials or mining wastes, the DoWCoP may not apply and a Waste Recovery Permit (or others) may be required. Liaison with the Environment Agency would be needed on a case by case basis to determine the best option.

Once the project is complete, a verification report detailing soils re-use/import will need to be produced and submitted to CL:AIRE, which may be subject to a random audit process. Sites found to be non-complaint with the CoP can be referred to the EA for further investigation.

Soils Re-use under Exemptions and Permits
Other potential options to allow the re-use and/or import of soils and aggregates on site are provided in the table below. Applies to England/Wales only – Scotland differs.

Re-use Mechanism	Description
U1 Exemption	Can be applied to re-use/import of soils and stones, but only up to 1000 tonnes or for brick and concrete up to 5000 tonnes. This is usually an efficient way to re-use small volumes of waste materials. However, only one U1 can be filled in per site in any 3-year period. Quick and free via online registration.
WRAP Quality Protocols	Describes how processed demolition arisings can be removed from regulatory waste regime. Requires a demonstration of appropriateness by: • Factory Production Control Manual. • Facility Permit (or Exemption). • Grading Analysis.
Waste Framework Directive (WFD) exclusion	In regard to "clean" naturally occurring soils only that are to be re-used on their site of origin, these are covered by a Waste Framework Directive (WFD) exclusion which is an EA regulatory position statement. So long as the project can prove the four criteria listed above for the DoWCoP, then permits or the DoWCoP are not required. However, many projects still use the CoP to ensure compliance.
T5 Screening and blending of waste	The T5 exemption allows you to temporarily treat waste on a small scale to produce aggregate or soil at a particular location, such as a construction or demolition site. The limit is 5,000 tonnes. This applies to: • Screening soil on a demolition site to remove wood and rubble. • Blending soil and compost that has been produced under an exemption on a construction site to produce better soil for landscaping on that site (e.g. peaty deposits). • Crushing waste (except bricks, tiles and concrete) before screening or blending • Grading waste concrete after it has been crushed to produce a certain type of aggregate.
T7 Exemption	The T7 allows treatment of waste bricks, tiles and concrete by crushing, grinding or reducing in size. This needs to be registered with the Local Authority.
Other Permitting Routes	Other options include use under an Environmental Permit (Standard or Bespoke Rules), however these may be a time consuming and costly route, where use of the other above options (if applicable) are likely to be more feasible in construction.

There are also potential non-enforcement positions for re-use e.g. a site has a large volume waste illegally deposited on it (not by landowner). The new owner is keen to re-use waste where possible to reprofile the site (planning condition granted). The DoWCoP could not be used as materials already excavated and deposited as a waste (illegally). The EA may agree that although the DoWCoP not applicable, they would take a non-enforcement position if the works were completed in accordance with the DoWCoP – this would need to be agreed in advance.

Waste Classification and Disposal Guidance for Soils

Introduction
As described in the 'Waste Duty of Care Code of Practice (2016)' any substance or object that the holder discards, intends to discard or is required to discard is a waste. Waste producers have a duty of care to classify the waste they are producing:

- Before it is collected, disposed of or recovered.
- To identify the controls that apply to the movement of the waste.
- To complete waste documents and records.
- To identify suitably authorised waste management options.
- To prevent harm to people and the environment.

The most sustainable and economic method of dealing with waste soil is usually the retention and re-use on site. Where this is not possible there are three main options for the disposal of soils:

1. Disposal to a permitted waste recycling facility.
2. Re-use on another site (subject to the suitability).
3. Disposal to a landfill site.

The disposal to a permitted facility will be subject to the **specific conditions of the permits for each individual facility** and will vary dependent on location and environmental sensitivity of the receiving site. Re-use on another site will also be subject to the acceptability criteria of that site.

The guidance below relates to disposal to **landfill sites only**.

Background for Landfill Disposal
The Landfill Directive places controls on waste disposal. These controls include requirements to follow the waste acceptance procedures and criteria that have been agreed by the Council of the European Union and are laid out in Council Decision 2003/33/EC.

Before a waste can be accepted at a landfill site, the landfill **operator** must be satisfied that the waste meets permit conditions, the waste acceptance procedures (WAP) and waste acceptance criteria (WAC).

If disposal to landfill is the best management option for the waste soils, these procedures **must** be followed or the operator may refuse to accept the waste.

Key Points:

- Not all waste can be landfilled.
- Landfills are classified according to whether they can accept hazardous, non-hazardous or inert wastes.
- Wastes can only be accepted at a landfill if they meet the waste acceptance criteria (WAC) for that class of landfill.
- Most wastes must be treated before you can send them to landfill.
- There are formal processes for identifying and checking wastes that must be followed before wastes can be accepted at a landfill site.

Classification

Wastes are listed in the European Waste Catalogue and grouped according to generic industry, process or waste types. Wastes within the EWC are either hazardous or non-hazardous. Some of these wastes are hazardous without further assessment (absolute entries) or are 'mirror' entries that require further assessment of their hazardous properties in order to determine whether they are hazardous waste.

Waste soil has mirror entries on the EWC and as such the first phase of the waste classification process is that of determining if the waste is hazardous or not i.e. the hazard assessment. The most common EWC waste codes related to soil are:

17 05	Soil (including excavated soil from contaminated sites), stones and dredging spoil
17 05 03*	soil and stones containing dangerous substances
17 05 04	soil and stones other than those mentioned in 17 05 03

Soils may contain certain contaminants (e.g. asbestos, oil,) which have prescribed concentration thresholds, that if breached will render the material hazardous waste. These are based on specific "hazardous properties" which include hazards such as carcinogenicity, flammability and toxicity.

In the first instance the concentrations of plausible contaminants within the soil should be identified and wastes should be **classified based on their total concentrations** and classified as either hazardous or non-hazardous waste. WAC analysis must not be used for waste classification.

Waste Definitions

Inert	• Will not undergo any significant physical, chemical or biological transformations. • Will not dissolve. • Will not burn. • Will not physically or chemically react. • Will not biodegrade. • Will not adversely affect other matter with which it comes into contact in a way likely to give rise to environmental pollution or harm to human health. • Has insignificant total leachability and pollutant content. • Produces a leachate with an ecotoxicity that is insignificant (if it produces leachate).
Non-Hazardous	Is not inert (see above). Is not hazardous (see below).
Hazardous	Soil has hazardous properties as defined in WM3 (Guidance on the classification and assessment of waste (1st edition 2015)- Technical Guidance).
Stable Non-reactive hazardous waste#	Hazardous waste, the leaching behaviour of which will not change adversely in the long-term, under landfill design conditions or foreseeable accidents either: in the waste alone (for example, by biodegradation), under the impact of long-term ambient conditions (for example, water, air, temperature or mechanical constraints) or by the impact of other wastes (including waste products such as leachate and gas).

This option allows hazardous waste that is stable and thus has a low leaching potential to be deposited in cells with a standard of containment consistent with non-hazardous wastes.

WAC Testing

The purpose of WAC analysis is to confirm that the waste complies with the relevant WAC for the receiving landfill. If the waste has any disposal route other than a landfill site (e.g. recycling facility, incineration etc) then WAC is not relevant. Furthermore, the WAC limits **cannot** be used to make an assessment of whether a waste is hazardous. WAC testing does however define if a non-hazardous waste is suitable for an inert landfill.

Classification based on Total Concentrations[1]	Non-Hazardous Waste		Hazardous Waste	
WAC testing	Below inert WAC limit values:	Above inert WAC limit values:	Below hazardous WAC limit values	> WAC limit values

Landfill requirements	INERT landfill	NON-HAZARDOUS landfill[2]	HAZARDOUS landfill	PRE-TREATMENT[3]

1 Total concentrations are defined as tests results on solids as opposed to leachate (i.e. a liquid).
2 Individual sites may have certain limit values pre-determined in their licence.
3 After pre-treatment the material characteristics may have changed to an extent that allow the soil to be re-classified.
4 Possibility that wastes could be classified as stable Nonreactive HAZARDOUS waste in non-hazardous Landfill (e.g. soils containing low concentrations of asbestos, gypsum or sulphate bearing soils).

Waste classified as non-hazardous can be accepted into a non-hazardous landfill without having to pass any numerical WAC.

Soils above hazardous WAC limit values require pre-treatment prior to disposal. The effective pre-treatment, typically involving separation, sorting and screening, can offer cost savings through reducing the hazardous nature and volumes of soil. Costs for disposal of non-hazardous/hazardous soils are significant compared to the disposal of inert material.

Greenfield Sites and Inert Waste
The possibility of automatic inert classification naturally occurring "clean" soils should be explored in accordance with the requirements of paragraph 10 (wastes acceptable without testing at landfills for inert waste) of the Landfill (England and Wales) (Amendment) Regulations (2005). This is the case if:

- They are single stream waste of a single waste type (although different waste types from the list may be accepted together if they are from a single source); and
- There is no suspicion of material or substances such as metals, asbestos, plastics, chemicals, etc to an extent which increases the risk associated with the waste sufficiently to justify contamination and they do not contain other classes of landfill (e.g. the waste producer can characterise the waste based on visual assessment and written description with supporting evidence such as a desk study, subject to agreement by the landfill operator).

Hydrocarbons in Soils
WM3 uses the term Oil or Waste Oil to cover hydrocarbons products such as fuel oil, petrol or diesel. These are defined by WM3 as hazardous under an absolute entry in the List of Wastes. However, hydrocarbons in soils are a mixture rather than a pure product and are therefore not absolute entries.

Known Oils
The simplest scenario is where the identity of the contaminating oil is known or can be identified. If the oil is known the manufacturer's or supplier's REACH compliant safety data sheet for the specific oil can be obtained and the hazard statement codes on that Safety Data Sheet can be used for the hazardous waste assessment.

Where the identity of the oil can only be identified down to a petroleum group level (i.e. the contaminating oil is known to be diesel, but the specific type/brand is unknown), then the classification of that petroleum group should be used in the assessment. The marker compounds associated with that petroleum group may be used to confirm carcinogenicity.

Oils may contain a range of hydrocarbons, so the presence of for instance Diesel Range Organics (DRO) does not enable the assessor to conclude that diesel is present. These hydrocarbons may have arisen from other oils, the laboratory needs to provide an interpretation of the chromatograph to determine if it is consistent with diesel or weathered diesel as a whole.

The concentration of known oils should be determined using a method that as a minimum spans the range in which the carbon numbers for that known oil fall.

Unknown Oils
Where hydrocarbons are contaminating soils, it is likely that the oil will be unknown or cannot be determined.

WM3 states that:

> For contaminated land specific consideration must be given to the following before proceeding:
>
> - The presence of other organic contaminants, for example solvents or coal tar that could be detected as hydrocarbons. Coal Tar is not an oil and is considered separately in WM3 example 2. Where the site history or investigation indicates the presence of hydrocarbons from oil and other sources (e.g. coal tar), and the origin of the hydrocarbons cannot reliably be assigned to either, then a worst case approach of considering the hydrocarbons both as waste oil (in accordance with this example) and from other sources, for example coal tar should be taken.
> - The presence of diesel, or weathered diesel, should be specifically considered by the laboratory and where this is confirmed by the hydrocarbon profile the oil should be assessed as a known or identified oil (diesel).

The use of marker compounds is optional; however, it is recommended that where possible the marker compounds should be used. WM3 states:

> If the identity of the oil is unknown, and the petroleum group cannot be established, then the oil contaminating the waste can be classified as non-carcinogenic/mutagenic due to the presence of oil if all three of the following criteria are met:
>
> - The waste contains benzo[a]pyrene (BaP) at a concentration of less than 0.01% (1/10,000th) of the TPH concentration (This is the carcinogenic limit specified in table 3.1 of the CLP for BaP)
> - This has been determined by an appropriate and representative sampling approach in accordance with the principles set out in Appendix D of WM3, and
> - The analysis clearly demonstrates, for example by carbon bands or chromatograph, and the laboratory has reasonably concluded that the hydrocarbons present have not arisen from petrol or diesel.

For example:

TPH Concentration (mg/kg)	Petrol or Diesel	BaP (mg/kg)	Classification
10,000	No	0.9	Non- Hazardous
1,000	No	Not available	Hazardous
1,000	Yes	Not relevant	Hazardous

References

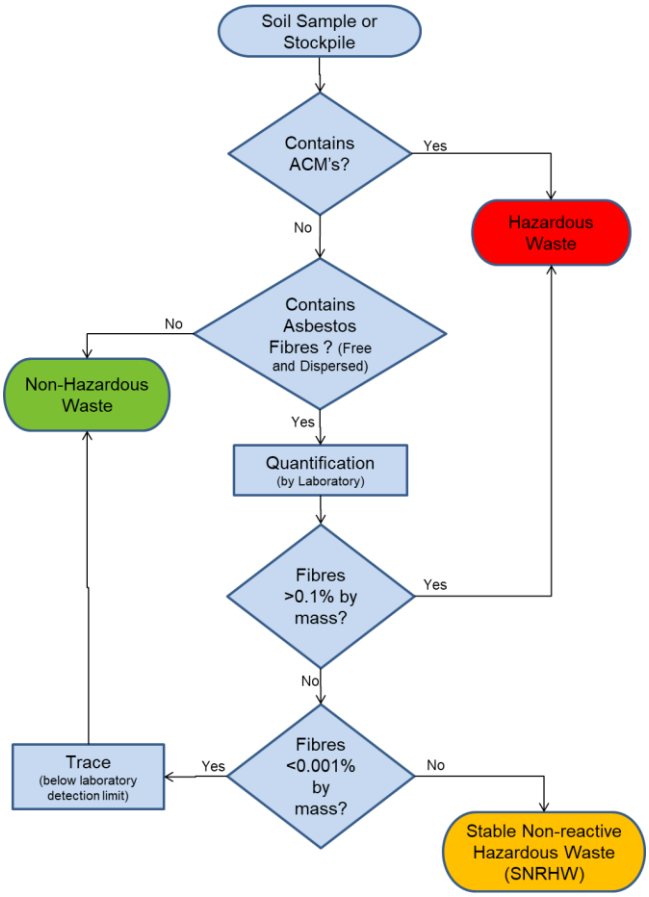
1. Environmental Permitting (England and Wales) Regulations 2010 (as amended) (EP Regulations), the Landfill Directive (1999/31/EC) and the subsequent Council Decisions.
2. Environment Agency Environmental Permitting Regulations: "Inert Waste Guidance- Standards and Measures for the Deposit of Inert Waste on Land" 2009.
3. Environment Agency "Waste acceptance at landfills - Guidance on waste acceptance procedures and criteria" Nov 2010.
4. Environment Agency "Guidance on the classification and assessment of waste (Technical Guidance WM3)".
5. Classification, Labelling and Packaging of Substances Regulation (EC 1272/2008) (CLP).
6. Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives.
7. 2014/955/EU: Commission Decision of 18 December 2014 amending Decision 2000/532/EC on the list of waste pursuant to Directive 2008/98/EC of the European Parliament.
8. Environmental Permitting Guidance The Landfill Directive For the Environmental Permitting (England and Wales) Regulations 2010 Updated March 2010 Version 3.1.
9. Classification, Labelling and Packaging of Substances Regulation (EC 1272/2008) (CLP).

Waste Containing Asbestos

The assessment of asbestos containing waste is dependent on whether the asbestos is present as:

- Fibres that are free and dispersed, or
- Identifiable pieces of asbestos containing materials (ACM's).

Identifiable pieces of asbestos are any particle of a size that can be identified as potentially being asbestos by a competent person if examined by the naked eye. The result is that commonly soils with visible ACM's are sorted and the ACM's removed by hand picking and separate disposal.



Should soils contain asbestos, the concentration and type of asbestos identified, in addition to the chemical composition (i.e. hazardous or non-hazardous detailed above), will determine which waste code is applicable to the soils and which landfill will accept it as summarised below:

Waste	Conc. by Weight (%)	EWC 2002 Catalogue Entry Code	Waste Disposal Route
Non-hazardous containing asbestos fibres	<0.001 - <0.1%	17 05 04 (soil and stones other than those mentioned in 17 05 03*)	Non-hazardous landfill subject to achieving Waste Acceptance Criteria (WAC) for a stable non-reactive hazardous landfill site.
Hazardous containing asbestos fibres	<0.001 - <0.1%	17 05 03* (soil and stones containing dangerous substances)	Hazardous landfill subject to achieving Waste Acceptance Criteria (WAC) for a hazardous landfill site.
Non-hazardous soils containing asbestos fibres	>0.1%	17 05 03* (soil and stones containing dangerous substances)	Hazardous landfill authorised to receive asbestos, or in a stable non-reactive hazardous waste cell at a non-hazardous landfill authorised to receive asbestos.

Waste	Conc. by Weight (%)	EWC 2002 Catalogue Entry Code	Waste Disposal Route
Non-hazardous Soils containing ACM (Mechanically separable)	>0.1%	17 06 05 (construction material containing asbestos) 17 05 04 (soil and stones other than those mentioned in 17 05 03*)	ACMs disposed of at a hazardous landfill authorised to receive asbestos, or in a stable non-reactive hazardous waste cell at a non-hazardous landfill authorised to receive asbestos. Soils should be disposed of at a non-hazardous landfill subject to achieving Waste Acceptance Criteria (WAC) for a stable non-reactive hazardous landfill site.
Hazardous soils containing ACM	>0.1%	17 05 03* (soil and stones containing dangerous substances)	Hazardous landfill subject to achieving Waste Acceptance Criteria (WAC) for a hazardous landfill site.

Asbestos concentrations below 0.001% by mass are below standard laboratory detection limits and are not currently regarded as containing asbestos for the purposes of disposal and may be disposed of to an inert landfill site[1]. These levels are often termed "trace" by laboratories.

Asbestos concentrations between 0.001% and 0.1% are stable non-reactive hazardous waste (SNRHW)[1]. Waste transfer stations where soil recycling takes place may be able to take SNRHW, but are unlikely to take soils containing asbestos above trace concentrations.

The following codes should be assigned to the asbestos waste as appropriate:

17 06	Insulation materials and asbestos-containing construction materials
17 06 01	Insulation materials containing asbestos
17 06 03	Other insulation materials consisting of or containing hazardous substances
17 06 04	Insulation materials other than those mentioned in 17 06 01 and 17 06 03
17 06 05	Construction material containing asbestos

WM3 indicates that 17 06 05 would normally be used in preference to 17 06 01 for the asbestos in asbestos contaminated soil and stones.

Construction materials containing asbestos and "*other suitable materials*" may be landfilled at landfills for non-hazardous waste in accordance with the Landfill Directive without testing.

This means that wastes that are only hazardous because of their asbestos content can be disposed of at landfills for non-hazardous waste in separate landfill cells that only accept asbestos wastes and other suitable materials. The Landfill Directive requires that stable non-reactive hazardous waste shall not be deposited with biodegradable waste (for example organic material, household waste, paper etc..) and must meet the waste acceptance criteria set out in accordance with Annex II.

Construction

Health and Safety Executive (HSE) guidance on asbestos is not directly related to soil and much of the guidance focuses on the removal of asbestos from buildings. The overarching legislation is the Control of Asbestos Regulation (CAR 2012). However, where work involves (or is likely to involve) contact with asbestos then CAR 2012 requires a risk assessment including whether the work is licensed or notifiable non-licensed work and may require an Asbestos Management Plan. Work becomes notifiable if it is considered that the control limit could be exceeded.

Brownfield sites frequently have soils that contain asbestos and the presence of asbestos needs to be considered within the context of construction, particularly in relation to groundworks. The exposure of soils and the use of excavators and plant to move soil around increases the possibility of fibres becoming airborne. However, it is good site practice to not generate dusts and to employ dust suppression on all sites regardless of the presence of asbestos.

The legal control limit for asbestos is 0.1f/ml over a continuous four-hour period. The control limit is not a '*safe*' level and exposure from work activities involving asbestos must be reduced to as far below the control limit as possible.

Clearly the higher the concentrations in the soil the greater potential there is for fibres to be released, however IOM publication TM/88/14 "the release of dispersed asbestos fibres from soil" 1988 concludes that:

- Mixtures of asbestos in dry soils with asbestos content as low as 0.001% can produce airborne respirable asbestos concentrations greater than 0.1f/ml in dust clouds where the respirable dust concentrations are less than 5mg/m3.
- An action limit is recommended of no higher than 0.001% asbestos in soils above which steps should be taken to minimise exposure to airborne fibres (e.g. by wetting).
- The addition of relatively small quantities (10%) of water can reduce the airborne fibre concentrations by an order of magnitude.

Where asbestos has been identified at concentrations above 0.001% as free and dispersed fibres in the soil precautions need to be adopted. Concentrations below this are considered to be normal background, although good site practice dictates that the generation of dusts should be avoided and therefore any fugitive fibre release from minor concentrations should be kept to a practical minimum.

End Use
The use of materials containing asbestos and material containing asbestos is prohibited under EU legislation.

Asbestos containing materials can remain in situ under a suitable cover system which may be hard surfacing or soft landscaping (with or without hard dig layers and markers).

There is a risk that future maintenance may compromise such systems and details of the presence of asbestos should be kept in the Health and Safety File.

Publications from the JIWG provide guides for decision making in relation to construction.

The re-use of waste soils should be undertaken in accordance with the CL:AIRE Code of Practice and is subject to suitable risk assessments demonstrating low risk. There is nothing that specifically excludes the re-use of soils containing asbestos as fill to raise levels. However, the movement of materials increases the risk of fibres becoming airborne and suitable precautions will be required. Re-use of soils containing asbestos should be as per CARSOILS.

The re-use of soils containing asbestos at concentrations above hazardous waste levels may be met with regulatory opposition. Assuming a suitable strategy could be agreed this would take a considerable amount of time and is only likely to be feasible where there is a long program for implementation.

Asbestos in Soil as Free Fibres

Concentration (by weight)	Waste Disposal				Construction Issues	End Use	
	Recycle	Inert	SNR	Haz		Suitable for re-use on site	Precautions
Not detected	√	√			No precautions necessary, however on a brownfield site asbestos not previously identified may be found during works and a statement within the contractor's method statement for how they will deal with this unforeseen asbestos would be good practice to ensure compliance with CAR2012.	Yes.	None.
Trace (<0.001%)		√ [2]			Precautions are unlikely to be required, however a detailed method statement may be required to ensure compliance with CAR2012. Basic asbestos management good practice will be required. Typically precautions would include: • Ensuring soils do not dry out to become dusty. • Site personnel have the risk communicated at induction stage.	Yes Soils can be re-used under CL:AIRE CoP with the correct precautions in place.	Generally clean cover or hardstanding cover required.
0.001% – 0.099%			√		Contractor needs to produce an Asbestos Management Plan in accordance with CAR2012 as part of their method statement. Typical precautions would include: • Site personnel have the risk communicated at induction stage. • Ensuring personnel have suitable training. • Task monitoring to inform PPE requirements. • Ensuring soils do not dry out to become dusty and that misting is available during groundworks. • Separate stockpiling. • Clean haulage routes.	Possibly. Soils may be able to be re-used under CL:AIRE CoP, subject to a satisfactory Risk Assessment and regulatory agreement with the correct precautions in place.	Clean cover with hard dig/demarcation layer or hardstanding cover required.
0.1+%				√	Contractor needs to produce an Asbestos Management Plan in accordance with CAR2012 as part of their method statement. Typical precautions would include: • Site personnel have the risk communicated at induction stage. • Ensuring personnel have suitable training. • Task monitoring to inform PPE requirements. • Site wide and or perimeter monitoring. • Ensuring soils do not dry out to become dusty and that misting is available during groundworks. • Separate stockpiling.	Unlikely [3] Re-use of soils containing asbestos within an earthworks scheme will involve significant engineering and the risk for generating dusts will be significantly	Clean cover and a hard dig / demarcation layer. A plan should be in place for future excavations as part of the Health and Safety File.

Concentration (by weight)	Waste Disposal				Construction Issues	End Use	
	Recycle	Inert	SNR	Haz		Suitable for re-use on site	Precautions
					• Clean haulage routes. • Decontamination unit	increased with repeated handling and compaction.	

1. The standard laboratory detection limit is normally 0.001%. Below 0.001% is trace and currently regarded as not containing asbestos for the purposes of disposal off site. However the waste producer has a duty to fully classify the waste and the presence of trace asbestos should be declared. Consequently it is unlikely that a waste treatment site will take this soil and an inert landfill may make a commercial decision to only take it under some circumstances.

2 The re-use of soils containing asbestos at concentrations above hazardous waste is likely to meet with regulatory opposition. Assuming a suitable strategy could be agreed this would take a considerable amount of time and is only likely to be warranted where there a long program for implementation.

APPENDIX B

Exploratory Hole Logs

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Open Hole Borehole No.

RO101

Sheet 1 of 2

PROJECT NO:	C5980	**CO-ORDS:**	347015E, 390428N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	42.40m OD
CLIENT:	UNITED LIVING	**DATES:**	29/01/25

Hole Type	Scale	Logged	Checked
RO	1:50	DR / MAS	PH

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.30	42.10		TOPSOIL: Grass over brown slightly gravelly clay with frequent roots. Gravel is sub-angular to sub-rounded fine to coarse of mudstone. Brown CLAY [Drillers' description]
					3.70	38.70		SILTSTONE [Drillers' description].
					6.70	35.70		MUDSTONE [Drillers' description].

1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0 10.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit excavation to 1.20m bgl.
3. Groundwater not encountered.
4. Borehole sides stable.
5. Borehole terminated at 16.60m bgl due to solid drilling.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Open Hole Borehole No.

RO101

Sheet 2 of 2

PROJECT NO:	C5980	**CO-ORDS:**	347015E, 390428N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	42.40m OD
CLIENT:	UNITED LIVING	**DATES:**	29/01/25

Hole Type	Scale	Logged	Checked
RO	1:50	DR / MAS	PH

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
		Depth (m)	Type	Results				
					12.70	29.70		BROKEN GROUND [Drillers' description].
					14.60	27.80		Solid drilling [Drillers' description].
					16.60	25.80		End of Borehole at 16.60m

11.0
12.0
13.0
14.0
15.0
16.0
17.0
18.0
19.0
20.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit excavation to 1.20m bgl.
3. Groundwater not encountered.
4. Borehole sides stable.
5. Borehole terminated at 16.60m bgl due to solid drilling.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Open Hole Borehole No.

RO102

Sheet 1 of 3

PROJECT NO:	C5980	**CO-ORDS:**	347065E, 390394N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	41.51m OD
CLIENT:	UNITED LIVING	**DATES:**	29/01/25

Hole Type	Scale	Logged	Checked
RO	1:50	DR / MAS	PH

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
					0.40	41.11		TOPSOIL: Grass over brown slightly gravelly clay with frequent roots. Gravel is sub-angular to sub-rounded fine to coarse of sandstone and coal. Brown CLAY [Drillers' description]
					3.50	38.01		SILTSTONE [Drillers' description]
					5.20	36.31		MUDSTONE [Drillers' description]
					9.50	32.01		COAL [Drillers' description]

1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0 10.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit excavation to 1.20m bgl.
3. Groundwater not encountered.
4. Borehole sides stable.
5. Borehole completed at 30.00m bgl.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Open Hole Borehole No.

RO102

Sheet 2 of 3

PROJECT NO:	C5980	**CO-ORDS:**	347065E, 390394N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	41.51m OD
CLIENT:	UNITED LIVING	**DATES:**	29/01/25

Hole Type	Scale	Logged	Checked
RO	1:50	DR / MAS	PH

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
		Depth (m)	Type	Results				
					11.20	30.31		MUDSTONE [Drillers' description]
					15.20	26.31		COAL [Drillers' description]
					17.20	24.31		MUDSTONE [Drillers' description]

11.0
12.0
13.0
14.0
15.0
16.0
17.0
18.0
19.0
20.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit excavation to 1.20m bgl.
3. Groundwater not encountered.
4. Borehole sides stable.
5. Borehole completed at 30.00m bgl.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Open Hole Borehole No.

RO102

Sheet 3 of 3

PROJECT NO:	C5980	**CO-ORDS:**	347065E, 390394N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	41.51m OD
CLIENT:	UNITED LIVING	**DATES:**	29/01/25

Hole Type	Scale	Logged	Checked
RO	1:50	DR / MAS	PH

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
					20.70	20.81		COAL [Drillers' description]
					22.20	19.31		MUDSTONE [Drillers' description]
					28.00	13.51		COAL [Drillers' description]
					29.00	12.51		MUDSTONE [Drillers' description]
					30.00	11.51		End of Borehole at 30.00m

21.0 22.0 23.0 24.0 25.0 26.0 27.0 28.0 29.0 30.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit excavation to 1.20m bgl.
3. Groundwater not encountered.
4. Borehole sides stable.
5. Borehole completed at 30.00m bgl.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Open Hole Borehole No.

RO103

Sheet 1 of 3

PROJECT NO:	C5980	**CO-ORDS:**	347066E, 390353N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	41.57m OD
CLIENT:	UNITED LIVING	**DATES:**	29/01/25

Hole Type	Scale	Logged	Checked
RO	1:50	DR / MAS	PH

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
					0.40	41.17		MADE GROUND TOPSOIL: Grass over brown slightly gravelly sandy clay. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of brick, shale, coal, and mudstone. Brown CLAY [Drillers' description]
					2.80	38.77		MUDSTONE [Drillers' description].

1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0 10.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit excavation to 1.20m bgl.
3. Groundwater not encountered.
4. Borehole sides stable.
5. Borehole completed at 30.00m bgl.
6. Installation to 10.00m bgl: 5.00m plain 50mm PVC, 5.00m slotted PVC pipe.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Open Hole Borehole No.

RO103

Sheet 2 of 3

PROJECT NO:	C5980	**CO-ORDS:**	347066E, 390353N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	41.57m OD
CLIENT:	UNITED LIVING	**DATES:**	29/01/25

Hole Type	Scale	Logged	Checked
RO	1:50	DR / MAS	PH

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
					18.40	23.17		COAL [Drillers' description].

11.0
12.0
13.0
14.0
15.0
16.0
17.0
18.0
19.0
20.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit excavation to 1.20m bgl.
3. Groundwater not encountered.
4. Borehole sides stable.
5. Borehole completed at 30.00m bgl.
6. Installation to 10.00m bgl: 5.00m plain 50mm PVC, 5.00m slotted PVC pipe.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Open Hole Borehole No.

RO103

Sheet 3 of 3

PROJECT NO:	C5980	**CO-ORDS:**	347066E, 390353N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	41.57m OD
CLIENT:	UNITED LIVING	**DATES:**	29/01/25

Hole Type	Scale	Logged	Checked
RO	1:50	DR / MAS	PH

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
					20.30	21.27		MUDSTONE [Drillers' description].
					24.00	17.57		COAL [Drillers' description].
					25.80	15.77		MUDSTONE [Drillers' description].
					30.00	11.57		End of Borehole at 30.00m

21.0 22.0 23.0 24.0 25.0 26.0 27.0 28.0 29.0 30.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit excavation to 1.20m bgl.
3. Groundwater not encountered.
4. Borehole sides stable.
5. Borehole completed at 30.00m bgl.
6. Installation to 10.00m bgl: 5.00m plain 50mm PVC, 5.00m slotted PVC pipe.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Open Hole Borehole No.

RO104

Sheet 1 of 3

PROJECT NO:	C5980	**CO-ORDS:**	347114E, 390292N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	41.82m OD
CLIENT:	UNITED LIVING	**DATES:**	29/01/25

Hole Type	Scale	Logged	Checked
RO	1:50	DR / MAS	PH

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
					0.30	41.52		MADE GROUND TOPSOIL: Grass over brown slightly gravelly sandy clay. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of brick and coal.
								Brown CLAY [Drillers' description]
					2.60	39.22		MUDSTONE [Drillers' description].
					9.70	32.12		COAL [Drillers' description].
					9.90	31.92		MUDSTONE [Drillers' description].

1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit excavation to 1.20m bgl.
3. Groundwater not encountered.
4. Borehole sides stable.
5. Borehole completed at 30.00m bgl.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Open Hole Borehole No.

RO104

Sheet 2 of 3

PROJECT NO:	C5980	**CO-ORDS:**	347114E, 390292N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	41.82m OD
CLIENT:	UNITED LIVING	**DATES:**	29/01/25

Hole Type	Scale	Logged	Checked
RO	1:50	DR / MAS	PH

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
		Depth (m)	Type	Results				
					18.20	23.62		COAL [Drillers' description].
					20.00	21.82		

11.0
12.0
13.0
14.0
15.0
16.0
17.0
18.0
19.0
20.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit excavation to 1.20m bgl.
3. Groundwater not encountered.
4. Borehole sides stable.
5. Borehole completed at 30.00m bgl.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Open Hole Borehole No.

RO104

Sheet 3 of 3

PROJECT NO:	C5980	**CO-ORDS:**	347114E, 390292N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	41.82m OD
CLIENT:	UNITED LIVING	**DATES:**	29/01/25

Hole Type	Scale	Logged	Checked
RO	1:50	DR / MAS	PH

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
								MUDSTONE [Drillers' description].
					23.20	18.62		COAL [Drillers' description].
					26.20	15.62		MUDSTONE [Drillers' description].
					30.00	11.82		End of Borehole at 30.00m

21.0 22.0 23.0 24.0 25.0 26.0 27.0 28.0 29.0 30.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit excavation to 1.20m bgl.
3. Groundwater not encountered.
4. Borehole sides stable.
5. Borehole completed at 30.00m bgl.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Open Hole Borehole No.

RO105

Sheet 1 of 3

PROJECT NO:	C5980	**CO-ORDS:**	347153E, 390271N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	42.21m OD
CLIENT:	UNITED LIVING	**DATES:**	29/01/25

Hole Type	Scale	Logged	Checked
RO	1:50	DR / MAS	PH

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.30	41.91		TOPSOIL: Grass over brown slightly gravelly clay with frequent roots. Gravel is sub-angular to sub-rounded fine to coarse of sandstone and coal. Brown CLAY [Drillers' description]
					3.00	39.21		MUDSTONE [Drillers' description].

1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground. Concrete obstruction encountered at 0.30m bgl so location was moved 2.00m East.
2. Hand pit excavation to 1.20m bgl.
3. Groundwater not encountered.
4. Borehole sides stable.
5. Borehole completed at 30.00m bgl.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Open Hole Borehole No.

RO105

Sheet 2 of 3

PROJECT NO:	C5980	**CO-ORDS:**	347153E, 390271N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	42.21m OD
CLIENT:	UNITED LIVING	**DATES:**	29/01/25

Hole Type	Scale	Logged	Checked
RO	1:50	DR / MAS	PH

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
		Depth (m)	Type	Results				
					19.20	23.01		COAL [Drillers' description].

11.0
12.0
13.0
14.0
15.0
16.0
17.0
18.0
19.0
20.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground. Concrete obstruction encountered at 0.30m bgl so location was moved 2.00m East.
2. Hand pit excavation to 1.20m bgl.
3. Groundwater not encountered.
4. Borehole sides stable.
5. Borehole completed at 30.00m bgl.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Open Hole Borehole No.

RO105

Sheet 3 of 3

PROJECT NO:	C5980	**CO-ORDS:**	347153E, 390271N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	42.21m OD
CLIENT:	UNITED LIVING	**DATES:**	29/01/25

Hole Type	Scale	Logged	Checked
RO	1:50	DR / MAS	PH

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
					20.40	21.81		MUDSTONE [Drillers' description].
					24.90	17.31		COAL [Drillers' description].
					26.20	16.01		MUDSTONE [Drillers' description].
					30.00	12.21		End of Borehole at 30.00m

21.0
22.0
23.0
24.0
25.0
26.0
27.0
28.0
29.0
30.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground. Concrete obstruction encountered at 0.30m bgl so location was moved 2.00m East.
2. Hand pit excavation to 1.20m bgl.
3. Groundwater not encountered.
4. Borehole sides stable.
5. Borehole completed at 30.00m bgl.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Open Hole Borehole No.

RO106

Sheet 1 of 2

PROJECT NO:	C5980	**CO-ORDS:**	347208E, 390270N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	41.87m OD
CLIENT:	UNITED LIVING	**DATES:**	28/01/25

Hole Type	Scale	Logged	Checked
RO	1:50	DR / MAS	PH

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.30	41.57		MADE GROUND TOPSOIL: Grass over brown slightly gravelly clay with frequent roots. Gravel is sub-angular to sub-rounded fine to coarse of brick, sandstone, and coal. Brown CLAY [Drillers' description]
					2.90	38.97		MUDSTONE [Drillers' description].
					5.80	36.07		Soft drilling [Drillers' description].
					7.40	34.47		Solid drilling [Drillers' description].

1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0 10.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit excavation to 1.20m bgl.
3. Groundwater not encountered.
4. Borehole terminated at 10.40m bgl due to collapse.
5. No installation.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Open Hole Borehole No.

RO106

Sheet 2 of 2

PROJECT NO:	C5980	**CO-ORDS:**	347208E, 390270N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	41.87m OD
CLIENT:	UNITED LIVING	**DATES:**	28/01/25

Hole Type	Scale	Logged	Checked
RO	1:50	DR / MAS	PH

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
		Depth (m)	Type	Results				
					10.40	31.47		End of Borehole at 10.40m

11.0
12.0
13.0
14.0
15.0
16.0
17.0
18.0
19.0
20.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit excavation to 1.20m bgl.
3. Groundwater not encountered.
4. Borehole terminated at 10.40m bgl due to collapse.
5. No installation.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Open Hole Borehole No.

RO107

Sheet 1 of 2

PROJECT NO:	C5980	**CO-ORDS:**	347297E, 390266N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	43.44m OD
CLIENT:	UNITED LIVING	**DATES:**	31/01/25

Hole Type	Scale	Logged	Checked
RO	1:50	DR / MAS	PH

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
					0.30	43.14		MADE GROUND TOPSOIL: Grass over brown slightly gravelly sandy clay. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of brick and mudstone.
								CLAY [Drillers' description]
					2.60	40.84		MUDSTONE [Drillers' description]
					6.50	36.94		COAL [Drillers' description]
					6.70	36.74		BROKEN GROUND [Drillers' description].
					8.20	35.24		Solid drilling [Drillers' description].

1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit excavation to 1.20m bgl.
3. Groundwater not encountered.
4. Borehole sides stable.
5. Borehole terminated at 10.20m bgl due to solid drilling.
6. No installation.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Open Hole Borehole No.

RO107

Sheet 2 of 2

PROJECT NO:	C5980	**CO-ORDS:**	347297E, 390266N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	43.44m OD
CLIENT:	UNITED LIVING	**DATES:**	31/01/25

Hole Type	Scale	Logged	Checked
RO	1:50	DR / MAS	PH

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
		Depth (m)	Type	Results				
					10.20	33.24		End of Borehole at 10.20m

11.0
12.0
13.0
14.0
15.0
16.0
17.0
18.0
19.0
20.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit excavation to 1.20m bgl.
3. Groundwater not encountered.
4. Borehole sides stable.
5. Borehole terminated at 10.20m bgl due to solid drilling.
6. No installation.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Open Hole Borehole No.

RO107A

Sheet 1 of 4

PROJECT NO:	C5980	**CO-ORDS:**	347308E, 390254N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	
CLIENT:	UNITED LIVING	**DATES:**	31/01/25

Hole Type	Scale	Logged	Checked
RO	1:50	DR / MAS	PH

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.30			MADE GROUND TOPSOIL: Grass over brown slightly gravelly sandy clay. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of brick and mudstone. Brown CLAY [Drillers' description]
					2.50			MUDSTONE [Drillers' description].
					3.90			COAL [Drillers' description].
					5.20			MUDSTONE [Drillers' description].

1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0 10.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit excavation to 1.20m bgl.
3. Groundwater not encountered.
4. Borehole sides stable.
5. Borehole completed at 40.00m bgl.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Open Hole Borehole No.

RO107A

Sheet 2 of 4

PROJECT NO:	C5980	**CO-ORDS:**	347308E, 390254N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	
CLIENT:	UNITED LIVING	**DATES:**	31/01/25

Hole Type	Scale	Logged	Checked
RO	1:50	DR / MAS	PH

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
					12.30			COAL [Drillers' description].
					13.40			MUDSTONE [Drillers' description].
					15.00			Black SHALE [Drillers' description].
					15.70			MUDSTONE and SILTSTONE [Drillers' description].

11.0
12.0
13.0
14.0
15.0
16.0
17.0
18.0
19.0
20.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit excavation to 1.20m bgl.
3. Groundwater not encountered.
4. Borehole sides stable.
5. Borehole completed at 40.00m bgl.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Open Hole Borehole No.

RO107A

Sheet 3 of 4

PROJECT NO:	C5980	**CO-ORDS:**	347308E, 390254N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	
CLIENT:	UNITED LIVING	**DATES:**	31/01/25

Hole Type	Scale	Logged	Checked
RO	1:50	DR / MAS	PH

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
		Depth (m)	Type	Results				
								23.10 COAL [Drillers' description].
								24.50 MUDSTONE [Drillers' description].

21.0
22.0
23.0
24.0
25.0
26.0
27.0
28.0
29.0
30.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit excavation to 1.20m bgl.
3. Groundwater not encountered.
4. Borehole sides stable.
5. Borehole completed at 40.00m bgl.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Open Hole Borehole No.

RO107A

Sheet 4 of 4

PROJECT NO:	C5980	**CO-ORDS:**	347308E, 390254N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	
CLIENT:	UNITED LIVING	**DATES:**	31/01/25

Hole Type	Scale	Logged	Checked
RO	1:50	DR / MAS	PH

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
					38.40			COAL [Drillers' description].
					39.10			MUDSTONE [Drillers' description].
					40.00			End of Borehole at 40.00m

31.0
32.0
33.0
34.0
35.0
36.0
37.0
38.0
39.0
40.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit excavation to 1.20m bgl.
3. Groundwater not encountered.
4. Borehole sides stable.
5. Borehole completed at 40.00m bgl.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Open Hole Borehole No.

RO108

Sheet 1 of 3

PROJECT NO:	C5980	**CO-ORDS:**	347117E, 390192N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	43.37m OD
CLIENT:	UNITED LIVING	**DATES:**	28/01/25

Hole Type	Scale	Logged	Checked
RO	1:50	DR / MAS	PH

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.30	43.07		MADE GROUND TOPSOIL: Grass over brown slightly gravelly clay with frequent roots. Gravel is sub-angular to sub-rounded fine to coarse of brick, sandstone, and coal. Brown CLAY [Drillers' description].
					3.50	39.87		MUDSTONE [Drillers' description].
					6.90	36.47		SILTSTONE [Drillers' description].
					9.20	34.17		MUDSTONE [Drillers' description].

1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0 10.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit excavation to 1.20m bgl.
3. Groundwater not encountered.
4. Borehole sides stable.
5. Borehole completed at 30.00m bgl.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Open Hole Borehole No.

RO108

Sheet 2 of 3

PROJECT NO:	C5980	**CO-ORDS:**	347117E, 390192N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	43.37m OD
CLIENT:	UNITED LIVING	**DATES:**	28/01/25

Hole Type	Scale	Logged	Checked
RO	1:50	DR / MAS	PH

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
		Depth (m)	Type	Results				
					11.20	32.17		SILTSTONE and MUDSTONE [Drillers' description].

11.0
12.0
13.0
14.0
15.0
16.0
17.0
18.0
19.0
20.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit excavation to 1.20m bgl.
3. Groundwater not encountered.
4. Borehole sides stable.
5. Borehole completed at 30.00m bgl.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Open Hole Borehole No.

RO108

Sheet 3 of 3

PROJECT NO:	C5980	**CO-ORDS:**	347117E, 390192N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	43.37m OD
CLIENT:	UNITED LIVING	**DATES:**	28/01/25

Hole Type	Scale	Logged	Checked
RO	1:50	DR / MAS	PH

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
		Depth (m)	Type	Results				
					30.00	13.37		End of Borehole at 30.00m

21.0
22.0
23.0
24.0
25.0
26.0
27.0
28.0
29.0
30.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit excavation to 1.20m bgl.
3. Groundwater not encountered.
4. Borehole sides stable.
5. Borehole completed at 30.00m bgl.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Open Hole Borehole No.

RO109

Sheet 1 of 3

PROJECT NO:	C5980	**CO-ORDS:**	347192E, 390220N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	43.39m OD
CLIENT:	UNITED LIVING	**DATES:**	28/01/25

Hole Type	Scale	Logged	Checked
RO	1:50	DR / MAS	PH

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
					0.30	43.09		TOPSOIL: Grass over brown slightly gravelly clay with frequent roots. Gravel is sub-angular to sub-rounded fine to coarse of sandstone and coal. Brown sandy CLAY [Drillers' description].
					4.50	38.89		MUDSTONE [Drillers' description].
					7.60	35.79		COAL [Drillers' description].

1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0 10.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit excavation to 1.20m bgl.
3. Groundwater not encountered.
4. Borehole sides stable.
5. Borehole completed at 30.00m bgl.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Open Hole Borehole No.

RO109

Sheet 2 of 3

PROJECT NO:	C5980	**CO-ORDS:**	347192E, 390220N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	43.39m OD
CLIENT:	UNITED LIVING	**DATES:**	28/01/25

Hole Type	Scale	Logged	Checked
RO	1:50	DR / MAS	PH

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
		Depth (m)	Type	Results				
					10.20	33.19		MUDSTONE [Drillers' description].

11.0
12.0
13.0
14.0
15.0
16.0
17.0
18.0
19.0
20.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit excavation to 1.20m bgl.
3. Groundwater not encountered.
4. Borehole sides stable.
5. Borehole completed at 30.00m bgl.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Open Hole Borehole No.

RO109

Sheet 3 of 3

PROJECT NO:	C5980	**CO-ORDS:**	347192E, 390220N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	43.39m OD
CLIENT:	UNITED LIVING	**DATES:**	28/01/25

Hole Type	Scale	Logged	Checked
RO	1:50	DR / MAS	PH

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
		Depth (m)	Type	Results				
					20.40	22.99		COAL [Drillers' description].
					22.00	21.39		MUDSTONE [Drillers' description].
					27.20	16.19		COAL [Drillers' description].
					28.30	15.09		MUDSTONE [Drillers' description].
					30.00	13.39		End of Borehole at 30.00m

21.0 22.0 23.0 24.0 25.0 26.0 27.0 28.0 29.0 30.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit excavation to 1.20m bgl.
3. Groundwater not encountered.
4. Borehole sides stable.
5. Borehole completed at 30.00m bgl.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Open Hole Borehole No.

RO110

Sheet 1 of 2

PROJECT NO:	C5980	**CO-ORDS:**	347248E, 390217N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	43.71m OD
CLIENT:	UNITED LIVING	**DATES:**	28/01/25

Hole Type	Scale	Logged	Checked
RO	1:50	DR / MAS	PH

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
					0.30	43.41		TOPSOIL: Grass over brown slightly gravelly clay with frequent roots. Gravel is sub-angular to sub-rounded fine to coarse of mudstone. Brown CLAY [Drillers' description].
					2.90	40.81		MUDSTONE [Drillers' description].
					8.20	35.51		Soft drilling [Drillers' description].

1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0 10.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit excavation to 1.20m bgl.
3. Groundwater not encountered.
4. Borehole terminated at 12.50m bgl due to collapse.
5. No installation.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Open Hole Borehole No.

RO110

Sheet 2 of 2

PROJECT NO:	C5980	**CO-ORDS:**	347248E, 390217N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	43.71m OD
CLIENT:	UNITED LIVING	**DATES:**	28/01/25

Hole Type	Scale	Logged	Checked
RO	1:50	DR / MAS	PH

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
		Depth (m)	Type	Results				
					10.50	33.21		Solid drilling [Drillers' description].
					12.50	31.21		End of Borehole at 12.50m

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit excavation to 1.20m bgl.
3. Groundwater not encountered.
4. Borehole terminated at 12.50m bgl due to collapse.
5. No installation.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Open Hole Borehole No.

RO111

Sheet 1 of 3

PROJECT NO:	C5980	**CO-ORDS:**	347329E, 390225N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	44.50m OD
CLIENT:	UNITED LIVING	**DATES:**	28/01/25

Hole Type	Scale	Logged	Checked
RO	1:50	DR / MAS	PH

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
					0.30	44.20		TOPSOIL: Grass over brown slightly gravelly clay with frequent roots. Gravel is sub-angular to sub-rounded fine to coarse of mudstone and coal. Brown CLAY [Drillers' description]
					2.80	41.70		MUDSTONE [Drillers' description].
					8.00	36.50		COAL [Drillers' description].
					9.30	35.20		MUDSTONE [Drillers' description].

1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0 10.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit excavation to 1.20m bgl.
3. Groundwater not encountered.
4. Borehole sides stable.
5. Borehole completed at 30.00m bgl.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Open Hole Borehole No.

RO111

Sheet 2 of 3

PROJECT NO:	C5980	**CO-ORDS:**	347329E, 390225N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	44.50m OD
CLIENT:	UNITED LIVING	**DATES:**	28/01/25

Hole Type	Scale	Logged	Checked
RO	1:50	DR / MAS	PH

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
					16.50	28.00		COAL [Drillers' description].
					17.80	26.70		MUDSTONE [Drillers' description].

11.0
12.0
13.0
14.0
15.0
16.0
17.0
18.0
19.0
20.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit excavation to 1.20m bgl.
3. Groundwater not encountered.
4. Borehole sides stable.
5. Borehole completed at 30.00m bgl.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Open Hole Borehole No.

RO111

Sheet 3 of 3

PROJECT NO:	C5980	**CO-ORDS:**	347329E, 390225N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	44.50m OD
CLIENT:	UNITED LIVING	**DATES:**	28/01/25

Hole Type	Scale	Logged	Checked
RO	1:50	DR / MAS	PH

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
					24.30	20.20		SILTSTONE [Drillers' description].
					26.40	18.10		MUDSTONE [Drillers' description].
					30.00	14.50		End of Borehole at 30.00m

21.0
22.0
23.0
24.0
25.0
26.0
27.0
28.0
29.0
30.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit excavation to 1.20m bgl.
3. Groundwater not encountered.
4. Borehole sides stable.
5. Borehole completed at 30.00m bgl.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Open Hole Borehole No.

RO112

Sheet 1 of 3

PROJECT NO:	C5980	**CO-ORDS:**	347170E, 390135N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	44.47m OD
CLIENT:	UNITED LIVING	**DATES:**	30/01/25

Hole Type	Scale	Logged	Checked
RO	1:50	GL / MAS	PH

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
					0.70	43.77		TOPSOIL: Grass over brown slightly gravelly clay with frequent roots. Gravel is sub-angular to sub-rounded fine to coarse of sandstone and coal.
					2.60	41.87		Brown sandy CLAY [Drillers' description].
					2.80	41.67		Black SHALE [Drillers' description].
								Grey MUDSTONE [Drillers' description].

1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit excavation to 1.20m bgl.
3. Groundwater not encountered.
4. Borehole sides stable.
5. Borehole completed at 30.00m bgl.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Open Hole Borehole No.

RO112

Sheet 2 of 3

PROJECT NO:	C5980	**CO-ORDS:**	347170E, 390135N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	44.47m OD
CLIENT:	UNITED LIVING	**DATES:**	30/01/25

Hole Type	Scale	Logged	Checked
RO	1:50	GL / MAS	PH

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
		Depth (m)	Type	Results				
					17.30	27.17		Black SHALE with coal trace [Drillers' description].
					18.40	26.07		Grey SILTSTONE [Drillers' description].

11.0
12.0
13.0
14.0
15.0
16.0
17.0
18.0
19.0
20.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit excavation to 1.20m bgl.
3. Groundwater not encountered.
4. Borehole sides stable.
5. Borehole completed at 30.00m bgl.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Open Hole Borehole No.

RO112

Sheet 3 of 3

PROJECT NO:	C5980	**CO-ORDS:**	347170E, 390135N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	44.47m OD
CLIENT:	UNITED LIVING	**DATES:**	30/01/25

Hole Type	Scale	Logged	Checked
RO	1:50	GL / MAS	PH

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
					20.30	24.17		Grey silty MUDSTONE [Drillers' description].
					21.80	22.67		COAL [Drillers' description].
					23.50	20.97		Grey silty MUDSTONE [Drillers' description].
					30.00	14.47		End of Borehole at 30.00m

21.0 22.0 23.0 24.0 25.0 26.0 27.0 28.0 29.0 30.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit excavation to 1.20m bgl.
3. Groundwater not encountered.
4. Borehole sides stable.
5. Borehole completed at 30.00m bgl.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Open Hole Borehole No.

RO113

Sheet 1 of 3

PROJECT NO:	C5980	**CO-ORDS:**	347228E, 390156N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	43.90m OD
CLIENT:	UNITED LIVING	**DATES:**	30/01/25

Hole Type	Scale	Logged	Checked
RO	1:50	GL / MAS	PH

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.40	43.50		MADE GROUND TOPSOIL: Grass over firm brown slightly gravelly clay with frequent roots. Gravel is sub-angular to sub-rounded fine to coarse of brick, sandstone, and coal.
					0.80	43.10		Brown SAND [Drillers' description].
								Very soft brown SANDSTONE [Drillers' description].
					3.30	40.60		SANDSTONE [Drillers' description].

1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit excavation to 1.20m bgl.
3. Groundwater not encountered.
4. Borehole sides stable.
5. Borehole terminated at 24.00m bgl due to solid drilling.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Open Hole Borehole No.

RO113

Sheet 2 of 3

PROJECT NO:	C5980	**CO-ORDS:**	347228E, 390156N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	43.90m OD
CLIENT:	UNITED LIVING	**DATES:**	30/01/25

Hole Type	Scale	Logged	Checked
RO	1:50	GL / MAS	PH

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
					13.10	30.80		MUDSTONE [Drillers' description].
					17.10	26.80		BROKEN GROUND [Drillers' description].
					18.80	25.10		Soft drilling [Drillers' description].
					19.40	24.50		Solid drilling [Drillers' description].

11.0
12.0
13.0
14.0
15.0
16.0
17.0
18.0
19.0
20.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit excavation to 1.20m bgl.
3. Groundwater not encountered.
4. Borehole sides stable.
5. Borehole terminated at 24.00m bgl due to solid drilling.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Open Hole Borehole No.

RO113

Sheet 3 of 3

PROJECT NO:	C5980	**CO-ORDS:**	347228E, 390156N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	43.90m OD
CLIENT:	UNITED LIVING	**DATES:**	30/01/25

Hole Type	Scale	Logged	Checked
RO	1:50	GL / MAS	PH

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
		Depth (m)	Type	Results				
					24.00	19.90		End of Borehole at 24.00m

21.0
22.0
23.0
24.0
25.0
26.0
27.0
28.0
29.0
30.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit excavation to 1.20m bgl.
3. Groundwater not encountered.
4. Borehole sides stable.
5. Borehole terminated at 24.00m bgl due to solid drilling.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Open Hole Borehole No.

RO114

Sheet 1 of 2

PROJECT NO:	C5980	**CO-ORDS:**	347280E, 390178N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	44.40m OD
CLIENT:	UNITED LIVING	**DATES:**	30/01/25

Hole Type	Scale	Logged	Checked
RO	1:50	GL / MAS	PH

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
					0.40	44.00		TOPSOIL: Grass over brown slightly gravelly clay with frequent roots. Gravel is sub-angular to sub-rounded fine to coarse of mudstone and coal.
					0.80	43.60		Black CLAY [Drillers' description].
					2.10	42.30		COAL [Drillers' desciption].
					4.90	39.50		Grey MUDSTONE [Drillers' description].
					9.30	35.10		Very soft MUDSTONE [Drillers' description].
								BROKEN GROUND [Drillers' description].

1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit excavation to 1.20m bgl.
3. Groundwater not encountered.
4. Borehole sides stable.
5. Borehole terminated at 15.00m bgl due to solid drilling.
6. Installation to 9.00m bgl: 5.00m plain 50mm PVC, 4.00m slotted PVC pipe.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Open Hole Borehole No.

RO114

Sheet 2 of 2

PROJECT NO:	C5980	**CO-ORDS:**	347280E, 390178N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	44.40m OD
CLIENT:	UNITED LIVING	**DATES:**	30/01/25

Hole Type	Scale	Logged	Checked
RO	1:50	GL / MAS	PH

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
					11.00	33.40		Solid drilling [Drillers' description].
					15.00	29.40		End of Borehole at 15.00m

11.0
12.0
13.0
14.0
15.0
16.0
17.0
18.0
19.0
20.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit excavation to 1.20m bgl.
3. Groundwater not encountered.
4. Borehole sides stable.
5. Borehole terminated at 15.00m bgl due to solid drilling.
6. Installation to 9.00m bgl: 5.00m plain 50mm PVC, 4.00m slotted PVC pipe.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Open Hole Borehole No.

RO115

Sheet 1 of 3

PROJECT NO:	C5980	**CO-ORDS:**	347334E, 390159N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	44.92m OD
CLIENT:	UNITED LIVING	**DATES:**	30/01/25

Hole Type	Scale	Logged	Checked
RO	1:50	GL / MAS	PH

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
					0.40	44.52		TOPSOIL: Grass over brown slightly gravelly clay with frequent roots. Gravel is sub-angular to sub-rounded fine to coarse of mudstone and coal. Brown sandy CLAY [Drillers' description].
					2.60	42.32		Grey MUDSTONE [Drillers' description].
					6.30	38.62		Black MUDSTONE [Drillers' description].
					8.90	36.02		Grey MUDSTONE [Drillers' description].

1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0 10.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit excavation to 1.20m bgl.
3. Groundwater not encountered.
4. Borehole sides stable.
5. Borehole completed at 30.00m bgl.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Open Hole Borehole No.

RO115

Sheet 2 of 3

PROJECT NO:	C5980	**CO-ORDS:**	347334E, 390159N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	44.92m OD
CLIENT:	UNITED LIVING	**DATES:**	30/01/25

Hole Type	Scale	Logged	Checked
RO	1:50	GL / MAS	PH

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
		Depth (m)	Type	Results				
					13.30	31.62		COAL [Drillers' description].
					14.80	30.12		Grey MUDSTONE [Drillers' description].

11.0
12.0
13.0
14.0
15.0
16.0
17.0
18.0
19.0
20.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit excavation to 1.20m bgl.
3. Groundwater not encountered.
4. Borehole sides stable.
5. Borehole completed at 30.00m bgl.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Open Hole Borehole No.

RO115

Sheet 3 of 3

PROJECT NO:	C5980	**CO-ORDS:**	347334E, 390159N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	44.92m OD
CLIENT:	UNITED LIVING	**DATES:**	30/01/25

Hole Type	Scale	Logged	Checked
RO	1:50	GL / MAS	PH

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
					26.00	18.92		BROKEN GROUND [Drillers' description].
					27.30	17.62		Solid drilling [Drillers' description].
					30.00	14.92		End of Borehole at 30.00m

21.0 22.0 23.0 24.0 25.0 26.0 27.0 28.0 29.0 30.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit excavation to 1.20m bgl.
3. Groundwater not encountered.
4. Borehole sides stable.
5. Borehole completed at 30.00m bgl.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Trial Pit Log

No.
SA101
Sheet 1 of 1

PROJECT NO:	C5980	**CO-ORDS:**	347102E, 390198N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	43.49m OD
CLIENT:	UNITED LIVING	**DATES:**	29/01/25

Hole Type	Scale	Logged	Checked
TP	1:25	MAS	PH

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
							MADE GROUND TOPSOIL: Grass over greyish brown slightly gravelly slightly sandy clay with frequent roots. Sand is fine to coarse. Gravel is sub-angular to rounded fine to coarse of coal, brick, and mudstone.
				0.50	42.99		Soft brown slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is sub-angular to rounded fine to coarse of coal, quartz, and sandstone.
				0.80	42.69		Stiff reddish brown and grey slightly gravelly CLAY. Gravel is angular to sub-rounded fine to coarse of coal and sandstone.
				2.40	41.09		Weak orangish brown destructured SANDSTONE recovered as sandy GRAVEL. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of sandstone.
				3.00	40.49		End of Trial Pit at 3.00m

1.0
2.0
3.0
4.0
5.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. No groundwater encountered.
3. Trial pit excavated to 3.00m bgl.
4. Trial pit walls stable.
5. Soakaway infiltration test undertaken between 2.00 - 3.00m bgl.
6. Location backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Trial Pit Log

No.
SA102
Sheet 1 of 1

PROJECT NO:	C5980	**CO-ORDS:**	347178E, 390166N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	44.70m OD
CLIENT:	UNITED LIVING	**DATES:**	29/01/25

Hole Type	Scale	Logged	Checked
TP	1:25	MAS	PH

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
				0.40	44.30		TOPSOIL: Grass over firm brown slightly gravelly clay with frequent roots. Gravel is sub-angular to sub-rounded fine to coarse of sandstone and coal.
	0.60	HSV	60kPa	0.70	44.00		Firm orangish brown slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of coal and sandstone.
				1.30	43.40		Stiff orangish brown and grey gravelly slightly sandy CLAY with rare boulders. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of sandstone. Boulders are angular to sub-rounded of sandstone up to 300mm in diameter.
							End of Trial Pit at 1.30m

1.0
2.0
3.0
4.0
5.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. No groundwater encountered.
3. Trial pit excavated to 1.30m bgl.
4. Trial pit walls stable.
5. Soakaway infiltration test undertaken between 0.48 - 1.30m bgl.
6. Location backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Trial Pit Log

No.
TP101
Sheet 1 of 1

PROJECT NO:	C5980	**CO-ORDS:**	347018E, 390450N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	42.65m OD
CLIENT:	UNITED LIVING	**DATES:**	31/01/25

Hole Type	Scale	Logged	Checked
TP	1:25	MAS	PH

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.10-0.40	ES					TOPSOIL: Grass over stiff brown slightly gravelly clay with frequent roots. Gravel is sub-angular to sub-rounded fine to coarse of mudstone and coal.
	0.20	HSV	85kPa				
	0.40-2.10	D		0.40	42.25		Very stiff orangish brown and grey slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of mudstone and coal.
	0.80	HSV	140kPa				
				2.10	40.55		End of Trial Pit at 2.10m

1.0
2.0
3.0
4.0
5.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. No groundwater encountered.
3. Trial pit excavated to 2.10m bgl due to reaching target depth.
4. Trial pit walls stable.
5. Location backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Trial Pit Log

No.
TP102
Sheet 1 of 1

PROJECT NO:	C5980	**CO-ORDS:**	347019E, 390405N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	42.29m OD
CLIENT:	UNITED LIVING	**DATES:**	31/01/25

Hole Type	Scale	Logged	Checked
TP	1:25	MAS	PH

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.10-0.30	ES					TOPSOIL: Grass over firm brown slightly gravelly clay with frequent roots. Gravel is sub-angular to sub-rounded fine to coarse of sandstone and coal.
	0.20	HSV	60kPa				
	0.30-2.00	ES		0.30	41.99		Firm orangish brown and grey slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of mudstone, sandstone, and coal.
	0.70	HSV	140kPa				*0.70m bgl: Becoming very stiff.*
	1.50	HSV	140kPa				
	2.00	D		2.00	40.29		End of Trial Pit at 2.00m
		HSV	140kPa				

1.0
2.0
3.0
4.0
5.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. No groundwater encountered.
3. Trial pit excavated to 2.00m bgl due to reaching target depth.
4. Trial pit walls stable.
5. Location backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Trial Pit Log

No.
TP103
Sheet 1 of 1

PROJECT NO:	C5980	**CO-ORDS:**	347101E, 390284N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	42.37m OD
CLIENT:	UNITED LIVING	**DATES:**	31/01/25

Hole Type	Scale	Logged	Checked
TP	1:25	MAS	PH

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.10-0.60	ES					TOPSOIL: Grass over firm brown slightly gravelly clay with frequent roots. Gravel is sub-angular to sub-rounded fine to coarse of mudstone and coal.
	0.20	HSV	60kPa				
	0.60-1.80	ES		0.60	41.77		Very stiff orangish brown and grey slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of mudstone and coal.
	0.70	HSV	140kPa				
	1.50	HSV	140kPa				
	1.80-2.00	D		1.80	40.57		Weak grey destructured MUDSTONE recovered as slightly clayey GRAVEL. Gravel is angular to sub-rounded fine to coarse of mudstone.
▼				2.10	40.27		End of Trial Pit at 2.10m

1.0
2.0
3.0
4.0
5.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Groundwater encountered at 2.00m bgl with small seepage.
3. Trial pit excavated to 2.10m bgl due to reaching target depth.
4. Trial pit walls stable.
5. Location backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Trial Pit Log

No.
TP106
Sheet 1 of 1

PROJECT NO:	C5980	**CO-ORDS:**	347077E, 390375N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	41.62m OD
CLIENT:	UNITED LIVING	**DATES:**	31/01/25

Hole Type	Scale	Logged	Checked
TP	1:25	MAS	PH

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.10-0.50	ES					MADE GROUND TOPSOIL: Grass over brown slightly gravelly sandy clay. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of brick and mudstone. Rare metal fragments up to 300mm in diameter.
	0.20	HSV	90kPa				
	0.50-2.30	D		0.50	41.12		Stiff orangish brown and grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of mudstone and quartz.
	0.80	HSV	100kPa				*0.70m bgl: Becoming very stiff.*
	1.70	HSV	140kPa				
	2.30	HSV	140kPa	2.30	39.32		End of Trial Pit at 2.30m

1.0
2.0
3.0
4.0
5.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. No groundwater encountered.
3. Trial pit excavated to 2.30m bgl due to reaching target depth.
4. Trial pit walls stable.
5. Location backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Trial Pit Log

No.
TP107
Sheet 1 of 1

PROJECT NO:	C5980	**CO-ORDS:**	347080E, 390338N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	41.47m OD
CLIENT:	UNITED LIVING	**DATES:**	31/01/25

Hole Type	Scale	Logged	Checked
TP	1:25	MAS	PH

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.10-0.30	ES					MADE GROUND TOPSOIL: Grass over brown slightly gravelly sandy clay. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of brick, shale, coal, ceramic, and mudstone.
	0.20	HSV	35kPa				
	0.30-0.70	ES		0.30	41.17		*0.20m bgl: Brick cobbles encountered. Cobbles are sub-angular to sub-rounded up to 200mm in diameter.*
	0.70-2.10	D		0.70	40.77		MADE GROUND: Light orangish brown slightly gravelly slightly sandy clay. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of brick, shale, ceramic, coal, and plastic.
	0.80	HSV	140kPa				*0.30 - 0.70m bgl: Rare brick cobbles encountered. Cobbles are sub-angular to rounded fine to coarse up to 200mm in diameter.*
▼	1.50	HSV	140kPa				MADE GROUND: Orangish brown and grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of coal, brick, sandstone, ceramic, and shale.
							1.90m bgl: Bricks and glass bottle encountered.
				2.10	39.37		End of Trial Pit at 2.10m

1.0
2.0
3.0
4.0
5.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Groundwater encountered at 1.60m bgl with small seepage.
3. Trial pit excavated to 2.10m bgl due to reaching target depth.
4. Trial pit walls stable.
5. Location backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Trial Pit Log

No.
TP108
Sheet 1 of 1

PROJECT NO:	C5980	**CO-ORDS:**	347109E, 390331N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	41.17m OD
CLIENT:	UNITED LIVING	**DATES:**	31/01/25

Hole Type	Scale	Logged	Checked
TP	1:25	MAS	PH

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.10-0.40	ES					MADE GROUND TOPSOIL: Grass over brown slightly gravelly sandy clay. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of brick and coal.
	0.30	HSV	60kPa				
	0.40-1.90	D		0.40	40.77		Very stiff brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of coal.
	0.60	HSV	140kPa				*0.70m bgl: Coal cobbles encountered. Cobbles are angular to sub-rounded up to 200mm in diameter.*
	1.00	HSV	140kPa				
	1.70	HSV	140kPa				
	1.90	D		1.90	39.27		End of Trial Pit at 1.90m

1.0
2.0
3.0
4.0
5.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. No groundwater encountered.
3. Trial pit excavated to 1.90m bgl due to reaching target depth.
4. Trial pit walls stable.
5. Location backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Trial Pit Log

No.
TP109
Sheet 1 of 1

PROJECT NO:	C5980	**CO-ORDS:**	347225E, 390187N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	43.78m OD
CLIENT:	UNITED LIVING	**DATES:**	29/01/25

Hole Type	Scale	Logged	Checked
TP	1:25	MAS	PH

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.10-0.40	ES					TOPSOIL: Grass over brown slightly gravelly clay with frequent roots. Gravel is sub-angular to sub-rounded fine to coarse of sandstone and coal.
	0.40-1.60	ES		0.40	43.38		Yellowish brown gravelly slightly clayey SAND. Sand is fine to coarse. Gravel is sub-angular to rounded fine to coarse of sandstone.
	1.60-2.40	D		1.60	42.18		Weak yellowish brown destructured SANDSTONE recovered as slightly sandy slightly clayey COBBLES with moderate gravel content. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of sandstone. Cobbles are angular to sub-rounded of sandstone up to 200mm in diameter. *2.00m bgl: Sandstone boulder encountered. Boulder is sub-angular up to 400mm in diameter.*
				2.40	41.38		End of Trial Pit at 2.40m

1.0
2.0
3.0
4.0
5.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. No groundwater encountered.
3. Trial pit excavated to 2.40m bgl due to solid ground conditions.
4. Trial pit walls stable.
5. Location backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Trial Pit Log

No.
TP111
Sheet 1 of 1

PROJECT NO:	C5980	**CO-ORDS:**	347096E, 390272N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	42.94m OD
CLIENT:	UNITED LIVING	**DATES:**	31/01/25

Hole Type	Scale	Logged	Checked
TP	1:25	MAS	PH

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.10-0.50	ES					MADE GROUND TOPSOIL: Grass over brown slightly gravelly clay with frequent roots. Gravel is sub-angular to sub-rounded fine to coarse of brick, mudstone, shale, and coal.
	0.20	HSV	55kPa				*0.10 - 0.20m bgl: Sandstone flagstones encountered.* *0.10 - 0.20m bgl: Mudstone and brick cobbles encountered. Cobbles are sub-angular to rounded up to 200mm in diameter.*
	0.50-2.10	D		0.50	42.44		Very stiff yellowish brown and grey slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of coal.
	0.60	HSV	140kPa				
	1.00	HSV	140kPa				
	2.00	HSV	140kPa				
				2.10	40.84		End of Trial Pit at 2.10m

1.0
2.0
3.0
4.0
5.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. No groundwater encountered.
3. Trial pit excavated to 2.10m bgl due to reaching target depth.
4. Trial pit walls stable.
5. Location backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Trial Pit Log

No.
TP112
Sheet 1 of 1

PROJECT NO:	C5980	**CO-ORDS:**	347180E, 390254N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	42.67m OD
CLIENT:	UNITED LIVING	**DATES:**	28/01/25

Hole Type	Scale	Logged	Checked
TP	1:25	MAS	PH

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.10-0.30	ES					TOPSOIL: Grass over stiff brown slightly gravelly clay with frequent roots. Gravel is sub-angular to sub-rounded fine to coarse of sandstone and coal.
	0.20	HSV	130kPa				
	0.30-0.70	ES		0.30	42.37		Stiff reddish brown and dark brown slightly gravelly CLAY. Gravel is angular to sub-rounded fine to coarse of coal, sandstone, and mudstone.
	0.40	HSV	80kPa				
				0.70	41.97		Stiff orangish brown and grey slightly sandy CLAY. Sand is fine to coarse.
	1.20	HSV	140kPa				*1.20m bgl: Becoming very stiff.*
	1.90-2.70	D		1.90	40.77		Weak orangish brown destructured SANDSTONE recovered as sandy GRAVEL. Sand is fine to medium. Gravel is angular to sub-rounded fine to coarse of sandstone.
				2.70	39.97		End of Trial Pit at 2.70m

1.0
2.0
3.0
4.0
5.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. No groundwater encountered.
3. Trial pit excavated to 2.70m bgl due to solid ground conditions.
4. Trial pit walls stable.
5. Location backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Trial Pit Log

No.
TP113
Sheet 1 of 1

PROJECT NO:	C5980	**CO-ORDS:**	347210E, 390261N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	42.00m OD
CLIENT:	UNITED LIVING	**DATES:**	30/01/25

Hole Type	Scale	Logged	Checked
TP	1:25	MAS	PH

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.10-0.30	ES					TOPSOIL: Grass over brown slightly gravelly clay with frequent roots. Gravel is sub-angular to sub-rounded fine to coarse of sandstone and coal.
	0.30-0.60	ES		0.30	41.70		
	0.50	HSV	120kPa				Stiff greyish brown slightly gravelly slightly sandy CLAY with frequent roots. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of mudstone.
	0.60-2.30	D		0.60	41.40		
	1.00	HSV	140kPa				Stiff reddish brown slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is sub-angular to rounded fine to coarse of mudstone and coal.
							1.00m bgl: Becoming very stiff.
▼							*1.70m bgl: Coal and mudstone boulders encountered. Boulders are sub-angular to sub-rounded up to 300mm in diameter.*
	2.00	HSV	140kPa				
	2.30-3.30	D		2.30	39.70		Weak grey destructured MUDSTONE recovered as clayey GRAVEL with moderate cobble content. Gravel is angular to sub-rounded fine to coarse of mudstone. Cobbles are angular to sub-rounded of mudstone up to 200mm in diameter.
				3.30	38.70		End of Trial Pit at 3.30m

1.0
2.0
3.0
4.0
5.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Groundwater encountered at 1.80m bgl with medium seepage.
3. Trial pit excavated to 3.30m bgl due to solid ground conditions.
4. Trial pit walls stable.
5. Location backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Trial Pit Log

No.
TP115
Sheet 1 of 1

PROJECT NO:	C5980	**CO-ORDS:**	347273E, 390270N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	42.78m OD
CLIENT:	UNITED LIVING	**DATES:**	31/01/25

Hole Type	Scale	Logged	Checked
TP	1:25	MAS	PH

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.10-0.50	ES					TOPSOIL: Grass over firm brown slightly gravelly clay with frequent roots. Gravel is sub-angular to sub-rounded fine to coarse of sandstone and coal.
	0.30	HSV	65kPa				
	0.50-2.10	D		0.50	42.28		Stiff orangish brown and grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of sandstone and coal.
	0.70	HSV	140kPa				
	1.20	HSV	140kPa				
	2.10	HSV	140kPa	2.10	40.67		End of Trial Pit at 2.10m

1.0
2.0
3.0
4.0
5.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. No groundwater encountered.
3. Trial pit excavated to 2.10m bgl due to reaching target depth.
4. Trial pit walls stable.
5. Location backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Trial Pit Log

No.
TP117
Sheet 1 of 1

PROJECT NO:	C5980	**CO-ORDS:**	347343E, 390274N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	44.70m OD
CLIENT:	UNITED LIVING	**DATES:**	31/01/25

Hole Type	Scale	Logged	Checked
TP	1:25	MAS	PH

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.10-0.40	ES					TOPSOIL: Grass over firm brown slightly gravelly clay with frequent roots. Gravel is sub-angular to sub-rounded fine to coarse of mudstone and coal.
	0.30	HSV	65kPa				
	0.40-1.60	D		0.40	44.30		
	0.50	HSV	140kPa				Very stiff orangish brown and grey slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of coal.
	1.00	HSV	140kPa				
	1.50	HSV	140kPa				
	1.60-2.00	D		1.60	43.10		
	1.70	HSV	140kPa				Very stiff blackish grey gravelly CLAY. Gravel is angular to sub-rounded fine to coarse of coal.
				2.00	42.70		End of Trial Pit at 2.00m

1.0
2.0
3.0
4.0
5.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. No groundwater encountered.
3. Trial pit excavated to 2.00m bgl due to reaching target depth.
4. Trial pit walls stable.
5. Location backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Trial Pit Log

No.
TP118
Sheet 1 of 1

PROJECT NO:	C5980	**CO-ORDS:**	347132E, 390234N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	43.36m OD
CLIENT:	UNITED LIVING	**DATES:**	29/01/25

Hole Type	Scale	Logged	Checked
TP	1:25	MAS	PH

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.10-0.40	ES					TOPSOIL: Grass over stiff brown slightly gravelly clay with frequent roots. Gravel is sub-angular to sub-rounded fine to coarse of sandstone and coal.
	0.30	HSV	100kPa				
	0.40-0.60	ES		0.40	42.96		
	0.50	HSV	140kPa				Very stiff orangish brown slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of coal and sandstone.
	0.60-1.50	D		0.60	42.76		Very stiff orangish brown and grey slightly sandy CLAY. Sand is fine to coarse.
	1.50-1.90	D		1.50	41.86		Very stiff orangish brown and grey gravelly slightly sandy CLAY with rare boulders. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of sandstone. Boulders are angular to sub-rounded of sandstone up to 300mm in diameter.
				1.90	41.46		End of Trial Pit at 1.90m

1.0
2.0
3.0
4.0
5.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. No groundwater encountered.
3. Trial pit excavated to 1.90m bgl due to reaching target depth.
4. Trial pit walls stable.
5. Location backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Trial Pit Log

No.
TP119
Sheet 1 of 1

PROJECT NO:	C5980	**CO-ORDS:**	347165E, 390217N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	43.25m OD
CLIENT:	UNITED LIVING	**DATES:**	28/01/25

Hole Type	Scale	Logged	Checked
TP	1:25	MAS	PH

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.20	HSV	90kPa				TOPSOIL: Grass over stiff brown slightly gravelly clay with frequent roots. Gravel is sub-angular to sub-rounded fine to coarse of sandstone and coal.
	0.30-0.50	ES		0.30	42.95		Very stiff orangish brown slightly gravelly CLAY. Gravel is angular to sub-rounded fine to coarse of coal and sandstone.
	0.40	HSV	140kPa				
	0.50-1.60	D		0.50	42.75		Very stiff orangish brown and grey slightly sandy CLAY. Sand is fine to coarse.
	1.00	HSV	140kPa				
				1.60	41.65		Weak orangish brown destructured SANDSTONE recovered as sandy GRAVEL with rare cobbles. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of sandstone. Cobbles are sub-angular to sub-rounded of sandstone up to 200mm in diameter.
				2.00	41.25		End of Trial Pit at 2.00m

1.0
2.0
3.0
4.0
5.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. No groundwater encountered.
3. Trial pit excavated to 2.00m bgl due to reaching target depth.
4. Trial pit walls stable.
5. Location backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Trial Pit Log

No.
TP120
Sheet 1 of 1

PROJECT NO:	C5980	**CO-ORDS:**	347214E, 390229N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	43.08m OD
CLIENT:	UNITED LIVING	**DATES:**	30/01/25

Hole Type	Scale	Logged	Checked
TP	1:25	MAS	PH

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.10-0.40	ES					TOPSOIL: Grass over firm brown slightly gravelly clay with frequent roots. Gravel is sub-angular to sub-rounded fine to coarse of mudstone and coal.
	0.30	HSV	75kPa				
	0.40-2.00	ES		0.40	42.68		Very stiff orangish brown slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of coal and mudstone.
	0.70	HSV	140kPa				
	1.50	HSV	140kPa				
	2.00-2.50	D		2.00	41.08		Very stiff orangish brown and grey slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of mudstone and coal.
	2.60	HSV	140kPa	2.50	40.58		Very stiff orangish brown slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of coal and mudstone.
	2.90-3.50	D		2.70	40.38		Very stiff black gravelly CLAY. Gravel is angular to sub-rounded fine to coarse of coal, sandstone, and mudstone.
				2.90	40.18		Very stiff grey very gravelly CLAY. Gravel is angular to sub-rounded fine to coarse of mudstone.
				3.50	39.58		End of Trial Pit at 3.50m

1.0
2.0
3.0
4.0
5.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Running sands encountered at 1.60m bgl. No other groundwater encountered.
3. Trial pit excavated to 3.50m bgl due to solid ground conditions.
4. Trial pit walls stable.
5. Location backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Trial Pit Log

No.
TP121
Sheet 1 of 1

PROJECT NO:	C5980	**CO-ORDS:**	347248E, 390242N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	42.76m OD
CLIENT:	UNITED LIVING	**DATES:**	30/01/25

Hole Type	Scale	Logged	Checked
TP	1:25	MAS	PH

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.10-0.50	ES					MADE GROUND TOPSOIL: Grass over brown slightly gravelly clay with frequent roots. Gravel is sub-angular to sub-rounded fine to coarse of brick.
	0.30	HSV	35kPa				
	0.50-2.50	D		0.50	42.26		Stiff orangish brown and grey slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of coal, mudstone, and sandstone.
	0.90	HSV	140kPa				*0.90m bgl: Becoming very stiff.*
	2.00	HSV	140kPa				
	2.50-3.90	D		2.50	40.26		Black non-intact bituminous COAL. *2.60 - 3.50m bgl: Very stiff grey gravelly clay pockets encountered. Gravel is angular to sub-rounded fine to coarse of coal.* *3.50m bgl: Coal cobbles encountered. Cobbles are angular to sub-rounded up to 200mm in diameter.*
▼	3.90-4.00	D		3.90	38.86		
				4.00	38.76		Very weak grey destructured MUDSTONE with interbedded coal recovered as GRAVEL. Gravel is angular to sub-rounded fine to coarse of mudstone and coal. End of Trial Pit at 4.00m

1.0
2.0
3.0
4.0
5.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Groundwater encountered at 3.90m bgl with small seepage.
3. Trial pit excavated to 4.00m bgl due to solid ground conditions.
4. Trial pit walls stable.
5. Location backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Trial Pit Log

No.
TP122
Sheet 1 of 1

PROJECT NO:	C5980	**CO-ORDS:**	347281E, 390235N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	42.97m OD
CLIENT:	UNITED LIVING	**DATES:**	30/01/25

Hole Type	Scale	Logged	Checked
TP	1:25	MAS	PH

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.10-0.40	ES					TOPSOIL: Grass over soft brown slightly gravelly clay with frequent roots. Gravel is sub-angular to sub-rounded fine to coarse of mudstone and coal.
	0.30	HSV	40kPa				
	0.40-0.60	ES		0.40	42.57		Stiff greyish orange slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of mudstone and coal.
	0.50	HSV	130kPa				
	0.60-2.20	D		0.60	42.37		Very stiff reddish brown slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of mudstone and coal.
	0.80	HSV	140kPa				
	1.50	HSV	140kPa				
	2.20-3.30	D		2.20	40.77		Stiff grey very gravelly CLAY. Gravel is angular to sub-rounded fine to coarse of mudstone.
				3.30	39.67		End of Trial Pit at 3.30m

1.0
2.0
3.0
4.0
5.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. No groundwater encountered.
3. Trial pit excavated to 3.30m bgl due to solid ground conditions.
4. Trial pit walls stable.
5. Location backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Trial Pit Log

No.
TP124
Sheet 1 of 1

PROJECT NO:	C5980	**CO-ORDS:**	347339E, 390245N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	43.96m OD
CLIENT:	UNITED LIVING	**DATES:**	31/01/25

Hole Type	Scale	Logged	Checked
TP	1:25	MAS	PH

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.10-0.30	ES					TOPSOIL: Grass over firm brown slightly gravelly clay with frequent roots. Gravel is sub-angular to sub-rounded fine to coarse of mudstone and coal.
	0.20	HSV	70kPa				
	0.30-1.60	D		0.30	43.66		Orangish brown and grey slightly gravelly slightly sandy CLAY with pockets of destructured coal. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of coal.
	0.60	HSV	140kPa				
	0.90	HSV	140kPa				
	1.50	HSV	140kPa				
	1.60-2.00	D		1.60	42.36		Very weak grey destructured MUDSTONE recovered as slightly clayey GRAVEL. Gravel is angular to sub-rounded fine to coarse of mudstone.
				2.00	41.96		End of Trial Pit at 2.00m

1.0
2.0
3.0
4.0
5.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. No groundwater encountered.
3. Trial pit excavated to 2.00m bgl due to reaching target depth.
4. Trial pit walls stable.
5. Location backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Trial Pit Log

No.
TP125
Sheet 1 of 1

PROJECT NO:	C5980	**CO-ORDS:**	347109E, 390209N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	43.38m OD
CLIENT:	UNITED LIVING	**DATES:**	28/01/25

Hole Type	Scale	Logged	Checked
TP	1:25	MAS	PH

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.10-0.30	ES					MADE GROUND TOPSOIL: Grass over brown slightly gravelly clay with frequent roots. Gravel is sub-angular to sub-rounded fine to coarse of brick, sandstone, and coal.
	0.20	HSV	50kPa				
	0.30-0.90	ES		0.30	43.08		*0.30m bgl: Sandstone flagstones encountered in northern end of trial pit.*
▼	0.60	HSV	40kPa				Soft yellowish brown gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone, coal, and shale.
	0.90-2.30	D		0.90	42.48		
	1.00	HSV	140kPa				Very stiff brown slightly sandy CLAY with rare gravel. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of coal.
	2.00	HSV	140kPa				
	2.30-2.60	D		2.30	41.08		Very stiff orangish brown and grey slightly sandy CLAY. Sand is fine to coarse.
	2.60-2.80	D		2.60	40.78		Very weak orangish brown destructured SANDSTONE recovered as sandy GRAVEL. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.
				2.80	40.58		End of Trial Pit at 2.80m

1.0
2.0
3.0
4.0
5.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Groundwater encountered at 0.70m bgl with small seepage.
3. Trial pit excavated to 2.80m bgl due to solid ground conditions.
4. Trial pit walls stable.
5. Location backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Trial Pit Log

No.
TP126
Sheet 1 of 1

PROJECT NO:	C5980	**CO-ORDS:**	347155E, 390193N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	43.41m OD
CLIENT:	UNITED LIVING	**DATES:**	28/01/25

Hole Type	Scale	Logged	Checked
TP	1:25	MAS	PH

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.10-0.30	ES					TOPSOIL: Grass over firm brown slightly gravelly clay with frequent roots. Gravel is sub-angular to sub-rounded fine to coarse of sandstone and coal.
	0.20	HSV	50kPa				
	0.30-1.20	ES		0.30	43.11		Very stiff reddish brown slightly gravelly CLAY. Gravel is angular to sub-rounded fine to coarse of coal.
	0.50	HSV	140kPa				
				1.20	42.21		Very weak orangish brown destructured SANDSTONE recovered as very sandy GRAVEL. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.
	2.00-2.80	D					
				2.80	40.61		End of Trial Pit at 2.80m

1.0
2.0
3.0
4.0
5.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. No groundwater encountered.
3. Trial pit excavated to 2.80m bgl due to solid ground conditions.
4. Trial pit walls stable.
5. Location backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Trial Pit Log

No.
TP127
Sheet 1 of 1

PROJECT NO:	C5980	**CO-ORDS:**	347196E, 390181N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	43.24m OD
CLIENT:	UNITED LIVING	**DATES:**	29/01/25

Hole Type	Scale	Logged	Checked
TP	1:25	MAS	PH

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.10-0.50	ES					TOPSOIL: Grass over soft brown slightly gravelly clay with frequent roots. Gravel is sub-angular to sub-rounded fine to coarse of sandstone and coal.
	0.30	HSV	36kPa				
				0.50	42.74		Yellowish brown clayey SAND with rare cobbles. Sand is fine to coarse. Cobbles are sub-angular to sub-rounded of sandstone up to 200mm in diameter.
	0.90-2.15	D		0.90	42.34		Very weak orangish brown destructured SANDSTONE recovered as very sandy GRAVEL with low cobble content. Gravel is sub-angular to sub-rounded fine to coarse of sandstone. Cobbles are sub-angular to sub-rounded of sandstone up to 200mm in diameter.
				2.15	41.09		End of Trial Pit at 2.15m

1.0
2.0
3.0
4.0
5.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. No groundwater encountered.
3. Trial pit excavated to 2.15m bgl due to reaching target depth.
4. Trial pit walls stable.
5. Location backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Trial Pit Log

No.
TP128
Sheet 1 of 1

PROJECT NO:	C5980	**CO-ORDS:**	347197E, 390207N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	43.04m OD
CLIENT:	UNITED LIVING	**DATES:**	29/01/25

Hole Type	Scale	Logged	Checked
TP	1:25	MAS	PH

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.10-0.50	ES					TOPSOIL: Grass over brown slightly gravelly clay with frequent roots. Gravel is sub-angular to sub-rounded fine to coarse of sandstone and coal.
				0.50	42.54		
	0.70	HSV	36kPa				Firm orangish brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of coal and sandstone.
	0.80-1.40	D		0.80	42.24		Yellowish brown clayey SAND. Sand is fine to coarse.
				1.40	41.64		
	1.50-2.50	D					Very weak orangish brown destructured SANDSTONE recovered as very sandy GRAVEL with low cobble content. Gravel is sub-angular to sub-rounded fine to coarse of sandstone. Cobbles are sub-angular to sub-rounded of sandstone up to 200mm in diameter.
				2.50	40.54		End of Trial Pit at 2.50m

1.0
2.0
3.0
4.0
5.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. No groundwater encountered.
3. Trial pit excavated to 2.50m bgl due to solid ground conditions.
4. Trial pit walls stable.
5. Location backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Trial Pit Log

No.
TP129
Sheet 1 of 1

PROJECT NO:	C5980	**CO-ORDS:**	347284E, 390209N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	43.78m OD
CLIENT:	UNITED LIVING	**DATES:**	30/01/25

Hole Type	Scale	Logged	Checked
TP	1:25	MAS	PH

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.10-0.40	ES					TOPSOIL: Grass over soft brown slightly gravelly clay with frequent roots. Gravel is sub-angular to sub-rounded fine to coarse of mudstone.
	0.30	HSV	35kPa				
	0.40-0.60	D		0.40	43.38		Soft yellowish brown very sandy CLAY. Sand is fine to coarse.
	0.60-2.50	D		0.60	43.18		Very stiff reddish brown slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of mudstone and coal.
	0.60	HSV	140kPa				
	1.20	HSV	140kPa				
	2.00	HSV					
	2.50-3.50	D		2.50	41.28		Very stiff grey slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of coal.
	2.50	HSV	140kPa				
	3.50-3.70	D		3.50	40.28		Black non-intact bituminous COAL.
				3.70	40.08		End of Trial Pit at 3.70m

1.0
2.0
3.0
4.0
5.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Running sands encountered at 1.40m bgl. No other groundwater encountered.
3. Trial pit excavated to 3.70m bgl due to solid ground conditions.
4. Trial pit walls stable.
5. Location backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Trial Pit Log

No.
TP130
Sheet 1 of 1

PROJECT NO:	C5980	**CO-ORDS:**	347313E, 390199N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	44.49m OD
CLIENT:	UNITED LIVING	**DATES:**	30/01/25

Hole Type	Scale	Logged	Checked
TP	1:25	MAS	PH

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.10-0.40	ES					TOPSOIL: Grass over soft brown slightly gravelly clay with frequent roots. Gravel is sub-angular to sub-rounded fine to coarse of mudstone and coal.
	0.30	HSV	35kPa				
	0.40-2.30	D		0.40	44.09		Very stiff orangish brown and grey slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of coal.
	0.50	HSV	140kPa				
	1.00	HSV	130kPa				
	2.20	HSV	140kPa				
	2.30-2.60	D		2.30	42.19		Very weak grey destructured MUDSTONE recovered as slightly clayey GRAVEL. Gravel is angular to sub-rounded fine to coarse of mudstone. *2.30 - 2.50m bgl: With black angular to sub-rounded gravels of coal.* *2.50m bgl: Mudstone cobbles and boulders encountered. Cobbles are sub-angular to sub-rounded up to 200mm in diameter. Boulders are sub-angular to sub-rounded up to 300mm in diameter.*
				3.60	40.89		End of Trial Pit at 3.60m

1.0
2.0
3.0
4.0
5.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. No groundwater encountered.
3. Trial pit excavated to 3.60m bgl due to solid ground conditions.
4. Trial pit walls stable.
5. Location backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Trial Pit Log

No.
TP131
Sheet 1 of 1

PROJECT NO:	C5980	**CO-ORDS:**	347355E, 390177N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	44.50m OD
CLIENT:	UNITED LIVING	**DATES:**	30/01/25

Hole Type	Scale	Logged	Checked
TP	1:25	MAS	PH

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.10-0.40	ES					TOPSOIL: Grass over firm brown slightly gravelly clay with frequent roots. Gravel is sub-angular to sub-rounded fine to coarse of mudstone.
	0.30	HSV	60kPa				
	0.40-0.60	ES		0.40	44.10		Very stiff orangish brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of mudstone and coal.
	0.50	HSV	140kPa				
	0.60-1.60	D		0.60	43.90		Very stiff orangish brown and grey slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of coal.
	1.00	HSV	140kPa				
				1.60	42.90		Black non-intact bituminous COAL.
	1.90-3.00	D		1.90	42.60		Orangish brown and grey slightly gravelly slightly sandy CLAY with pockets of destructured coal. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of coal.
	3.00-3.50	D					
				3.50	41.00		End of Trial Pit at 3.50m

1.0
2.0
3.0
4.0
5.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. No groundwater encountered.
3. Trial pit excavated to 3.50m bgl due to solid ground conditions.
4. Trial pit walls stable.
5. Location backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Trial Pit Log

No.
TP132
Sheet 1 of 1

PROJECT NO:	C5980	**CO-ORDS:**	347108E, 390165N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	44.23m OD
CLIENT:	UNITED LIVING	**DATES:**	28/01/25

Hole Type	Scale	Logged	Checked
TP	1:25	MAS	PH

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.10-0.40	ES					MADE GROUND TOPSOIL: Grass over brown slightly gravelly slightly sandy clay with frequent roots. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of brick, mudstone, and quartz.
	0.30	HSV	140kPa				
	0.40-1.80	ES		0.40	43.83		Very stiff orangish brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of mudstone.
	0.50	HSV	140kPa				
	1.80-1.90	D		1.80	42.43		
	1.80	HSV	140kPa				Very stiff black very gravelly CLAY. Gravel is angular to sub-rounded of coal.
	1.90-2.10	D		1.90	42.33		Black non-intact bituminous COAL.
	2.10-3.00	D		2.10	42.13		*2.00 - 2.10m bgl: With grey angular to sub-rounded gravels of mudstone.*
							Very weak grey destructured MUDSTONE recovered as slightly sandy GRAVEL. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of mudstone.
				3.00	41.23		End of Trial Pit at 3.00m

1.0
2.0
3.0
4.0
5.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. No groundwater encountered.
3. Trial pit excavated to 3.00m bgl due to solid ground conditions.
4. Trial pit walls stable.
5. Location backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Trial Pit Log

No.
TP133
Sheet 1 of 1

PROJECT NO:	C5980	**CO-ORDS:**	347160E, 390155N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	43.85m OD
CLIENT:	UNITED LIVING	**DATES:**	28/01/25

Hole Type	Scale	Logged	Checked
TP	1:25	MAS	PH

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.10-0.30	ES					MADE GROUND TOPSOIL: Grass over brown slightly gravelly clay with frequent roots. Gravel is sub-angular to sub-rounded fine to coarse of brick, sandstone, and coal.
	0.20	HSV	50kPa				
	0.30-0.60	ES		0.30	43.55		Firm brown slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is sub-angular to rounded fine to coarse of coal, quartz, and sandstone.
	0.50	HSV	50kPa				
	0.60-1.90	D		0.60	43.25		Very stiff orangish brown and grey slightly sandy CLAY. Sand is fine to coarse.
	0.80	HSV	120kPa				
▼	2.00-2.70	D					*1.90m bgl: Becoming gravelly. Gravel is angular to sub-rounded fine to coarse of sandstone.*
							2.30m bgl: Becoming gravelly. Gravel is angular to sub-rounded of coal and sandstone.
				2.80	41.05		End of Trial Pit at 2.80m

1.0
2.0
3.0
4.0
5.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Groundwater encountered at 2.00m bgl with small seepage.
3. Trial pit excavated to 2.80m bgl due to solid ground conditions.
4. Trial pit walls stable.
5. Location backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Trial Pit Log

No.
TP134
Sheet 1 of 1

PROJECT NO:	C5980	**CO-ORDS:**	347238E, 390150N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	44.03m OD
CLIENT:	UNITED LIVING	**DATES:**	29/01/25

Hole Type	Scale	Logged	Checked
TP	1:25	MAS	PH

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.10-0.70	ES					TOPSOIL: Grass over stiff brown slightly gravelly clay with frequent roots. Gravel is sub-angular to sub-rounded fine to coarse of sandstone and coal.
	0.30	HSV	80kPa				
	0.70-2.00	D		0.70	43.33		Very stiff orangish brown and grey slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone and coal.
	2.00-2.60	D		2.00	42.03		Very weak orangish brown destructured SANDSTONE recovered as sandy GRAVEL with low cobble content. Gravel is sub-angular to sub-rounded fine to coarse of sandstone. Cobbles are sub-angular to sub-rounded of sandstone up to 200mm in diameter.
				2.60	41.43		End of Trial Pit at 2.60m

1.0
2.0
3.0
4.0
5.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. No groundwater encountered.
3. Trial pit excavated to 2.60m bgl due to solid ground conditions.
4. Trial pit walls stable.
5. Location backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Trial Pit Log

No.
TP135
Sheet 1 of 1

PROJECT NO:	C5980	**CO-ORDS:**	347277E, 390148N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	44.73m OD
CLIENT:	UNITED LIVING	**DATES:**	29/01/25

Hole Type	Scale	Logged	Checked
TP	1:25	MAS	PH

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.10-0.70	ES					MADE GROUND TOPSOIL: Grass over brown slightly gravelly clay with frequent roots. Gravel is sub-angular to sub-rounded fine to coarse of brick, sandstone, and coal.
	0.20	HSV	70kPa				
	0.70-1.00	ES		0.70	44.03		Very stiff brown slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of coal.
	0.80	HSV	136kPa				
	1.00-2.50	D		1.00	43.73		Black non-intact sub-bituminous COAL.
							1.60m bgl: Coal boulders encountered. Boulders are sub-angular to sub-rounded up to 500mm in diameter.
	1.80	HSV	140kPa				*1.80 - 2.00m bgl: Very stiff grey clay pockets encountered.*
	2.40	HSV	140kPa				*2.40 - 2.50m bgl: Very stiff brown clay pockets encountered.*
	2.50-2.70	D		2.50	42.23		Black non-intact bituminous COAL.
				2.70	42.03		End of Trial Pit at 2.70m

1.0
2.0
3.0
4.0
5.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. No groundwater encountered.
3. Trial pit excavated to 2.70m bgl due to solid ground conditions.
4. Trial pit walls stable.
5. Location backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Trial Pit Log

No.
TP136
Sheet 1 of 1

PROJECT NO:	C5980	**CO-ORDS:**	347340E, 390145N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	45.31m OD
CLIENT:	UNITED LIVING	**DATES:**	29/01/25

Hole Type	Scale	Logged	Checked
TP	1:25	MAS	PH

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.10-0.40	ES					MADE GROUND TOPSOIL: Grass over brown slightly gravelly clay with frequent roots. Gravel is sub-angular to sub-rounded fine to coarse of brick and coal.
	0.20	HSV	40kPa				
	0.40-0.70	ES		0.40	44.91		MADE GROUND: Brown slightly gravelly slightly sandy clay. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of brick and coal.
	0.60	HSV	140kPa				
	0.70-3.00	D		0.70	44.61		Very stiff orangish brown and brown slightly gravelly CLAY with pockets of destructured coal. Gravel is sub-angular to sub-rounded fine to coarse of coal, mudstone, and sandstone.
	1.00	HSV	140kPa				
	3.00-3.80	D		3.00	42.31		Very stiff grey gravelly CLAY. Gravel is angular to sub-rounded fine to coarse of mudstone.
				3.80	41.51		End of Trial Pit at 3.80m

1.0
2.0
3.0
4.0
5.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. No groundwater encountered.
3. Trial pit excavated to 3.80m bgl due to solid ground conditions.
4. Trial pit walls stable.
5. Location backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Window Sampler No.
WS101
Sheet 1 of 1

PROJECT NO:	C5980	**CO-ORDS:**	347047E, 390449N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	42.35m OD
CLIENT:	UNITED LIVING	**DATES:**	04/02/25

Hole Type	Scale	Logged	Checked
WS	1:30	MAS	PH

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.10-0.40	ES					TOPSOIL: Grass over firm brown slightly gravelly slightly sandy clay with frequent roots. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of sandstone and coal.
		0.30	HSV	60kPa				
		0.40-1.70	D		0.40	41.95		Soft orangish brown and grey slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of mudstone, sandstone, and coal.
		1.20	SPT	N=7 (1,1/2,1,2,2)				
					1.70	40.65		Soft reddish brown very sandy CLAY. Sand is fine to coarse.
		1.90-3.40	D		1.90	40.45		Firm brown slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is sub-angular to rounded fine to coarse of coal, mudstone, and sandstone.
		2.00	SPT	N=10 (2,2/2,2,3,3)				
		3.00	SPT	N=10 (1,2/2,2,3,3)				
					3.40	38.95		Weak grey destructured MUDSTONE recovered as slightly clayey GRAVEL. Gravel is angular to sub-rounded fine to coarse of mudstone.
					3.45	38.90		Firm brown slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is sub-angular to rounded fine to coarse of coal, mudstone, and sandstone.
					3.90	38.45		
		4.00-4.38	D		4.00	38.35		Firm grey gravelly CLAY. Gravel is angular to sub-rounded fine to coarse of mudstone and coal.
		4.00	SPT	N≥50 (8,12/50 for 225mm)				
					4.38	37.98		Weak grey destructured MUDSTONE recovered as slightly clayey GRAVEL. Gravel is angular to sub-rounded fine to coarse of mudstone.
								End of Borehole at 4.38m

1.0
2.0
3.0
4.0
5.0
6.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit to 1.20m bgl to check for buried services.
3. No groundwater encountered.
4. Window sample terminated at 4.38m bgl due to refusal.
5. Installed to 3.60m bgl: 0.60m plain and 3.00m slotted PVC 35mm pipe.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Window Sampler No.
WS102
Sheet 1 of 1

PROJECT NO:	C5980	**CO-ORDS:**	347027E, 390338N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	42.88m OD
CLIENT:	UNITED LIVING	**DATES:**	04/02/25

Hole Type	Scale	Logged	Checked
WS	1:30	MAS	PH

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
		0.10-1.00	ES					MADE GROUND TOPSOIL: Grass over blackish brown slightly sandy gravel with frequent roots. Gravel is angular to sub-rounded fine to coarse of coal, brick, sandstone, and mudstone. *0.10 - 1.00m bgl: Rare clinker cobbles encountered. Cobbles are angular fine to coarse up to 150mm in diameter.*
					1.00	41.88		
					1.10	41.78		MADE GROUND: Brown slightly gravelly sandy clay. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of coal and mudstone.
		1.20	SPT	N=6 (1,1/1,1,2,2)	1.30	41.58		MADE GROUND: Blackish grey slightly gravelly slightly sandy clay. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of brick, coal, and mudstone.
		1.30-1.70	D					Soft brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of coal.
		1.70-2.00	D		1.70	41.18		Soft brown and grey very gravelly CLAY. Gravel is angular to sub-rounded fine to coarse of mudstone.
		2.00-2.44	D		2.00	40.88		Weak grey destructured MUDSTONE recovered as GRAVEL. Gravel is angular to sub-rounded fine to coarse of mudstone.
		2.00	SPT	N≥50 (4,4/50 for 290mm)				
					2.44	40.44		End of Borehole at 2.44m

1.0 2.0 3.0 4.0 5.0 6.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit to 1.20m bgl to check for buried services.
3. No groundwater encountered.
4. Window sample terminated at 2.44m bgl due to refusal.
5. No install: backfilled with arisings.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Window Sampler No.
WS103
Sheet 1 of 1

PROJECT NO:	C5980	**CO-ORDS:**	346983E, 390284N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	43.74m OD
CLIENT:	UNITED LIVING	**DATES:**	04/02/25

Hole Type	Scale	Logged	Checked
WS	1:30	MAS	PH

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.10-0.60	ES					MADE GROUND TOPSOIL: Grass over blackish brown slightly sandy gravel with frequent roots. Gravel is angular to sub-rounded fine to coarse of coal, brick, sandstone, mudstone, and clinker.
		0.60-1.20	ES		0.60	43.14		MADE GROUND: Grey slightly sandy gravelly clay. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of coal, brick, sandstone, mudstone, and clinker.
	▼	1.20-3.00	D		1.20	42.54		Soft grey slightly gravelly CLAY. Gravel is angular to sub-rounded fine to coarse of coal and mudstone.
		1.20	SPT	N=6 (1,0/1,1,2,2)				
		2.00	SPT	N=12 (1,1/1,2,4,5)				*2.00m bgl: Becoming firm.*
		2.80	SPT	N≥50 (12,13/50 for 175mm)				*2.80m bgl: Becoming very stiff.*
		3.00-3.12	D		3.00	40.74		Weak grey destructured MUDSTONE recovered as GRAVEL. Gravel is angular to sub-rounded fine to coarse of mudstone.
					3.12	40.62		End of Borehole at 3.12m

1.0
2.0
3.0
4.0
5.0
6.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit to 1.20m bgl to check for buried services.
3. Groundwater encountered at 1.20m bgl.
4. Window sample terminated at 3.12m bgl due to refusal.
5. Installed to 3.00m bgl: 1.50m plain and 1.50m slotted PVC 35mm pipe.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Window Sampler No.
WS104
Sheet 1 of 1

PROJECT NO:	C5980	**CO-ORDS:**	347063E, 390309N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	43.38m OD
CLIENT:	UNITED LIVING	**DATES:**	04/02/25

Hole Type	Scale	Logged	Checked
WS	1:30	MAS	PH

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.10-0.40	ES					MADE GROUND TOPSOIL: Grass over brown slightly gravelly slightly sandy clay with frequent roots. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of brick, mudstone, and sandstone.
		0.40-1.50	D		0.40	42.98		Soft orangish brown and grey slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of mudstone, sandstone, and coal.
		1.20	SPT	N=11 (2,2/2,3,3,3)				*1.20m bgl: Becoming firm.*
		1.50-2.00	D		1.50	41.88		Firm grey gravelly CLAY. Gravel is angular to sub-rounded fine to coarse of mudstone, coal, and sandstone.
		2.00	SPT	N≥50 (10,13/50 for 125mm)	2.00	41.38		Weak grey destructured MUDSTONE recovered as GRAVEL. Gravel is angular to sub-rounded fine to coarse of mudstone.
					2.28	41.10		End of Borehole at 2.28m

1.0
2.0
3.0
4.0
5.0
6.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit to 1.20m bgl to check for buried services.
3. No groundwater encountered.
4. Window sample terminated at 2.28m bgl due to refusal.
5. No install: backfilled with arisings.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Window Sampler No.
WS105
Sheet 1 of 1

PROJECT NO:	C5980	**CO-ORDS:**	347159E, 390240N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	43.40m OD
CLIENT:	UNITED LIVING	**DATES:**	03/02/25

Hole Type	Scale	Logged	Checked
WS	1:30	AH	PH

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.00-0.30	ES		0.30	43.10		TOPSOIL: Grass over soft dark brown slightly gravelly sandy clay with occasional rootlets. Sand is fine to coarse. Gravel is sub-angular to sub-angular fine to coarse of sandstone and mudstone.
		0.50	D					Firm brown and grey CLAY.
		1.20	SPT	N=15 (2,2/3,3,4,5)				
		1.60-1.80	D		1.50	41.90		Weak grey destructured MUDSTONE recovered as GRAVEL. Gravel is angular to sub-rounded fine to coarse of mudstone.
		2.00	SPT	N≥50 (8,9/50 for 295mm)				
					2.44	40.96		End of Borehole at 2.44m

1.0
2.0
3.0
4.0
5.0
6.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit to 1.20m bgl to check for buried services.
3. No groundwater encountered.
4. Window sample terminated at 2.44m bgl due to refusal.
5. Installed to 2.40m bgl: 0.40m plain and 2.00m slotted PVC 35mm pipe.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Window Sampler No.
WS106
Sheet 1 of 1

PROJECT NO:	C5980	**CO-ORDS:**	347226E, 390209N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	43.84m OD
CLIENT:	UNITED LIVING	**DATES:**	03/02/25

Hole Type	Scale	Logged	Checked
WS	1:30	AH	PH

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.00-0.30	ES					TOPSOIL: Grass over soft dark brown slightly gravelly sandy clay with occasional rootlets. Sand is fine to coarse. Gravel is sub-angular to sub-angular fine to coarse of sandstone and mudstone.
		0.40	D		0.30	43.54		Firm orangish brown and grey slightly sandy CLAY. Sand is fine to coarse.
		0.90-1.20	D		0.60	43.24		Light grey and brown gravelly SAND. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse of sandstone, mudstone, and coal.
		1.20	SPT	N=13 (2,3/4,3,3,3)				*0.60 - 0.90m bgl: Becoming slightly clayey.*
								1.20m bgl: Becoming medium dense.
		2.00	SPT	N≥50 (6,9/50 for 285mm)	1.90	41.94		Weak grey destructured SANDSTONE recovered as sandy GRAVEL. Sand is fine to medium. Gravel is angular to sub-rounded fine to coarse of sandstone.
					2.44	41.41		End of Borehole at 2.44m

1.0
2.0
3.0
4.0
5.0
6.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit to 1.20m bgl to check for buried services.
3. No groundwater encountered.
4. Window sample terminated at 2.44m bgl due to refusal.
5. Installed to 2.40m bgl: 0.40m plain and 2.00m slotted PVC 35mm pipe.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Window Sampler No.
WS107
Sheet 1 of 1

PROJECT NO:	C5980	**CO-ORDS:**	347301E, 390221N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	43.83m OD
CLIENT:	UNITED LIVING	**DATES:**	03/02/25

Hole Type	Scale	Logged	Checked
WS	1:30	AH	PH

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.40	D		0.30	43.53		TOPSOIL: Grass over soft dark brown slightly gravelly sandy clay with occasional rootlets. Sand is fine to coarse. Gravel is sub-angular to sub-angular fine to coarse of sandstone and mudstone.
								Soft brown and grey CLAY.
		0.80-1.00	ES		0.70	43.13		Brown and grey slightly gravelly slightly clayey SAND. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.
		1.20	SPT	N=9 (2,2/2,2,2,3)				*1.20m bgl: Becoming loose.*
					1.60	42.23		Firm brown and grey CLAY.
		2.00	SPT	N=26 (3,6/6,6,6,8)				*2.00m bgl: Becoming stiff.*
		2.10	D					*2.30 - 2.40m bgl: Pockets of brownish grey fine to coarse sand encountered.*
		2.80	SPT	N≥50 (5,8/50 for 295mm)	2.80	41.03		Weak grey destructured MUDSTONE recovered as GRAVEL. Gravel is angular to sub-rounded fine to coarse of mudstone.
					3.12	40.71		End of Borehole at 3.12m

1.0
2.0
3.0
4.0
5.0
6.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit to 1.20m bgl to check for buried services.
3. No groundwater encountered.
4. Window sample terminated at 3.12m bgl due to refusal.
5. No install: backfilled with arisings.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Window Sampler No.
WS108
Sheet 1 of 1

PROJECT NO:	C5980	**CO-ORDS:**	347330E, 390261N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	44.05m OD
CLIENT:	UNITED LIVING	**DATES:**	03/02/25

Hole Type	
WS	
Scale	
1:30	
Logged	**Checked**
AH	PH

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.00-0.30	ES		0.30	43.75		TOPSOIL: Grass over soft dark brown slightly gravelly sandy clay with occasional rootlets. Sand is fine to coarse. Gravel is sub-angular to sub-angular fine to coarse of sandstone and mudstone.
		0.40	D					Firm brown and grey CLAY.
		1.20	SPT	N=10 (2,2/2,2,3,3)				
		1.50	D					
		2.00	SPT	N≥50 (4,7/50 for 275mm)	1.90	42.15		Weak grey destructured MUDSTONE recovered as GRAVEL. Gravel is angular to sub-rounded fine to coarse of mudstone.
					2.43	41.62		End of Borehole at 2.43m

1.0
2.0
3.0
4.0
5.0
6.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit to 1.20m bgl to check for buried services.
3. No groundwater encountered.
4. Window sample terminated at 2.43m bgl due to refusal.
5. Installed to 2.40m bgl: 0.40m plain and 2.00m slotted PVC 35mm pipe.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Window Sampler No.
WS109
Sheet 1 of 1

PROJECT NO:	C5980	**CO-ORDS:**	347137E, 390167N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	43.68m OD
CLIENT:	UNITED LIVING	**DATES:**	03/02/25

Hole Type	Scale	Logged	Checked
WS	1:30	AH	PH

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.00-0.40	ES					TOPSOIL: Grass over soft dark brown slightly gravelly sandy clay with occasional rootlets. Sand is fine to coarse. Gravel is sub-angular to sub-angular fine to coarse of sandstone and mudstone.
		0.50	D		0.40	43.28		Firm brown and grey CLAY.
								0.90 - 0.95m bgl: Band of grey fine to medium sand encountered.
								1.10 - 1.15m bgl: Band of grey fine to medium sand encountered.
		1.20	SPT	N=9 (2,2/2,2,2,3)				
		1.50	D					
		2.00	SPT	N≥50 (5,8/11,12,13,14)	2.10	41.58		Weak grey destructured MUDSTONE recovered as GRAVEL. Gravel is angular to sub-rounded fine to coarse of mudstone.
					2.45	41.23		End of Borehole at 2.45m

1.0
2.0
3.0
4.0
5.0
6.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit to 1.20m bgl to check for buried services.
3. No groundwater encountered.
4. Window sample terminated at 2.45m bgl due to refusal.
5. No install: backfilled with arisings.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Window Sampler No.
WS109A
Sheet 1 of 1

PROJECT NO:	C5980	**CO-ORDS:**	347163E, 390166N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	
CLIENT:	UNITED LIVING	**DATES:**	03/02/25

Hole Type	Scale	Logged	Checked
WS	1:30	AH	PH

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.00-0.40	ES		0.40			TOPSOIL: Grass over soft dark brown slightly gravelly sandy clay with occasional rootlets. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone and mudstone.
		0.60	D					Firm brown and grey mottled slightly gravelly slightly sandy silty CLAY. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse of mudstone and coal.
		1.20	SPT	N=14 (2,2/3,3,4,4)				
		1.50	D					
	▼	2.00	SPT	N≥50 (3,4/50 for 220mm)	2.10			Weak grey destructured MUDSTONE recovered as GRAVEL. Gravel is angular to sub-rounded fine to coarse of mudstone.
					2.37			End of Borehole at 2.37m

1.0
2.0
3.0
4.0
5.0
6.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit to 1.20m bgl to check for buried services.
3. Groundwater encountered. at 2.00m bgl.
4. Window sample terminated at 2.37m bgl due to refusal.
5. No install: backfilled with arisings.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Window Sampler No.
WS110
Sheet 1 of 1

PROJECT NO:	C5980	**CO-ORDS:**	347195E, 390151N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	44.13m OD
CLIENT:	UNITED LIVING	**DATES:**	03/02/25

Hole Type	Scale	Logged	Checked
WS	1:30	AH	PH

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.00-0.40	ES					TOPSOIL: Grass over soft dark brown slightly gravelly sandy clay with occasional rootlets. Sand is fine to coarse. Gravel is sub-angular to sub-angular fine to coarse of sandstone and mudstone.
					0.40	43.73		Brown and grey slightly gravelly clayey SAND. Sand is fine to coarse. Gravel is aub-angular to sub-rounded fine to medium of mudstone and coal.
					0.60	43.53		Firm brown and grey CLAY.
		1.20	SPT	N=15 (2,2/3,3,4,5)				
	▼				1.90	42.23		Weak grey destructured MUDSTONE recovered as GRAVEL. Gravel is angular to sub-rounded fine to coarse of mudstone.
		2.00	SPT	N≥50 (2,4/50 for 275mm)				
					2.43	41.70		End of Borehole at 2.43m

1.0
2.0
3.0
4.0
5.0
6.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit to 1.20m bgl to check for buried services.
3. Groundwater encountered. at 1.90m bgl.
4. Window sample terminated at 2.43m bgl due to refusal.
5. No install: backfilled with arisings.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Window Sampler No.
WS111
Sheet 1 of 1

PROJECT NO:	C5980	**CO-ORDS:**	347251E, 390187N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	44.54m OD
CLIENT:	UNITED LIVING	**DATES:**	03/02/25

Hole Type	Scale	Logged	Checked
WS	1:30	AH	PH

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.10-0.30	D					TOPSOIL: Grass over soft dark brown slightly gravelly sandy clay with occasional rootlets. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone and mudstone.
					0.40	44.14		
		0.50	D					Firm brown and grey CLAY.
					0.80	43.74		
		1.00-1.10	D					Grey slightly clayey gravelly SAND. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of sandstone and mudstone.
		1.20	SPT	N=10 (1,2/2,2,3,3)				*1.20m bgl: Becoming loose.*
					1.90	42.64		
		2.00	SPT	N≥50 (12,12/50 for 205mm)				Weak grey destructured SANDSTONE recovered as GRAVEL. Gravel is angular to sub-rounded fine to coarse of sandstone.
					2.36	42.19		End of Borehole at 2.36m

1.0
2.0
3.0
4.0
5.0
6.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit to 1.20m bgl to check for buried services.
3. No groundwater encountered.
4. Window sample terminated at 2.36m bgl due to refusal.
5. No install: backfilled with arisings.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Window Sampler No.
WS112
Sheet 1 of 1

PROJECT NO:	C5980	**CO-ORDS:**	347349E, 390216N
PROJECT NAME:	HALSNEAD GARDENS	**LEVEL:**	44.49m OD
CLIENT:	UNITED LIVING	**DATES:**	03/02/25

Hole Type	Scale	Logged	Checked
WS	1:30	AH	PH

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.00-0.30	ES		0.30	44.19		TOPSOIL: Grass over soft dark brown slightly gravelly sandy clay with occasional rootlets. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone and mudstone.
		0.50	D					Soft brown and grey CLAY.
		1.20	SPT	N=7 (1,1/1,2,2,2)				
		1.50	D					
	▼				1.90	42.59		
		2.00	SPT	N=11 (1,2/2,2,3,4)	2.10	42.39		Weak grey destructured MUDSTONE recovered as GRAVEL. Gravel is angular to sub-rounded fine to coarse of mudstone.
		2.50	D					Black non-intact bituminous COAL.
		3.00	SPT	N≥50 (5,8/50 for 285mm)				
					3.44	41.06		End of Borehole at 3.44m

1.0
2.0
3.0
4.0
5.0
6.0

Remarks

1. Clearance of services using GPR techniques and CAT and Genny prior to breaking ground.
2. Hand pit to 1.20m bgl to check for buried services.
3. Groundwater encountered at 1.90m bgl.
4. Window sample terminated at 3.44m bgl due to refusal.
5. No install: backfilled with arisings.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

APPENDIX C

Chemical Testing Results

Brownfield Solutions Ltd
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Analytical Report Number : 25-006103

Project / Site name:	Halsnead Gardens	**Samples received on:**	11/02/2025
Your job number:	C5980	**Samples instructed on/ Analysis started on:**	11/02/2025
Your order number:	6137_C5980_MAS	**Analysis completed by:**	14/02/2025
Report Issue Number:	1	**Report issued on:**	17/02/2025
Samples Analysed:	29 soil samples		

Signed:

Charlotte Andrew
Key Account Manager
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting
air	- once the analysis is complete

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Retention period for records and reports is minimum 6 years from the date of issue of the final report.
Some records may be kept for longer according to other legal/best practice requirements.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

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The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number: 25-006103
Project / Site name: Halsnead Gardens
Your Order No: 6137_C5980_MAS

Lab Sample Number				448218	448219	448220	448221	448222
Sample Reference				TP101	TP103	TP106	TP107	TP112
Sample Number				ES	ES	D	ES	ES
Water Matrix				N/A	N/A	N/A	N/A	N/A
Depth (m)				0.10-0.40	0.60-1.80	0.50-2.30	0.30-0.70	0.30-0.70
Date Sampled				Deviating	Deviating	Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	30.8	< 0.1
Moisture Content	%	0.01	NONE	20	17	18	12	14
Total mass of sample received	kg	0.1	NONE	0.8	0.8	1	0.7	0.8
Asbestos								
Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	-	-	-	Not-detected	-
Asbestos Analyst ID	N/A	N/A	N/A	-	-	-	KMC	-
General Inorganics								
pH (L099)	pH Units	N/A	MCERTS	6.2	5	9.9	7.4	8.2
Total Sulphate as SO_4	%	0.005	MCERTS	-	-	0.39	-	-
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	16	30	2100	66	16
Water Soluble SO_4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	-	1070	33	7.74
Water Soluble SO_4 16hr extraction (2:1)	mg/l	1.25	MCERTS	7.81	14.7	-	-	-
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	-	-	41	-	-
Total Sulphur	mg/kg	50	MCERTS	-	-	2100	-	-
Total Sulphur	%	0.005	MCERTS	-	-	0.208	-	-
Ammoniacal Nitrogen as NH_4^+	mg/kg	0.5	MCERTS	-	-	3.1	-	-
Ammonium as NH_4^+ (10:1 leachate equivalent)	mg/l	0.05	MCERTS	-	-	0.2	-	-
Organic Matter (automated)	%	0.1	MCERTS	-	-	-	2	0.6
Water Soluble Nitrate (2:1) as N	mg/kg	2	NONE	-	-	< 2.0	-	-
Water Soluble Nitrate (2:1) as N (leachate equivalent)	mg/l	2	NONE	-	-	< 2.0	-	-
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	-	-	-	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	-	-	-	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	-	-	-	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	-	-	-	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	-	-	-	0.13	< 0.05
Anthracene	mg/kg	0.05	MCERTS	-	-	-	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	-	-	-	0.17	< 0.05
Pyrene	mg/kg	0.05	MCERTS	-	-	-	0.19	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	-	-	0.07	< 0.05
Chrysene	mg/kg	0.05	MCERTS	-	-	-	0.11	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	-	-	-	0.1	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	-	-	-	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	-	-	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	-	-	0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	-	-	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	-	-	0.06	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	-	-	-	0.88	< 0.80

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The results included within the report relate only to the sample(s) submitted for testing.

Analytical Report Number: 25-006103
Project / Site name: Halsnead Gardens
Your Order No: 6137_C5980_MAS

Lab Sample Number				448218	448219	448220	448221	448222
Sample Reference				TP101	TP103	TP106	TP107	TP112
Sample Number				ES	ES	D	ES	ES
Water Matrix				N/A	N/A	N/A	N/A	N/A
Depth (m)				0.10-0.40	0.60-1.80	0.50-2.30	0.30-0.70	0.30-0.70
Date Sampled				Deviating	Deviating	Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	9.4	9
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	-	-	-	0.3	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	-	-	-	< 1.8	< 1.8
Chromium (III)	mg/kg	1	NONE	-	-	-	100	42
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	100	42
Copper (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	33	18
Lead (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	100	8.9
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	-	-	-	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	46	46
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	80	37
Magnesium (leachate equivalent)	mg/l	2.5	NONE	-	-	3.4	-	-
Magnesium (water soluble)	mg/kg	5	NONE	-	-	6.7	-	-
Petroleum Hydrocarbons								
TPHCWG - Aliphatic >EC5 - EC6 $_{HS\_1D\_AL}$	mg/kg	0.01	MCERTS	-	-	-	< 0.010	-
TPHCWG - Aliphatic >EC5 - EC10 $_{HS\_1D\_AL}$	mg/kg	1	NONE	-	-	-	< 1.0	-
TPHCWG - Aliphatic >EC6 - EC8 $_{HS\_1D\_AL}$	mg/kg	0.01	MCERTS	-	-	-	< 0.010	-
TPHCWG - Aliphatic >EC8 - EC10 $_{HS\_1D\_AL}$	mg/kg	0.01	MCERTS	-	-	-	< 0.010	-
TPHCWG - Aliphatic >EC10 - EC12 $_{EH\_CU\_1D\_AL}$	mg/kg	1	MCERTS	-	-	-	< 1.0	-
TPHCWG - Aliphatic >EC10 - EC16 $_{EH\_CU\_1D\_AL}$	mg/kg	3	NONE	-	-	-	< 3.0	-
TPHCWG - Aliphatic >EC12 - EC16 $_{EH\_CU\_1D\_AL}$	mg/kg	2	MCERTS	-	-	-	< 2.0	-
TPHCWG - Aliphatic >EC16 - EC21 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	-	-	-	< 8.0	-
TPHCWG - Aliphatic >EC16 - EC35 $_{EH\_CU\_1D\_AL}$	mg/kg	10	MCERTS	-	-	-	< 10	-
TPHCWG - Aliphatic >EC16 - EC40 $_{EH\_CU\_1D\_AL}$	mg/kg	10	NONE	-	-	-	< 10	-
TPHCWG - Aliphatic >EC21 - EC35 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	-	-	-	< 8.0	-
TPHCWG - Aliphatic >EC35 - EC40 $_{EH\_CU\_1D\_AL}$	mg/kg	10	NONE	-	-	-	< 10	-
TPHCWG - Aliphatic >EC5 - EC35 $_{EH\_CU+HS\_1D\_AL}$	mg/kg	10	NONE	-	-	-	< 10	-
TPHCWG - Aliphatic >EC5 - EC40 $_{EH\_CU+HS\_1D\_AL}$	mg/kg	10	NONE	-	-	-	< 10	-
TPHCWG - Aromatic >EC5 - EC7 $_{HS\_1D\_AR}$	mg/kg	0.01	MCERTS	-	-	-	< 0.010	-
TPHCWG - Aromatic >EC5 - EC10 $_{HS\_1D\_AR}$	mg/kg	1	NONE	-	-	-	< 1.0	-
TPHCWG - Aromatic >EC7 - EC8 $_{HS\_1D\_AR}$	mg/kg	0.01	MCERTS	-	-	-	< 0.010	-
TPHCWG - Aromatic >EC8 - EC10 $_{HS\_1D\_AR}$	mg/kg	0.02	MCERTS	-	-	-	< 0.020	-
TPHCWG - Aromatic >EC10 - EC12 $_{EH\_CU\_1D\_AR}$	mg/kg	1	MCERTS	-	-	-	< 1.0	-
TPHCWG - Aromatic >EC10 - EC16 $_{EH\_CU\_1D\_AR}$	mg/kg	3	NONE	-	-	-	< 3.0	-
TPHCWG - Aromatic >EC12 - EC16 $_{EH\_CU\_1D\_AR}$	mg/kg	2	MCERTS	-	-	-	< 2.0	-
TPHCWG - Aromatic >EC16 - EC21 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	-	-	-	< 10	-
TPHCWG - Aromatic >EC16 - EC40 $_{EH\_CU\_1D\_AR}$	mg/kg	10	NONE	-	-	-	< 10	-
TPHCWG - Aromatic >EC21 - EC35 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	-	-	-	< 10	-
TPHCWG - Aromatic >EC35 - EC40 $_{EH\_CU\_1D\_AR}$	mg/kg	10	NONE	-	-	-	< 10	-
TPHCWG - Aromatic >EC5 - EC35 $_{EH\_CU+HS\_1D\_AR}$	mg/kg	10	NONE	-	-	-	< 10	-
TPHCWG - Aromatic >EC5 - EC40 $_{EH\_CU+HS\_1D\_AR}$	mg/kg	10	NONE	-	-	-	< 10	-
TPH Total >EC5 - EC40 $_{EH\_CU+HS\_1D\_TOTAL}$	mg/kg	10	NONE	-	-	-	< 10	-

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Analytical Report Number: 25-006103
Project / Site name: Halsnead Gardens
Your Order No: 6137_C5980_MAS

Lab Sample Number				448218	448219	448220	448221	448222
Sample Reference				TP101	TP103	TP106	TP107	TP112
Sample Number				ES	ES	D	ES	ES
Water Matrix				N/A	N/A	N/A	N/A	N/A
Depth (m)				0.10-0.40	0.60-1.80	0.50-2.30	0.30-0.70	0.30-0.70
Date Sampled				Deviating	Deviating	Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
VOCs								
MTBE (Methyl Tertiary Butyl Ether)	mg/kg	0.005	MCERTS	-	-	-	< 0.005	-
Benzene	mg/kg	0.005	MCERTS	-	-	-	< 0.005	-
Toluene	mg/kg	0.005	MCERTS	-	-	-	< 0.005	-
Ethylbenzene	mg/kg	0.005	MCERTS	-	-	-	< 0.005	-
p & m-xylene	mg/kg	0.008	MCERTS	-	-	-	< 0.008	-
o-Xylene	mg/kg	0.005	MCERTS	-	-	-	< 0.005	-
Total BTEX	mg/kg	0.01	NONE	-	-	-	< 0.010	-

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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Analytical Report Number: 25-006103
Project / Site name: Halsnead Gardens
Your Order No: 6137_C5980_MAS

Lab Sample Number				448223	448224	448225	448226	448227
Sample Reference				TP115	TP117	TP120	TP124	TP125
Sample Number				D	ES	ES	D	ES
Water Matrix				N/A	N/A	N/A	N/A	N/A
Depth (m)				0.50-2.10	0.10-0.40	0.40-2.00	1.60-2.00	0.10-0.30
Date Sampled				Deviating	Deviating	Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	15	23	13	13	23
Total mass of sample received	kg	0.1	NONE	0.5	0.7	0.8	0.5	0.8
Asbestos								
Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	-	-	-	-	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	-	-	-	-	KMC
General Inorganics								
pH (L099)	pH Units	N/A	MCERTS	6	6.4	7.9	5.5	6.1
Total Sulphate as SO_4	%	0.005	MCERTS	-	-	-	-	-
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	12	13	40	12	13
Water Soluble SO_4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	6.13	6.39	-	-	6.36
Water Soluble SO_4 16hr extraction (2:1)	mg/l	1.25	MCERTS	-	-	19.8	6.09	-
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	-	-	-	-	-
Total Sulphur	mg/kg	50	MCERTS	-	-	-	-	-
Total Sulphur	%	0.005	MCERTS	-	-	-	-	-
Ammoniacal Nitrogen as NH_4^+	mg/kg	0.5	MCERTS	-	-	-	-	-
Ammonium as NH_4^+ (10:1 leachate equivalent)	mg/l	0.05	MCERTS	-	-	-	-	-
Organic Matter (automated)	%	0.1	MCERTS	0.6	3.9	-	-	3.6
Water Soluble Nitrate (2:1) as N	mg/kg	2	NONE	-	-	-	-	-
Water Soluble Nitrate (2:1) as N (leachate equivalent)	mg/l	2	NONE	-	-	-	-	-
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	0.09
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	0.16
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	0.15
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	0.08
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	0.12
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	< 0.05	-	-	0.13
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	< 0.05	-	-	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	0.07
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	< 0.80	< 0.80	-	-	0.81

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Analytical Report Number: 25-006103
Project / Site name: Halsnead Gardens
Your Order No: 6137_C5980_MAS

Lab Sample Number				448223	448224	448225	448226	448227
Sample Reference				TP115	TP117	TP120	TP124	TP125
Sample Number				D	ES	ES	D	ES
Water Matrix				N/A	N/A	N/A	N/A	N/A
Depth (m)				0.50-2.10	0.10-0.40	0.40-2.00	1.60-2.00	0.10-0.30
Date Sampled				Deviating	Deviating	Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	7.9	11	-	-	11
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	0.7	-	-	0.8
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	-	-	< 1.8
Chromium (III)	mg/kg	1	NONE	33	22	-	-	19
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	33	23	-	-	19
Copper (aqua regia extractable)	mg/kg	1	MCERTS	9.7	55	-	-	48
Lead (aqua regia extractable)	mg/kg	1	MCERTS	7.7	34	-	-	62
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	-	-	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	18	18	-	-	19
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	-	-	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	28	61	-	-	71
Magnesium (leachate equivalent)	mg/l	2.5	NONE	-	-	-	-	-
Magnesium (water soluble)	mg/kg	5	NONE	-	-	-	-	-
Petroleum Hydrocarbons								
TPHCWG - Aliphatic >EC5 - EC6 $_{HS\_1D\_AL}$	mg/kg	0.01	MCERTS	-	-	-	-	< 0.010
TPHCWG - Aliphatic >EC5 - EC10 $_{HS\_1D\_AL}$	mg/kg	1	NONE	-	-	-	-	< 1.0
TPHCWG - Aliphatic >EC6 - EC8 $_{HS\_1D\_AL}$	mg/kg	0.01	MCERTS	-	-	-	-	< 0.010
TPHCWG - Aliphatic >EC8 - EC10 $_{HS\_1D\_AL}$	mg/kg	0.01	MCERTS	-	-	-	-	< 0.010
TPHCWG - Aliphatic >EC10 - EC12 $_{EH\_CU\_1D\_AL}$	mg/kg	1	MCERTS	-	-	-	-	< 1.0
TPHCWG - Aliphatic >EC10 - EC16 $_{EH\_CU\_1D\_AL}$	mg/kg	3	NONE	-	-	-	-	< 3.0
TPHCWG - Aliphatic >EC12 - EC16 $_{EH\_CU\_1D\_AL}$	mg/kg	2	MCERTS	-	-	-	-	< 2.0
TPHCWG - Aliphatic >EC16 - EC21 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	-	-	-	-	< 8.0
TPHCWG - Aliphatic >EC16 - EC35 $_{EH\_CU\_1D\_AL}$	mg/kg	10	MCERTS	-	-	-	-	< 10
TPHCWG - Aliphatic >EC16 - EC40 $_{EH\_CU\_1D\_AL}$	mg/kg	10	NONE	-	-	-	-	< 10
TPHCWG - Aliphatic >EC21 - EC35 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	-	-	-	-	< 8.0
TPHCWG - Aliphatic >EC35 - EC40 $_{EH\_CU\_1D\_AL}$	mg/kg	10	NONE	-	-	-	-	< 10
TPHCWG - Aliphatic >EC5 - EC35 $_{EH\_CU+HS\_1D\_AL}$	mg/kg	10	NONE	-	-	-	-	< 10
TPHCWG - Aliphatic >EC5 - EC40 $_{EH\_CU+HS\_1D\_AL}$	mg/kg	10	NONE	-	-	-	-	< 10
TPHCWG - Aromatic >EC5 - EC7 $_{HS\_1D\_AR}$	mg/kg	0.01	MCERTS	-	-	-	-	< 0.010
TPHCWG - Aromatic >EC5 - EC10 $_{HS\_1D\_AR}$	mg/kg	1	NONE	-	-	-	-	< 1.0
TPHCWG - Aromatic >EC7 - EC8 $_{HS\_1D\_AR}$	mg/kg	0.01	MCERTS	-	-	-	-	< 0.010
TPHCWG - Aromatic >EC8 - EC10 $_{HS\_1D\_AR}$	mg/kg	0.02	MCERTS	-	-	-	-	< 0.020
TPHCWG - Aromatic >EC10 - EC12 $_{EH\_CU\_1D\_AR}$	mg/kg	1	MCERTS	-	-	-	-	< 1.0
TPHCWG - Aromatic >EC10 - EC16 $_{EH\_CU\_1D\_AR}$	mg/kg	3	NONE	-	-	-	-	< 3.0
TPHCWG - Aromatic >EC12 - EC16 $_{EH\_CU\_1D\_AR}$	mg/kg	2	MCERTS	-	-	-	-	< 2.0
TPHCWG - Aromatic >EC16 - EC21 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	-	-	-	-	< 10
TPHCWG - Aromatic >EC16 - EC40 $_{EH\_CU\_1D\_AR}$	mg/kg	10	NONE	-	-	-	-	< 10
TPHCWG - Aromatic >EC21 - EC35 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	-	-	-	-	< 10
TPHCWG - Aromatic >EC35 - EC40 $_{EH\_CU\_1D\_AR}$	mg/kg	10	NONE	-	-	-	-	< 10
TPHCWG - Aromatic >EC5 - EC35 $_{EH\_CU+HS\_1D\_AR}$	mg/kg	10	NONE	-	-	-	-	< 10
TPHCWG - Aromatic >EC5 - EC40 $_{EH\_CU+HS\_1D\_AR}$	mg/kg	10	NONE	-	-	-	-	< 10
TPH Total >EC5 - EC40 $_{EH\_CU+HS\_1D\_TOTAL}$	mg/kg	10	NONE	-	-	-	-	< 10

Analytical Report Number: 25-006103
Project / Site name: Halsnead Gardens
Your Order No: 6137_C5980_MAS

Lab Sample Number				448223	448224	448225	448226	448227
Sample Reference				TP115	TP117	TP120	TP124	TP125
Sample Number				D	ES	ES	D	ES
Water Matrix				N/A	N/A	N/A	N/A	N/A
Depth (m)				0.50-2.10	0.10-0.40	0.40-2.00	1.60-2.00	0.10-0.30
Date Sampled				Deviating	Deviating	Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
VOCs								
MTBE (Methyl Tertiary Butyl Ether)	mg/kg	0.005	MCERTS	-	-	-	-	< 0.005
Benzene	mg/kg	0.005	MCERTS	-	-	-	-	< 0.005
Toluene	mg/kg	0.005	MCERTS	-	-	-	-	< 0.005
Ethylbenzene	mg/kg	0.005	MCERTS	-	-	-	-	< 0.005
p & m-xylene	mg/kg	0.008	MCERTS	-	-	-	-	< 0.008
o-Xylene	mg/kg	0.005	MCERTS	-	-	-	-	< 0.005
Total BTEX	mg/kg	0.01	NONE	-	-	-	-	< 0.010

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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Analytical Report Number: 25-006103
Project / Site name: Halsnead Gardens
Your Order No: 6137_C5980_MAS

Lab Sample Number				448228	448229	448230	448231	448232
Sample Reference				TP126	TP127	TP130	TP131	TP133
Sample Number				D	D	D	D	ES
Water Matrix				N/A	N/A	N/A	N/A	N/A
Depth (m)				1.20-2.80	0.90-2.15	0.40-2.30	0.60-1.60	0.10-0.30
Date Sampled				Deviating	Deviating	Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
Stone Content	%	0.1	NONE	42.5	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	11	15	15	15	21
Total mass of sample received	kg	0.1	NONE	0.5	0.5	0.5	0.5	0.7
Asbestos								
Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	-	-	-	-	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	-	-	-	-	KMC
General Inorganics								
pH (L099)	pH Units	N/A	MCERTS	7.5	6.3	6.1	8.3	6.9
Total Sulphate as SO_4	%	0.005	MCERTS	-	0.007	0.008	-	-
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	3.7	5.5	10	9.6	12
Water Soluble SO_4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	2.74	4.99	-	6.1
Water Soluble SO_4 16hr extraction (2:1)	mg/l	1.25	MCERTS	1.87	-	-	4.79	-
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	-	1.4	1.1	-	-
Total Sulphur	mg/kg	50	MCERTS	-	< 50	65	-	-
Total Sulphur	%	0.005	MCERTS	-	< 0.005	0.006	-	-
Ammoniacal Nitrogen as NH_4^+	mg/kg	0.5	MCERTS	-	< 0.5	< 0.5	-	-
Ammonium as NH_4^+ (10:1 leachate equivalent)	mg/l	0.05	MCERTS	-	< 0.05	< 0.05	-	-
Organic Matter (automated)	%	0.1	MCERTS	-	-	-	-	3.4
Water Soluble Nitrate (2:1) as N	mg/kg	2	NONE	-	< 2.0	< 2.0	-	-
Water Soluble Nitrate (2:1) as N (leachate equivalent)	mg/l	2	NONE	-	< 2.0	< 2.0	-	-
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	-	-	-	-	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	-	-	-	-	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	-	-	-	-	< 0.05
Fluorene	mg/kg	0.05	MCERTS	-	-	-	-	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	-	-	-	-	0.11
Anthracene	mg/kg	0.05	MCERTS	-	-	-	-	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	-	-	-	-	0.15
Pyrene	mg/kg	0.05	MCERTS	-	-	-	-	0.15
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	-	-	-	0.08
Chrysene	mg/kg	0.05	MCERTS	-	-	-	-	0.12
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	-	-	-	-	0.12
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	-	-	-	-	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	-	-	-	0.06
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	-	-	-	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	-	-	-	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	-	-	-	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	-	-	-	-	< 0.80

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Analytical Report Number: 25-006103
Project / Site name: Halsnead Gardens
Your Order No: 6137_C5980_MAS

Lab Sample Number				448228	448229	448230	448231	448232
Sample Reference				TP126	TP127	TP130	TP131	TP133
Sample Number				D	D	D	D	ES
Water Matrix				N/A	N/A	N/A	N/A	N/A
Depth (m)				1.20-2.80	0.90-2.15	0.40-2.30	0.60-1.60	0.10-0.30
Date Sampled				Deviating	Deviating	Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	20
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	-	-	-	-	1.3
Chromium (hexavalent)	mg/kg	1.8	MCERTS	-	-	-	-	< 1.8
Chromium (III)	mg/kg	1	NONE	-	-	-	-	19
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	20
Copper (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	89
Lead (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	100
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	-	-	-	-	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	20
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	99
Magnesium (leachate equivalent)	mg/l	2.5	NONE	-	< 2.5	4.4	-	-
Magnesium (water soluble)	mg/kg	5	NONE	-	< 5.0	8.8	-	-
Petroleum Hydrocarbons								
TPHCWG - Aliphatic >EC5 - EC6 $_{HS\_1D\_AL}$	mg/kg	0.01	MCERTS	-	-	-	-	< 0.010
TPHCWG - Aliphatic >EC5 - EC10 $_{HS\_1D\_AL}$	mg/kg	1	NONE	-	-	-	-	< 1.0
TPHCWG - Aliphatic >EC6 - EC8 $_{HS\_1D\_AL}$	mg/kg	0.01	MCERTS	-	-	-	-	< 0.010
TPHCWG - Aliphatic >EC8 - EC10 $_{HS\_1D\_AL}$	mg/kg	0.01	MCERTS	-	-	-	-	< 0.010
TPHCWG - Aliphatic >EC10 - EC12 $_{EH\_CU\_1D\_AL}$	mg/kg	1	MCERTS	-	-	-	-	< 1.0
TPHCWG - Aliphatic >EC10 - EC16 $_{EH\_CU\_1D\_AL}$	mg/kg	3	NONE	-	-	-	-	< 3.0
TPHCWG - Aliphatic >EC12 - EC16 $_{EH\_CU\_1D\_AL}$	mg/kg	2	MCERTS	-	-	-	-	< 2.0
TPHCWG - Aliphatic >EC16 - EC21 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	-	-	-	-	< 8.0
TPHCWG - Aliphatic >EC16 - EC35 $_{EH\_CU\_1D\_AL}$	mg/kg	10	MCERTS	-	-	-	-	< 10
TPHCWG - Aliphatic >EC16 - EC40 $_{EH\_CU\_1D\_AL}$	mg/kg	10	NONE	-	-	-	-	< 10
TPHCWG - Aliphatic >EC21 - EC35 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	-	-	-	-	< 8.0
TPHCWG - Aliphatic >EC35 - EC40 $_{EH\_CU\_1D\_AL}$	mg/kg	10	NONE	-	-	-	-	< 10
TPHCWG - Aliphatic >EC5 - EC35 $_{EH\_CU+HS\_1D\_AL}$	mg/kg	10	NONE	-	-	-	-	< 10
TPHCWG - Aliphatic >EC5 - EC40 $_{EH\_CU+HS\_1D\_AL}$	mg/kg	10	NONE	-	-	-	-	< 10
TPHCWG - Aromatic >EC5 - EC7 $_{HS\_1D\_AR}$	mg/kg	0.01	MCERTS	-	-	-	-	< 0.010
TPHCWG - Aromatic >EC5 - EC10 $_{HS\_1D\_AR}$	mg/kg	1	NONE	-	-	-	-	< 1.0
TPHCWG - Aromatic >EC7 - EC8 $_{HS\_1D\_AR}$	mg/kg	0.01	MCERTS	-	-	-	-	< 0.010
TPHCWG - Aromatic >EC8 - EC10 $_{HS\_1D\_AR}$	mg/kg	0.02	MCERTS	-	-	-	-	< 0.020
TPHCWG - Aromatic >EC10 - EC12 $_{EH\_CU\_1D\_AR}$	mg/kg	1	MCERTS	-	-	-	-	< 1.0
TPHCWG - Aromatic >EC10 - EC16 $_{EH\_CU\_1D\_AR}$	mg/kg	3	NONE	-	-	-	-	< 3.0
TPHCWG - Aromatic >EC12 - EC16 $_{EH\_CU\_1D\_AR}$	mg/kg	2	MCERTS	-	-	-	-	< 2.0
TPHCWG - Aromatic >EC16 - EC21 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	-	-	-	-	< 10
TPHCWG - Aromatic >EC16 - EC40 $_{EH\_CU\_1D\_AR}$	mg/kg	10	NONE	-	-	-	-	< 10
TPHCWG - Aromatic >EC21 - EC35 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	-	-	-	-	< 10
TPHCWG - Aromatic >EC35 - EC40 $_{EH\_CU\_1D\_AR}$	mg/kg	10	NONE	-	-	-	-	< 10
TPHCWG - Aromatic >EC5 - EC35 $_{EH\_CU+HS\_1D\_AR}$	mg/kg	10	NONE	-	-	-	-	< 10
TPHCWG - Aromatic >EC5 - EC40 $_{EH\_CU+HS\_1D\_AR}$	mg/kg	10	NONE	-	-	-	-	< 10
TPH Total >EC5 - EC40 $_{EH\_CU+HS\_1D\_TOTAL}$	mg/kg	10	NONE	-	-	-	-	< 10

Analytical Report Number: 25-006103
Project / Site name: Halsnead Gardens
Your Order No: 6137_C5980_MAS

Lab Sample Number				448228	448229	448230	448231	448232
Sample Reference				TP126	TP127	TP130	TP131	TP133
Sample Number				D	D	D	D	ES
Water Matrix				N/A	N/A	N/A	N/A	N/A
Depth (m)				1.20-2.80	0.90-2.15	0.40-2.30	0.60-1.60	0.10-0.30
Date Sampled				Deviating	Deviating	Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
VOCs								
MTBE (Methyl Tertiary Butyl Ether)	mg/kg	0.005	MCERTS	-	-	-	-	< 0.005
Benzene	mg/kg	0.005	MCERTS	-	-	-	-	< 0.005
Toluene	mg/kg	0.005	MCERTS	-	-	-	-	< 0.005
Ethylbenzene	mg/kg	0.005	MCERTS	-	-	-	-	< 0.005
p & m-xylene	mg/kg	0.008	MCERTS	-	-	-	-	< 0.008
o-Xylene	mg/kg	0.005	MCERTS	-	-	-	-	< 0.005
Total BTEX	mg/kg	0.01	NONE	-	-	-	-	< 0.010

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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Analytical Report Number: 25-006103
Project / Site name: Halsnead Gardens
Your Order No: 6137_C5980_MAS

Lab Sample Number				448233	448234	448235	448236	448237
Sample Reference				TP135	WS101	WS102	WS103	WS103
Sample Number				ES	D	D	ES	ES
Water Matrix				N/A	N/A	N/A	N/A	N/A
Depth (m)				0.10-0.70	0.40-1.70	2.00-2.45	0.10-0.60	0.60-1.20
Date Sampled				Deviating	Deviating	Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	30	15	8.2	18	18
Total mass of sample received	kg	0.1	NONE	0.7	0.5	0.5	0.7	0.8
Asbestos								
Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected	-	-	Not-detected	-
Asbestos Analyst ID	N/A	N/A	N/A	KMC	-	-	KMC	-
General Inorganics								
pH (L099)	pH Units	N/A	MCERTS	6.4	8.6	7.3	6.8	7.3
Total Sulphate as SO_4	%	0.005	MCERTS	-	-	-	-	-
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	20	8.3	35	65	240
Water Soluble SO_4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	9.94	-	-	32.4	121
Water Soluble SO_4 16hr extraction (2:1)	mg/l	1.25	MCERTS	-	4.16	17.7	-	-
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	-	-	-	-	-
Total Sulphur	mg/kg	50	MCERTS	-	-	-	-	-
Total Sulphur	%	0.005	MCERTS	-	-	-	-	-
Ammoniacal Nitrogen as NH_4^+	mg/kg	0.5	MCERTS	-	-	-	-	-
Ammonium as NH_4^+ (10:1 leachate equivalent)	mg/l	0.05	MCERTS	-	-	-	-	-
Organic Matter (automated)	%	0.1	MCERTS	8.1	-	-	11	3.5
Water Soluble Nitrate (2:1) as N	mg/kg	2	NONE	-	-	-	-	-
Water Soluble Nitrate (2:1) as N (leachate equivalent)	mg/l	2	NONE	-	-	-	-	-
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	-	-	0.08	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	-	-	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	-	-	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	-	-	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.08	-	-	0.42	0.16
Anthracene	mg/kg	0.05	MCERTS	< 0.05	-	-	0.09	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	0.12	-	-	0.7	0.08
Pyrene	mg/kg	0.05	MCERTS	0.11	-	-	0.73	0.08
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.07	-	-	0.49	< 0.05
Chrysene	mg/kg	0.05	MCERTS	0.08	-	-	0.63	0.07
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	0.09	-	-	0.66	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	-	-	0.27	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	-	-	0.48	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	-	-	0.23	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	-	-	0.07	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	-	-	0.33	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	< 0.80	-	-	5.2	< 0.80

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Analytical Report Number: 25-006103
Project / Site name: Halsnead Gardens
Your Order No: 6137_C5980_MAS

Lab Sample Number				448233	448234	448235	448236	448237
Sample Reference				TP135	WS101	WS102	WS103	WS103
Sample Number				ES	D	D	ES	ES
Water Matrix				N/A	N/A	N/A	N/A	N/A
Depth (m)				0.10-0.70	0.40-1.70	2.00-2.45	0.10-0.60	0.60-1.20
Date Sampled				Deviating	Deviating	Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	14	-	-	39	26
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.8	-	-	< 0.2	1.9
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	-	-	< 1.8	< 1.8
Chromium (III)	mg/kg	1	NONE	18	-	-	19	20
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	18	-	-	20	20
Copper (aqua regia extractable)	mg/kg	1	MCERTS	47	-	-	160	52
Lead (aqua regia extractable)	mg/kg	1	MCERTS	47	-	-	980	65
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	-	-	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	16	-	-	110	43
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	-	-	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	63	-	-	130	340
Magnesium (leachate equivalent)	mg/l	2.5	NONE	-	-	-	-	-
Magnesium (water soluble)	mg/kg	5	NONE	-	-	-	-	-
Petroleum Hydrocarbons								
TPHCWG - Aliphatic >EC5 - EC6 $_{HS\_1D\_AL}$	mg/kg	0.01	MCERTS	< 0.010	-	-	< 0.010	-
TPHCWG - Aliphatic >EC5 - EC10 $_{HS\_1D\_AL}$	mg/kg	1	NONE	< 1.0	-	-	< 1.0	-
TPHCWG - Aliphatic >EC6 - EC8 $_{HS\_1D\_AL}$	mg/kg	0.01	MCERTS	< 0.010	-	-	< 0.010	-
TPHCWG - Aliphatic >EC8 - EC10 $_{HS\_1D\_AL}$	mg/kg	0.01	MCERTS	< 0.010	-	-	< 0.010	-
TPHCWG - Aliphatic >EC10 - EC12 $_{EH\_CU\_1D\_AL}$	mg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
TPHCWG - Aliphatic >EC10 - EC16 $_{EH\_CU\_1D\_AL}$	mg/kg	3	NONE	< 3.0	-	-	< 3.0	-
TPHCWG - Aliphatic >EC12 - EC16 $_{EH\_CU\_1D\_AL}$	mg/kg	2	MCERTS	< 2.0	-	-	< 2.0	-
TPHCWG - Aliphatic >EC16 - EC21 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	< 8.0	-	-	< 8.0	-
TPHCWG - Aliphatic >EC16 - EC35 $_{EH\_CU\_1D\_AL}$	mg/kg	10	MCERTS	< 10	-	-	< 10	-
TPHCWG - Aliphatic >EC16 - EC40 $_{EH\_CU\_1D\_AL}$	mg/kg	10	NONE	< 10	-	-	< 10	-
TPHCWG - Aliphatic >EC21 - EC35 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	< 8.0	-	-	< 8.0	-
TPHCWG - Aliphatic >EC35 - EC40 $_{EH\_CU\_1D\_AL}$	mg/kg	10	NONE	< 10	-	-	< 10	-
TPHCWG - Aliphatic >EC5 - EC35 $_{EH\_CU+HS\_1D\_AL}$	mg/kg	10	NONE	< 10	-	-	< 10	-
TPHCWG - Aliphatic >EC5 - EC40 $_{EH\_CU+HS\_1D\_AL}$	mg/kg	10	NONE	< 10	-	-	< 10	-
TPHCWG - Aromatic >EC5 - EC7 $_{HS\_1D\_AR}$	mg/kg	0.01	MCERTS	< 0.010	-	-	< 0.010	-
TPHCWG - Aromatic >EC5 - EC10 $_{HS\_1D\_AR}$	mg/kg	1	NONE	< 1.0	-	-	< 1.0	-
TPHCWG - Aromatic >EC7 - EC8 $_{HS\_1D\_AR}$	mg/kg	0.01	MCERTS	< 0.010	-	-	< 0.010	-
TPHCWG - Aromatic >EC8 - EC10 $_{HS\_1D\_AR}$	mg/kg	0.02	MCERTS	< 0.020	-	-	< 0.020	-
TPHCWG - Aromatic >EC10 - EC12 $_{EH\_CU\_1D\_AR}$	mg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
TPHCWG - Aromatic >EC10 - EC16 $_{EH\_CU\_1D\_AR}$	mg/kg	3	NONE	< 3.0	-	-	< 3.0	-
TPHCWG - Aromatic >EC12 - EC16 $_{EH\_CU\_1D\_AR}$	mg/kg	2	MCERTS	< 2.0	-	-	< 2.0	-
TPHCWG - Aromatic >EC16 - EC21 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	< 10	-	-	< 10	-
TPHCWG - Aromatic >EC16 - EC40 $_{EH\_CU\_1D\_AR}$	mg/kg	10	NONE	< 10	-	-	19	-
TPHCWG - Aromatic >EC21 - EC35 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	< 10	-	-	14	-
TPHCWG - Aromatic >EC35 - EC40 $_{EH\_CU\_1D\_AR}$	mg/kg	10	NONE	< 10	-	-	< 10	-
TPHCWG - Aromatic >EC5 - EC35 $_{EH\_CU+HS\_1D\_AR}$	mg/kg	10	NONE	< 10	-	-	14	-
TPHCWG - Aromatic >EC5 - EC40 $_{EH\_CU+HS\_1D\_AR}$	mg/kg	10	NONE	< 10	-	-	14	-
TPH Total >EC5 - EC40 $_{EH\_CU+HS\_1D\_TOTAL}$	mg/kg	10	NONE	< 10	-	-	14	-

Analytical Report Number: 25-006103
Project / Site name: Halsnead Gardens
Your Order No: 6137_C5980_MAS

Lab Sample Number				448233	448234	448235	448236	448237
Sample Reference				TP135	WS101	WS102	WS103	WS103
Sample Number				ES	D	D	ES	ES
Water Matrix				N/A	N/A	N/A	N/A	N/A
Depth (m)				0.10-0.70	0.40-1.70	2.00-2.45	0.10-0.60	0.60-1.20
Date Sampled				Deviating	Deviating	Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
VOCs								
MTBE (Methyl Tertiary Butyl Ether)	mg/kg	0.005	MCERTS	< 0.005	-	-	< 0.005	-
Benzene	mg/kg	0.005	MCERTS	< 0.005	-	-	< 0.005	-
Toluene	mg/kg	0.005	MCERTS	< 0.005	-	-	< 0.005	-
Ethylbenzene	mg/kg	0.005	MCERTS	< 0.005	-	-	< 0.005	-
p & m-xylene	mg/kg	0.008	MCERTS	< 0.008	-	-	< 0.008	-
o-Xylene	mg/kg	0.005	MCERTS	< 0.005	-	-	< 0.005	-
Total BTEX	mg/kg	0.01	NONE	< 0.010	-	-	< 0.010	-

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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Analytical Report Number: 25-006103
Project / Site name: Halsnead Gardens
Your Order No: 6137_C5980_MAS

Lab Sample Number				448238	448239	448240	448241	448242
Sample Reference				WS105	WS107	WS108	WS109A	WS109A
Sample Number				ES	D	D	ES	D
Water Matrix				N/A	N/A	N/A	N/A	N/A
Depth (m)				0.00-0.30	0.80-1.00	1.50-1.50	0.00-0.50	0.60-0.60
Date Sampled				Deviating	Deviating	Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	18	11	17	20	16
Total mass of sample received	kg	0.1	NONE	0.8	0.5	0.5	0.7	0.5
Asbestos								
Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	-	-	-	-	-
Asbestos Analyst ID	N/A	N/A	N/A	-	-	-	-	-
General Inorganics								
pH (L099)	pH Units	N/A	MCERTS	7.8	6.4	7.2	6.5	7.9
Total Sulphate as SO_4	%	0.005	MCERTS	-	-	0.016	-	0.012
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	7.6	5.7	38	44	9.5
Water Soluble SO_4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	3.79	-	19	21.9	4.77
Water Soluble SO_4 16hr extraction (2:1)	mg/l	1.25	MCERTS	-	2.87	-	-	-
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	-	-	1.7	-	1.7
Total Sulphur	mg/kg	50	MCERTS	-	-	84	-	59
Total Sulphur	%	0.005	MCERTS	-	-	0.008	-	0.006
Ammoniacal Nitrogen as NH_4^+	mg/kg	0.5	MCERTS	-	-	< 0.5	-	< 0.5
Ammonium as NH_4^+ (10:1 leachate equivalent)	mg/l	0.05	MCERTS	-	-	< 0.05	-	< 0.05
Organic Matter (automated)	%	0.1	MCERTS	3.3	-	-	3.3	-
Water Soluble Nitrate (2:1) as N	mg/kg	2	NONE	-	-	< 2.0	-	< 2.0
Water Soluble Nitrate (2:1) as N (leachate equivalent)	mg/l	2	NONE	-	-	< 2.0	-	< 2.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	-	-	< 0.05	-
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	-	-	< 0.05	-
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	-	-	< 0.05	-
Fluorene	mg/kg	0.05	MCERTS	< 0.05	-	-	< 0.05	-
Phenanthrene	mg/kg	0.05	MCERTS	0.05	-	-	0.09	-
Anthracene	mg/kg	0.05	MCERTS	< 0.05	-	-	< 0.05	-
Fluoranthene	mg/kg	0.05	MCERTS	0.08	-	-	0.11	-
Pyrene	mg/kg	0.05	MCERTS	0.08	-	-	0.1	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	-	-	< 0.05	-
Chrysene	mg/kg	0.05	MCERTS	0.06	-	-	0.09	-
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	0.07	-	-	0.07	-
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	-	-	< 0.05	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	-	-	< 0.05	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	-	-	< 0.05	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	-	-	< 0.05	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	-	-	< 0.05	-
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	< 0.80	-	-	< 0.80	-

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Analytical Report Number: 25-006103
Project / Site name: Halsnead Gardens
Your Order No: 6137_C5980_MAS

Lab Sample Number				448238	448239	448240	448241	448242
Sample Reference				WS105	WS107	WS108	WS109A	WS109A
Sample Number				ES	D	D	ES	D
Water Matrix				N/A	N/A	N/A	N/A	N/A
Depth (m)				0.00-0.30	0.80-1.00	1.50-1.50	0.00-0.50	0.60-0.60
Date Sampled				Deviating	Deviating	Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	13	-	-	15	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.9	-	-	0.9	-
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	-	-	< 1.8	-
Chromium (III)	mg/kg	1	NONE	20	-	-	21	-
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	20	-	-	22	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	50	-	-	68	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	46	-	-	53	-
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	-	-	< 0.3	-
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	19	-	-	27	-
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	-	-	1.2	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	89	-	-	81	-
Magnesium (leachate equivalent)	mg/l	2.5	NONE	-	-	2.6	-	< 2.5
Magnesium (water soluble)	mg/kg	5	NONE	-	-	5.2	-	< 5.0
Petroleum Hydrocarbons								
TPHCWG - Aliphatic >EC5 - EC6 $_{HS\_1D\_AL}$	mg/kg	0.01	MCERTS	-	-	-	-	-
TPHCWG - Aliphatic >EC5 - EC10 $_{HS\_1D\_AL}$	mg/kg	1	NONE	-	-	-	-	-
TPHCWG - Aliphatic >EC6 - EC8 $_{HS\_1D\_AL}$	mg/kg	0.01	MCERTS	-	-	-	-	-
TPHCWG - Aliphatic >EC8 - EC10 $_{HS\_1D\_AL}$	mg/kg	0.01	MCERTS	-	-	-	-	-
TPHCWG - Aliphatic >EC10 - EC12 $_{EH\_CU\_1D\_AL}$	mg/kg	1	MCERTS	-	-	-	-	-
TPHCWG - Aliphatic >EC10 - EC16 $_{EH\_CU\_1D\_AL}$	mg/kg	3	NONE	-	-	-	-	-
TPHCWG - Aliphatic >EC12 - EC16 $_{EH\_CU\_1D\_AL}$	mg/kg	2	MCERTS	-	-	-	-	-
TPHCWG - Aliphatic >EC16 - EC21 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	-	-	-	-	-
TPHCWG - Aliphatic >EC16 - EC35 $_{EH\_CU\_1D\_AL}$	mg/kg	10	MCERTS	-	-	-	-	-
TPHCWG - Aliphatic >EC16 - EC40 $_{EH\_CU\_1D\_AL}$	mg/kg	10	NONE	-	-	-	-	-
TPHCWG - Aliphatic >EC21 - EC35 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	-	-	-	-	-
TPHCWG - Aliphatic >EC35 - EC40 $_{EH\_CU\_1D\_AL}$	mg/kg	10	NONE	-	-	-	-	-
TPHCWG - Aliphatic >EC5 - EC35 $_{EH\_CU+HS\_1D\_AL}$	mg/kg	10	NONE	-	-	-	-	-
TPHCWG - Aliphatic >EC5 - EC40 $_{EH\_CU+HS\_1D\_AL}$	mg/kg	10	NONE	-	-	-	-	-
TPHCWG - Aromatic >EC5 - EC7 $_{HS\_1D\_AR}$	mg/kg	0.01	MCERTS	-	-	-	-	-
TPHCWG - Aromatic >EC5 - EC10 $_{HS\_1D\_AR}$	mg/kg	1	NONE	-	-	-	-	-
TPHCWG - Aromatic >EC7 - EC8 $_{HS\_1D\_AR}$	mg/kg	0.01	MCERTS	-	-	-	-	-
TPHCWG - Aromatic >EC8 - EC10 $_{HS\_1D\_AR}$	mg/kg	0.02	MCERTS	-	-	-	-	-
TPHCWG - Aromatic >EC10 - EC12 $_{EH\_CU\_1D\_AR}$	mg/kg	1	MCERTS	-	-	-	-	-
TPHCWG - Aromatic >EC10 - EC16 $_{EH\_CU\_1D\_AR}$	mg/kg	3	NONE	-	-	-	-	-
TPHCWG - Aromatic >EC12 - EC16 $_{EH\_CU\_1D\_AR}$	mg/kg	2	MCERTS	-	-	-	-	-
TPHCWG - Aromatic >EC16 - EC21 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	-	-	-	-	-
TPHCWG - Aromatic >EC16 - EC40 $_{EH\_CU\_1D\_AR}$	mg/kg	10	NONE	-	-	-	-	-
TPHCWG - Aromatic >EC21 - EC35 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	-	-	-	-	-
TPHCWG - Aromatic >EC35 - EC40 $_{EH\_CU\_1D\_AR}$	mg/kg	10	NONE	-	-	-	-	-
TPHCWG - Aromatic >EC5 - EC35 $_{EH\_CU+HS\_1D\_AR}$	mg/kg	10	NONE	-	-	-	-	-
TPHCWG - Aromatic >EC5 - EC40 $_{EH\_CU+HS\_1D\_AR}$	mg/kg	10	NONE	-	-	-	-	-
TPH Total >EC5 - EC40 $_{EH\_CU+HS\_1D\_TOTAL}$	mg/kg	10	NONE	-	-	-	-	-

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Analytical Report Number: 25-006103
Project / Site name: Halsnead Gardens
Your Order No: 6137_C5980_MAS

Lab Sample Number				448238	448239	448240	448241	448242
Sample Reference				WS105	WS107	WS108	WS109A	WS109A
Sample Number				ES	D	D	ES	D
Water Matrix				N/A	N/A	N/A	N/A	N/A
Depth (m)				0.00-0.30	0.80-1.00	1.50-1.50	0.00-0.50	0.60-0.60
Date Sampled				Deviating	Deviating	Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
VOCs								
MTBE (Methyl Tertiary Butyl Ether)	mg/kg	0.005	MCERTS	-	-	-	-	-
Benzene	mg/kg	0.005	MCERTS	-	-	-	-	-
Toluene	mg/kg	0.005	MCERTS	-	-	-	-	-
Ethylbenzene	mg/kg	0.005	MCERTS	-	-	-	-	-
p & m-xylene	mg/kg	0.008	MCERTS	-	-	-	-	-
o-Xylene	mg/kg	0.005	MCERTS	-	-	-	-	-
Total BTEX	mg/kg	0.01	NONE	-	-	-	-	-

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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Analytical Report Number: 25-006103
Project / Site name: Halsnead Gardens
Your Order No: 6137_C5980_MAS

Lab Sample Number				448243	448244	448245	448246
Sample Reference				WS110	WS111	WS112	WS112
Sample Number				ES	D	D	D
Water Matrix				N/A	N/A	N/A	N/A
Depth (m)				0.00-0.40	0.50-0.50	0.50-0.50	1.50-1.50
Date Sampled				Deviating	Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**				
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	20	17	18	15
Total mass of sample received	kg	0.1	NONE	0.8	0.5	0.5	0.5
Asbestos							
Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	-	-	-	-
Asbestos Analyst ID	N/A	N/A	N/A	-	-	-	-
General Inorganics							
pH (L099)	pH Units	N/A	MCERTS	6.7	6.4	6.9	7.4
Total Sulphate as SO_4	%	0.005	MCERTS	-	-	-	-
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	11	8.9	11	26
Water Soluble SO_4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	5.68	4.47	-	13
Water Soluble SO_4 16hr extraction (2:1)	mg/l	1.25	MCERTS	-	-	5.53	-
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	-	-	-	-
Total Sulphur	mg/kg	50	MCERTS	-	-	-	-
Total Sulphur	%	0.005	MCERTS	-	-	-	-
Ammoniacal Nitrogen as NH_4^+	mg/kg	0.5	MCERTS	-	-	-	-
Ammonium as NH_4^+ (10:1 leachate equivalent)	mg/l	0.05	MCERTS	-	-	-	-
Organic Matter (automated)	%	0.1	MCERTS	2.6	1.3	-	0.8
Water Soluble Nitrate (2:1) as N	mg/kg	2	NONE	-	-	-	-
Water Soluble Nitrate (2:1) as N (leachate equivalent)	mg/l	2	NONE	-	-	-	-
Speciated PAHs							
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	< 0.05	-	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	< 0.05	-	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05
Total PAH							
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	< 0.80	< 0.80	-	< 0.80

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Analytical Report Number: 25-006103
Project / Site name: Halsnead Gardens
Your Order No: 6137_C5980_MAS

Lab Sample Number				448243	448244	448245	448246
Sample Reference				WS110	WS111	WS112	WS112
Sample Number				ES	D	D	D
Water Matrix				N/A	N/A	N/A	N/A
Depth (m)				0.00-0.40	0.50-0.50	0.50-0.50	1.50-1.50
Date Sampled				Deviating	Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**				
Heavy Metals / Metalloids							
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	8	6.2	-	4.6
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.4	0.2	-	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	-	< 1.8
Chromium (III)	mg/kg	1	NONE	17	14	-	32
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	18	15	-	32
Copper (aqua regia extractable)	mg/kg	1	MCERTS	31	25	-	19
Lead (aqua regia extractable)	mg/kg	1	MCERTS	24	12	-	8.5
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	-	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	13	15	-	39
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	-	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	44	42	-	43
Magnesium (leachate equivalent)	mg/l	2.5	NONE	-	-	-	-
Magnesium (water soluble)	mg/kg	5	NONE	-	-	-	-
Petroleum Hydrocarbons							
TPHCWG - Aliphatic >EC5 - EC6 $_{HS\_1D\_AL}$	mg/kg	0.01	MCERTS	-	-	-	-
TPHCWG - Aliphatic >EC5 - EC10 $_{HS\_1D\_AL}$	mg/kg	1	NONE	-	-	-	-
TPHCWG - Aliphatic >EC6 - EC8 $_{HS\_1D\_AL}$	mg/kg	0.01	MCERTS	-	-	-	-
TPHCWG - Aliphatic >EC8 - EC10 $_{HS\_1D\_AL}$	mg/kg	0.01	MCERTS	-	-	-	-
TPHCWG - Aliphatic >EC10 - EC12 $_{EH\_CU\_1D\_AL}$	mg/kg	1	MCERTS	-	-	-	-
TPHCWG - Aliphatic >EC10 - EC16 $_{EH\_CU\_1D\_AL}$	mg/kg	3	NONE	-	-	-	-
TPHCWG - Aliphatic >EC12 - EC16 $_{EH\_CU\_1D\_AL}$	mg/kg	2	MCERTS	-	-	-	-
TPHCWG - Aliphatic >EC16 - EC21 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	-	-	-	-
TPHCWG - Aliphatic >EC16 - EC35 $_{EH\_CU\_1D\_AL}$	mg/kg	10	MCERTS	-	-	-	-
TPHCWG - Aliphatic >EC16 - EC40 $_{EH\_CU\_1D\_AL}$	mg/kg	10	NONE	-	-	-	-
TPHCWG - Aliphatic >EC21 - EC35 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	-	-	-	-
TPHCWG - Aliphatic >EC35 - EC40 $_{EH\_CU\_1D\_AL}$	mg/kg	10	NONE	-	-	-	-
TPHCWG - Aliphatic >EC5 - EC35 $_{EH\_CU+HS\_1D\_AL}$	mg/kg	10	NONE	-	-	-	-
TPHCWG - Aliphatic >EC5 - EC40 $_{EH\_CU+HS\_1D\_AL}$	mg/kg	10	NONE	-	-	-	-
TPHCWG - Aromatic >EC5 - EC7 $_{HS\_1D\_AR}$	mg/kg	0.01	MCERTS	-	-	-	-
TPHCWG - Aromatic >EC5 - EC10 $_{HS\_1D\_AR}$	mg/kg	1	NONE	-	-	-	-
TPHCWG - Aromatic >EC7 - EC8 $_{HS\_1D\_AR}$	mg/kg	0.01	MCERTS	-	-	-	-
TPHCWG - Aromatic >EC8 - EC10 $_{HS\_1D\_AR}$	mg/kg	0.02	MCERTS	-	-	-	-
TPHCWG - Aromatic >EC10 - EC12 $_{EH\_CU\_1D\_AR}$	mg/kg	1	MCERTS	-	-	-	-
TPHCWG - Aromatic >EC10 - EC16 $_{EH\_CU\_1D\_AR}$	mg/kg	3	NONE	-	-	-	-
TPHCWG - Aromatic >EC12 - EC16 $_{EH\_CU\_1D\_AR}$	mg/kg	2	MCERTS	-	-	-	-
TPHCWG - Aromatic >EC16 - EC21 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	-	-	-	-
TPHCWG - Aromatic >EC16 - EC40 $_{EH\_CU\_1D\_AR}$	mg/kg	10	NONE	-	-	-	-
TPHCWG - Aromatic >EC21 - EC35 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	-	-	-	-
TPHCWG - Aromatic >EC35 - EC40 $_{EH\_CU\_1D\_AR}$	mg/kg	10	NONE	-	-	-	-
TPHCWG - Aromatic >EC5 - EC35 $_{EH\_CU+HS\_1D\_AR}$	mg/kg	10	NONE	-	-	-	-
TPHCWG - Aromatic >EC5 - EC40 $_{EH\_CU+HS\_1D\_AR}$	mg/kg	10	NONE	-	-	-	-
TPH Total >EC5 - EC40 $_{EH\_CU+HS\_1D\_TOTAL}$	mg/kg	10	NONE	-	-	-	-

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Analytical Report Number: 25-006103
Project / Site name: Halsnead Gardens
Your Order No: 6137_C5980_MAS

Lab Sample Number				448243	448244	448245	448246
Sample Reference				WS110	WS111	WS112	WS112
Sample Number				ES	D	D	D
Water Matrix				N/A	N/A	N/A	N/A
Depth (m)				0.00-0.40	0.50-0.50	0.50-0.50	1.50-1.50
Date Sampled				Deviating	Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**				
VOCs							
MTBE (Methyl Tertiary Butyl Ether)	mg/kg	0.005	MCERTS	-	-	-	-
Benzene	mg/kg	0.005	MCERTS	-	-	-	-
Toluene	mg/kg	0.005	MCERTS	-	-	-	-
Ethylbenzene	mg/kg	0.005	MCERTS	-	-	-	-
p & m-xylene	mg/kg	0.008	MCERTS	-	-	-	-
o-Xylene	mg/kg	0.005	MCERTS	-	-	-	-
Total BTEX	mg/kg	0.01	NONE	-	-	-	-

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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Analytical Report Number : 25-006103
Project / Site name: Halsnead Gardens

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
448218	TP101	ES	0.10-0.40	Brown loam and clay with gravel and vegetation
448219	TP103	ES	0.60-1.80	Brown clay and sand
448220	TP106	D	0.50-2.30	Brown clay and sand with gravel
448221	TP107	ES	0.30-0.70	Brown loam and sand with gravel and vegetation
448222	TP112	ES	0.30-0.70	Brown clay and sand with gravel
448223	TP115	D	0.50-2.10	Brown clay and sand
448224	TP117	ES	0.10-0.40	Brown clay and loam with vegetation
448225	TP120	ES	0.40-2.00	Brown clay and sand
448226	TP124	D	1.60-2.00	Brown clay and sand
448227	TP125	ES	0.10-0.30	Brown clay and loam with vegetation
448228	TP126	D	1.20-2.80	Brown sand with gravel
448229	TP127	D	0.90-2.15	Brown clay and sand
448230	TP130	D	0.40-2.30	Brown clay and sand
448231	TP131	D	0.60-1.60	Brown clay and sand
448232	TP133	ES	0.10-0.30	Brown clay and loam with vegetation
448233	TP135	ES	0.10-0.70	Brown clay and loam with vegetation
448234	WS101	D	0.40-1.70	Brown clay
448235	WS102	D	2.00-2.45	Brown clay
448236	WS103	ES	0.10-0.60	Brown loam and sand with gravel and vegetation
448237	WS103	ES	0.60-1.20	Brown clay and loam with gravel and vegetation
448238	WS105	ES	0.00-0.30	Brown clay and loam with vegetation
448239	WS107	D	0.80-1.00	Brown clay and sand with vegetation
448240	WS108	D	1.50-1.50	Brown clay and sand with vegetation
448241	WS109A	ES	0.00-0.50	Brown clay and loam with gravel and vegetation
448242	WS109A	D	0.60-0.60	Brown clay and sand
448243	WS110	ES	0.00-0.40	Brown clay and loam with gravel and vegetation
448244	WS111	D	0.50-0.50	Brown clay and loam with gravel and vegetation
448245	WS112	D	0.50-0.50	Brown clay and loam with gravel and vegetation
448246	WS112	D	1.50-1.50	Brown clay

Analytical Report Number : 25-006103
Project / Site name: Halsnead Gardens

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters Heating/Cooling (PrW) DI Process Water (DI PrW)
Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in Soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques	In-house method based on HSG 248, 2021	A001B	D	ISO 17025
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L038B	D	MCERTS
Magnesium, water soluble, in soil	Determination of water soluble magnesium by extraction with water followed by ICP-OES	In-house method based on TRL 447	L038B	D	NONE
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES	In-house method	L038B	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Sulphate, water soluble, in soil (16hr extraction)	In-house method	L038B	D	MCERTS
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES	In-house method	L038B	D	MCERTS
BTEX and/or Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS	In-house method based on USEPA 8260	L073B	W	MCERTS
Speciated PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	MCERTS
Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS with carbon banding aliphatic and aromatic	In-house method	L076B/L088-PL	D/W	MCERTS
Water Soluble Nitrate (2:1) as N in soil	Determination of nitrate by reaction with sodium salicylate and colorimetry	In-house method based on Examination of Water and Wastewatern & Polish Standard Method PN-82/C-04579.08, 2:1 extraction	L078-PL	W	NONE
Chromium III in soil	In-house method by calculation from total Cr and Cr VI	In-house method by calculation	L080-PL/L130B	W	NONE
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazide followed by colorimetry	In-house method	L080-PL	W	MCERTS
Chloride, water soluble, in soil	Determination of Chloride colorimetrically by discrete analyser	In-house method	L082B	D	MCERTS

Analytical Report Number : 25-006103
Project / Site name: Halsnead Gardens

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters Heating/Cooling (PrW) DI Process Water (DI PrW)
Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Ammonium as NH4 in soil	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the colorimetric salicylate/nitroprusside method, 10:1 water extraction.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082B	W	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement	In-house method	L099-PL	D	MCERTS

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL' or 'B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Quality control parameter failure associated with individual result applies to calculated sum of individuals.
The result for sum should be interpreted with caution

Analytical Report Number : 25-006103
Project / Site name: Halsnead Gardens

This deviation report indicates the sample and test deviations that apply to the samples submitted for analysis.Please note that the associated result(s) may be unreliable and should be interpreted with care.

Key: a - No sampling date b - Incorrect container c - Holding time d - Headspace e - Temperature

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
TP101	ES	S	448218	a	Moisture Content	L019B	a
TP101	ES	S	448218	a	Sample preparation	L019B	a
TP101	ES	S	448218	a	Soil Descriptions	L019B	a
TP101	ES	S	448218	a	Stones content of soil	L019B	a
TP101	ES	S	448218	a	Sulphate, water soluble, in soil (16hr extraction)	L038B	a
TP101	ES	S	448218	a	pH in soil (automated)	L099-PL	a
TP103	ES	S	448219	a	Moisture Content	L019B	a
TP103	ES	S	448219	a	Sample preparation	L019B	a
TP103	ES	S	448219	a	Soil Descriptions	L019B	a
TP103	ES	S	448219	a	Stones content of soil	L019B	a
TP103	ES	S	448219	a	Sulphate, water soluble, in soil (16hr extraction)	L038B	a
TP103	ES	S	448219	a	pH in soil (automated)	L099-PL	a
TP106	D	S	448220	a	Ammonium as NH4 in soil	L082B	a
TP106	D	S	448220	a	Chloride, water soluble, in soil	L082B	a
TP106	D	S	448220	a	Magnesium, water soluble, in soil	L038B	a
TP106	D	S	448220	a	Moisture Content	L019B	a
TP106	D	S	448220	a	Sample preparation	L019B	a
TP106	D	S	448220	a	Soil Descriptions	L019B	a
TP106	D	S	448220	a	Stones content of soil	L019B	a
TP106	D	S	448220	a	Sulphate, water soluble, in soil (16hr extraction)	L038B	a
TP106	D	S	448220	a	Total Sulphur in soil	L038B	a
TP106	D	S	448220	a	Total sulphate (as SO4 in soil)	L038B	a
TP106	D	S	448220	a	Water Soluble Nitrate (2:1) as N in soil	L078-PL	a
TP106	D	S	448220	a	pH in soil (automated)	L099-PL	a
TP107	ES	S	448221	a	Asbestos identification in Soil	A001B	a
TP107	ES	S	448221	a	Asbestos types if id positive	N/A	a
TP107	ES	S	448221	a	BTEX and/or Volatile organic compounds in soil	L073B	a
TP107	ES	S	448221	a	Chromium III in soil	L080-PL/L130B	a
TP107	ES	S	448221	a	Hexavalent chromium in soil	L080-PL	a
TP107	ES	S	448221	a	Metals in soil by ICP-OES	L038B	a
TP107	ES	S	448221	a	Moisture Content	L019B	a
TP107	ES	S	448221	a	Organic matter (Automated) in soil	L009B	a
TP107	ES	S	448221	a	Sample preparation	L019B	a
TP107	ES	S	448221	a	Soil Descriptions	L019B	a
TP107	ES	S	448221	a	Speciated PAHs and/or Semi-volatile organic compounds in soil	L064B	a
TP107	ES	S	448221	a	Stones content of soil	L019B	a
TP107	ES	S	448221	a	Sulphate, water soluble, in soil (16hr extraction)	L038B	a
TP107	ES	S	448221	a	Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil	L076B/L088-PL	a
TP107	ES	S	448221	a	pH in soil (automated)	L099-PL	a
TP112	ES	S	448222	a	Chromium III in soil	L080-PL/L130B	a
TP112	ES	S	448222	a	Hexavalent chromium in soil	L080-PL	a
TP112	ES	S	448222	a	Metals in soil by ICP-OES	L038B	a
TP112	ES	S	448222	a	Moisture Content	L019B	a
TP112	ES	S	448222	a	Organic matter (Automated) in soil	L009B	a
TP112	ES	S	448222	a	Sample preparation	L019B	a
TP112	ES	S	448222	a	Soil Descriptions	L019B	a
TP112	ES	S	448222	a	Speciated PAHs and/or Semi-volatile organic compounds in soil	L064B	a
TP112	ES	S	448222	a	Stones content of soil	L019B	a
TP112	ES	S	448222	a	Sulphate, water soluble, in soil (16hr extraction)	L038B	a
TP112	ES	S	448222	a	pH in soil (automated)	L099-PL	a
TP115	D	S	448223	ab	Chromium III in soil	L080-PL/L130B	a
TP115	D	S	448223	ab	Hexavalent chromium in soil	L080-PL	a
TP115	D	S	448223	ab	Metals in soil by ICP-OES	L038B	a
TP115	D	S	448223	ab	Moisture Content	L019B	a
TP115	D	S	448223	ab	Organic matter (Automated) in soil	L009B	a
TP115	D	S	448223	ab	Sample preparation	L019B	a
TP115	D	S	448223	ab	Soil Descriptions	L019B	a
TP115	D	S	448223	ab	Speciated PAHs and/or Semi-volatile organic compounds in soil	L064B	ab

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Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
TP115	D	S	448223	ab	Stones content of soil	L019B	a
TP115	D	S	448223	ab	Sulphate, water soluble, in soil (16hr extraction)	L038B	a
TP115	D	S	448223	ab	pH in soil (automated)	L099-PL	a
TP117	ES	S	448224	a	Chromium III in soil	L080-PL/L130B	a
TP117	ES	S	448224	a	Hexavalent chromium in soil	L080-PL	a
TP117	ES	S	448224	a	Metals in soil by ICP-OES	L038B	a
TP117	ES	S	448224	a	Moisture Content	L019B	a
TP117	ES	S	448224	a	Organic matter (Automated) in soil	L009B	a
TP117	ES	S	448224	a	Sample preparation	L019B	a
TP117	ES	S	448224	a	Soil Descriptions	L019B	a
TP117	ES	S	448224	a	Speciated PAHs and/or Semi-volatile organic compounds in soil	L064B	a
TP117	ES	S	448224	a	Stones content of soil	L019B	a
TP117	ES	S	448224	a	Sulphate, water soluble, in soil (16hr extraction)	L038B	a
TP117	ES	S	448224	a	pH in soil (automated)	L099-PL	a
TP120	ES	S	448225	a	Moisture Content	L019B	a
TP120	ES	S	448225	a	Sample preparation	L019B	a
TP120	ES	S	448225	a	Soil Descriptions	L019B	a
TP120	ES	S	448225	a	Stones content of soil	L019B	a
TP120	ES	S	448225	a	Sulphate, water soluble, in soil (16hr extraction)	L038B	a
TP120	ES	S	448225	a	pH in soil (automated)	L099-PL	a
TP124	D	S	448226	a	Moisture Content	L019B	a
TP124	D	S	448226	a	Sample preparation	L019B	a
TP124	D	S	448226	a	Soil Descriptions	L019B	a
TP124	D	S	448226	a	Stones content of soil	L019B	a
TP124	D	S	448226	a	Sulphate, water soluble, in soil (16hr extraction)	L038B	a
TP124	D	S	448226	a	pH in soil (automated)	L099-PL	a
TP125	ES	S	448227	a	Asbestos identification in Soil	A001B	a
TP125	ES	S	448227	a	Asbestos types if id positive	N/A	a
TP125	ES	S	448227	a	BTEX and/or Volatile organic compounds in soil	L073B	a
TP125	ES	S	448227	a	Chromium III in soil	L080-PL/L130B	a
TP125	ES	S	448227	a	Hexavalent chromium in soil	L080-PL	a
TP125	ES	S	448227	a	Metals in soil by ICP-OES	L038B	a
TP125	ES	S	448227	a	Moisture Content	L019B	a
TP125	ES	S	448227	a	Organic matter (Automated) in soil	L009B	a
TP125	ES	S	448227	a	Sample preparation	L019B	a
TP125	ES	S	448227	a	Soil Descriptions	L019B	a
TP125	ES	S	448227	a	Speciated PAHs and/or Semi-volatile organic compounds in soil	L064B	a
TP125	ES	S	448227	a	Stones content of soil	L019B	a
TP125	ES	S	448227	a	Sulphate, water soluble, in soil (16hr extraction)	L038B	a
TP125	ES	S	448227	a	Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil	L076B/L088-PL	a
TP125	ES	S	448227	a	pH in soil (automated)	L099-PL	a
TP126	D	S	448228	a	Moisture Content	L019B	a
TP126	D	S	448228	a	Sample preparation	L019B	a
TP126	D	S	448228	a	Soil Descriptions	L019B	a
TP126	D	S	448228	a	Stones content of soil	L019B	a
TP126	D	S	448228	a	Sulphate, water soluble, in soil (16hr extraction)	L038B	a
TP126	D	S	448228	a	pH in soil (automated)	L099-PL	a
TP127	D	S	448229	a	Ammonium as NH4 in soil	L082B	a
TP127	D	S	448229	a	Chloride, water soluble, in soil	L082B	a
TP127	D	S	448229	a	Magnesium, water soluble, in soil	L038B	a
TP127	D	S	448229	a	Moisture Content	L019B	a
TP127	D	S	448229	a	Sample preparation	L019B	a
TP127	D	S	448229	a	Soil Descriptions	L019B	a
TP127	D	S	448229	a	Stones content of soil	L019B	a
TP127	D	S	448229	a	Sulphate, water soluble, in soil (16hr extraction)	L038B	a
TP127	D	S	448229	a	Total Sulphur in soil	L038B	a
TP127	D	S	448229	a	Total sulphate (as SO4 in soil)	L038B	a
TP127	D	S	448229	a	Water Soluble Nitrate (2:1) as N in soil	L078-PL	a

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Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
TP127	D	S	448229	a	pH in soil (automated)	L099-PL	a
TP130	D	S	448230	a	Ammonium as NH4 in soil	L082B	a
TP130	D	S	448230	a	Chloride, water soluble, in soil	L082B	a
TP130	D	S	448230	a	Magnesium, water soluble, in soil	L038B	a
TP130	D	S	448230	a	Moisture Content	L019B	a
TP130	D	S	448230	a	Sample preparation	L019B	a
TP130	D	S	448230	a	Soil Descriptions	L019B	a
TP130	D	S	448230	a	Stones content of soil	L019B	a
TP130	D	S	448230	a	Sulphate, water soluble, in soil (16hr extraction)	L038B	a
TP130	D	S	448230	a	Total Sulphur in soil	L038B	a
TP130	D	S	448230	a	Total sulphate (as SO4 in soil)	L038B	a
TP130	D	S	448230	a	Water Soluble Nitrate (2:1) as N in soil	L078-PL	a
TP130	D	S	448230	a	pH in soil (automated)	L099-PL	a
TP131	D	S	448231	a	Moisture Content	L019B	a
TP131	D	S	448231	a	Sample preparation	L019B	a
TP131	D	S	448231	a	Soil Descriptions	L019B	a
TP131	D	S	448231	a	Stones content of soil	L019B	a
TP131	D	S	448231	a	Sulphate, water soluble, in soil (16hr extraction)	L038B	a
TP131	D	S	448231	a	pH in soil (automated)	L099-PL	a
TP133	ES	S	448232	a	Asbestos identification in Soil	A001B	a
TP133	ES	S	448232	a	Asbestos types if id positive	N/A	a
TP133	ES	S	448232	a	BTEX and/or Volatile organic compounds in soil	L073B	a
TP133	ES	S	448232	a	Chromium III in soil	L080-PL/L130B	a
TP133	ES	S	448232	a	Hexavalent chromium in soil	L080-PL	a
TP133	ES	S	448232	a	Metals in soil by ICP-OES	L038B	a
TP133	ES	S	448232	a	Moisture Content	L019B	a
TP133	ES	S	448232	a	Organic matter (Automated) in soil	L009B	a
TP133	ES	S	448232	a	Sample preparation	L019B	a
TP133	ES	S	448232	a	Soil Descriptions	L019B	a
TP133	ES	S	448232	a	Speciated PAHs and/or Semi-volatile organic compounds in soil	L064B	a
TP133	ES	S	448232	a	Stones content of soil	L019B	a
TP133	ES	S	448232	a	Sulphate, water soluble, in soil (16hr extraction)	L038B	a
TP133	ES	S	448232	a	Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil	L076B/L088-PL	a
TP133	ES	S	448232	a	pH in soil (automated)	L099-PL	a
TP135	ES	S	448233	a	Asbestos identification in Soil	A001B	a
TP135	ES	S	448233	a	Asbestos types if id positive	N/A	a
TP135	ES	S	448233	a	BTEX and/or Volatile organic compounds in soil	L073B	a
TP135	ES	S	448233	a	Chromium III in soil	L080-PL/L130B	a
TP135	ES	S	448233	a	Hexavalent chromium in soil	L080-PL	a
TP135	ES	S	448233	a	Metals in soil by ICP-OES	L038B	a
TP135	ES	S	448233	a	Moisture Content	L019B	a
TP135	ES	S	448233	a	Organic matter (Automated) in soil	L009B	a
TP135	ES	S	448233	a	Sample preparation	L019B	a
TP135	ES	S	448233	a	Soil Descriptions	L019B	a
TP135	ES	S	448233	a	Speciated PAHs and/or Semi-volatile organic compounds in soil	L064B	a
TP135	ES	S	448233	a	Stones content of soil	L019B	a
TP135	ES	S	448233	a	Sulphate, water soluble, in soil (16hr extraction)	L038B	a
TP135	ES	S	448233	a	Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil	L076B/L088-PL	a
TP135	ES	S	448233	a	pH in soil (automated)	L099-PL	a
WS101	D	S	448234	a	Moisture Content	L019B	a
WS101	D	S	448234	a	Sample preparation	L019B	a
WS101	D	S	448234	a	Soil Descriptions	L019B	a
WS101	D	S	448234	a	Stones content of soil	L019B	a
WS101	D	S	448234	a	Sulphate, water soluble, in soil (16hr extraction)	L038B	a
WS101	D	S	448234	a	pH in soil (automated)	L099-PL	a
WS102	D	S	448235	a	Moisture Content	L019B	a
WS102	D	S	448235	a	Sample preparation	L019B	a
WS102	D	S	448235	a	Soil Descriptions	L019B	a

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Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
WS102	D	S	448235	a	Stones content of soil	L019B	a
WS102	D	S	448235	a	Sulphate, water soluble, in soil (16hr extraction)	L038B	a
WS102	D	S	448235	a	pH in soil (automated)	L099-PL	a
WS103	ES	S	448236	a	Asbestos identification in Soil	A001B	a
WS103	ES	S	448236	a	Asbestos types if id positive	N/A	a
WS103	ES	S	448236	a	BTEX and/or Volatile organic compounds in soil	L073B	a
WS103	ES	S	448236	a	Chromium III in soil	L080-PL/L130B	a
WS103	ES	S	448236	a	Hexavalent chromium in soil	L080-PL	a
WS103	ES	S	448236	a	Metals in soil by ICP-OES	L038B	a
WS103	ES	S	448236	a	Moisture Content	L019B	a
WS103	ES	S	448236	a	Organic matter (Automated) in soil	L009B	a
WS103	ES	S	448236	a	Sample preparation	L019B	a
WS103	ES	S	448236	a	Soil Descriptions	L019B	a
WS103	ES	S	448236	a	Speciated PAHs and/or Semi-volatile organic compounds in soil	L064B	a
WS103	ES	S	448236	a	Stones content of soil	L019B	a
WS103	ES	S	448236	a	Sulphate, water soluble, in soil (16hr extraction)	L038B	a
WS103	ES	S	448236	a	Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil	L076B/L088-PL	a
WS103	ES	S	448236	a	pH in soil (automated)	L099-PL	a
WS103	ES	S	448237	a	Chromium III in soil	L080-PL/L130B	a
WS103	ES	S	448237	a	Hexavalent chromium in soil	L080-PL	a
WS103	ES	S	448237	a	Metals in soil by ICP-OES	L038B	a
WS103	ES	S	448237	a	Moisture Content	L019B	a
WS103	ES	S	448237	a	Organic matter (Automated) in soil	L009B	a
WS103	ES	S	448237	a	Sample preparation	L019B	a
WS103	ES	S	448237	a	Soil Descriptions	L019B	a
WS103	ES	S	448237	a	Speciated PAHs and/or Semi-volatile organic compounds in soil	L064B	a
WS103	ES	S	448237	a	Stones content of soil	L019B	a
WS103	ES	S	448237	a	Sulphate, water soluble, in soil (16hr extraction)	L038B	a
WS103	ES	S	448237	a	pH in soil (automated)	L099-PL	a
WS105	ES	S	448238	a	Chromium III in soil	L080-PL/L130B	a
WS105	ES	S	448238	a	Hexavalent chromium in soil	L080-PL	a
WS105	ES	S	448238	a	Metals in soil by ICP-OES	L038B	a
WS105	ES	S	448238	a	Moisture Content	L019B	a
WS105	ES	S	448238	a	Organic matter (Automated) in soil	L009B	a
WS105	ES	S	448238	a	Sample preparation	L019B	a
WS105	ES	S	448238	a	Soil Descriptions	L019B	a
WS105	ES	S	448238	a	Speciated PAHs and/or Semi-volatile organic compounds in soil	L064B	a
WS105	ES	S	448238	a	Stones content of soil	L019B	a
WS105	ES	S	448238	a	Sulphate, water soluble, in soil (16hr extraction)	L038B	a
WS105	ES	S	448238	a	pH in soil (automated)	L099-PL	a
WS107	D	S	448239	a	Moisture Content	L019B	a
WS107	D	S	448239	a	Sample preparation	L019B	a
WS107	D	S	448239	a	Soil Descriptions	L019B	a
WS107	D	S	448239	a	Stones content of soil	L019B	a
WS107	D	S	448239	a	Sulphate, water soluble, in soil (16hr extraction)	L038B	a
WS107	D	S	448239	a	pH in soil (automated)	L099-PL	a
WS108	D	S	448240	a	Ammonium as NH4 in soil	L082B	a
WS108	D	S	448240	a	Chloride, water soluble, in soil	L082B	a
WS108	D	S	448240	a	Magnesium, water soluble, in soil	L038B	a
WS108	D	S	448240	a	Moisture Content	L019B	a
WS108	D	S	448240	a	Sample preparation	L019B	a
WS108	D	S	448240	a	Soil Descriptions	L019B	a
WS108	D	S	448240	a	Stones content of soil	L019B	a
WS108	D	S	448240	a	Sulphate, water soluble, in soil (16hr extraction)	L038B	a
WS108	D	S	448240	a	Total Sulphur in soil	L038B	a
WS108	D	S	448240	a	Total sulphate (as SO4 in soil)	L038B	a
WS108	D	S	448240	a	Water Soluble Nitrate (2:1) as N in soil	L078-PL	a
WS108	D	S	448240	a	pH in soil (automated)	L099-PL	a

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Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
WS109A	D	S	448242	a	Ammonium as NH4 in soil	L082B	a
WS109A	D	S	448242	a	Chloride, water soluble, in soil	L082B	a
WS109A	D	S	448242	a	Magnesium, water soluble, in soil	L038B	a
WS109A	D	S	448242	a	Moisture Content	L019B	a
WS109A	D	S	448242	a	Sample preparation	L019B	a
WS109A	D	S	448242	a	Soil Descriptions	L019B	a
WS109A	D	S	448242	a	Stones content of soil	L019B	a
WS109A	D	S	448242	a	Sulphate, water soluble, in soil (16hr extraction)	L038B	a
WS109A	D	S	448242	a	Total Sulphur in soil	L038B	a
WS109A	D	S	448242	a	Total sulphate (as SO4 in soil)	L038B	a
WS109A	D	S	448242	a	Water Soluble Nitrate (2:1) as N in soil	L078-PL	a
WS109A	D	S	448242	a	pH in soil (automated)	L099-PL	a
WS109A	ES	S	448241	a	Chromium III in soil	L080-PL/L130B	a
WS109A	ES	S	448241	a	Hexavalent chromium in soil	L080-PL	a
WS109A	ES	S	448241	a	Metals in soil by ICP-OES	L038B	a
WS109A	ES	S	448241	a	Moisture Content	L019B	a
WS109A	ES	S	448241	a	Organic matter (Automated) in soil	L009B	a
WS109A	ES	S	448241	a	Sample preparation	L019B	a
WS109A	ES	S	448241	a	Soil Descriptions	L019B	a
WS109A	ES	S	448241	a	Speciated PAHs and/or Semi-volatile organic compounds in soil	L064B	a
WS109A	ES	S	448241	a	Stones content of soil	L019B	a
WS109A	ES	S	448241	a	Sulphate, water soluble, in soil (16hr extraction)	L038B	a
WS109A	ES	S	448241	a	pH in soil (automated)	L099-PL	a
WS110	ES	S	448243	a	Chromium III in soil	L080-PL/L130B	a
WS110	ES	S	448243	a	Hexavalent chromium in soil	L080-PL	a
WS110	ES	S	448243	a	Metals in soil by ICP-OES	L038B	a
WS110	ES	S	448243	a	Moisture Content	L019B	a
WS110	ES	S	448243	a	Organic matter (Automated) in soil	L009B	a
WS110	ES	S	448243	a	Sample preparation	L019B	a
WS110	ES	S	448243	a	Soil Descriptions	L019B	a
WS110	ES	S	448243	a	Speciated PAHs and/or Semi-volatile organic compounds in soil	L064B	a
WS110	ES	S	448243	a	Stones content of soil	L019B	a
WS110	ES	S	448243	a	Sulphate, water soluble, in soil (16hr extraction)	L038B	a
WS110	ES	S	448243	a	pH in soil (automated)	L099-PL	a
WS111	D	S	448244	ab	Chromium III in soil	L080-PL/L130B	a
WS111	D	S	448244	ab	Hexavalent chromium in soil	L080-PL	a
WS111	D	S	448244	ab	Metals in soil by ICP-OES	L038B	a
WS111	D	S	448244	ab	Moisture Content	L019B	a
WS111	D	S	448244	ab	Organic matter (Automated) in soil	L009B	a
WS111	D	S	448244	ab	Sample preparation	L019B	a
WS111	D	S	448244	ab	Soil Descriptions	L019B	a
WS111	D	S	448244	ab	Speciated PAHs and/or Semi-volatile organic compounds in soil	L064B	ab
WS111	D	S	448244	ab	Stones content of soil	L019B	a
WS111	D	S	448244	ab	Sulphate, water soluble, in soil (16hr extraction)	L038B	a
WS111	D	S	448244	ab	pH in soil (automated)	L099-PL	a
WS112	D	S	448245	a	Moisture Content	L019B	a
WS112	D	S	448245	a	Sample preparation	L019B	a
WS112	D	S	448245	a	Soil Descriptions	L019B	a
WS112	D	S	448245	a	Stones content of soil	L019B	a
WS112	D	S	448245	a	Sulphate, water soluble, in soil (16hr extraction)	L038B	a
WS112	D	S	448245	a	pH in soil (automated)	L099-PL	a
WS112	D	S	448246	ab	Chromium III in soil	L080-PL/L130B	a
WS112	D	S	448246	ab	Hexavalent chromium in soil	L080-PL	a
WS112	D	S	448246	ab	Metals in soil by ICP-OES	L038B	a
WS112	D	S	448246	ab	Moisture Content	L019B	a
WS112	D	S	448246	ab	Organic matter (Automated) in soil	L009B	a
WS112	D	S	448246	ab	Sample preparation	L019B	a
WS112	D	S	448246	ab	Soil Descriptions	L019B	a

Sample Deviation Report

Analytical Report Number : 25-006103
Project / Site name: Halsnead Gardens

This deviation report indicates the sample and test deviations that apply to the samples submitted for analysis.Please note that the associated result(s) may be unreliable and should be interpreted with care.

Key: a - No sampling date b - Incorrect container c - Holding time d - Headspace e - Temperature

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
WS112	D	S	448246	ab	Speciated PAHs and/or Semi-volatile organic compounds in soil	L064B	ab
WS112	D	S	448246	ab	Stones content of soil	L019B	a
WS112	D	S	448246	ab	Sulphate, water soluble, in soil (16hr extraction)	L038B	a
WS112	D	S	448246	ab	pH in soil (automated)	L099-PL	a

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Analytical Report Number : 25-006339

Project / Site name:	Halsnead Gardens	**Samples received on:**	10/02/2025
Your job number:	C5980	**Samples instructed on/ Analysis started on:**	11/02/2025
Your order number:	6137 C5980 MAS	**Analysis completed by:**	17/02/2025
Report Issue Number:	1	**Report issued on:**	17/02/2025
Samples Analysed:	1 soil sample		

Signed:

Caterina Bentley
Customer Service Advisor
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting
air	- once the analysis is complete

Excel copies of reports are only valid when accompanied by this PDF certificate.

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Some records may be kept for longer according to other legal/best practice requirements.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

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The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number: 25-006339
Project / Site name: Halsnead Gardens
Your Order No: 6137 C5980 MAS

Lab Sample Number				449319
Sample Reference				WS01
Sample Number				ES
Water Matrix				N/A
Depth (m)				0.10-0.40
Date Sampled				Deviating
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**	
Stone Content	%	0.1	NONE	< 0.1
Moisture Content	%	0.01	NONE	18
Total mass of sample received	kg	0.1	NONE	0.8

General Inorganics

pH (L099)	pH Units	N/A	MCERTS	6.3
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	1000
Water Soluble SO_4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	510
Organic Matter (automated)	%	0.1	MCERTS	6.2

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.16
Anthracene	mg/kg	0.05	MCERTS	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	0.35
Pyrene	mg/kg	0.05	MCERTS	0.34
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.17
Chrysene	mg/kg	0.05	MCERTS	0.25
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	0.26
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.11
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.22
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.11
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.12

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	2.1

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	21
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	1.4
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8
Chromium (III)	mg/kg	1	NONE	21
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	22
Copper (aqua regia extractable)	mg/kg	1	MCERTS	87
Lead (aqua regia extractable)	mg/kg	1	MCERTS	99
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.5
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	28
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	120

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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Analytical Report Number : 25-006339
Project / Site name: Halsnead Gardens

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
449319	WS01	ES	0.10-0.40	Brown loam with vegetation

Analytical Report Number : 25-006339
Project / Site name: Halsnead Gardens

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters Heating/Cooling (PrW) DI Process Water (DI PrW)
Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L038B	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Sulphate, water soluble, in soil (16hr extraction)	In-house method	L038B	D	MCERTS
Speciated PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	MCERTS
Chromium III in soil	In-house method by calculation from total Cr and Cr VI	In-house method by calculation	L080-PL/L130B	W	NONE
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazide followed by colorimetry	In-house method	L080-PL	W	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement	In-house method	L099-PL	D	MCERTS

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL' or 'B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Quality control parameter failure associated with individual result applies to calculated sum of individuals.
The result for sum should be interpreted with caution

Sample Deviation Report

Analytical Report Number : 25-006339

Project / Site name: Halsnead Gardens

This deviation report indicates the sample and test deviations that apply to the samples submitted for analysis.Please note that the associated result(s) may be unreliable and should be interpreted with care.

Key: a - No sampling date b - Incorrect container c - Holding time d - Headspace e - Temperature

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
WS01	ES	S	449319	a	Chromium III in soil	L080-PL/L130B	a
WS01	ES	S	449319	a	Hexavalent chromium in soil	L080-PL	a
WS01	ES	S	449319	a	Metals in soil by ICP-OES	L038B	a
WS01	ES	S	449319	a	Moisture Content	L019B	a
WS01	ES	S	449319	a	Organic matter (Automated) in soil	L009B	a
WS01	ES	S	449319	a	Sample preparation	L019B	a
WS01	ES	S	449319	a	Soil Descriptions	L019B	a
WS01	ES	S	449319	a	Speciated PAHs and/or Semi-volatile organic compounds in soil	L064B	a
WS01	ES	S	449319	a	Stones content of soil	L019B	a
WS01	ES	S	449319	a	Sulphate, water soluble, in soil (16hr extraction)	L038B	a
WS01	ES	S	449319	a	pH in soil (automated)	L099-PL	a

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Analytical Report Number : 25-007197

Project / Site name:	Halsnead Phase 1	**Samples received on:**	17/02/2025
Your job number:	C5980	**Samples instructed on/ Analysis started on:**	17/02/2025
Your order number:	C5980 6162 JM	**Analysis completed by:**	20/02/2025
Report Issue Number:	1	**Report issued on:**	20/02/2025
Samples Analysed:	2 soil samples		

Signed:

Dominika Liana
Junior Reporting Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting
air	- once the analysis is complete

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Analytical Report Number: 25-007197
Project / Site name: Halsnead Phase 1
Your Order No: C5980 6162 JM

Lab Sample Number				453915	453916
Sample Reference				MS03	MS06
Sample Number				None Supplied	None Supplied
Water Matrix				N/A	N/A
Depth (m)				5.50	2.30
Date Sampled				12/02/2025	12/02/2025
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**		
Stone Content	%	0.1	NONE	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	22	20
Total mass of sample received	kg	0.1	NONE	0.5	0.6
General Inorganics					
Loss on Ignition @ 450°C	%	0.2	MCERTS	30	22
Calorific Value	MJ/Kg	0.12	ISO 17025	9.92	8.53

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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Analytical Report Number : 25-007197
Project / Site name: Halsnead Phase 1

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Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
453915	MS03	None Supplied	5.5	Black clay and sand with gravel
453916	MS06	None Supplied	2.3	Brown clay and sand with gravel

Analytical Report Number : 25-007197
Project / Site name: Halsnead Phase 1

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters Heating/Cooling (PrW) DI Process Water (DI PrW)
Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Calorific Value of soil	Determination of the calorific value of soil by combustion in a controlled environment	Calorific Value of Soil by Bomb Calorimeter	L013B	D	ISO 17025
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
Loss on ignition of soil @ 450°C	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	In-house method	L047-PL	D	MCERTS

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL' or 'B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

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The result for sum should be interpreted with caution

Human Health Assessment Summary - Soils Test Data						Soil Type:																									
						Location:	TP101	TP103	TP106	TP107	TP112	TP115	TP117	TP120	TP124	TP125	TP126	TP127	TP130	TP131	TP133	TP135	WS101	WS102	WS103	WS103	WS105	WS107	WS108	WS109A	WS109A	WS110
						Depth:	0.10-0.40	0.60-1.80	0.50-2.30	0.30-0.70	0.30-0.70	0.50-2.10	0.10-0.40	0.40-2.00	1.60-2.00	0.10-0.30	1.20-2.80	0.90-2.15	0.40-2.30	0.60-1.60	0.10-0.30	0.10-0.70	0.40-1.70	2.00-2.45	0.10-0.60	0.60-1.20	0.00-0.30	0.80-1.00	1.50-1.50	0.00-0.50	0.60-0.60	0.00-0.40
Contaminant	GAC (mg/kg)	No. Samples	Min. Value	Max. Value	No. Samples ≥GAC																										
Moisture Content	-	34	8.20	30.00	-	20	17	18	12	14	15	23	13	13	23	11	15	15	15	21	30	15	8	18	18	18	11	17	20	16	20
Soil Organic Matter	-	30	0.60	11.00	-				2.0	0.6	0.6	3.9			3.6					3.4	8.1			11.0	3.5	3.3			3.3		2.6
pH	-	32	5.00	9.90	-	6.2	5.0	9.9	7.4	8.2	6.0	6.4	7.9	5.5	6.1	7.5	6.3	6.1	8.3	6.9	6.4	8.6	7.3	6.8	7.3	7.8	6.4	7.2	6.5	7.9	6.7
Water Soluble Sulphate (2:1 Leachate Equivalent) (mg/l)	Note mg/l	30	2.74	1070.00	-			1070.0	33.0	7.7	6.1	6.4			6.4		2.7	5.0		6.1	9.9			32.4	121.0	3.8		19.0	21.9	4.8	5.7
Arsenic	37	30	4.60	39.00	1				9.4	9.0	7.9	11.0			11.0					20.0	14.0			39.0	26.0	13.0			15.0		8.0
Cadmium	11	30	< LOD	1.90	0				0.3	< 0.2	< 0.2	0.7			0.8					1.3	0.8			< 0.2	1.9	0.9			0.9		0.4
Chromium (III)	910	30	14.00	100.00	0				100.0	42.0	33.0	22.0			19.0					19.0	18.0			19.0	20.0	20.0			21.0		17.0
Hexavalent Chromium (VI)	6	15	0.00	<LOD	0				<1.8	<1.8	<1.8	<1.8			<1.8					<1.8	<1.8			<1.8	<1.8	<1.8			<1.8		<1.8
Copper	2400	30	9.70	160.00	0				33.0	18.0	9.7	55.0			48.0					89.0	47.0			160.0	52.0	50.0			68.0		31.0
Lead	200	30	7.70	980.00	1				100.0	8.9	7.7	34.0			62.0					100.0	47.0			980.0	65.0	46.0			53.0		24.0
Mercury	1.2	30	< LOD	0.50	0				< 0.3	< 0.3	< 0.3	< 0.3			< 0.3					< 0.3	< 0.3			< 0.3	< 0.3	< 0.3			< 0.3		< 0.3
Nickel	130	30	13.00	110.00	0				46.0	46.0	18.0	18.0			19.0					20.0	16.0			110.0	43.0	19.0			27.0		13.0
Selenium	250	30	< LOD	120.00	0				< 1.0	< 1.0	< 1.0	< 1.0			< 1.0					< 1.0	< 1.0			< 1.0	< 1.0	< 1.0			1.2		< 1.0
Zinc	3700	29	28.00	340.00	0				80.0	37.0	28.0	61.0			71.0					99.0	63.0			130.0	340.0	89.0			81.0		44.0
Cyanide (free)	34	0	0.00	<LOD	0																										
Phenol (total)	120	0	0.00	<LOD	0																										
Naphthalene	2.3	32	< LOD	0.08	0				< 0.05	< 0.05	< 0.05	< 0.05			< 0.05					< 0.05	< 0.05			0.08	< 0.05	< 0.05			< 0.05		< 0.05
Acenaphthylene	170	32	< LOD	0.00	0				< 0.05	< 0.05	< 0.05	< 0.05			< 0.05					< 0.05	< 0.05			< 0.05	< 0.05	< 0.05			< 0.05		< 0.05
Acenaphthene	210	32	< LOD	0.00	0				< 0.05	< 0.05	< 0.05	< 0.05			< 0.05					< 0.05	< 0.05			< 0.05	< 0.05	< 0.05			< 0.05		< 0.05
Fluorene	170	32	< LOD	0.00	0				< 0.05	< 0.05	< 0.05	< 0.05			< 0.05					< 0.05	< 0.05			< 0.05	< 0.05	< 0.05			< 0.05		< 0.05
Phenanthrene	95	32	< LOD	0.42	0				0.13	< 0.05	< 0.05	< 0.05			0.09					0.11	0.08			0.42	0.16	0.05			0.09		< 0.05
Anthracene	2400	32	< LOD	0.09	0				< 0.05	< 0.05	< 0.05	< 0.05			< 0.05					< 0.05	< 0.05			0.09	< 0.05	< 0.05			< 0.05		< 0.05
Fluoranthene	280	32	< LOD	0.70	0				0.17	< 0.05	< 0.05	< 0.05			0.16					0.15	0.12			0.70	0.08	0.08			0.11		< 0.05
Pyrene	620	32	< LOD	0.73	0				0.19	< 0.05	< 0.05	< 0.05			0.15					0.15	0.11			0.73	0.08	0.08			0.10		< 0.05
Benzo(a)anthracene	7	32	< LOD	0.49	0				0.07	< 0.05	< 0.05	< 0.05			0.08					0.08	0.07			0.49	< 0.05	< 0.05			< 0.05		< 0.05
Chrysene	15	32	< LOD	0.63	0				0.11	< 0.05	< 0.05	< 0.05			0.12					0.12	0.08			0.63	0.07	0.06			0.09		< 0.05
Benzo(b)fluoranthene	2.6	32	< LOD	0.66	0				0.10	< 0.05	< 0.05	< 0.05			0.13					0.12	0.09			0.66	< 0.05	0.07			0.07		< 0.05
Benzo(k)fluoranthene	77	32	< LOD	0.27	0				< 0.05	< 0.05	< 0.05	< 0.05			< 0.05					< 0.05	< 0.05			0.27	< 0.05	< 0.05			< 0.05		< 0.05
Benzo(a)pyrene	2.2	32	< LOD	0.48	0				< 0.05	< 0.05	< 0.05	< 0.05			0.07					0.06	< 0.05			0.48	< 0.05	< 0.05			< 0.05		< 0.05
Indeno(1,2,3-cd)pyrene	27	32	< LOD	0.23	0				0.05	< 0.05	< 0.05	< 0.05			< 0.05					< 0.05	< 0.05			0.23	< 0.05	< 0.05			< 0.05		< 0.05
Dibenz(a,h)anthracene	0.24	32	< LOD	0.07	0				< 0.05	< 0.05	< 0.05	< 0.05			< 0.05					< 0.05	< 0.05			0.07	< 0.05	< 0.05			< 0.05		< 0.05
Benzo(ghi)perylene	320	32	< LOD	0.33	0				0.06	< 0.05	< 0.05	< 0.05			< 0.05					< 0.05	< 0.05			0.33	< 0.05	< 0.05			< 0.05		< 0.05
Asbestos Detected (Detected or Not-Detected)	Y	29	0.00	0.00	0				Not-detected						Not-detected					Not-detected	Not-detected			Not-detected							
Asbestos Quantification (% w/w)	0.001	0	0.00	<LOD	0																										
Petroleum Hydrocarbons Aliphatic >EC5-EC6	42	5	< LOD	<LOD	0				< 0.010						< 0.010					< 0.010	< 0.010			< 0.010							
Petroleum Hydrocarbons Aliphatic >EC6-EC8	100	5	< LOD	<LOD	0				< 0.010						< 0.010					< 0.010	< 0.010			< 0.010							
Petroleum Hydrocarbons Aliphatic >EC8-EC10	27	5	< LOD	<LOD	0				< 0.010						< 0.010					< 0.010	< 0.010			< 0.010							
Petroleum Hydrocarbons Aliphatic >EC10-EC12	130	5	< LOD	<LOD	0				< 1.0						< 1.0					< 1.0	< 1.0			< 1.0							
Petroleum Hydrocarbons Aliphatic >EC12-EC16	1100	5	< LOD	<LOD	0				< 2.0						< 2.0					< 2.0	< 2.0			< 2.0							
Petroleum Hydrocarbons Aliphatic >EC16-EC35	65000	5	< LOD	<LOD	0				< 10						< 10					< 10	< 10			< 10							
Petroleum Hydrocarbons Aliphatic >EC35-EC40	65000	5	< LOD	<LOD	0				< 10						< 10					< 10	< 10			< 10							
Petroleum Hydrocarbons Aromatic >EC5-EC7	70	5	< LOD	<LOD	0				< 0.010						< 0.010					< 0.010	< 0.010			< 0.010							
Petroleum Hydrocarbons Aromatic >EC7-EC8	130	5	< LOD	<LOD	0				< 0.010						< 0.010					< 0.010	< 0.010			< 0.010							
Petroleum Hydrocarbons Aromatic >EC8-EC10	34	5	< LOD	<LOD	0				< 0.020						< 0.020					< 0.020	< 0.020			< 0.020							
Petroleum Hydrocarbons Aromatic >EC10-EC12	74	5	< LOD	<LOD	0				< 1.0						< 1.0					< 1.0	< 1.0			< 1.0							
Petroleum Hydrocarbons Aromatic >EC12-EC16	140	5	< LOD	<LOD	0				< 2.0						< 2.0					< 2.0	< 2.0			< 2.0							
Petroleum Hydrocarbons Aromatic >EC16-EC21	260	5	< LOD	<LOD	0				< 10						< 10					< 10	< 10			< 10							
Petroleum Hydrocarbons Aromatic >EC21-EC35	1100	5	< LOD	14.00	0				< 10						< 10					< 10	< 10			14.0							
Petroleum Hydrocarbons Aromatic >EC35-EC40	1100	5	< LOD	<LOD	0				< 10						< 10					< 10	< 10			< 10							
Benzene	0.09	22	< LOD	0.00	0				< 0.005						< 0.005					< 0.005	< 0.005			< 0.005							
Toluene	130	28	< LOD	0.00	0				< 0.005						< 0.005					< 0.005	< 0.005			< 0.005							
Ethyl benzene	47	31	< LOD	0.00	0				< 0.005						< 0.005					< 0.005	< 0.005			< 0.005							
o-Xylene	60	31	< LOD	0.00	0				< 0.005						< 0.005					< 0.005	< 0.005			< 0.005							
m- & p-Xylene	115	31	< LOD	0.00	0				< 0.008						< 0.008					< 0.008	< 0.008			< 0.008							
MTBE	49	29	< LOD	0.00	0				< 0.005						< 0.005					< 0.005	< 0.005			< 0.005							
Chloroethene (Vinyl Chloride)	0.00064	0	0.00	<LOD	0																										
1,2-Dichloroethane (1,2-DCA)	0.007	0	0.00	<LOD	0																										
1,1,1-Trichloroethane	8.8	0	0.00	<LOD	0																										
1,1,2,2-Tetrachloroethane	1.6	0	0.00	<LOD	0																										
1,1,1,2-Tetrachloroethane	1.2	0	0.00	<LOD	0																										
Tetrachloroethene (PCE)	0.18	0	0.00	<LOD	0																										
Tetrachloromethane (carbon tetrachloride)	0.026	0	0.00	<LOD	0																										
Trichloroethene (TCE)	0.016	0	0.00	<LOD	0																										
Trichloromethane (chloroform)	0.91	0	0.00	<LOD	0																										
Chlorobenzene	0.45	0	0.00	<LOD	0																										
1, 2 Dichlorobenzene	23	0	0.00	<LOD	0																										
1, 3 Dichlorobenzene	0.40	0	0.00	<LOD	0																										
1, 4 Dichlorobenzene	61	0	0.00	<LOD	0																										
1, 2, 3 Trichlorobenzene	1.50	0	0.00	<LOD	0																										
1, 2, 4 Trichlorobenzene	2.60	0	0.00	<LOD	0																										
1, 3, 5 Trichlorobenzene	0.33	0	0.00	<LOD	0																										
1, 2, 3, 4 Tetrachlorobenzene	15	0	0.00	<LOD	0																										
1, 2, 3, 5 Tetrachlorobenzene	0.66	0	0.00	<LOD	0																										
1, 2, 4, 5 Tetrachlorobenzene	0.33	0	0.00	<LOD	0																										
Pentachlorobenzene	5.8	0	0.00	<LOD	0																										
Hexachlorobenzene	1.8	0	0.00	<LOD	0																										
Hexachlorobutadiene	0.29	0	0.00	<LOD	0																										
ADD CoC	0.0	0	0.00	<LOD	0																										
ADD CoC	0.0	0	0.00	<LOD	0																										
Mean Average SOM	**3.6**																														
Mean Average pH	**7.0**																														

Residential with Homegrown Produce 1% SOM

Values in RED are > the relevant screening levels and further assessment is required. Exceedance of the screening levels alone may not mean a risk is posed.

Job Number: C5980
Client: United Living
Site: Halsnead Gardens, Prescot
Soil Group Type Combined Results

Human Health Assessment Summary - Soils Test Data					Soil Type: Location: Depth:	WS111 0.50-0.50	WS112 0.50-0.50	WS112 1.50-1.50	TP135 0.10-0.70	WS109A 0.00-0.50	WS01 0.10-0.40	MS03 5.5	MS06 2.3
Contaminant	GAC (mg/kg)	No. Samples	Min. Value	Max. Value	No. Samples ≥GAC								
Moisture Content	-	34	8.20	30.00	-	17	18	15	30	20	18	22	20
Soil Organic Matter	-	30	0.60	11.00	-	1.3		0.8			6.2		
pH	-	32	5.00	9.90	-	6.4	6.9	7.4	6.4	7.7	6.3		
Water Soluble Sulphate (2:1 Leachate Equivalent) (mg/l)	Note mg/l	30	2.74	1070.00	-	4.5		13.0			510.0		
Arsenic	37	30	4.60	39.00	1	6.2		4.6			21.0		
Cadmium	11	30	< LOD	1.90	0	0.2		< 0.2			1.4		
Chromium (III)	910	30	14.00	100.00	0	14.0		32.0			21.0		
Hexavalent Chromium (VI)	6	15	0.00	<LOD	0	<1.8		<1.8			<1.8		
Copper	2400	30	9.70	160.00	0	25.0		19.0			87.0		
Lead	200	30	7.70	980.00	1	12.0		8.5			99.0		
Mercury	1.2	30	< LOD	0.50	0	< 0.3		< 0.3			0.5		
Nickel	130	30	13.00	110.00	0	15.0		39.0			28.0		
Selenium	250	30	< LOD	120.00	0	< 1.0		< 1.0			120.0		
Zinc	3700	29	28.00	340.00	0	42.0		43.0					
Cyanide (free)	34	0	0.00	<LOD	0								
Phenol (total)	120	0	0.00	<LOD	0								
Naphthalene	2.3	32	< LOD	0.08	0	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05		
Acenaphthylene	170	32	< LOD	0.00	0	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05		
Acenaphthene	210	32	< LOD	0.00	0	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05		
Fluorene	170	32	< LOD	0.00	0	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05		
Phenanthrene	95	32	< LOD	0.42	0	< 0.05		< 0.05	0.08	0.09	0.16		
Anthracene	2400	32	< LOD	0.09	0	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05		
Fluoranthene	280	32	< LOD	0.70	0	< 0.05		< 0.05	0.12	0.11	0.35		
Pyrene	620	32	< LOD	0.73	0	< 0.05		< 0.05	0.11	0.10	0.34		
Benzo(a)anthracene	7	32	< LOD	0.49	0	< 0.05		< 0.05	0.07	< 0.05	0.17		
Chrysene	15	32	< LOD	0.63	0	< 0.05		< 0.05	0.08	0.09	0.25		
Benzo(b)fluoranthene	2.6	32	< LOD	0.66	0	< 0.05		< 0.05	0.09	0.07	0.26		
Benzo(k)fluoranthene	77	32	< LOD	0.27	0	< 0.05		< 0.05	< 0.05	< 0.05	0.11		
Benzo(a)pyrene	2.2	32	< LOD	0.48	0	< 0.05		< 0.05	< 0.05	< 0.05	0.22		
Indeno(1,2,3-cd)pyrene	27	32	< LOD	0.23	0	< 0.05		< 0.05	< 0.05	< 0.05	0.11		
Dibenz(a,h)anthracene	0.24	32	< LOD	0.07	0	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05		
Benzo(ghi)perylene	320	32	< LOD	0.33	0	< 0.05		< 0.05	< 0.05	< 0.05	0.12		
Asbestos Detected (Detected or Not-Detected)	Y	29	0.00	0.00	0								
Asbestos Quantification (% w/w)	0.001	0	0.00	<LOD	0								
Petroleum Hydrocarbons Aliphatic >EC5-EC6	42	5	< LOD	<LOD	0								
Petroleum Hydrocarbons Aliphatic >EC6-EC8	100	5	< LOD	<LOD	0								
Petroleum Hydrocarbons Aliphatic >EC8-EC10	27	5	< LOD	<LOD	0								
Petroleum Hydrocarbons Aliphatic >EC10-EC12	130	5	< LOD	<LOD	0								
Petroleum Hydrocarbons Aliphatic >EC12-EC16	1100	5	< LOD	<LOD	0								
Petroleum Hydrocarbons Aliphatic >EC16-EC35	65000	5	< LOD	<LOD	0								
Petroleum Hydrocarbons Aliphatic >EC35-EC40	65000	5	< LOD	<LOD	0								
Petroleum Hydrocarbons Aromatic >EC5-EC7	70	5	< LOD	<LOD	0								
Petroleum Hydrocarbons Aromatic >EC7-EC8	130	5	< LOD	<LOD	0								
Petroleum Hydrocarbons Aromatic >EC8-EC10	34	5	< LOD	<LOD	0								
Petroleum Hydrocarbons Aromatic >EC10-EC12	74	5	< LOD	<LOD	0								
Petroleum Hydrocarbons Aromatic >EC12-EC16	140	5	< LOD	<LOD	0								
Petroleum Hydrocarbons Aromatic >EC16-EC21	260	5	< LOD	<LOD	0								
Petroleum Hydrocarbons Aromatic >EC21-EC35	1100	5	< LOD	14.00	0								
Petroleum Hydrocarbons Aromatic >EC35-EC40	1100	5	< LOD	<LOD	0								
Benzene	0.09	22	< LOD	0.00	0				< 5.0	< 5.0			
Toluene	130	28	< LOD	0.00	0				< 5.0	< 5.0			
Ethyl benzene	47	31	< LOD	0.00	0				< 5.0	< 5.0			
o-Xylene	60	31	< LOD	0.00	0				< 8.0	< 8.0			
m- & p-Xylene	115	31	< LOD	0.00	0				< 5.0	< 5.0			
MTBE	49	29	< LOD	0.00	0								
Chloroethene (Vinyl Chloride)	0.00064	0	0.00	<LOD	0								
1,2-Dichloroethane (1,2-DCA)	0.007	0	0.00	<LOD	0								
1,1,1-Trichloroethane	8.8	0	0.00	<LOD	0								
1,1,2,2-Tetrachloroethane	1.6	0	0.00	<LOD	0								
1,1,1,2-Tetrachloroethane	1.2	0	0.00	<LOD	0								
Tetrachloroethene (PCE)	0.18	0	0.00	<LOD	0								
Tetrachloromethane (carbon tetrachloride)	0.026	0	0.00	<LOD	0								
Trichloroethene (TCE)	0.016	0	0.00	<LOD	0								
Trichloromethane (chloroform)	0.91	0	0.00	<LOD	0								
Chlorobenzene	0.45	0	0.00	<LOD	0								
1, 2 Dichlorobenzene	23	0	0.00	<LOD	0								
1, 3 Dichlorobenzene	0.40	0	0.00	<LOD	0								
1, 4 Dichlorobenzene	61	0	0.00	<LOD	0								
1, 2, 3 Trichlorobenzene	1.50	0	0.00	<LOD	0								
1, 2, 4 Trichlorobenzene	2.60	0	0.00	<LOD	0								
1, 3, 5 Trichlorobenzene	0.33	0	0.00	<LOD	0								
1, 2, 3, 4 Tetrachlorobenzene	15	0	0.00	<LOD	0								
1, 2, 3, 5 Tetrachlorobenzene	0.66	0	0.00	<LOD	0								
1, 2, 4, 5 Tetrachlorobenzene	0.33	0	0.00	<LOD	0								
Pentachlorobenzene	5.8	0	0.00	<LOD	0								
Hexachlorobenzene	1.8	0	0.00	<LOD	0								
Hexachlorobutadiene	0.29	0	0.00	<LOD	0								
ADD CoC	0.0	0	0.00	<LOD	0								
ADD CoC	0.0	0	0.00	<LOD	0								
Mean Average SOM	**3.6**												
Mean Average pH	**7.0**												
	Residential with Homegrown Produce 1% SOM												
Job Number:	**C5980**												
Client:	**United Living**												
Site:	**Halsnead Gardens, Prescot**												
Soil Group Type	**Combined Results**												

APPENDIX D

Geotechnical Testing Results

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with: BS EN ISO 17892-12:2018+A2:2022, cl 5.3.14, 5.5, Fall Cone Method, 1 Pt Test, BS 1377-2:2022, cl 5.3, 6

i2 Analytical Ltd
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Northampton NN4 7EB

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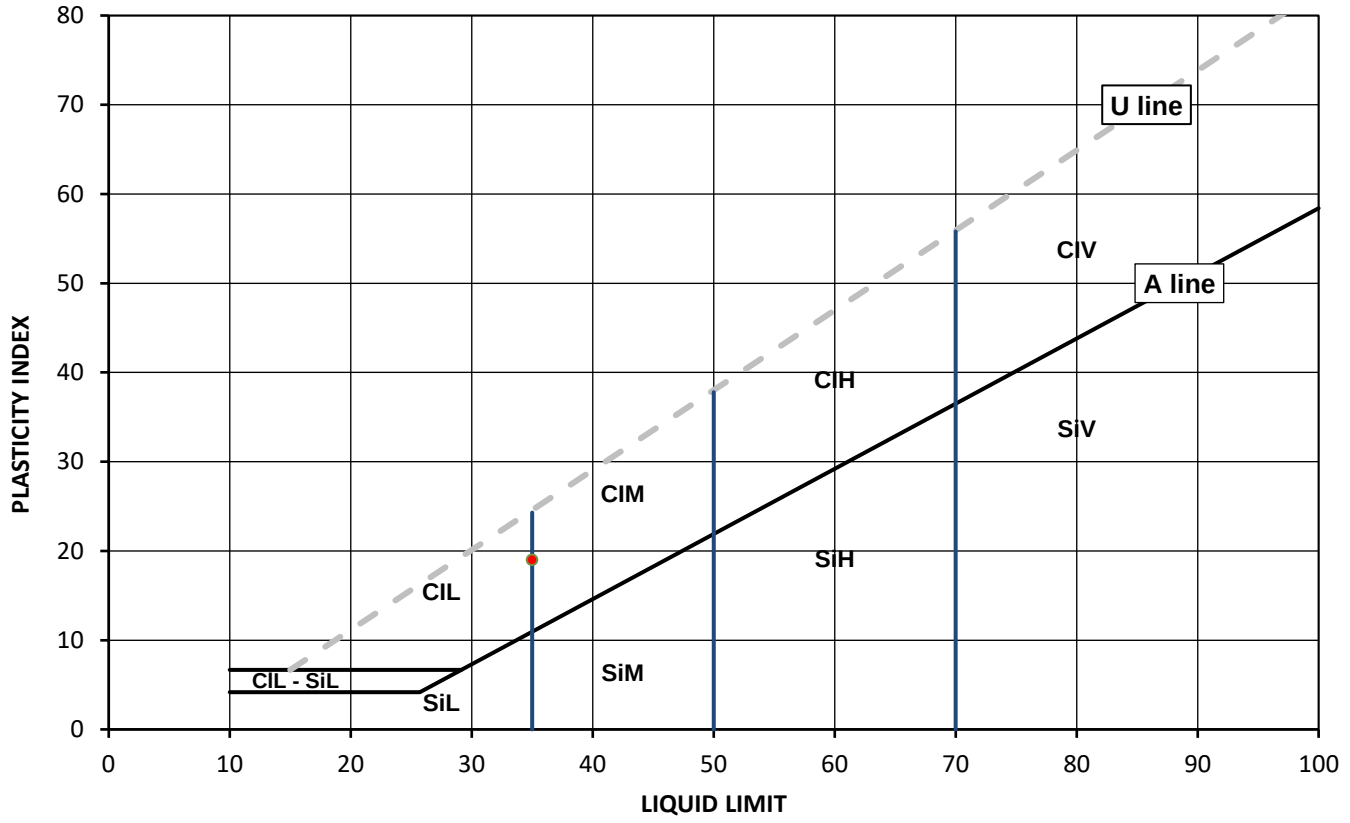
Client:	Brownfield Solutions Ltd	Client Reference:	C5980
Client Address:	William Smith House, 173 - 183 Witton Street, Northwich, Cheshire, CW9 5LP	Job Number:	25-006245-1
		Date Sampled:	Not Given
		Date Received:	11/02/2025
Contact:	Maeve Sutterby	Date Tested:	17/02/2025
Site Address:	Halsnead Gardens	Sampled By:	Client - MAS

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	448939	Depth Top [m]:	0.40
Hole No.:	TP101	Depth Base [m]:	2.10
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Brown slightly gravelly sandy CLAY		
Sample Preparation:	Tested after >0.425 mm removed by hand;		
Cone Type:	80g/30deg		

As Received Water Content [W] %	Corrected Liquid Limit [WL] %	Correlation Factor	Plastic Limit [Wp] %	Plasticity Index [Ip] %	Liquidity index [IL] % #	Consistency index [IC] % #	% Passing 425µm BS Test Sieve
19.8	35	1.030	16	19	0.21	0.79	85



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS EN 17892-1:2014+A1:2022, BS 1377-2:2022; Correlation Factor by Clayton C.R.I and Jukes A.W (1978); # Non accredited

Remarks:

Opinions and interpretations expressed herein are outside of the scope of the UKAS Accreditation. This report may not be reproduced other than in full without the prior written approval of the issuing laboratory. The results included within the report relate only to the sample(s) submitted for testing.

Signed:

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 25/02/2025

GF 360.13

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with: BS EN ISO 17892-12:2018+A2:2022, cl 5.3.14, 5.5, Fall Cone Method, 1 Pt Test, BS 1377-2:2022, cl 5.3, 6

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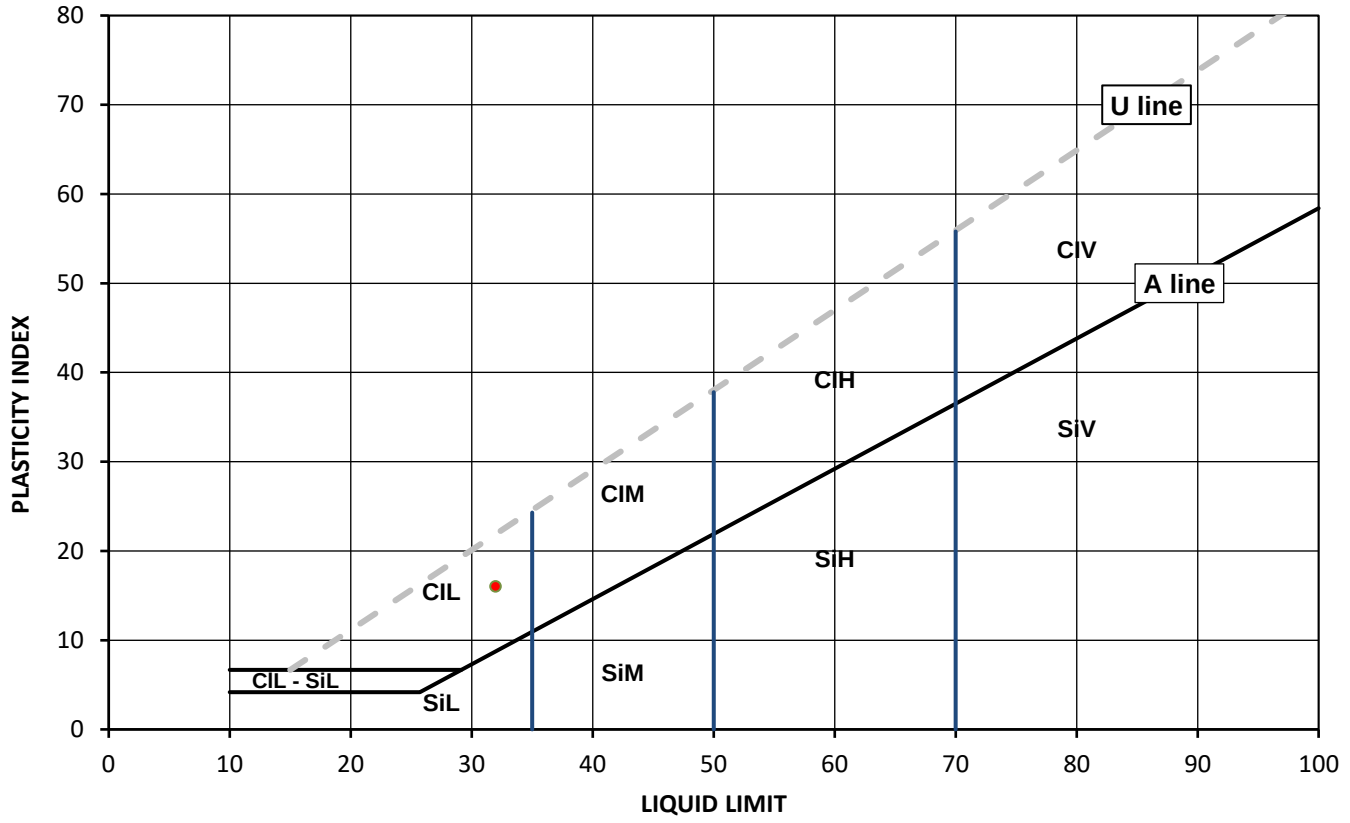
Client:	Brownfield Solutions Ltd	Client Reference:	C5980
Client Address:	William Smith House, 173 - 183 Witton Street, Northwich, Cheshire, CW9 5LP	Job Number:	25-006245-1
		Date Sampled:	Not Given
		Date Received:	11/02/2025
Contact:	Maeve Sutterby	Date Tested:	17/02/2025
Site Address:	Halsnead Gardens	Sampled By:	Client - MAS

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	448940	Depth Top [m]:	0.40
Hole No.:	TP108	Depth Base [m]:	1.90
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Dark brown slightly gravelly very sandy CLAY		
Sample Preparation:	Tested after >0.425 mm removed by hand;		
Cone Type:	80g/30deg		

As Received Water Content [W] %	Corrected Liquid Limit [WL] %	Correlation Factor	Plastic Limit [Wp] %	Plasticity Index [Ip] %	Liquidity index [IL] % #	Consistency index [IC] % #	% Passing 425µm BS Test Sieve
26.1	32	0.984	16	16	0.63	0.38	86



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS EN 17892-1:2014+A1:2022, BS 1377-2:2022; Correlation Factor by Clayton C.R.I and Jukes A.W (1978); # Non accredited

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Date Reported: 25/02/2025

GF 360.13

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with: BS EN ISO 17892-12:2018+A2:2022, cl 5.3.14, 5.5, Fall Cone Method, 1 Pt Test, BS 1377-2:2022, cl 5.3, 6

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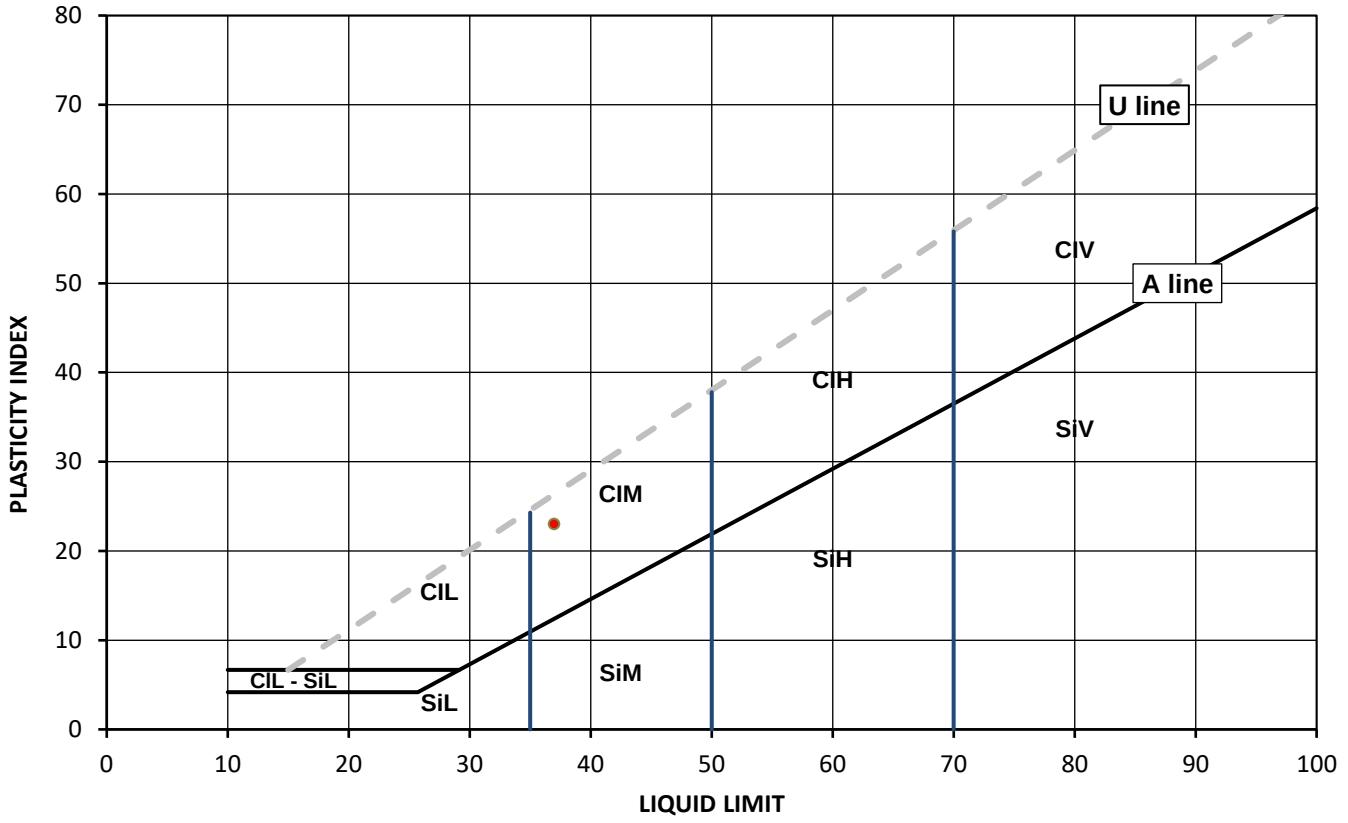
Client:	Brownfield Solutions Ltd	Client Reference:	C5980
Client Address:	William Smith House, 173 - 183 Witton Street, Northwich, Cheshire, CW9 5LP	Job Number:	25-006245-1
		Date Sampled:	Not Given
		Date Received:	11/02/2025
Contact:	Maeve Sutterby	Date Tested:	17/02/2025
Site Address:	Halsnead Gardens	Sampled By:	Client - MAS

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	448941	Depth Top [m]:	0.40
Hole No.:	TP117	Depth Base [m]:	1.60
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Brown slightly gravelly sandy CLAY		
Sample Preparation:	Tested after >0.425 mm removed by hand;		
Cone Type:	80g/30deg		

As Received Water Content [W] %	Corrected Liquid Limit [WL] %	Correlation Factor	Plastic Limit [Wp] %	Plasticity Index [Ip] %	Liquidity index [IL] % #	Consistency index [IC] % #	% Passing 425µm BS Test Sieve
19.7	37	1.039	14	23	0.26	0.74	93



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS EN 17892-1:2014+A1:2022, BS 1377-2:2022; Correlation Factor by Clayton C.R.I and Jukes A.W (1978); # Non accredited

Remarks:

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Signed: Monika Siewior

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 25/02/2025

GF 360.13

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with: BS EN ISO 17892-12:2018+A2:2022, cl 5.3.14, 5.5, Fall Cone Method, 1 Pt Test, BS 1377-2:2022, cl 5.3, 6

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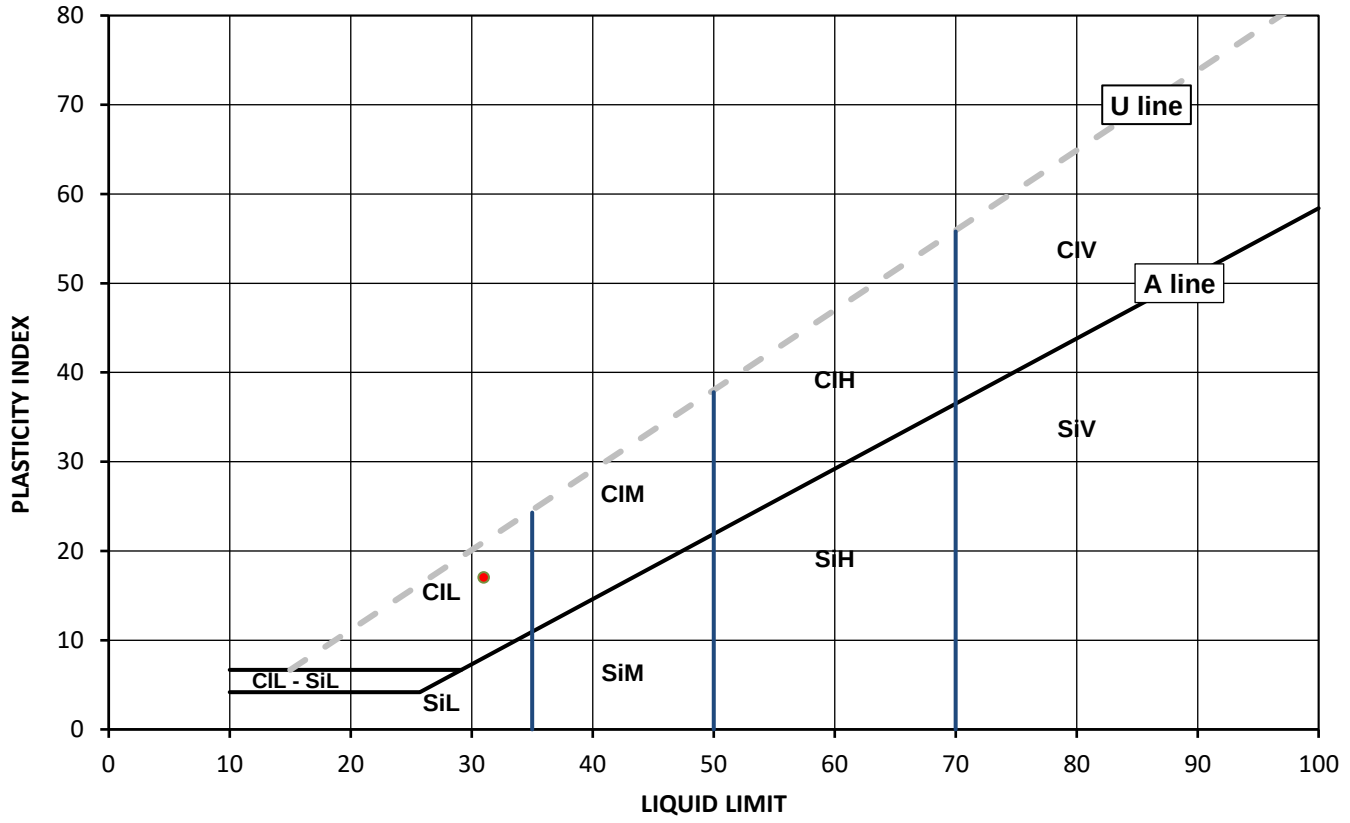
Client:	Brownfield Solutions Ltd	Client Reference:	C5980
Client Address:	William Smith House, 173 - 183 Witton Street, Northwich, Cheshire, CW9 5LP	Job Number:	25-006245-1
		Date Sampled:	Not Given
		Date Received:	11/02/2025
Contact:	Maeve Sutterby	Date Tested:	17/02/2025
Site Address:	Halsnead Gardens	Sampled By:	Client - MAS

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	448942	Depth Top [m]:	2.00
Hole No.:	TP120	Depth Base [m]:	2.50
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Brown slightly gravelly very sandy CLAY		
Sample Preparation:	Tested after >0.425 mm removed by hand;		
Cone Type:	80g/30deg		

As Received Water Content [W] %	Corrected Liquid Limit [WL] %	Correlation Factor	Plastic Limit [Wp] %	Plasticity Index [Ip] %	Liquidity index [IL] % #	Consistency index [IC] % #	% Passing 425µm BS Test Sieve
20.8	31	1.000	14	17	0.41	0.59	81



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS EN 17892-1:2014+A1:2022, BS 1377-2:2022; Correlation Factor by Clayton C.R.I and Jukes A.W (1978); # Non accredited

Remarks:

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Signed:

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 25/02/2025

GF 360.13

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with: BS EN ISO 17892-12:2018+A2:2022, cl 5.3.14, 5.5, Fall Cone Method, 1 Pt Test, BS 1377-2:2022, cl 5.3, 6

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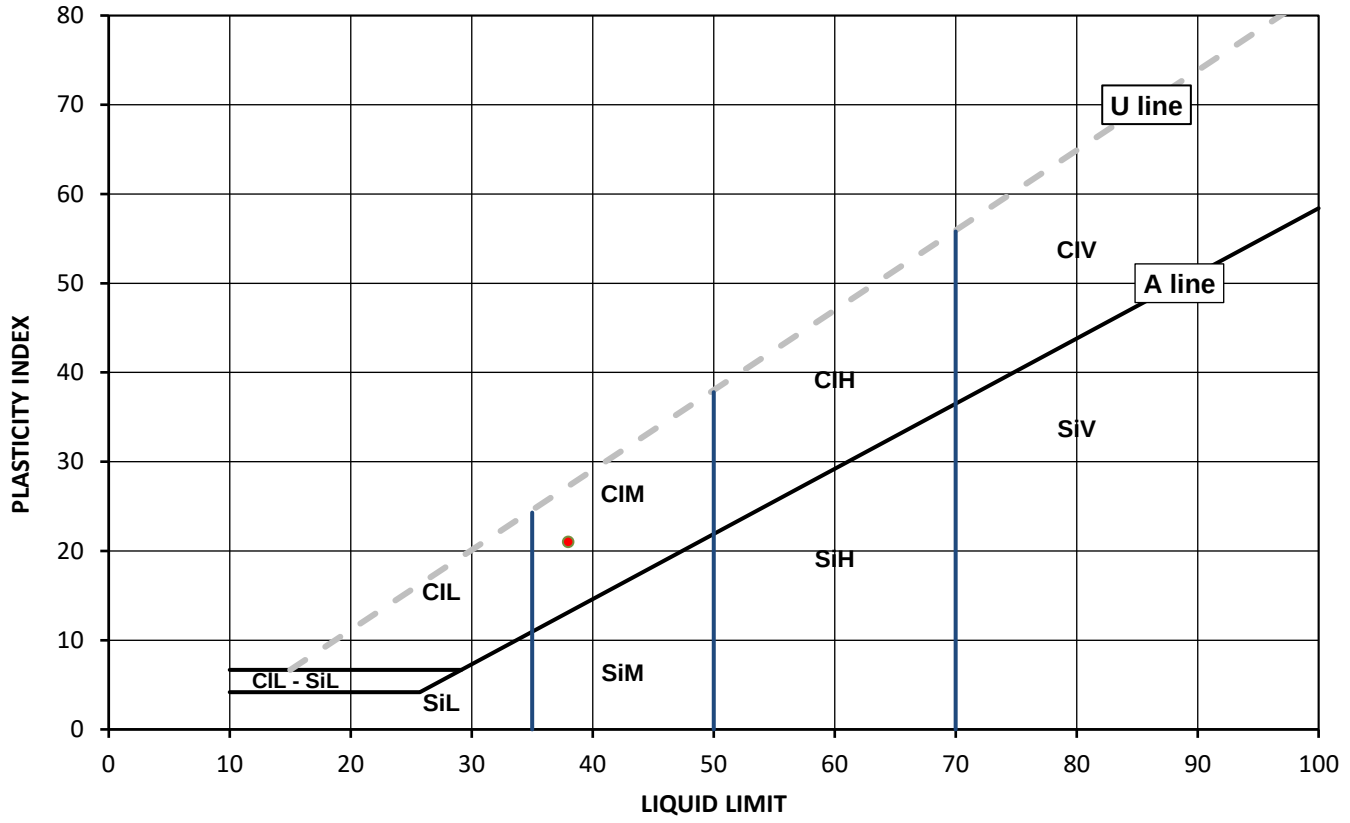
Client:	Brownfield Solutions Ltd	Client Reference:	C5980
Client Address:	William Smith House, 173 - 183 Witton Street, Northwich, Cheshire, CW9 5LP	Job Number:	25-006245-1
		Date Sampled:	Not Given
		Date Received:	11/02/2025
Contact:	Maeve Sutterby	Date Tested:	17/02/2025
Site Address:	Halsnead Gardens	Sampled By:	Client - MAS

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	448943	Depth Top [m]:	0.90
Hole No.:	TP125	Depth Base [m]:	2.30
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Brown slightly gravelly sandy CLAY		
Sample Preparation:	Tested after >0.425 mm removed by hand;		
Cone Type:	80g/30deg		

As Received Water Content [W] %	Corrected Liquid Limit [WL] %	Correlation Factor	Plastic Limit [Wp] %	Plasticity Index [Ip] %	Liquidity index [IL] % #	Consistency index [IC] % #	% Passing 425µm BS Test Sieve
19.3	38	1.058	17	21	0.10	0.90	84



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS EN 17892-1:2014+A1:2022, BS 1377-2:2022; Correlation Factor by Clayton C.R.I and Jukes A.W (1978); # Non accredited

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TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with: BS EN ISO 17892-12:2018+A2:2022, cl 5.3.14, 5.5, Fall Cone Method, 1 Pt Test, BS 1377-2:2022, cl 5.3, 6

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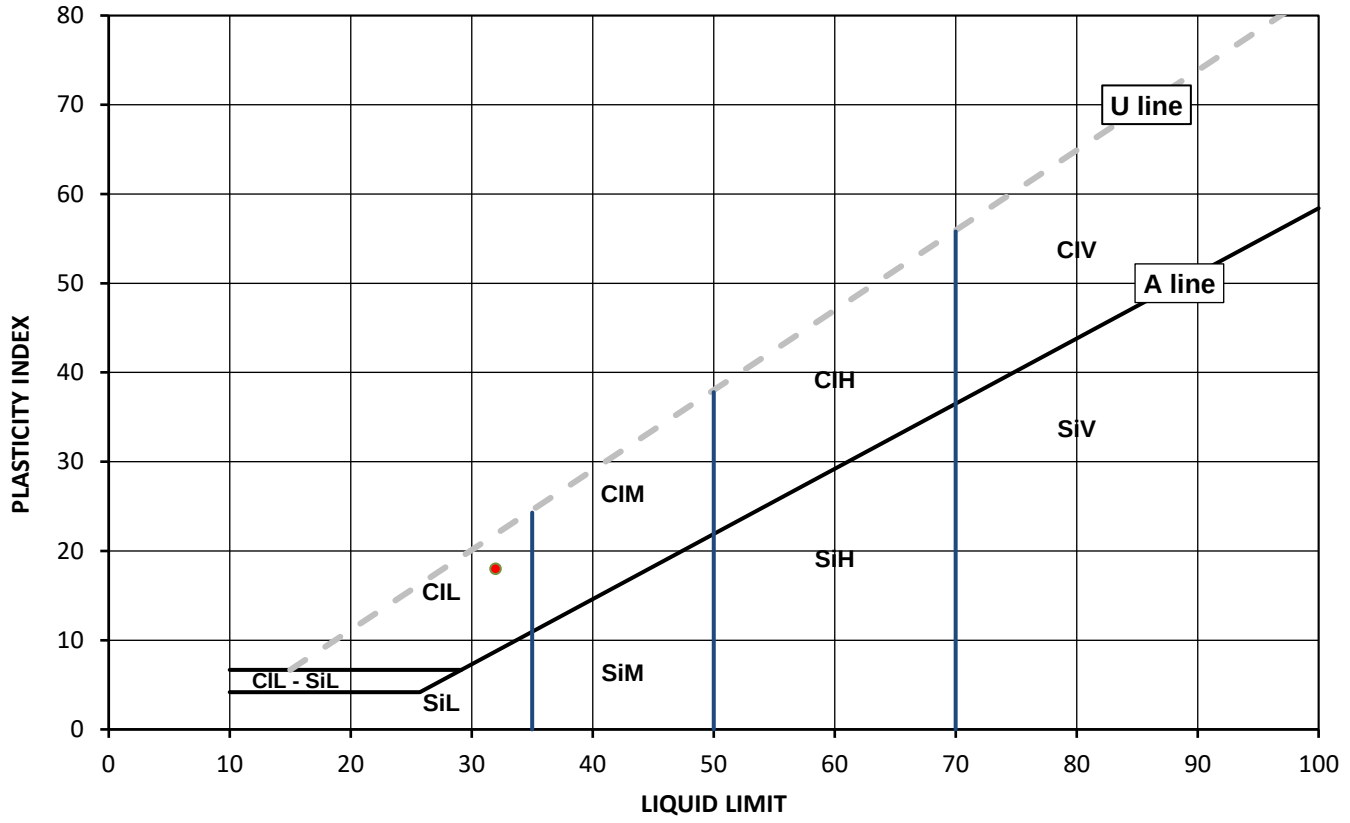
Client:	Brownfield Solutions Ltd	Client Reference:	C5980
Client Address:	William Smith House, 173 - 183 Witton Street, Northwich, Cheshire, CW9 5LP	Job Number:	25-006245-1
		Date Sampled:	Not Given
		Date Received:	11/02/2025
Contact:	Maeve Sutterby	Date Tested:	17/02/2025
Site Address:	Halsnead Gardens	Sampled By:	Client - MAS

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	448944	Depth Top [m]:	0.40
Hole No.:	WS104	Depth Base [m]:	1.50
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Brown very sandy CLAY		
Sample Preparation:	Tested in natural condition;		
Cone Type:	80g/30deg		

As Received Water Content [W] %	Corrected Liquid Limit [WL] %	Correlation Factor	Plastic Limit [Wp] %	Plasticity Index [Ip] %	Liquidity index [IL] % #	Consistency index [IC] % #	% Passing 425µm BS Test Sieve
20.0	32	1.000	14	18	0.33	0.67	100



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS EN 17892-1:2014+A1:2022, BS 1377-2:2022; Correlation Factor by Clayton C.R.I and Jukes A.W (1978); # Non accredited

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TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

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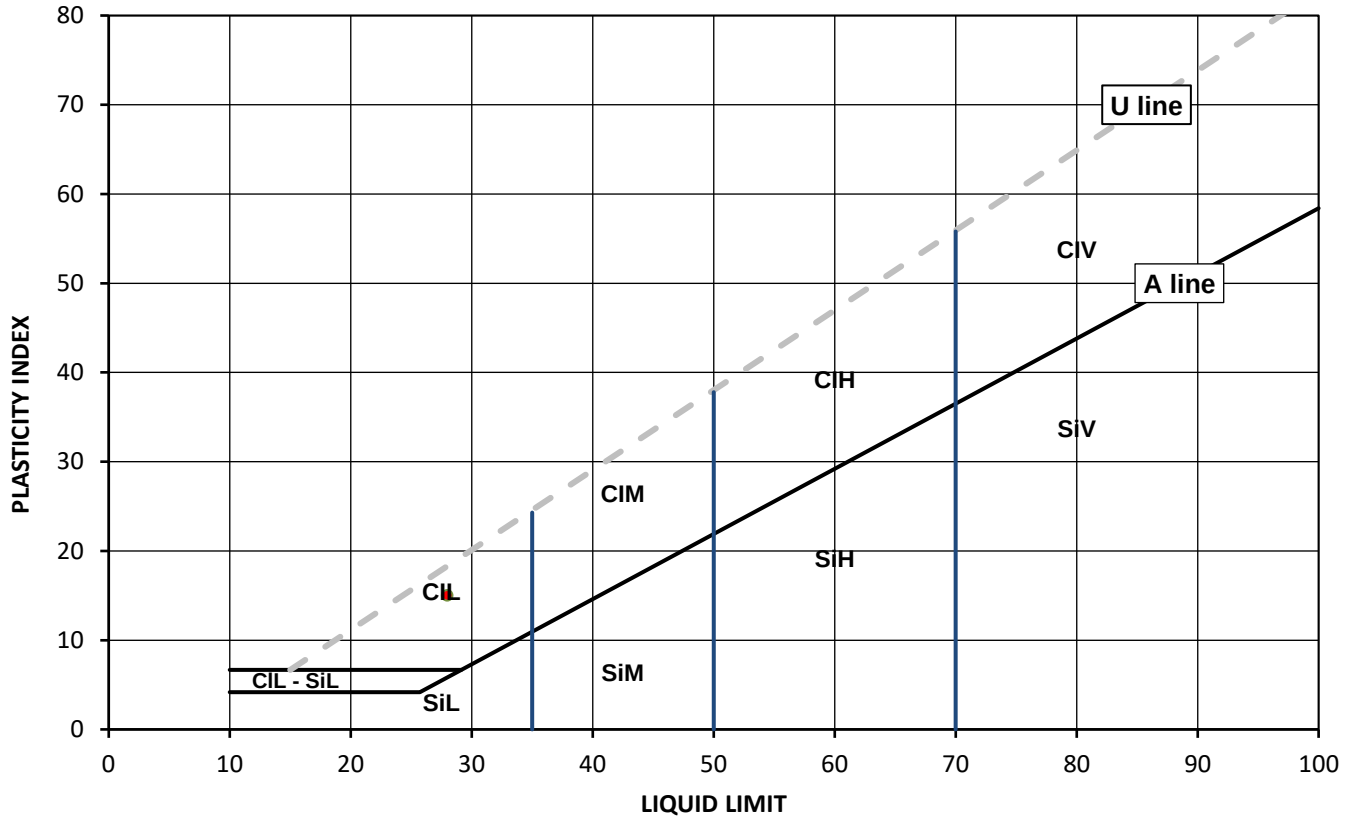
Client:	Brownfield Solutions Ltd	Client Reference:	C5980
Client Address:	William Smith House, 173 - 183 Witton Street, Northwich, Cheshire, CW9 5LP	Job Number:	25-006245-1
		Date Sampled:	Not Given
		Date Received:	11/02/2025
Contact:	Maeve Sutterby	Date Tested:	17/02/2025
Site Address:	Halsnead Gardens	Sampled By:	Client - MAS

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	448945	Depth Top [m]:	1.30
Hole No.:	WS102	Depth Base [m]:	1.70
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Brown slightly gravelly very sandy CLAY		
Sample Preparation:	Tested after >0.425 mm removed by hand;		
Cone Type:	80g/30deg		

As Received Water Content [W] %	Corrected Liquid Limit [WL] %	Correlation Factor	Plastic Limit [Wp] %	Plasticity Index [Ip] %	Liquidity index [IL] % #	Consistency index [IC] % #	% Passing 425µm BS Test Sieve
19.8	28	1.030	13	15	0.47	0.53	95



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS EN 17892-1:2014+A1:2022, BS 1377-2:2022; Correlation Factor by Clayton C.R.I and Jukes A.W (1978); # Non accredited

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Date Reported: 25/02/2025

GF 360.13

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with: BS EN ISO 17892-12:2018+A2:2022, cl 5.3.14, 5.5, Fall Cone Method, 1 Pt Test, BS 1377-2:2022, cl 5.3, 6

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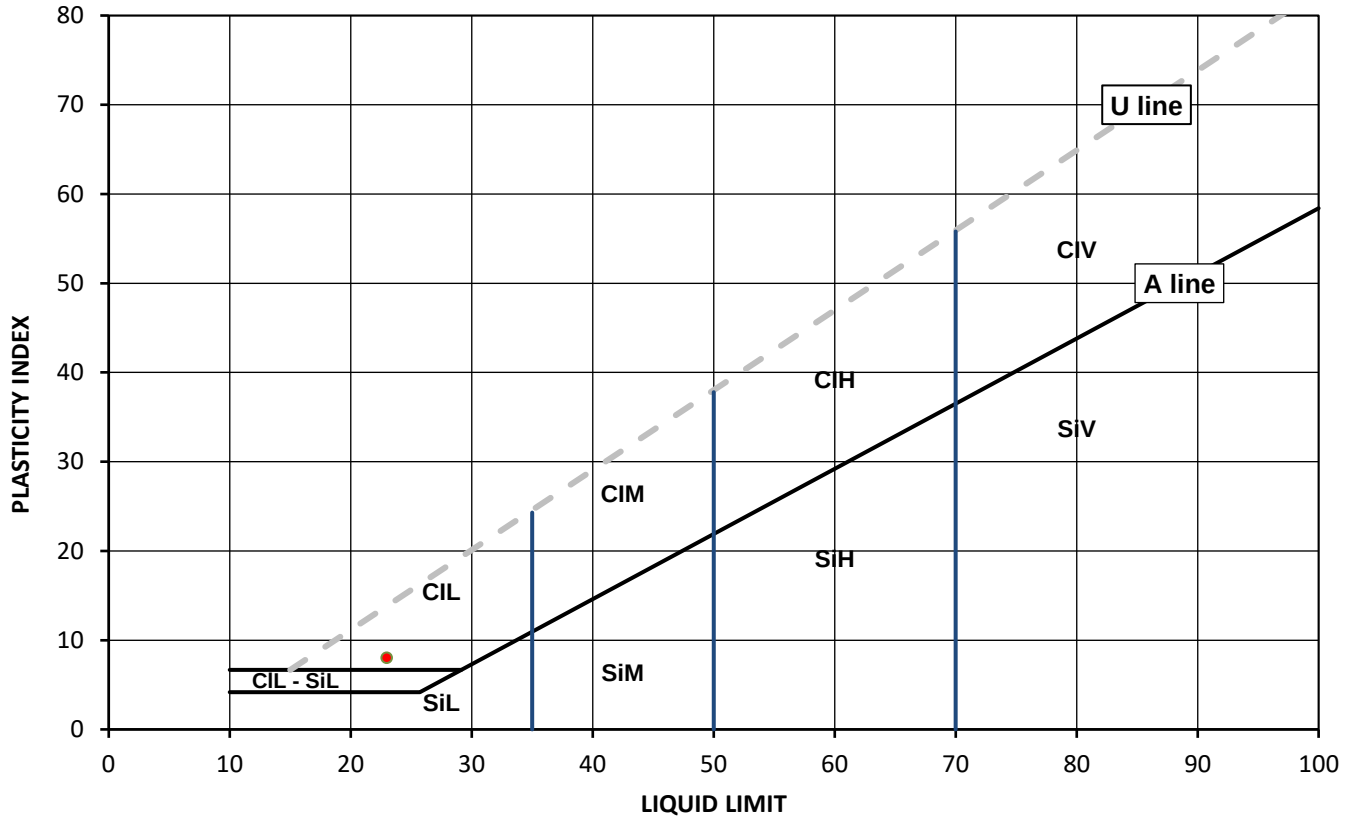
Client:	Brownfield Solutions Ltd	Client Reference:	C5980
Client Address:	William Smith House, 173 - 183 Witton Street, Northwich, Cheshire, CW9 5LP	Job Number:	25-006245-1
		Date Sampled:	Not Given
		Date Received:	11/02/2025
Contact:	Maeve Sutterby	Date Tested:	17/02/2025
Site Address:	Halsnead Gardens	Sampled By:	Client - MAS

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	448946	Depth Top [m]:	0.50
Hole No.:	WS105	Depth Base [m]:	0.50
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Brown slightly gravelly clayey SAND		
Sample Preparation:	Tested after >0.425 mm removed by hand;		
Cone Type:	80g/30deg		

As Received Water Content [W] %	Corrected Liquid Limit [WL] %	Correlation Factor	Plastic Limit [Wp] %	Plasticity Index [Ip] %	Liquidity index [IL] % #	Consistency index [IC] % #	% Passing 425µm BS Test Sieve
18.5	23	1.030	15	8	0.50	0.50	99



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS EN 17892-1:2014+A1:2022, BS 1377-2:2022; Correlation Factor by Clayton C.R.I and Jukes A.W (1978); # Non accredited

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for and on behalf of i2 Analytical Ltd

Date Reported: 25/02/2025

GF 360.13

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with: BS EN ISO 17892-12:2018+A2:2022, cl 5.3.14, 5.5, Fall Cone Method, 1 Pt Test, BS 1377-2:2022, cl 5.3, 6

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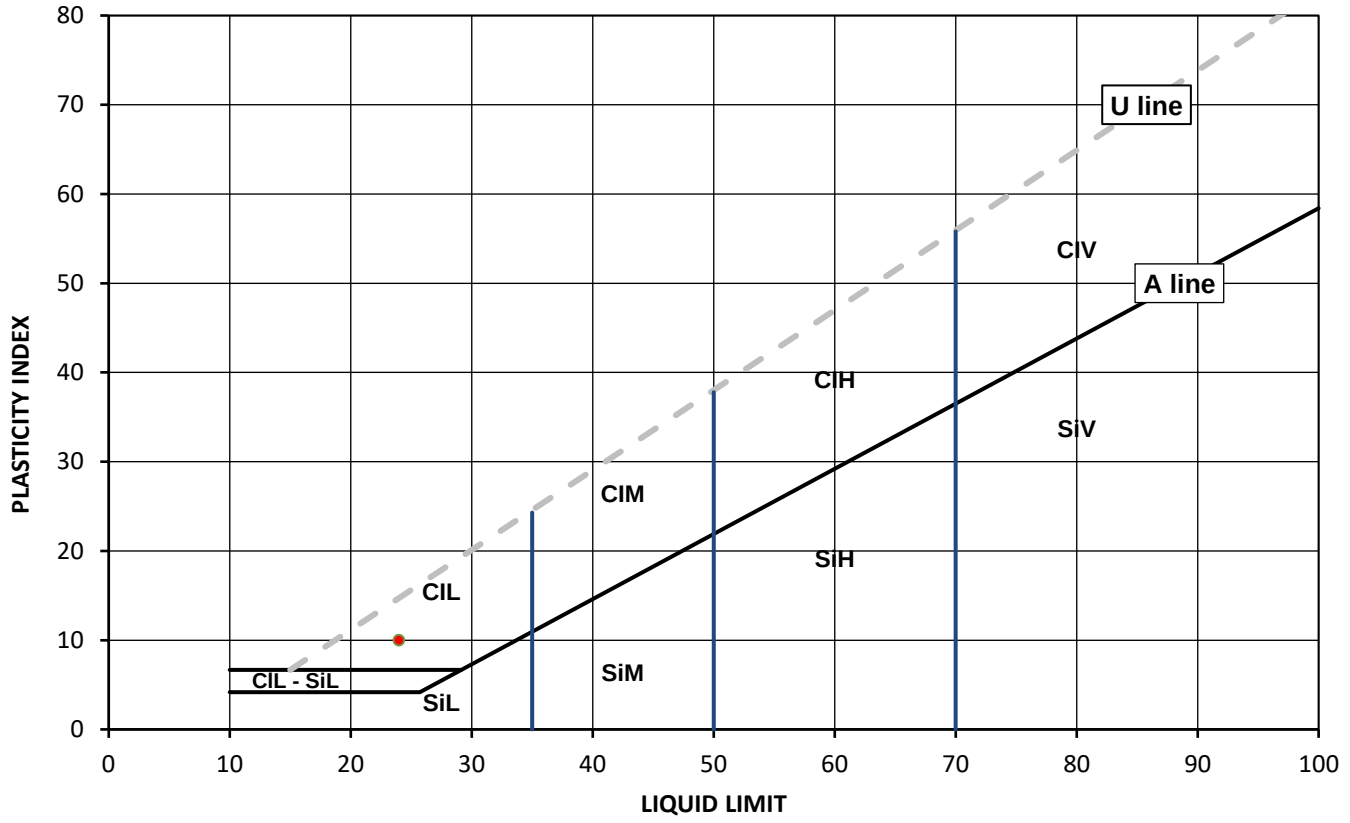
Client:	Brownfield Solutions Ltd	Client Reference:	C5980
Client Address:	William Smith House, 173 - 183 Witton Street, Northwich, Cheshire, CW9 5LP	Job Number:	25-006245-1
		Date Sampled:	Not Given
		Date Received:	11/02/2025
Contact:	Maeve Sutterby	Date Tested:	17/02/2025
Site Address:	Halsnead Gardens	Sampled By:	Client - MAS

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	448947	Depth Top [m]:	0.40
Hole No.:	WS106	Depth Base [m]:	0.40
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Brown slightly gravelly clayey SAND		
Sample Preparation:	Tested after >0.425 mm removed by hand;		
Cone Type:	80g/30deg		

As Received Water Content [W] %	Corrected Liquid Limit [WL] %	Correlation Factor	Plastic Limit [Wp] %	Plasticity Index [Ip] %	Liquidity index [IL] % #	Consistency index [IC] % #	% Passing 425µm BS Test Sieve
14.9	24	1.014	14	10	0.10	0.90	96



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS EN 17892-1:2014+A1:2022, BS 1377-2:2022; Correlation Factor by Clayton C.R.I and Jukes A.W (1978); # Non accredited

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Date Reported: 25/02/2025

GF 360.13

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with: BS EN ISO 17892-12:2018+A2:2022, cl 5.3.14, 5.5, Fall Cone Method, 1 Pt Test, BS 1377-2:2022, cl 5.3, 6

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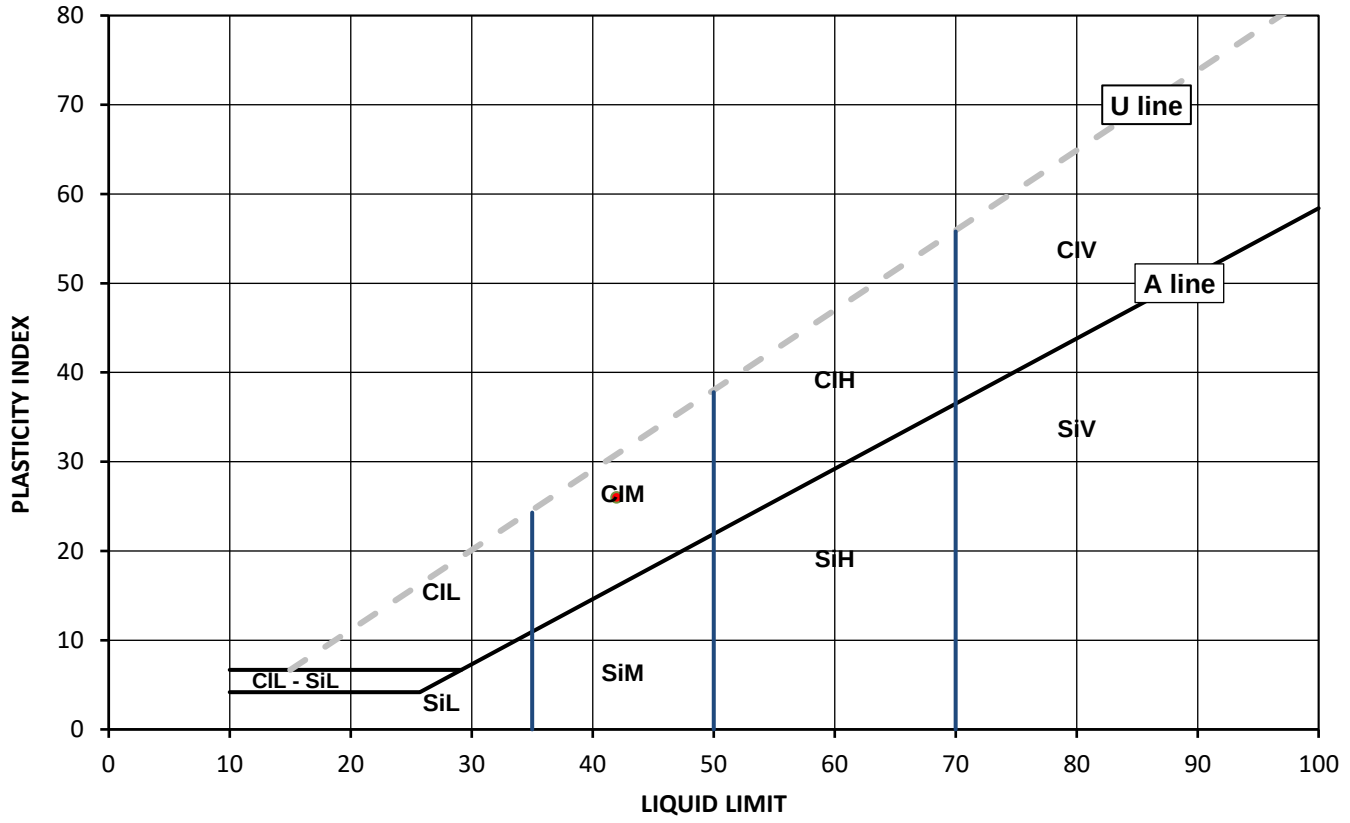
Client:	Brownfield Solutions Ltd	Client Reference:	C5980
Client Address:	William Smith House, 173 - 183 Witton Street, Northwich, Cheshire, CW9 5LP	Job Number:	25-006245-1
		Date Sampled:	Not Given
		Date Received:	11/02/2025
Contact:	Maeve Sutterby	Date Tested:	17/02/2025
Site Address:	Halsnead Gardens	Sampled By:	Client - MAS

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	448948	Depth Top [m]:	0.40
Hole No.:	WS108	Depth Base [m]:	0.40
Sample Reference:	Not Given	Sample Type:	D
Sample Description:	Brown slightly gravelly sandy CLAY		
Sample Preparation:	Tested after >0.425 mm removed by hand;		
Cone Type:	80g/30deg		

As Received Water Content [W] %	Corrected Liquid Limit [WL] %	Correlation Factor	Plastic Limit [Wp] %	Plasticity Index [Ip] %	Liquidity index [IL] % #	Consistency index [IC] % #	% Passing 425µm BS Test Sieve
18.9	42	1.058	16	26	0.12	0.88	85



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS EN 17892-1:2014+A1:2022, BS 1377-2:2022; Correlation Factor by Clayton C.R.I and Jukes A.W (1978); # Non accredited

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Date Reported: 25/02/2025

GF 360.13

SUMMARY REPORT

SUMMARY OF CLASSIFICATION TEST RESULTS

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Tested in Accordance with:

BS EN ISO 17892-12:2018+A2:2022, cl 5.3.14, 5.5, Fall Cone Method, 1 Pt Test, BS 1377-2:2022, cl 5.3, 6. Correlation Factor by Clayton C.R.I and Jukes A.W (1978). W by BS EN ISO 17892-1:2014+A1:2022.

4041

Client: Brownfield Solutions Ltd
Client Address: William Smith House, 173 - 183 Witton Street, Northwich, Cheshire, CW9 5LP
Contact: Maeve Sutterby
Site Address: Halsnead Gardens

Client Reference: C5980
Job Number: 25-006245-1
Date Sampled: Not Given
Date Received: 11/02/2025
Date Tested: 17/02/2025
Sampled By: Client - MAS

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	W	Liquid & Plastic Limit							Density		
		Reference	Depth Top m	Depth Base m	Type			%	% Passing 425um %	WL* %	Correlation Factor	Wp %	Ip %	Cone type	Sample Preparation	bulk Mg/m3	dry Mg/m3	PD Mg/m3
448939	TP101	Not Given	0.40	2.10	D	Brown slightly gravelly sandy CLAY	Atterberg 1 Point	19.8	85	35	1.030	16	19	80g/30 deg	R			
448940	TP108	Not Given	0.40	1.90	D	Dark brown slightly gravelly very sandy CLAY	Atterberg 1 Point	26.1	86	32	0.984	16	16	80g/30 deg	R			
448941	TP117	Not Given	0.40	1.60	D	Brown slightly gravelly sandy CLAY	Atterberg 1 Point	19.7	93	37	1.039	14	23	80g/30 deg	R			
448942	TP120	Not Given	2.00	2.50	D	Brown slightly gravelly very sandy CLAY	Atterberg 1 Point	20.8	81	31	1.000	14	17	80g/30 deg	R			
448943	TP125	Not Given	0.90	2.30	D	Brown slightly gravelly sandy CLAY	Atterberg 1 Point	19.3	84	38	1.058	17	21	80g/30 deg	R			
448944	WS104	Not Given	0.40	1.50	D	Brown very sandy CLAY	Atterberg 1 Point	20.0	100	32	1.000	14	18	80g/30 deg	N			
448945	WS102	Not Given	1.30	1.70	D	Brown slightly gravelly very sandy CLAY	Atterberg 1 Point	19.8	95	28	1.030	13	15	80g/30 deg	R			
448946	WS105	Not Given	0.50	0.50	D	Brown slightly gravelly clayey SAND	Atterberg 1 Point	18.5	99	23	1.030	15	8	80g/30 deg	R			
448947	WS106	Not Given	0.40	0.40	D	Brown slightly gravelly clayey SAND	Atterberg 1 Point	14.9	96	24	1.014	14	10	80g/30 deg	R			
448948	WS108	Not Given	0.40	0.40	D	Brown slightly gravelly sandy CLAY	Atterberg 1 Point	18.9	85	42	1.058	16	26	80g/30 deg	R			

Note: # Non accredited; NP - Non plastic; N - Tested in natural condition, R - Tested after >0.425mm removed by hand, WR - Tested after washing to remove >425mm; * - One point liquid limit corrected as per the report Correlation Factor by Clayton C.R.I and Jukes A.W (1978)

Comments:

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Signed:

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 25/02/2025 **GF 361.15**

SUMMARY REPORT

DETERMINATION OF WATER CONTENT

Tested in Accordance with: BS EN ISO 17892-1:2014+A1:2022, BS 1377-2: 2022, clause 4.1

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

Client: Brownfield Solutions Ltd

Client Address: William Smith House, 173 - 183 Witton Street,
Northwich, Cheshire,
CW9 5LP

Contact: Maeve Sutterby

Site Address: Halsnead Gardens

Client Reference: C5980
Job Number: 25-006245-1
Date Sampled: Not Given
Date Received: 11/02/2025
Date Tested: 17/02/2025
Sampled By: Client - MAS

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	WC											
		Reference	Depth Top m	Depth Base m	Type			%											
448939	TP101	Not Given	0.40	2.10	D	Brown slightly gravelly sandy CLAY		19.8											
448940	TP108	Not Given	0.40	1.90	D	Dark brown slightly gravelly very sandy CLAY		26.1											
448941	TP117	Not Given	0.40	1.60	D	Brown slightly gravelly sandy CLAY		19.7											
448942	TP120	Not Given	2.00	2.50	D	Brown slightly gravelly very sandy CLAY		20.8											
448943	TP125	Not Given	0.90	2.30	D	Brown slightly gravelly sandy CLAY		19.3											
448944	WS104	Not Given	0.40	1.50	D	Brown very sandy CLAY		20.0											
448945	WS102	Not Given	1.30	1.70	D	Brown slightly gravelly very sandy CLAY		19.8											
448946	WS105	Not Given	0.50	0.50	D	Brown slightly gravelly clayey SAND		18.5											
448947	WS106	Not Given	0.40	0.40	D	Brown slightly gravelly clayey SAND		14.9											
448948	WS108	Not Given	0.40	0.40	D	Brown slightly gravelly sandy CLAY		18.9											

Comments:

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for and on behalf of i2 Analytical Ltd

Date Reported: 25/02/2025

GF 126.18

Determination of Indicative CBR Value by Lightweight Deflectometer (LWD)

IAN 73/06 (2009 amendment), LWD Manufacturer's Manual and Barounis, N. & Smith, T. (2017)

BROWNFIELD SOLUTIONS LTD
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(+44) 0800 044 8025
info@brownfield-solutions.co.uk

Client: United Living
Site Name: Halsnead Gardens Phase 1
Job Number: C5980
Date(s) Tested: 14/02/2025

Equipment: Terratest 4000 STREAM
Plate Size: 300mm
Drop Weight Mass: 10kg

Location	Depth (m)	Stratum Type	Brief Description	Evd (MN/m^2)	Poisson's Ratio	Ev1 (MN/m^2)	k_{300}	k_{762}	Estimated CBR (%)
LWD101	0.20	Natural - Cohesive/Fine	Slightly sandy slightly gravelly CLAY	5.9	0.4	4.92	13.77	6.06	0.2
LWD102	0.30	Natural - Cohesive/Fine	Slightly sandy slightly gravelly CLAY	6.5	0.4	5.42	15.17	6.67	0.3
LWD103	0.30	Natural - Cohesive/Fine	Slightly sandy slightly gravelly CLAY	10.7	0.4	8.92	24.97	10.99	0.6
LWD104	0.20	Natural - Cohesive/Fine	Slightly sandy slightly gravelly CLAY	5.4	0.4	4.50	12.60	5.54	0.2
LWD105	0.20	Natural - Cohesive/Fine	Slightly sandy slightly gravelly CLAY	7.3	0.4	6.08	17.03	7.49	0.3
LWD106	0.30	Natural - Cohesive/Fine	Slightly sandy slightly gravelly CLAY	8.0	0.4	6.67	18.67	8.21	0.4
LWD107	0.30	Natural - Cohesive/Fine	Slightly sandy slightly gravelly CLAY	6.2	0.4	5.17	14.47	6.37	0.2
LWD108	0.20	Natural - Cohesive/Fine	Slightly sandy slightly gravelly CLAY	7.3	0.4	6.08	17.03	7.49	0.3
LWD110	0.30	Natural - Cohesive/Fine	Slightly sandy slightly gravelly CLAY	5.8	0.4	4.83	13.53	5.95	0.2
LWD111	0.30	Natural - Cohesive/Fine	Slightly sandy slightly gravelly CLAY	5.2	0.4	4.33	12.13	5.34	0.2
LWD112	0.30	Natural - Cohesive/Fine	Slightly sandy slightly gravelly CLAY	5.9	0.4	4.92	13.77	6.06	0.2
LWD113	0.30	Natural - Cohesive/Fine	Slightly sandy slightly gravelly CLAY	5.1	0.4	4.25	11.90	5.24	0.2
LWD114	0.30	Natural - Cohesive/Fine	Slightly sandy slightly gravelly CLAY	6.2	0.4	5.17	14.47	6.37	0.2
LWD115	0.30	Natural - Cohesive/Fine	Slightly sandy slightly gravelly CLAY	5.4	0.4	4.50	12.60	5.54	0.2
LWD116	0.20	Natural - Cohesive/Fine	Slightly sandy slightly gravelly CLAY	5.1	0.4	4.25	11.90	5.24	0.2
LWD118	0.30	Natural - Cohesive/Fine	Slightly sandy slightly gravelly CLAY	5.0	0.4	4.17	11.67	5.13	0.2
LWD119	0.30	Natural - Cohesive/Fine	Slightly sandy slightly gravelly CLAY	5.1	0.4	4.25	11.90	5.24	0.2
LWS120	0.30	Natural - Cohesive/Fine	Slightly sandy slightly gravelly CLAY	5.2	0.4	4.33	12.13	5.34	0.2

Compiled By: Sam Jennings **Signature:**

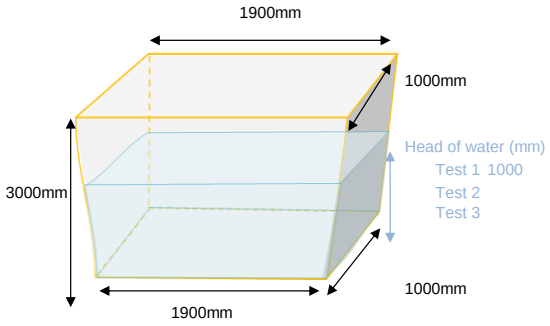
Checked By: Jack Mather **Signature:**

Date: 25/03/25

Percolation Test	**UNITED LIVING**	Date of Test: 29/01/2025	BROWNFIELD SOLUTIONS LTD
	Halsnead Gardens	Logged By: GK	
SA101	C5890	Checked By: JM	

Dimensions (mm)	TEST 1		
Length at Top	1900		
Length at Bottom	1900		
Width at Top	1000		
Width at Bottom	1000		
Depth Tested (Head of Water)	1000		
Depth of Excavation	3000		
Volume of Water (m3)	1.9		
Void Ratio	1		
Factored Volume of Water (m3)	1.9		
Strata Description	Clay to 2.40m then destructured sandstone bedrock to base		
Pit Details	Open with no stone filling See associated log for stratum details		

Test Pit Construction

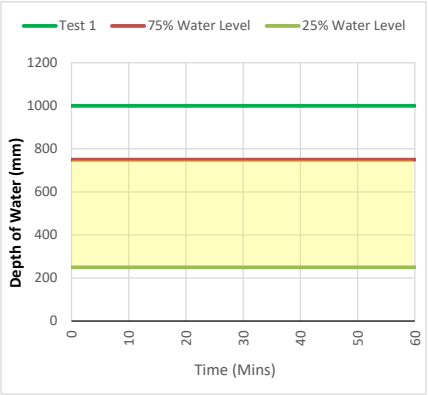


Site Recorded Data

Test 1								
Time (mins)	Depth to water (mm)	Head of water (mm)						
0.00	2000	1000						
0.08	2000	1000						
0.16	2000	1000						
0.24	2000	1000						
0.32	2000	1000						
0.42	2000	1000						
0.50	2000	1000						
0.64	2000	1000						
0.78	2000	1000						
1.00	2000	1000						
2.00	2000	1000						
3.00	2000	1000						
4.00	2000	1000						
5.00	2000	1000						
6.00	2000	1000						
7.00	2000	1000						
8.00	2000	1000						
9.00	2000	1000						
10.00	2000	1000						
15.00	2000	1000						
20.00	2000	1000						
25.00	2000	1000						
30.00	2000	1000						
40.00	2000	1000						
50.00	2000	1000						
60.00	2000	1000						

Percolation Test	UNITED LIVING	Date of Test: 29/01/2025	BROWNFIELD SOLUTIONS LTD
	Halsnead Gardens	Logged By: GK	
SA101	C5890	Checked By: JM	

Data Analysis



Soil Infiltration Rate Calculation

	Test 1	Test 2	Test 3
Water Level 1	2000.000		
Water Level 2	2000.000		
Time to drain from Water Level 1 to Level 2 (m	60.000		
Volume of Water Discharged m3)	0.0000000		
Discharge Area (m3)	13.500		
Soil Infiltration Rate (m/min)	0.0000000		
Soil Infiltration Rate (m/sec)	Unable to calculate due to no infiltration		

Compliancy Check

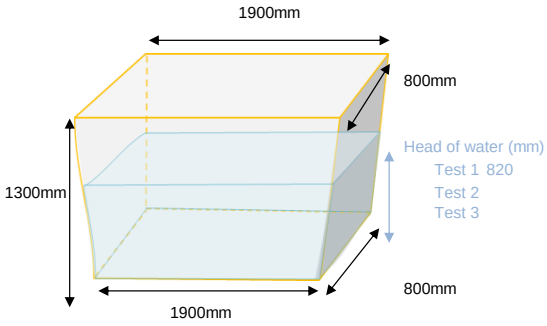
	Test 1	Test 2	Test 3
Water Level at 75% effective depth (mm)	750		
Water Level at 25% effective depth (mm)	250		
	Not Compliant with BRE 365 - Insufficient time to drain past 25% effective depth		

Percolation Test	UNITED LIVING	Date of Test: 29/01/2025
	Halsnead Gardens	Logged By: GK
SA102	C5890	Checked By: JM

BROWNFIELD SOLUTIONS LTD

Dimensions (mm)	TEST 1	TEST 2	TEST 3
Length at Top	1900		
Length at Bottom	1900		
Width at Top	800		
Width at Bottom	800		
Depth Tested (Head of Water)	820		
Depth of Excavation	1300		
Volume of Water (m3)	1.2464		
Void Ratio	1		
Factored Volume of Water (m3)	1.2464		
Strata Description	Slightly sandy gravelly clay		
Pit Details	Open with no stone filling See associated log for stratum details		

Test Pit Construction



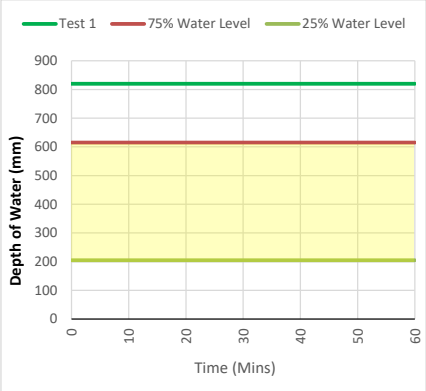
Site Recorded Data

Test 1		
Time (mins)	Depth to water (mm)	Head of water (mm)
0.00	480	820
0.08	480	820
0.16	480	820
0.24	480	820
0.32	480	820
0.42	480	820
0.50	480	820
0.64	480	820
0.78	480	820
1.00	480	820
2.00	480	820
3.00	480	820
4.00	480	820
5.00	480	820
6.00	480	820
7.00	480	820
8.00	480	820
9.00	480	820
10.00	480	820
15.00	480	820
20.00	480	820
25.00	480	820
30.00	480	820
40.00	480	820
50.00	480	820
60.00	480	820

Percolation Test	UNITED LIVING	Date of Test: 29/01/2025
	Halsnead Gardens	Logged By: GK
SA102	C5890	Checked By: JM

BROWNFIELD SOLUTIONS LTD

Data Analysis



Soil Infiltration Rate Calculation

	Test 1	Test 2	Test 3
Water Level 1	480.000		
Water Level 2	480.000		
Time to drain from Water Level 1 to Level 2 (m	60.000		
Volume of Water Discharged m3)	0.0000000		
Discharge Area (m3)	4.112		
Soil Infiltration Rate (m/min)	0.0000000		
Soil Infiltration Rate (m/sec)	Unable to calculate due to no infiltration		

Compliancy Check

	Test 1	Test 2	Test 3
Water Level at 75% effective depth (mm)	615		
Water Level at 25% effective depth (mm)	205		
	Not Compliant with BRE 365 - Insufficient time to drain past 25% effective depth		

APPENDIX E

Monitoring Results

Ground Gas Monitoring Results

BROWNFIELD SOLUTIONS LTD

CLIENT:	Date	Operator	Analsyer	Weather Observations			Temp (°C)	Pressure Trend	Min Barometric Pressure (mb)	Notes
UNITED LIVING	13/02/2025	AR	GA5000	Overcast	Light breeze	Cold	4	Rising	1021	
JOB NO.	26/02/2025	AR	GFM436	Sunny	Light breeze	Cool	7	Rising	1008	
C5980	13/03/2025	AR	GFM436	Sunny	Light breeze	Cold	4	Rising	1006	
SITE:	26/03/2025	AR	GFM436	Intermittent cloud	Light breeze	Warm	11	Falling	1025	
HALSNEAD GARDENS	11/05/2025	AR	GFM436	Sunny	No wind	Warm	11	Falling	1024	
	22/04/2025	SJ	GFM436	Sunny	No wind	Warm	13	Falling	1015	

Notes: mb = milibars; CH_4 = methane; LEL = lower explosive limit = 5%v/v; CO_2 = carbon dioxide; O_2 = oxygen; CO=carbon monoxide; H_2S = hydrogen sulphide; TVOC= Total volatile organic compounds; PPM = parts per million. Where the flow is less than the limit of detection of the instrument, the detection limit is reported (Highlighted in green). Gas Screening Values (GSVs) are rounded to 3 decimal places. Calibration Records for analysers used availble on request.

Date	Time	Location	Response zone (m)			Pressures (mb)		Gas flows (l/hr)		CH_4 (%v/v)		CH_4 (%LEL)		CO_2 (%v/v)		O_2 (%v/v)		Other Gases (PPM)			Depth to Water (m)	Well Base (m)	Gas Screening Value (CH_4) (l/hr)	Gas Screening Value (CO_2) (l/hr)	Notes
						Atmospheric Pressure	Relative Well Pressure	Initial	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	CO	H_2S	TVOC (PID)					
						Summary Statistcs																			
				Max. values:		1022	0.2	3.3	0.2	0.7	0.2	14.0	4.0	8.6	4.8	21.6	21.6	0.0	0.0	0.0	9.6	33.3	0.000	0.004	Highlight Box - Methane >1.0% v/v
				Min. values:		1000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	7.4	0.0	0.0	0.0	1.2	2.3	0.000	0.000	Highlight Box - Carbon Dioxide >5.0% v/v
			Top	Bottom		Worst-case (note - not worst credible) GSVs based on maximum recorded steady flow and maximum individual peak concentrations:																	0.001	0.017	Highlight Box - Water above Response Zone
13/02/2025		Ambient			1014					0.1		2.0		0.1		21.4									
	AM	WS101	0.60	3.60		0.0	0.0	0.0		0.1	0.1	2.0	2.0	0.8	0.5	20.8	21.3			0.0	1.54	3.38	0.000	0.000	
	AM	RO103	5.00	10.00		0.0	0.0	0.0		0.7	0.2	14.0	4.0	5.1	1.1	3.4	18.3			0.0	7.00	33.30	0.000	0.000	
	AM	WS103	1.50	3.00		0.2	0.2	0.2		0.1	0.1	2.0	2.0	2.1	1.8	11.4	12.7			0.0	1.83	2.89	0.000	0.004	
	AM	WS105	0.50	2.50		0.0	0.0	0.0		0.1	0.1	2.0	2.0	0.2	0.2	21.3	21.6			0.0	NGW	2.36	0.000	0.000	
	AM	WS106	0.5	2.50		0.0	0.0	0.0		0.1	0.1	2.0	2.0	0.6	0.3	19.7	20.4			0.0	NGW	2.61	0.000	0.000	
	PM	WS108	0.50	2.50		0.1	0.1	0.0		0.1	0.1	2.0	2.0	0.1	0.1	13.5	16.0			0.0	NGW	2.61	0.000	0.000	
	AM	WS109	0.50	2.00		0.0	0.0	0.0		0.1	0.1	2.0	2.0	3.1	1.1	20.5	21.4			0.0	1.47	2.55	0.000	0.000	
	PM	RO114	5.00	9.00		0.0	0.0	0.0		0.1	0.1	2.0	2.0	1.5	0.3	19.1	21.2			0.0	6.64	8.63	0.000	0.000	
		Ambient			1013					0.1		2.0		0.1		21.6									
26/02/2025		Ambient			1003					0.1		2.0		0.1		20.4									
	AM	WS101	0.60	3.60		0.0	0.0	0.0		0.1	0.1	2.0	2.0	0.9	0.8	19.4	19.4	0.0	0.0		1.22	3.34	0.000	0.000	
	AM	RO103	5.00	10.00		0.0	0.0	0.0		0.1	0.1	2.0	2.0	4.8	1.2	2.0	16.5	0.0	0.0		8.09	30.00	0.000	0.000	
	AM	WS103	1.50	3.00		0.0	0.0	0.0		0.1	0.1	2.0	2.0	3.0	2.3	7.1	7.4	0.0	0.0		2.4	2.82	0.000	0.000	
	AM	WS105	0.50	2.50		0	0	0		0.1	0.1	2.0	2.0	1.5	1.2	18.6	19	0	0		NGW	2.33	0.000	0.000	
	AM	WS106	0.5	2.50		0.0	0.0	0.0		0.1	0.1	2.0	2.0	0.7	0.5	18.7	19.5	0.0	0.0		NGW	2.56	0.000	0.000	
	AM	WS108	0.50	2.50		0.0	0.0	0.0		0.1	0.1	2.0	2.0	0.5	0.2	12.6	17.6	0.0	0.0		NGW	2.57	0.000	0.000	
	AM	WS109	0.50	2.00		0.0	0.0	0.0		0.1	0.1	2.0	2.0	3.2	2.4	16.5	17.4	0.0	0.0		1.48	2.58	0.000	0.000	
	AM	RO114	5.00	9.00		0.0	0.0	0.0		0.1	0.1	2.0	2.0	2.1	0.4	17.8	20.4	0.0	0.0		7.63	8.55	0.000	0.000	
		Ambient			1000					0.1		2.0		0.1		20.6									
13/03/2025		Ambient			1008					0.1		2.0		0.0		20.1									
	AM	WS101	0.60	3.60		0.0	0.0	0.0		0.1	0.1	2.0	2.0	1.6	0.7	18.7	19.6	0.0	0.0		1.87	3.39	0.000	0.000	
	AM	RO103	5.00	10.00		0.0	3.3	0.0		0.1	0.1	2.0	2.0	5.4	1.3	0.3	15.8	0.0	0.0		8.72	30.24	0.000	0.000	
	AM	WS103	1.50	3.00		0.0	0.0	0.0		0.1	0.1	2.0	2.0	2.8	1.2	7.6	14.9	0.0	0.0		2.40	2.85	0.000	0.000	
	AM	WS105	0.50	2.50		0.0	0.0	0.0		0.1	0.1	2.0	2.0	3.2	1.8	15.6	17.8	0.0	0.0		NGW	2.37	0.000	0.000	
	AM	WS106	0.5	2.50		0.0	0.0	0.0		0.1	0.1	2.0	2.0	0.6	0.6	20.0	20.1	0.0	0.0		NGW	2.59	0.000	0.000	
	AM	WS108	0.50	2.50		0.0	0.0	0.0		0.1	0.1	2.0	2.0	1.4	0.9	8.6	13.6	0.0	0.0		NGW	2.61	0.000	0.000	
	AM	WS109	0.50	2.00		0.0	0.0	0.0		0.1	0.1	2.0	2.0	6.1	3.5	6.2	12.5	0.0	0.0		1.96	2.52	0.000	0.000	
	AM	RO114	5.00	9.00		0.0	0.0	0.0		0.1	0.1	2.0	2.0	2.7	0.8	14.7	18.9	0.0	0.0		8.53	8.60	0.000	0.000	
		Ambient			1005					0.1		2.0		0.0		20.3									

Ground Gas Monitoring Results

BROWNFIELD SOLUTIONS LTD

Date	Time	Location	Response zone (m)		Pressures (mb)		Gas flows (l/hr)		CH_4 (%v/v)		CH_4 (%LEL)		CO_2 (%v/v)		O_2 (%v/v)		Other Gases (PPM)			Depth to Water (m)	Well Base (m)	Gas Screening Value (CH_4) (l/hr)	Gas Screening Value (CO_2) (l/hr)	Notes
					Atmospheric Pressure	Relative Well Pressure	Initial	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	CO	H_2S	TVOC (PID)					
26/03/2025		Ambient			1021				0.0		0.0		0.1		20.7									
	AM	WS101	0.60	3.60		0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.7	18.8	20.1	0.0	0.0		2.08	3.34	0.000	0.000	
	PM	RO103	5.00	10.00		0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.1	1.0	0.4	16.7	0.0	0.0		9.05	30.12	0.000	0.000	
	AM	WS103	1.50	3.00		0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	1.0	9.2	16.2	0.0	0.0		2.58	2.80	0.000	0.000	
	AM	WS105	0.50	2.50		0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.1	1.9	15.7	18.3	0.0	0.0		NGW	2.35	0.000	0.000	
	PM	WS106	0.5	2.50		0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1	0.5	17.8	20.4	0.0	0.0		NGW	2.55	0.000	0.000	
	PM	WS108	0.50	2.50		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.8	20.5	16.0	0.0	0.0		NGW	2.57	0.000	0.000	
	AM	WS109	0.50	2.00		0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.0	2.1	5.9	15.2	0.0	0.0		1.99	2.48	0.000	0.000	
	PM	RO114	5.00	9.00		0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.2	13.4	20.4	0.0	0.0		NGW	8.54	0.000	0.000	
		Ambient			1022				0.0		0.0		0.0		20.7									
11/05/2025		Ambient			1016				0.0		0.0		0.0		20.2									
	AM	WS101	0.60	3.60		0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6	1.1	18.3	19.6	0.0	0.0		2.27	3.38	0.000	0.000	
	AM	RO103	5.00	10.00		0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.3	1.1	0.5	16.3	0.0	0.0		9.41	30.09	0.000	0.000	
	AM	WS103	1.50	3.00		0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7	1.4	8.2	14.6	0.0	0.0		2.71	2.89	0.000	0.000	
	AM	WS105	0.50	2.50		0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.5	2.0	14.3	18.1	0.0	0.0		NGW	2.37	0.000	0.000	
	AM	WS106	0.5	2.50		0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	1.2	18.6	19.5	0.0	0.0		NGW	2.59	0.000	0.000	
	AM	WS108	0.50	2.50		0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	2.9	3.7	8.7	0.0	0.0		NGW	2.61	0.000	0.000	
	AM	WS109	0.50	2.00		0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.6	3.5	10.3	16.2	0.0	0.0		2.17	2.51	0.000	0.000	
	AM	RO114	5.00	9.00		0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.9	17.4	18.7	0.0	0.0		NGW	8.60	0.000	0.000	
		Ambient			1016				0.0		0.0		0.0		20.6									
22/04/2025		Ambient			1006				0.0		0.0		0.0		20.9									
	AM	WS101	0.60	3.60		0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	1.7	19.2	19.8	0.0	0.0		2.36	3.40	0.000	0.000	
	AM	RO103	5.00	10.00		0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.7	0.9	1.4	17.4	0.0	0.0		9.56	30.51	0.000	0.000	
	AM	WS103	1.50	3.00		0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6	1.2	10.1	15.5	0.0	0.0		2.30	2.89	0.000	0.000	
	AM	WS105	0.50	2.50		0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.3	2.0	17.2	19.4	0.0	0.0		NGW	2.38	0.000	0.000	
	AM	WS106	0.5	2.50		0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.7	20.3	20.5	0.0	0.0		NGW	2.62	0.000	0.000	
	AM	WS108	0.50	2.50		0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.6	19.1	20.3	0.0	0.0		NGW	2.61	0.000	0.000	
	AM	WS109	0.50	2.00		0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.6	4.8	16.6	17.7	0.0	0.0		2.20	2.53	0.000	0.000	
	AM	RO114	5.00	9.00		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.3	19.4	20.5	0.0	0.0		8.56	8.72	0.000	0.000	
		Ambient			1006				0.0		0.0		0.0		21.0									

APPENDIX F

Waste Assessment Report

Waste Classification Report

HazWasteOnline™ classifies waste as either **hazardous** or **non-hazardous** based on its chemical composition, related legislation and the rules and data defined in the current UK or EU technical guidance (Appendix C) (note that HP 9 Infectious is not assessed). It is the responsibility of the classifier named below to:

a) understand the origin of the waste
b) select the correct List of Waste code(s)
c) confirm that the list of determinands, results and sampling plan are fit for purpose
d) select and justify the chosen metal species (Appendix B)
e) correctly apply moisture correction and other available corrections
f) add the meta data for their user-defined substances (Appendix A)
g) check that the classification engine is suitable with respect to the national destination of the waste (Appendix C)

To aid the reviewer, the laboratory results, assumptions and justifications managed by the classifier are highlighted in pale yellow.

EGSP8-4Z9HA-3PJJY

Report is invalid if pages are removed.

Job name

C5980 Halsnead Phase 1

Description/Comments

Project

Halsnead Phase 1

Site

C5980

Classified by

Name:
Jack Mather
Date:
28 Mar 2025 11:59 GMT
Telephone:
01606334844

Company:
Brownfield Solutions Limited
173-183 Witton Street
Northwich
CW9 5LP

HazWasteOnline™ provides a two day, hazardous waste classification course that covers the use of the software and both basic and advanced waste classification techniques. Certification has to be renewed every 3 years.

HazWasteOnline™ Certification: **CERTIFIED**

Course	Date
Hazardous Waste Classification	09 Feb 2023

Next 3 year Refresher due by Feb 2026

Purpose of classification

2 - Material Characterisation

Address of the waste

Halsnead Gardens, Prescot **Post Code** L35 3QF

SIC for the process giving rise to the waste

41100 Development of building projects

Description of industry/producer giving rise to the waste

Development of soft landscaping open fields into residential housing.

Description of the specific process, sub-process and/or activity that created the waste

Waste created during soil excavation for land redevelopment into housing.

Description of the waste

"Predominantly:
Made Ground: Sandy gravelly clay with anthropogenic inclusions of brick, ceramic, metal, and coal.
Natural Superficial: Sandy gravelly clay.
Solid Geology: Coal, sandstone, mudstone, siltstone, and/or shale."

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	TP101	0.10-0.40	Non Hazardous		3
2	TP103	0.60-1.80	Non Hazardous		4
3	TP106	0.50-2.30	Non Hazardous		5
4	TP107	0.30-0.70	Non Hazardous		6
5	TP112	0.30-0.70	Non Hazardous		8
6	TP115	0.50-2.10	Non Hazardous		10
7	TP117	0.10-0.40	Non Hazardous		12
8	TP120	0.40-2.00	Non Hazardous		14
9	TP124	1.60-2.00	Non Hazardous		15
10	TP125	0.10-0.30	Non Hazardous		16
11	TP126	1.20-2.80	Non Hazardous		18
12	TP127	0.90-2.15	Non Hazardous		19
13	TP130	0.40-2.30	Non Hazardous		20
14	TP131	0.60-1.60	Non Hazardous		21
15	TP133	0.10-0.30	Non Hazardous		22
16	TP135	0.10-0.70	Non Hazardous		24
17	WS101	0.40-1.70	Non Hazardous		26
18	WS102	2.00-2.45	Non Hazardous		27
19	WS103	0.10-0.60	Non Hazardous		28
20	WS103[2]	0.60-1.20	Non Hazardous		30
21	WS105	0.00-0.30	Non Hazardous		32
22	WS107	0.80-1.00	Non Hazardous		34
23	WS108	1.50-1.50	Non Hazardous		35
24	WS109A	0.00-0.50	Non Hazardous		36
25	WS109A[2]	0.60-0.60	Non Hazardous		38
26	WS110	0.00-0.40	Non Hazardous		39
27	WS111	0.50-0.50	Non Hazardous		41
28	WS112	0.50-0.50	Non Hazardous		43
29	WS112[2]	1.50-1.50	Non Hazardous		44
30	TP135[2]	0.10-0.70	Non Hazardous		46
31	WS109A[3]	0.00-0.50	Non Hazardous		48
32	WS01	0.10-0.40	Non Hazardous		50

Related documents

#	Name	Description
1	BSL Suite	waste stream template used to create this Job

Report

Created by: Jack Mather

Created date: 28 Mar 2025 11:59 GMT

Appendices	Page
Appendix A: Classifier defined and non GB MCL determinands	52
Appendix B: Rationale for selection of metal species	53
Appendix C: Version	53

Classification of sample: TP101

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
TP101
Sample Depth:
0.10-0.40 m
Moisture content:
20%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 20% Wet Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number							
1	•	pH		PH		6.2 pH		6.2 pH	6.2 pH		
								Total:	0%		

Key

	User supplied data
•	Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: TP103

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
TP103
Sample Depth:
0.60-1.80 m
Moisture content:
17%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 17% Wet Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number							
1	•	pH				5 pH		5 pH	5pH		
				PH							
								Total:	0%		

Key

	User supplied data
•	Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: TP106

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
TP106
Sample Depth:
0.50-2.30 m
Moisture content:
18%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 18% Wet Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number							
1	•	pH		PH		9.9 pH		9.9 pH	9.9 pH		
								Total:	0%		

Key

	User supplied data
•	Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: TP107

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
TP107
Sample Depth:
0.30-0.70 m
Moisture content:
12%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 12% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	pH			PH		7.4 pH		7.4 pH	7.4 pH		
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		9.4 mg/kg	1.32	10.922 mg/kg	0.00109 %	✓	
3	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	0.3 mg/kg	1.285	0.339 mg/kg	0.0000264 %	✓	
4	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		100 mg/kg	1.462	128.617 mg/kg	0.0129 %	✓	
5	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		33 mg/kg	1.126	32.696 mg/kg	0.00327 %	✓	
6	lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	100 mg/kg		88 mg/kg	0.0088 %	✓	
7	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.3 mg/kg	1.353	<0.406 mg/kg	<0.0000406 %		<**LOD**
8	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		46 mg/kg	1.579	63.938 mg/kg	0.00639 %	✓	
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %		<**LOD**
10	zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		80 mg/kg	2.469	173.838 mg/kg	0.0174 %	✓	
11	naphthalene	601-052-00-2	202-049-5	91-20-3		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<**LOD**
12	acenaphthylene		205-917-1	208-96-8		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<**LOD**
13	acenaphthene		201-469-6	83-32-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<**LOD**
14	fluorene		201-695-5	86-73-7		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<**LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
15		phenanthrene				0.13	mg/kg		0.114	mg/kg	0.0000114 %	✓	
			201-581-5	85-01-8									
16		anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			204-371-1	120-12-7									
17		fluoranthene				0.17	mg/kg		0.15	mg/kg	0.000015 %	✓	
			205-912-4	206-44-0									
18		pyrene				0.19	mg/kg		0.167	mg/kg	0.0000167 %	✓	
			204-927-3	129-00-0									
19		benzo[a]anthracene				0.07	mg/kg		0.0616	mg/kg	0.00000616 %	✓	
		601-033-00-9	200-280-6	56-55-3									
20		chrysene				0.11	mg/kg		0.0968	mg/kg	0.00000968 %	✓	
		601-048-00-0	205-923-4	218-01-9									
21		benzo[b]fluoranthene				0.1	mg/kg		0.088	mg/kg	0.0000088 %	✓	
		601-034-00-4	205-911-9	205-99-2									
22		benzo[k]fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-036-00-5	205-916-6	207-08-9									
23		benzo[a]pyrene; benzo[def]chrysene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-032-00-3	200-028-5	50-32-8									
24		indeno[123-cd]pyrene				0.05	mg/kg		0.044	mg/kg	0.0000044 %	✓	
			205-893-2	193-39-5									
25		dibenz[a,h]anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
26		benzo[ghi]perylene				0.06	mg/kg		0.0528	mg/kg	0.00000528 %	✓	
			205-883-8	191-24-2									
27		benzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		601-020-00-8	200-753-7	71-43-2									
28		toluene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		601-021-00-3	203-625-9	108-88-3									
29		ethylbenzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		601-023-00-4	202-849-4	100-41-4									
30		xylene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
										Total:	0.0499 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP112

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
TP112
Sample Depth:
0.30-0.70 m
Moisture content:
14%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 14% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	pH			PH		8.2 pH		8.2 pH	8.2 pH		
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		9 mg/kg	1.32	10.219 mg/kg	0.00102 %	✓	
3	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	<0.2 mg/kg	1.285	<0.257 mg/kg	<0.00002 %		<LOD
4	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		42 mg/kg	1.462	52.791 mg/kg	0.00528 %	✓	
5	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		18 mg/kg	1.126	17.429 mg/kg	0.00174 %	✓	
6	lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	8.9 mg/kg		7.654 mg/kg	0.000765 %	✓	
7	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.3 mg/kg	1.353	<0.406 mg/kg	<0.0000406 %		<LOD
8	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		46 mg/kg	1.579	62.485 mg/kg	0.00625 %	✓	
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %		<LOD
10	zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		37 mg/kg	2.469	78.573 mg/kg	0.00786 %	✓	
11	naphthalene	601-052-00-2	202-049-5	91-20-3		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
12	acenaphthylene		205-917-1	208-96-8		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
13	acenaphthene		201-469-6	83-32-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
14	fluorene		201-695-5	86-73-7		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
15		phenanthrene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			201-581-5	85-01-8									
16		anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			204-371-1	120-12-7									
17		fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			205-912-4	206-44-0									
18		pyrene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			204-927-3	129-00-0									
19		benzo[a]anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-033-00-9	200-280-6	56-55-3									
20		chrysene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-048-00-0	205-923-4	218-01-9									
21		benzo[b]fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-034-00-4	205-911-9	205-99-2									
22		benzo[k]fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-036-00-5	205-916-6	207-08-9									
23		benzo[a]pyrene; benzo[def]chrysene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-032-00-3	200-028-5	50-32-8									
24		indeno[123-cd]pyrene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			205-893-2	193-39-5									
25		dibenz[a,h]anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
26		benzo[ghi]perylene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			205-883-8	191-24-2									
										Total:	0.0229 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP115

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
TP115
Sample Depth:
0.50-2.10 m
Moisture content:
15%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 15% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	pH			PH		6	pH		6	pH	6pH		
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		7.9	mg/kg	1.32	8.866	mg/kg	0.000887 %	✓	
3	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	<0.2	mg/kg	1.285	<0.257	mg/kg	<0.00002 %		<LOD
4	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		33	mg/kg	1.462	40.997	mg/kg	0.0041 %	✓	
5	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		9.7	mg/kg	1.126	9.283	mg/kg	0.000928 %	✓	
6	lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	7.7	mg/kg		6.545	mg/kg	0.000655 %	✓	
7	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.3	mg/kg	1.353	<0.406	mg/kg	<0.0000406 %		<LOD
8	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		18	mg/kg	1.579	24.166	mg/kg	0.00242 %	✓	
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1	mg/kg	1.405	<1.405	mg/kg	<0.000141 %		<LOD
10	zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		28	mg/kg	2.469	58.769	mg/kg	0.00588 %	✓	
11	naphthalene	601-052-00-2	202-049-5	91-20-3		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
12	acenaphthylene		205-917-1	208-96-8		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
13	acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
14	fluorene		201-695-5	86-73-7		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
15		phenanthrene	201-581-5	85-01-8		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
16		anthracene	204-371-1	120-12-7		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
17		fluoranthene	205-912-4	206-44-0		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
18		pyrene	204-927-3	129-00-0		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
19		benzo[a]anthracene	200-280-6	56-55-3		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
20		chrysene	205-923-4	218-01-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
21		benzo[b]fluoranthene	205-911-9	205-99-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
22		benzo[k]fluoranthene	205-916-6	207-08-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
23		benzo[a]pyrene; benzo[def]chrysene	200-028-5	50-32-8		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
24		indeno[123-cd]pyrene	205-893-2	193-39-5		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
25		dibenz[a,h]anthracene	200-181-8	53-70-3		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
26		benzo[ghi]perylene	205-883-8	191-24-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
										Total:	0.0149 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP117

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
TP117
Sample Depth:
0.10-0.40 m
Moisture content:
23%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 23% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	pH			PH		6.4 pH		6.4 pH	6.4 pH		
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		11 mg/kg	1.32	11.183 mg/kg	0.00112 %	✓	
3	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	0.7 mg/kg	1.285	0.693 mg/kg	0.0000539 %	✓	
4	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		22 mg/kg	1.462	24.759 mg/kg	0.00248 %	✓	
5	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		55 mg/kg	1.126	47.681 mg/kg	0.00477 %	✓	
6	lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	34 mg/kg		26.18 mg/kg	0.00262 %	✓	
7	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.3 mg/kg	1.353	<0.406 mg/kg	<0.0000406 %		<LOD
8	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		18 mg/kg	1.579	21.892 mg/kg	0.00219 %	✓	
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %		<LOD
10	zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		61 mg/kg	2.469	115.983 mg/kg	0.0116 %	✓	
11	naphthalene	601-052-00-2	202-049-5	91-20-3		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
12	acenaphthylene		205-917-1	208-96-8		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
13	acenaphthene		201-469-6	83-32-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
14	fluorene		201-695-5	86-73-7		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
15		phenanthrene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			201-581-5	85-01-8									
16		anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			204-371-1	120-12-7									
17		fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			205-912-4	206-44-0									
18		pyrene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			204-927-3	129-00-0									
19		benzo[a]anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-033-00-9	200-280-6	56-55-3									
20		chrysene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-048-00-0	205-923-4	218-01-9									
21		benzo[b]fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-034-00-4	205-911-9	205-99-2									
22		benzo[k]fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-036-00-5	205-916-6	207-08-9									
23		benzo[a]pyrene; benzo[def]chrysene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-032-00-3	200-028-5	50-32-8									
24		indeno[123-cd]pyrene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			205-893-2	193-39-5									
25		dibenz[a,h]anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
26		benzo[ghi]perylene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			205-883-8	191-24-2									
										Total:	0.0248 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP120

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
TP120
Sample Depth:
0.40-2.00 m
Moisture content:
13%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 13% Wet Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number							
1	•	pH				7.9 pH		7.9 pH	7.9 pH		
				PH							
								Total:	0%		

Key

	User supplied data
•	Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: TP124

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
TP124
Sample Depth:
1.60-2.00 m
Moisture content:
13%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 13% Wet Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number							
1	•	pH		PH		5.5 pH		5.5 pH	5.5 pH		
								Total:	0%		

Key

	User supplied data
•	Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: TP125

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
TP125
Sample Depth:
0.10-0.30 m
Moisture content:
23%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 23% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	pH			PH		6.1 pH		6.1 pH	6.1 pH		
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		11 mg/kg	1.32	11.183 mg/kg	0.00112 %	✓	
3	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	0.8 mg/kg	1.285	0.792 mg/kg	0.0000616 %	✓	
4	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		19 mg/kg	1.462	21.383 mg/kg	0.00214 %	✓	
5	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		48 mg/kg	1.126	41.613 mg/kg	0.00416 %	✓	
6	lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	62 mg/kg		47.74 mg/kg	0.00477 %	✓	
7	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.3 mg/kg	1.353	<0.406 mg/kg	<0.0000406 %		<**LOD**
8	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		19 mg/kg	1.579	23.108 mg/kg	0.00231 %	✓	
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %		<**LOD**
10	zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		71 mg/kg	2.469	134.996 mg/kg	0.0135 %	✓	
11	naphthalene	601-052-00-2	202-049-5	91-20-3		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<**LOD**
12	acenaphthylene		205-917-1	208-96-8		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<**LOD**
13	acenaphthene		201-469-6	83-32-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<**LOD**
14	fluorene		201-695-5	86-73-7		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<**LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
15		phenanthrene				0.09	mg/kg		0.0693	mg/kg	0.00000693 %	✓	
			201-581-5	85-01-8									
16		anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			204-371-1	120-12-7									
17		fluoranthene				0.16	mg/kg		0.123	mg/kg	0.0000123 %	✓	
			205-912-4	206-44-0									
18		pyrene				0.15	mg/kg		0.115	mg/kg	0.0000115 %	✓	
			204-927-3	129-00-0									
19		benzo[a]anthracene				0.08	mg/kg		0.0616	mg/kg	0.00000616 %	✓	
		601-033-00-9	200-280-6	56-55-3									
20		chrysene				0.12	mg/kg		0.0924	mg/kg	0.00000924 %	✓	
		601-048-00-0	205-923-4	218-01-9									
21		benzo[b]fluoranthene				0.13	mg/kg		0.1	mg/kg	0.00001 %	✓	
		601-034-00-4	205-911-9	205-99-2									
22		benzo[k]fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-036-00-5	205-916-6	207-08-9									
23		benzo[a]pyrene; benzo[def]chrysene				0.07	mg/kg		0.0539	mg/kg	0.00000539 %	✓	
		601-032-00-3	200-028-5	50-32-8									
24		indeno[123-cd]pyrene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			205-893-2	193-39-5									
25		dibenz[a,h]anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
26		benzo[ghi]perylene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			205-883-8	191-24-2									
27		benzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		601-020-00-8	200-753-7	71-43-2									
28		toluene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		601-021-00-3	203-625-9	108-88-3									
29		ethylbenzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		601-023-00-4	202-849-4	100-41-4									
30		xylene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
										Total:	0.0281 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP126

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
TP126
Sample Depth:
1.20-2.80 m
Moisture content:
11%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 11% Wet Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number							
1	•	pH				7.5 pH		7.5 pH	7.5 pH		
				PH							
								Total:	0%		

Key

	User supplied data
•	Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: TP127

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
TP127
Sample Depth:
0.90-2.15 m
Moisture content:
15%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 15% Wet Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number							
1	•	pH		PH		6.3 pH		6.3 pH	6.3 pH		
								Total:	0%		

Key

	User supplied data
•	Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: TP130

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
TP130
Sample Depth:
0.40-2.30 m
Moisture content:
15%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 15% Wet Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number							
1	•	pH				6.1 pH		6.1 pH	6.1 pH		
				PH							
								Total:	0%		

Key

	User supplied data
•	Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: TP131

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
TP131	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	
0.60-1.60 m	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
Moisture content:	
15% (wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 15% Wet Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number							
1	•	pH		PH		8.3 pH		8.3 pH	8.3 pH		
								Total:	0%		

Key

	User supplied data
•	Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: TP133

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
TP133
Sample Depth:
0.10-0.30 m
Moisture content:
21%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 21% Wet Weight Moisture Correction applied (MC)

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		pH			PH		6.9	pH		6.9	pH	6.9 pH		
2		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		20	mg/kg	1.32	20.861	mg/kg	0.00209 %	✓	
3		cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	1.3	mg/kg	1.285	1.32	mg/kg	0.000103 %	✓	
4		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		19	mg/kg	1.462	21.938	mg/kg	0.00219 %	✓	
5		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		89	mg/kg	1.126	79.161	mg/kg	0.00792 %	✓	
6		lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	100	mg/kg		79	mg/kg	0.0079 %	✓	
7		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.3	mg/kg	1.353	<0.406	mg/kg	<0.0000406 %		<LOD
8		nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		20	mg/kg	1.579	24.956	mg/kg	0.0025 %	✓	
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1	mg/kg	1.405	<1.405	mg/kg	<0.000141 %		<LOD
10		zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		99	mg/kg	2.469	193.124	mg/kg	0.0193 %	✓	
11		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
12		acenaphthylene		205-917-1	208-96-8		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
13		acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
14		fluorene		201-695-5	86-73-7		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
15		phenanthrene				0.11	mg/kg		0.0869	mg/kg	0.00000869 %	✓	
			201-581-5	85-01-8									
16		anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			204-371-1	120-12-7									
17		fluoranthene				0.15	mg/kg		0.119	mg/kg	0.0000119 %	✓	
			205-912-4	206-44-0									
18		pyrene				0.15	mg/kg		0.119	mg/kg	0.0000119 %	✓	
			204-927-3	129-00-0									
19		benzo[a]anthracene				0.08	mg/kg		0.0632	mg/kg	0.00000632 %	✓	
		601-033-00-9	200-280-6	56-55-3									
20		chrysene				0.12	mg/kg		0.0948	mg/kg	0.00000948 %	✓	
		601-048-00-0	205-923-4	218-01-9									
21		benzo[b]fluoranthene				0.12	mg/kg		0.0948	mg/kg	0.00000948 %	✓	
		601-034-00-4	205-911-9	205-99-2									
22		benzo[k]fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-036-00-5	205-916-6	207-08-9									
23		benzo[a]pyrene; benzo[def]chrysene				0.06	mg/kg		0.0474	mg/kg	0.00000474 %	✓	
		601-032-00-3	200-028-5	50-32-8									
24		indeno[123-cd]pyrene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			205-893-2	193-39-5									
25		dibenz[a,h]anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
26		benzo[ghi]perylene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			205-883-8	191-24-2									
27		benzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		601-020-00-8	200-753-7	71-43-2									
28		toluene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		601-021-00-3	203-625-9	108-88-3									
29		ethylbenzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		601-023-00-4	202-849-4	100-41-4									
30		xylene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
										Total:	0.0421 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP135

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
TP135
Sample Depth:
0.10-0.70 m
Moisture content:
30%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 30% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	pH			PH		6.4 pH		6.4 pH	6.4 pH		
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		14 mg/kg	1.32	12.939 mg/kg	0.00129 %	✓	
3	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	0.8 mg/kg	1.285	0.72 mg/kg	0.000056 %	✓	
4	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		18 mg/kg	1.462	18.416 mg/kg	0.00184 %	✓	
5	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		47 mg/kg	1.126	37.042 mg/kg	0.0037 %	✓	
6	lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	47 mg/kg		32.9 mg/kg	0.00329 %	✓	
7	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.3 mg/kg	1.353	<0.406 mg/kg	<0.0000406 %		<**LOD**
8	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		16 mg/kg	1.579	17.69 mg/kg	0.00177 %	✓	
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %		<**LOD**
10	zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		63 mg/kg	2.469	108.896 mg/kg	0.0109 %	✓	
11	naphthalene	601-052-00-2	202-049-5	91-20-3		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<**LOD**
12	acenaphthylene		205-917-1	208-96-8		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<**LOD**
13	acenaphthene		201-469-6	83-32-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<**LOD**
14	fluorene		201-695-5	86-73-7		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<**LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
15		phenanthrene				0.08	mg/kg		0.056	mg/kg	0.0000056 %	✓	
			201-581-5	85-01-8									
16		anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			204-371-1	120-12-7									
17		fluoranthene				0.12	mg/kg		0.084	mg/kg	0.0000084 %	✓	
			205-912-4	206-44-0									
18		pyrene				0.11	mg/kg		0.077	mg/kg	0.0000077 %	✓	
			204-927-3	129-00-0									
19		benzo[a]anthracene				0.07	mg/kg		0.049	mg/kg	0.0000049 %	✓	
		601-033-00-9	200-280-6	56-55-3									
20		chrysene				0.08	mg/kg		0.056	mg/kg	0.0000056 %	✓	
		601-048-00-0	205-923-4	218-01-9									
21		benzo[b]fluoranthene				0.09	mg/kg		0.063	mg/kg	0.0000063 %	✓	
		601-034-00-4	205-911-9	205-99-2									
22		benzo[k]fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-036-00-5	205-916-6	207-08-9									
23		benzo[a]pyrene; benzo[def]chrysene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-032-00-3	200-028-5	50-32-8									
24		indeno[123-cd]pyrene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			205-893-2	193-39-5									
25		dibenz[a,h]anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
26		benzo[ghi]perylene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			205-883-8	191-24-2									
27		benzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		601-020-00-8	200-753-7	71-43-2									
28		toluene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		601-021-00-3	203-625-9	108-88-3									
29		ethylbenzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		601-023-00-4	202-849-4	100-41-4									
30		xylene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
										Total:	0.0229 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS101

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
WS101
Sample Depth:
0.40-1.70 m
Moisture content:
15%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 15% Wet Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number							
1	•	pH				8.6 pH		8.6 pH	8.6 pH		
				PH							
								Total:	0%		

Key

	User supplied data
•	Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: WS102

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
WS102
Sample Depth:
2.00-2.45 m
Moisture content:
8.2%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 8.2% Wet Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number							
1	•	pH		PH		7.3 pH		7.3 pH	7.3 pH		
								Total:	0%		

Key

	User supplied data
•	Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: WS103

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
WS103
Sample Depth:
0.10-0.60 m
Moisture content:
18%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 18% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	pH			PH		6.8 pH		6.8 pH	6.8 pH		
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		39 mg/kg	1.32	42.224 mg/kg	0.00422 %	✓	
3	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	<0.2 mg/kg	1.285	<0.257 mg/kg	<0.00002 %		<LOD
4	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		19 mg/kg	1.462	22.771 mg/kg	0.00228 %	✓	
5	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		160 mg/kg	1.126	147.717 mg/kg	0.0148 %	✓	
6	lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	980 mg/kg		803.6 mg/kg	0.0804 %	✓	
7	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.3 mg/kg	1.353	<0.406 mg/kg	<0.0000406 %		<LOD
8	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		110 mg/kg	1.579	142.471 mg/kg	0.0142 %	✓	
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %		<LOD
10	zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		130 mg/kg	2.469	263.227 mg/kg	0.0263 %	✓	
11	naphthalene	601-052-00-2	202-049-5	91-20-3		0.08 mg/kg		0.0656 mg/kg	0.00000656 %	✓	
12	acenaphthylene		205-917-1	208-96-8		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
13	acenaphthene		201-469-6	83-32-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
14	fluorene		201-695-5	86-73-7		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
15		phenanthrene				0.42	mg/kg		0.344	mg/kg	0.0000344 %	✓	
			201-581-5	85-01-8									
16		anthracene				0.09	mg/kg		0.0738	mg/kg	0.00000738 %	✓	
			204-371-1	120-12-7									
17		fluoranthene				0.7	mg/kg		0.574	mg/kg	0.0000574 %	✓	
			205-912-4	206-44-0									
18		pyrene				0.73	mg/kg		0.599	mg/kg	0.0000599 %	✓	
			204-927-3	129-00-0									
19		benzo[a]anthracene				0.49	mg/kg		0.402	mg/kg	0.0000402 %	✓	
		601-033-00-9	200-280-6	56-55-3									
20		chrysene				0.63	mg/kg		0.517	mg/kg	0.0000517 %	✓	
		601-048-00-0	205-923-4	218-01-9									
21		benzo[b]fluoranthene				0.66	mg/kg		0.541	mg/kg	0.0000541 %	✓	
		601-034-00-4	205-911-9	205-99-2									
22		benzo[k]fluoranthene				0.27	mg/kg		0.221	mg/kg	0.0000221 %	✓	
		601-036-00-5	205-916-6	207-08-9									
23		benzo[a]pyrene; benzo[def]chrysene				0.48	mg/kg		0.394	mg/kg	0.0000394 %	✓	
		601-032-00-3	200-028-5	50-32-8									
24		indeno[123-cd]pyrene				0.23	mg/kg		0.189	mg/kg	0.0000189 %	✓	
			205-893-2	193-39-5									
25		dibenz[a,h]anthracene				0.07	mg/kg		0.0574	mg/kg	0.00000574 %	✓	
		601-041-00-2	200-181-8	53-70-3									
26		benzo[ghi]perylene				0.33	mg/kg		0.271	mg/kg	0.0000271 %	✓	
			205-883-8	191-24-2									
27		TPH (C6 to C40) petroleum group				14	mg/kg		11.48	mg/kg	0.00115 %	✓	
				TPH									
28		benzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-020-00-8	200-753-7	71-43-2									
29		toluene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-021-00-3	203-625-9	108-88-3									
30		ethylbenzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-023-00-4	202-849-4	100-41-4									
31		xylene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
										Total:	0.144 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous Property to non-hazardous for cumulative determinand results below the threshold of: 1000 mg/kg (0.1%) because: Concentration too low to be considered flammable. Low concentrations of short chain hydrocarbons. Discounted as this is a solid waste without a free draining liquid phase.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group (conc.: 0.00115%)

Classification of sample: WS103[2]

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
WS103[2]
Sample Depth:
0.60-1.20 m
Moisture content:
18%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 18% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	pH			PH		7.3 pH		7.3 pH	7.3 pH		
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		26 mg/kg	1.32	28.149 mg/kg	0.00281 %	✓	
3	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	1.9 mg/kg	1.285	2.002 mg/kg	0.000156 %	✓	
4	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		20 mg/kg	1.462	23.97 mg/kg	0.0024 %	✓	
5	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		52 mg/kg	1.126	48.008 mg/kg	0.0048 %	✓	
6	lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	65 mg/kg		53.3 mg/kg	0.00533 %	✓	
7	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.3 mg/kg	1.353	<0.406 mg/kg	<0.0000406 %		<LOD
8	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		43 mg/kg	1.579	55.693 mg/kg	0.00557 %	✓	
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %		<LOD
10	zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		340 mg/kg	2.469	688.44 mg/kg	0.0688 %	✓	
11	naphthalene	601-052-00-2	202-049-5	91-20-3		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
12	acenaphthylene		205-917-1	208-96-8		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
13	acenaphthene		201-469-6	83-32-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
14	fluorene		201-695-5	86-73-7		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
15		phenanthrene				0.16	mg/kg		0.131	mg/kg	0.0000131 %	✓	
			201-581-5	85-01-8									
16		anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			204-371-1	120-12-7									
17		fluoranthene				0.08	mg/kg		0.0656	mg/kg	0.00000656 %	✓	
			205-912-4	206-44-0									
18		pyrene				0.08	mg/kg		0.0656	mg/kg	0.00000656 %	✓	
			204-927-3	129-00-0									
19		benzo[a]anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-033-00-9	200-280-6	56-55-3									
20		chrysene				0.07	mg/kg		0.0574	mg/kg	0.00000574 %	✓	
		601-048-00-0	205-923-4	218-01-9									
21		benzo[b]fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-034-00-4	205-911-9	205-99-2									
22		benzo[k]fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-036-00-5	205-916-6	207-08-9									
23		benzo[a]pyrene; benzo[def]chrysene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-032-00-3	200-028-5	50-32-8									
24		indeno[123-cd]pyrene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			205-893-2	193-39-5									
25		dibenz[a,h]anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
26		benzo[ghi]perylene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			205-883-8	191-24-2									
										Total:	0.0899 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS105

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
WS105
Sample Depth:
0.00-0.30 m
Moisture content:
18%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 18% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	pH			PH		7.8 pH		7.8 pH	7.8 pH		
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		13 mg/kg	1.32	14.075 mg/kg	0.00141 %	✓	
3	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	0.9 mg/kg	1.285	0.949 mg/kg	0.0000738 %	✓	
4	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		20 mg/kg	1.462	23.97 mg/kg	0.0024 %	✓	
5	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		50 mg/kg	1.126	46.161 mg/kg	0.00462 %	✓	
6	lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	46 mg/kg		37.72 mg/kg	0.00377 %	✓	
7	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.3 mg/kg	1.353	<0.406 mg/kg	<0.0000406 %		<LOD
8	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		19 mg/kg	1.579	24.609 mg/kg	0.00246 %	✓	
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %		<LOD
10	zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		89 mg/kg	2.469	180.209 mg/kg	0.018 %	✓	
11	naphthalene	601-052-00-2	202-049-5	91-20-3		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
12	acenaphthylene		205-917-1	208-96-8		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
13	acenaphthene		201-469-6	83-32-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
14	fluorene		201-695-5	86-73-7		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
15		phenanthrene				0.05	mg/kg		0.041	mg/kg	0.0000041 %	✓	
			201-581-5	85-01-8									
16		anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			204-371-1	120-12-7									
17		fluoranthene				0.08	mg/kg		0.0656	mg/kg	0.00000656 %	✓	
			205-912-4	206-44-0									
18		pyrene				0.08	mg/kg		0.0656	mg/kg	0.00000656 %	✓	
			204-927-3	129-00-0									
19		benzo[a]anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-033-00-9	200-280-6	56-55-3									
20		chrysene				0.06	mg/kg		0.0492	mg/kg	0.00000492 %	✓	
		601-048-00-0	205-923-4	218-01-9									
21		benzo[b]fluoranthene				0.07	mg/kg		0.0574	mg/kg	0.00000574 %	✓	
		601-034-00-4	205-911-9	205-99-2									
22		benzo[k]fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-036-00-5	205-916-6	207-08-9									
23		benzo[a]pyrene; benzo[def]chrysene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-032-00-3	200-028-5	50-32-8									
24		indeno[123-cd]pyrene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			205-893-2	193-39-5									
25		dibenz[a,h]anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
26		benzo[ghi]perylene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			205-883-8	191-24-2									
										Total:	0.0328 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS107

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
WS107
Sample Depth:
0.80-1.00 m
Moisture content:
11%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 11% Wet Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number							
1	•	pH				6.4 pH		6.4 pH	6.4 pH		
				PH							
								Total:	0%		

Key

	User supplied data
•	Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: WS108

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
WS108
Sample Depth:
1.50-1.50 m
Moisture content:
17%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 17% Wet Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number							
1	●	pH		PH		7.2 pH		7.2 pH	7.2 pH		
								Total:	0%		

Key

	User supplied data
●	Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: WS109A

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
WS109A
Sample Depth:
0.00-0.50 m
Moisture content:
20%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 20% Wet Weight Moisture Correction applied (MC)

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		pH			PH		6.5	pH		6.5	pH	6.5 pH		
2		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		15	mg/kg	1.32	15.844	mg/kg	0.00158 %	✓	
3		cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	0.9	mg/kg	1.285	0.925	mg/kg	0.000072 %	✓	
4		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		21	mg/kg	1.462	24.554	mg/kg	0.00246 %	✓	
5		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		68	mg/kg	1.126	61.248	mg/kg	0.00612 %	✓	
6		lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	53	mg/kg		42.4	mg/kg	0.00424 %	✓	
7		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.3	mg/kg	1.353	<0.406	mg/kg	<0.0000406 %		<**LOD**
8		nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		27	mg/kg	1.579	34.117	mg/kg	0.00341 %	✓	
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				1.2	mg/kg	1.405	1.349	mg/kg	0.000135 %	✓	
10		zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		81	mg/kg	2.469	160.01	mg/kg	0.016 %	✓	
11		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
12		acenaphthylene		205-917-1	208-96-8		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
13		acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
14		fluorene		201-695-5	86-73-7		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
15		phenanthrene	201-581-5	85-01-8		0.09	mg/kg		0.072	mg/kg	0.0000072 %	✓	
16		anthracene	204-371-1	120-12-7		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
17		fluoranthene	205-912-4	206-44-0		0.11	mg/kg		0.088	mg/kg	0.0000088 %	✓	
18		pyrene	204-927-3	129-00-0		0.1	mg/kg		0.08	mg/kg	0.000008 %	✓	
19		benzo[a]anthracene	200-280-6	56-55-3		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
20		chrysene	205-923-4	218-01-9		0.09	mg/kg		0.072	mg/kg	0.0000072 %	✓	
21		benzo[b]fluoranthene	205-911-9	205-99-2		0.07	mg/kg		0.056	mg/kg	0.0000056 %	✓	
22		benzo[k]fluoranthene	205-916-6	207-08-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
23		benzo[a]pyrene; benzo[def]chrysene	200-028-5	50-32-8		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
24		indeno[123-cd]pyrene	205-893-2	193-39-5		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
25		dibenz[a,h]anthracene	200-181-8	53-70-3		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
26		benzo[ghi]perylene	205-883-8	191-24-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
										Total:	0.0341 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS109A[2]

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
WS109A[2]
Sample Depth:
0.60-0.60 m
Moisture content:
16%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 16% Wet Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number							
1	●	pH				7.9 pH		7.9 pH	7.9 pH		
				PH							
								Total:	0%		

Key

	User supplied data
●	Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: WS110

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
WS110
Sample Depth:
0.00-0.40 m
Moisture content:
20%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 20% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	pH			PH		6.7	pH		6.7	pH	6.7 pH		
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		8	mg/kg	1.32	8.45	mg/kg	0.000845 %	✓	
3	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	0.4	mg/kg	1.285	0.411	mg/kg	0.000032 %	✓	
4	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		17	mg/kg	1.462	19.877	mg/kg	0.00199 %	✓	
5	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		31	mg/kg	1.126	27.922	mg/kg	0.00279 %	✓	
6	lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	24	mg/kg		19.2	mg/kg	0.00192 %	✓	
7	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.3	mg/kg	1.353	<0.406	mg/kg	<0.0000406 %		<**LOD**
8	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		13	mg/kg	1.579	16.427	mg/kg	0.00164 %	✓	
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1	mg/kg	1.405	<1.405	mg/kg	<0.000141 %		<**LOD**
10	zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		44	mg/kg	2.469	86.919	mg/kg	0.00869 %	✓	
11	naphthalene	601-052-00-2	202-049-5	91-20-3		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
12	acenaphthylene		205-917-1	208-96-8		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
13	acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
14	fluorene		201-695-5	86-73-7		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
15		phenanthrene	201-581-5	85-01-8		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
16		anthracene	204-371-1	120-12-7		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
17		fluoranthene	205-912-4	206-44-0		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
18		pyrene	204-927-3	129-00-0		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
19		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
20		chrysene	601-048-00-0	205-923-4	218-01-9	<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
21		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
22		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
23		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
24		indeno[123-cd]pyrene	205-893-2	193-39-5		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
25		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
26		benzo[ghi]perylene	205-883-8	191-24-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
										Total:	0.0179 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS111

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
WS111
Sample Depth:
0.50-0.50 m
Moisture content:
17%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 17% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	pH			PH		6.4 pH		6.4 pH	6.4 pH		
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		6.2 mg/kg	1.32	6.794 mg/kg	0.000679 %	✓	
3	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	0.2 mg/kg	1.285	0.213 mg/kg	0.0000166 %	✓	
4	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		14 mg/kg	1.462	16.983 mg/kg	0.0017 %	✓	
5	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		25 mg/kg	1.126	23.362 mg/kg	0.00234 %	✓	
6	lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	12 mg/kg		9.96 mg/kg	0.000996 %	✓	
7	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.3 mg/kg	1.353	<0.406 mg/kg	<0.0000406 %		<**LOD**
8	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		15 mg/kg	1.579	19.665 mg/kg	0.00197 %	✓	
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %		<**LOD**
10	zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		42 mg/kg	2.469	86.08 mg/kg	0.00861 %	✓	
11	naphthalene	601-052-00-2	202-049-5	91-20-3		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<**LOD**
12	acenaphthylene		205-917-1	208-96-8		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<**LOD**
13	acenaphthene		201-469-6	83-32-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<**LOD**
14	fluorene		201-695-5	86-73-7		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<**LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
15		phenanthrene	201-581-5	85-01-8		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
16		anthracene	204-371-1	120-12-7		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
17		fluoranthene	205-912-4	206-44-0		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
18		pyrene	204-927-3	129-00-0		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
19		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
20		chrysene	601-048-00-0	205-923-4	218-01-9	<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
21		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
22		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
23		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
24		indeno[123-cd]pyrene	205-893-2	193-39-5		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
25		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
26		benzo[ghi]perylene	205-883-8	191-24-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
										Total:	0.0163 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS112

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
WS112
Sample Depth:
0.50-0.50 m
Moisture content:
18%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 18% Wet Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number							
1	●	pH				6.9 pH		6.9 pH	6.9 pH		
				PH							
								Total:	0%		

Key

	User supplied data
●	Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: WS112[2]

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
WS112[2]
Sample Depth:
1.50-1.50 m
Moisture content:
15%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 15% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	pH			PH		7.4 pH		7.4 pH	7.4 pH		
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		4.6 mg/kg	1.32	5.162 mg/kg	0.000516 %	✓	
3	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	<0.2 mg/kg	1.285	<0.257 mg/kg	<0.00002 %		<LOD
4	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		32 mg/kg	1.462	39.754 mg/kg	0.00398 %	✓	
5	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		19 mg/kg	1.126	18.183 mg/kg	0.00182 %	✓	
6	lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	8.5 mg/kg		7.225 mg/kg	0.000722 %	✓	
7	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.3 mg/kg	1.353	<0.406 mg/kg	<0.0000406 %		<LOD
8	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		39 mg/kg	1.579	52.36 mg/kg	0.00524 %	✓	
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %		<LOD
10	zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		43 mg/kg	2.469	90.253 mg/kg	0.00903 %	✓	
11	naphthalene	601-052-00-2	202-049-5	91-20-3		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
12	acenaphthylene		205-917-1	208-96-8		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
13	acenaphthene		201-469-6	83-32-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
14	fluorene		201-695-5	86-73-7		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
15		phenanthrene	201-581-5	85-01-8		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
16		anthracene	204-371-1	120-12-7		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
17		fluoranthene	205-912-4	206-44-0		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
18		pyrene	204-927-3	129-00-0		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
19		benzo[a]anthracene	200-280-6	56-55-3		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
20		chrysene	205-923-4	218-01-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
21		benzo[b]fluoranthene	205-911-9	205-99-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
22		benzo[k]fluoranthene	205-916-6	207-08-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
23		benzo[a]pyrene; benzo[def]chrysene	200-028-5	50-32-8		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
24		indeno[123-cd]pyrene	205-893-2	193-39-5		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
25		dibenz[a,h]anthracene	200-181-8	53-70-3		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
26		benzo[ghi]perylene	205-883-8	191-24-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
										Total:	0.0213 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP135[2]

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
TP135[2]
Sample Depth:
0.10-0.70 m
Moisture content:
30%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 30% Wet Weight Moisture Correction applied (MC)

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	●	pH			PH		6.4	pH		6.4	pH	6.4 pH		
2		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
3	●	acenaphthylene		205-917-1	208-96-8		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
4	●	acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
5	●	fluorene		201-695-5	86-73-7		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
6	●	phenanthrene		201-581-5	85-01-8		0.08	mg/kg		0.056	mg/kg	0.0000056 %	✓	
7	●	anthracene		204-371-1	120-12-7		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
8	●	fluoranthene		205-912-4	206-44-0		0.12	mg/kg		0.084	mg/kg	0.0000084 %	✓	
9	●	pyrene		204-927-3	129-00-0		0.11	mg/kg		0.077	mg/kg	0.0000077 %	✓	
10		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.07	mg/kg		0.049	mg/kg	0.0000049 %	✓	
11		chrysene	601-048-00-0	205-923-4	218-01-9		0.08	mg/kg		0.056	mg/kg	0.0000056 %	✓	
12		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.09	mg/kg		0.063	mg/kg	0.0000063 %	✓	
13		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
14		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
15	●	indeno[123-cd]pyrene		205-893-2	193-39-5		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
16		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
17	●	benzo[ghi]perylene		205-883-8	191-24-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
18		benzene				<5	mg/kg		<5	mg/kg	<0.0005 %		<**LOD**
		601-020-00-8	200-753-7	71-43-2									
19		toluene				<5	mg/kg		<5	mg/kg	<0.0005 %		<**LOD**
		601-021-00-3	203-625-9	108-88-3									
20	•	ethylbenzene				<5	mg/kg		<5	mg/kg	<0.0005 %		<**LOD**
		601-023-00-4	202-849-4	100-41-4									
21		xylene				<8	mg/kg		<8	mg/kg	<0.0008 %		<**LOD**
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
										Total:	0.00003 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
<LOD	Below limit of detection

Classification of sample: WS109A[3]

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
WS109A[3]
Sample Depth:
0.00-0.50 m
Moisture content:
20%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 20% Wet Weight Moisture Correction applied (MC)

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	●	pH			PH		7.7	pH		7.7	pH	7.7 pH		
2		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
3	●	acenaphthylene		205-917-1	208-96-8		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
4	●	acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
5	●	fluorene		201-695-5	86-73-7		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
6	●	phenanthrene		201-581-5	85-01-8		0.09	mg/kg		0.072	mg/kg	0.0000072 %	✓	
7	●	anthracene		204-371-1	120-12-7		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
8	●	fluoranthene		205-912-4	206-44-0		0.11	mg/kg		0.088	mg/kg	0.0000088 %	✓	
9	●	pyrene		204-927-3	129-00-0		0.1	mg/kg		0.08	mg/kg	0.000008 %	✓	
10		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
11		chrysene	601-048-00-0	205-923-4	218-01-9		0.09	mg/kg		0.072	mg/kg	0.0000072 %	✓	
12		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.07	mg/kg		0.056	mg/kg	0.0000056 %	✓	
13		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
14		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
15	●	indeno[123-cd]pyrene		205-893-2	193-39-5		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
16		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
17	●	benzo[ghi]perylene		205-883-8	191-24-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
18		benzene				<5	mg/kg		<5	mg/kg	<0.0005 %		<**LOD**
		601-020-00-8	200-753-7	71-43-2									
19		toluene				<5	mg/kg		<5	mg/kg	<0.0005 %		<**LOD**
		601-021-00-3	203-625-9	108-88-3									
20	•	ethylbenzene				<5	mg/kg		<5	mg/kg	<0.0005 %		<**LOD**
		601-023-00-4	202-849-4	100-41-4									
21		xylene				<8	mg/kg		<8	mg/kg	<0.0008 %		<**LOD**
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
										Total:	0.00003 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
<LOD	Below limit of detection

Classification of sample: WS01

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
WS01
Sample Depth:
0.10-0.40 m
Moisture content:
18%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 18% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	pH			PH		6.3 pH		6.3 pH	6.3 pH		
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		21 mg/kg	1.32	22.736 mg/kg	0.00227 %	✓	
3	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	1.4 mg/kg	1.285	1.475 mg/kg	0.000115 %	✓	
4	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<1.8 mg/kg	1.923	<3.462 mg/kg	<0.000346 %		<**LOD**
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		21 mg/kg	1.462	25.168 mg/kg	0.00252 %	✓	
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		87 mg/kg	1.126	80.321 mg/kg	0.00803 %	✓	
7	lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	99 mg/kg		81.18 mg/kg	0.00812 %	✓	
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.5 mg/kg	1.353	0.555 mg/kg	0.0000555 %	✓	
9	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		28 mg/kg	1.579	36.265 mg/kg	0.00363 %	✓	
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				120 mg/kg	1.405	138.252 mg/kg	0.0138 %	✓	
11	naphthalene	601-052-00-2	202-049-5	91-20-3		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<**LOD**
12	acenaphthylene		205-917-1	208-96-8		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<**LOD**
13	acenaphthene		201-469-6	83-32-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<**LOD**
14	fluorene		201-695-5	86-73-7		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<**LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
15		phenanthrene				0.16	mg/kg		0.131	mg/kg	0.0000131 %	✓	
			201-581-5	85-01-8									
16		anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		**<LOD**
			204-371-1	120-12-7									
17		fluoranthene				0.35	mg/kg		0.287	mg/kg	0.0000287 %	✓	
			205-912-4	206-44-0									
18		pyrene				0.34	mg/kg		0.279	mg/kg	0.0000279 %	✓	
			204-927-3	129-00-0									
19		benzo[a]anthracene				0.17	mg/kg		0.139	mg/kg	0.0000139 %	✓	
		601-033-00-9	200-280-6	56-55-3									
20		chrysene				0.25	mg/kg		0.205	mg/kg	0.0000205 %	✓	
		601-048-00-0	205-923-4	218-01-9									
21		benzo[b]fluoranthene				0.26	mg/kg		0.213	mg/kg	0.0000213 %	✓	
		601-034-00-4	205-911-9	205-99-2									
22		benzo[k]fluoranthene				0.11	mg/kg		0.0902	mg/kg	0.00000902 %	✓	
		601-036-00-5	205-916-6	207-08-9									
23		benzo[a]pyrene; benzo[def]chrysene				0.22	mg/kg		0.18	mg/kg	0.000018 %	✓	
		601-032-00-3	200-028-5	50-32-8									
24		indeno[123-cd]pyrene				0.11	mg/kg		0.0902	mg/kg	0.00000902 %	✓	
			205-893-2	193-39-5									
25		dibenz[a,h]anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		**<LOD**
		601-041-00-2	200-181-8	53-70-3									
26		benzo[ghi]perylene				0.12	mg/kg		0.0984	mg/kg	0.00000984 %	✓	
			205-883-8	191-24-2									
										Total:	0.0387 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Appendix A: Classifier defined and non GB MCL determinands

- **pH** (CAS Number: PH)

Description/Comments: Appendix C4
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: None.

- **chromium(III) oxide (worst case)** (EC Number: 215-160-9, CAS Number: 1308-38-9)

Description/Comments: Data from C&L Inventory Database
Data source: https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/33806
Data source date: 17 Jul 2015
Hazard Statements: Acute Tox. 4; H332 , Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Resp. Sens. 1; H334 , Skin Sens. 1; H317 , Repr. 1B; H360FD , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

- **lead compounds with the exception of those specified elsewhere in this Annex**

GB MCL index number: 082-001-00-6
Description/Comments: Least-worst case: IARC considers lead compounds Group 2A; Probably carcinogenic to humans; Lead REACH Consortium, following MCL protocols, considers many simple lead compounds to be Carcinogenic category 2
Additional Hazard Statement(s): Carc. 2; H351
Reason for additional Hazards Statement(s):
20 Nov 2021 - Carc. 2; H351 hazard statement sourced from: IARC Group 2A (Sup 7, 87) 2006; Lead REACH Consortium www.reach-lead.eu/substanceinformation.html. Review date 29/09/2015

- **acenaphthylene** (EC Number: 205-917-1, CAS Number: 208-96-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Acute Tox. 4; H302 , Acute Tox. 1; H330 , Acute Tox. 1; H310 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315

- **acenaphthene** (EC Number: 201-469-6, CAS Number: 83-32-9)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Aquatic Chronic 2; H411

- **fluorene** (EC Number: 201-695-5, CAS Number: 86-73-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

- **phenanthrene** (EC Number: 201-581-5, CAS Number: 85-01-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Carc. 2; H351 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Skin Irrit. 2; H315

- **anthracene** (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

- **fluoranthene** (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Acute Tox. 4; H302 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

- **pyrene** (EC Number: 204-927-3, CAS Number: 129-00-0)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

indeno[123-cd]pyrene (EC Number: 205-893-2, CAS Number: 193-39-5)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Carc. 2; H351

benzo[ghi]perylene (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 23 Jul 2015
Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

ethylbenzene (EC Number: 202-849-4, CAS Number: 100-41-4)

GB MCL index number: 601-023-00-4
Description/Comments:
Additional Hazard Statement(s): Carc. 2; H351
Reason for additional Hazards Statement(s):
20 Nov 2021 - Carc. 2; H351 hazard statement sourced from: IARC Group 2B (77) 2000

TPH (C6 to C40) petroleum group (CAS Number: TPH)

Description/Comments: Hazard statements taken from WM3 1st Edition 2015; Risk phrases: WM2 3rd Edition 2013
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: Flam. Liq. 3; H226 , Asp. Tox. 1; H304 , STOT RE 2; H373 , Muta. 1B; H340 , Carc. 1B; H350 , Repr. 2; H361d , Aquatic Chronic 2; H411

Appendix B: Rationale for selection of metal species

arsenic {arsenic trioxide}

Worst case species based on hazard statements

cadmium {cadmium sulfide}

Worst case species based on hazard statements

chromium in chromium(III) compounds {chromium(III) oxide (worst case)}

Worst case species based on hazard statements

copper {dicopper oxide; copper (I) oxide}

Most likely common species

lead {lead compounds with the exception of those specified elsewhere in this Annex}

Absence of hexavalent chromium indicates it unlikely that lead chromate is present within the site soils.

mercury {mercury dichloride}

Worst case species based on hazard statements

nickel {nickel dihydroxide}

Worst case species based on hazard statements

selenium {selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex}

Worst case species based on hazard statements

zinc {zinc sulphate}

Absence of hexavalent chromium indicates it unlikely that zinc chromate is present within the site soils.

chromium in chromium(VI) compounds {chromium(VI) oxide}

Worst case species based on hazard statements

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.2.GB - Oct 2021
HazWasteOnline Classification Engine Version: 2025.86.6540.11894 (27 Mar 2025)
HazWasteOnline Database: 2025.84.6536.11888 (25 Mar 2025)

This classification utilises the following guidance and legislation:
WM3 v1.2.GB - Waste Classification - 1st Edition v1.2.GB - Oct 2021
CLP Regulation - Regulation 1272/2008/EC of 16 December 2008
1st ATP - Regulation 790/2009/EC of 10 August 2009
2nd ATP - Regulation 286/2011/EC of 10 March 2011
3rd ATP - Regulation 618/2012/EU of 10 July 2012
4th ATP - Regulation 487/2013/EU of 8 May 2013
Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013
5th ATP - Regulation 944/2013/EU of 2 October 2013
6th ATP - Regulation 605/2014/EU of 5 June 2014
WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014
Revised List of Waste 2014 - Decision 2014/955/EU of 18 December 2014
7th ATP - Regulation 2015/1221/EU of 24 July 2015
8th ATP - Regulation (EU) 2016/918 of 19 May 2016
9th ATP - Regulation (EU) 2016/1179 of 19 July 2016
10th ATP - Regulation (EU) 2017/776 of 4 May 2017
HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017
13th ATP - Regulation (EU) 2018/1480 of 4 October 2018
14th ATP - Regulation (EU) 2020/217 of 4 October 2019
15th ATP - Regulation (EU) 2020/1182 of 19 May 2020
The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1567 of 16th December 2020
The Waste and Environmental Permitting etc. (Legislative Functions and Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1540 of 16th December 2020
GB MCL List - version 1.1 of 09 June 2021
GB MCL List v2.0 - version 2.0 of 20th October 2023
GB MCL List v3.0 - version 3.0 of 11th January 2024
GB MCL List v4.0 - version 4.0 of 2nd March 2024
GB MCL List v5.0 - version 5.0 of 26th June 2024

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Analytical Report Number : 25-006110

Project / Site name:	Halsnead Gardens	**Samples received on:**	11/02/2025
Your job number:	C5980	**Samples instructed on/ Analysis started on:**	11/02/2025
Your order number:	6137_C5980_MAS	**Analysis completed by:**	19/02/2025
Report Issue Number:	1	**Report issued on:**	19/02/2025
Samples Analysed:	2 soil samples - 2 leachate samples		

Signed:

Trevor Hill
Customer Service Advisor
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting
air	- once the analysis is complete

Excel copies of reports are only valid when accompanied by this PDF certificate.

Retention period for records and reports is minimum 6 years from the date of issue of the final report.
Some records may be kept for longer according to other legal/best practice requirements.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number: 25-006110
Project / Site name: Halsnead Gardens
Your Order No: 6137_C5980_MAS

Lab Sample Number				448273	448274
Sample Reference				TP135	WS109A
Sample Number				ES	ES
Water Matrix				N/A	N/A
Depth (m)				0.10-0.70	0.00-0.50
Date Sampled				Deviating	Deviating
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**		
Stone Content	%	0.1	NONE	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	30	20
Total mass of sample received	kg	0.1	NONE	0.7	0.7
General Inorganics					
pH (L005B)	pH Units	N/A	MCERTS	6.4	7.7
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	4.7	2.3
Loss on Ignition @ 450°C	%	0.2	MCERTS	12	6
Acid Neutralisation Capacity	+/- mmol/kg	-9999	NONE	-2.9	1.7
Speciated PAHs					
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.08	0.09
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	0.12	0.11
Pyrene	mg/kg	0.05	MCERTS	0.11	0.1
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.07	< 0.05
Chrysene	mg/kg	0.05	MCERTS	0.08	0.09
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	0.09	0.07
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Coronene	mg/kg	0.05	NONE	< 0.05	< 0.05
Total PAH					
Total WAC-17 PAHs	mg/kg	0.85	NONE	< 0.85	< 0.85
Petroleum Hydrocarbons					
Mineral Oil (EC10 - EC40) EH_CU_1D_AL	mg/kg	10	NONE	< 10	< 10
VOCs					
Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0
p & m-Xylene	µg/kg	8	MCERTS	< 8.0	< 8.0
o-Xylene	µg/kg	5	MCERTS	< 5.0	< 5.0
Total BTEX	µg/kg	10	MCERTS	< 10	< 10

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The results included within the report relate only to the sample(s) submitted for testing.

Analytical Report Number: 25-006110
Project / Site name: Halsnead Gardens
Your Order No: 6137_C5980_MAS

Lab Sample Number				448273	448274
Sample Reference				TP135	WS109A
Sample Number				ES	ES
Water Matrix				N/A	N/A
Depth (m)				0.10-0.70	0.00-0.50
Date Sampled				Deviating	Deviating
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**		
PCBs by GC-MS					
PCB Congener 28	mg/kg	0.001	MCERTS	< 0.001	< 0.001
PCB Congener 52	mg/kg	0.001	MCERTS	< 0.001	< 0.001
PCB Congener 101	mg/kg	0.001	MCERTS	< 0.001	< 0.001
PCB Congener 118	mg/kg	0.001	MCERTS	< 0.001	< 0.001
PCB Congener 138	mg/kg	0.001	MCERTS	< 0.001	< 0.001
PCB Congener 153	mg/kg	0.001	MCERTS	< 0.001	< 0.001
PCB Congener 180	mg/kg	0.001	MCERTS	< 0.001	< 0.001
Total PCBs	mg/kg	0.007	MCERTS	< 0.007	< 0.007

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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Waste Acceptance Criteria Analytical Results

Report No:	**25-006110**						
					Client: BSL		
Location	**Halsnead Gardens**						
Lab Reference (Sample Number)	448273				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	/ /				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	TP135 ES						
Depth (m)	0.10-0.70						
Solid Waste Analysis							
TOC (%)**	4.7				3%	5%	6%
Loss on Ignition (%) **	12				--	--	10%
BTEX (µg/kg) **	< 10				6000	--	--
Sum of PCBs (mg/kg) **	< 0.007				1	--	--
Mineral Oil (mg/kg) EH_1D_CU_AL	< 10				500	--	--
Total PAH (WAC-17) (mg/kg)	< 0.85				100	--	--
pH (units)**	6.4				--	>6	--
Acid Neutralisation Capacity (mmol / kg)	-2.9				--	To be evaluated	To be evaluated
Eluate Analysis (BS EN 12457 - 2 preparation utilising end over end leaching procedure)	10:1 mg/l			10:1 mg/kg	Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
Arsenic *	< 0.00100			< 0.0100	0.5	2	25
Barium *	0.0117			0.117	20	100	300
Cadmium *	< 0.000100			< 0.00100	0.04	1	5
Chromium *	0.0020			0.020	0.5	10	70
Copper *	0.0076			0.076	2	50	100
Mercury *	< 0.000500			< 0.00500	0.01	0.2	2
Molybdenum *	< 0.000400			< 0.00400	0.5	10	30
Nickel *	0.0020			0.020	0.4	10	40
Lead *	0.0023			0.023	0.5	10	50
Antimony *	< 0.0017			< 0.017	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.0062			0.062	4	50	200
Chloride *	4.6			46	800	15000	25000
Fluoride*	0.26			2.6	10	150	500
Sulphate *	6.4			64	1000	20000	50000
TDS*	26			260	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	20.3			203	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	0.7						
Dry Matter (%)	70						
Moisture (%)	30						

Results are expressed on a dry weight basis, after correction for moisture content where applicable.

*= UKAS accredited (liquid eluate analysis only)

Stated limits are for guidance only and i2 cannot be held responsible for any discrepancies with current legislation

** = MCERTS accredited

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3. This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Where colour coding is used on this report, this is for guidance purposes only. This does not constitute a statement of conformity of pass or fail.

Application of uncertainty of measurement would provide a range within which the true result lies. An estimate of measurement uncertainty can be provided on request.

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

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Waste Acceptance Criteria Analytical Results

Report No:	**25-006110**						
					Client:	**BSL**	
Location	**Halsnead Gardens**						
Lab Reference (Sample Number)	448274				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	/ /				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	WS109A ES						
Depth (m)	0.00-0.50						
Solid Waste Analysis							
TOC (%)**	2.3				3%	5%	6%
Loss on Ignition (%) **	6.0				--	--	10%
BTEX (µg/kg) **	< 10				6000	--	--
Sum of PCBs (mg/kg) **	< 0.007				1	--	--
Mineral Oil (mg/kg) EH_1D_CU_AL	< 10				500	--	--
Total PAH (WAC-17) (mg/kg)	< 0.85				100	--	--
pH (units)**	7.7				--	>6	--
Acid Neutralisation Capacity (mmol / kg)	1.7				--	To be evaluated	To be evaluated
Eluate Analysis	10:1			10:1	Limit values for compliance leaching test		
(BS EN 12457 - 2 preparation utilising end over end leaching procedure)	mg/l			mg/kg	using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
Arsenic *	< 0.00100			< 0.0100	0.5	2	25
Barium *	0.0144			0.144	20	100	300
Cadmium *	< 0.000100			< 0.00100	0.04	1	5
Chromium *	0.0022			0.022	0.5	10	70
Copper *	0.0066			0.066	2	50	100
Mercury *	< 0.000500			< 0.00500	0.01	0.2	2
Molybdenum *	0.000888			0.00888	0.5	10	30
Nickel *	0.0018			0.018	0.4	10	40
Lead *	0.0019			0.019	0.5	10	50
Antimony *	< 0.0017			< 0.017	0.06	0.7	5
Selenium *	0.0053			0.053	0.1	0.5	7
Zinc *	0.0040			0.040	4	50	200
Chloride *	4.0			40	800	15000	25000
Fluoride*	0.47			4.7	10	150	500
Sulphate *	5.1			51	1000	20000	50000
TDS*	26			260	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	17.6			176	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	0.7						
Dry Matter (%)	80						
Moisture (%)	20						

Results are expressed on a dry weight basis, after correction for moisture content where applicable.

*= UKAS accredited (liquid eluate analysis only)

Stated limits are for guidance only and i2 cannot be held responsible for any discrepancies with current legislation

** = MCERTS accredited

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3. This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Where colour coding is used on this report, this is for guidance purposes only. This does not constitute a statement of conformity of pass or fail.

Application of uncertainty of measurement would provide a range within which the true result lies. An estimate of measurement uncertainty can be provided on request.

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number : 25-006110
Project / Site name: Halsnead Gardens

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
448273	TP135	ES	0.10-0.70	Brown clay and loam with vegetation
448274	WS109A	ES	0.00-0.50	Brown clay and loam with gravel and vegetation

Analytical Report Number : 25-006110
Project / Site name: Halsnead Gardens

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters Heating/Cooling (PrW) DI Process Water (DI PrW)
Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
pH at 20°C in soil	Determination of pH in soil by addition of water followed by electrometric measurement	In-house method	L005B	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
PCB's By GC-MS in soil	Determination of PCB by extraction with hexane followed by GC-MS	In-house method based on USEPA 8082	L027B	D	MCERTS
Total dissolved solids 10:1 WAC	Determination of total dissolved solids in water by electrometric measurement	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L031B	W	ISO 17025
Fluoride 10:1 WAC	Determination of fluoride in leachate by 1:1ratio with a buffer solution followed by Ion Selective Electrode	In-house method based on Use of Total Ionic Strength Adjustment Buffer for Electrode Determination	L033B	W	ISO 17025
Dissolved organic carbon 10:1 WAC	Determination of dissolved organic carbon in leachate by TOC/DOC NDIR Analyser	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037B	W	NONE
Metals in leachate by ICP-OES	Determination of metals in leachate by acidification followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L039B	W	ISO 17025
Sample Preparation		In-house method	L043B	W	NONE
Acid neutralisation capacity of soil	Determination of acid neutralisation capacity by addition of acid or alkali followed by electronic probe	In-house method based on Guidance an Sampling and Testing of Wastes to Meet Landfill Waste Acceptance	L046B	W	NONE
Loss on ignition of soil @ 450°C	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	In-house method	L047-PL	D	MCERTS
Speciated PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	MCERTS
BTEX and/or Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS	In-house method based on USEPA 8260	L073B	W	MCERTS
Total petroleum hydrocarbons by GC-FID/GC-MS HS in soil	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS	In-house method	L076B/L088-PL	D/W	NONE
Monohydric phenols 10:1 WAC	Determination of phenols in leachate by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	ISO 17025

Analytical Report Number : 25-006110
Project / Site name: Halsnead Gardens

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters Heating/Cooling (PrW) DI Process Water (DI PrW)
Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Chloride 10:1 WAC	Determination of Chloride colorimetrically by discrete analyser	In-house based on MEWAM Method ISBN 0117516260	L082B	W	ISO 17025

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL' or 'B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Quality control parameter failure associated with individual result applies to calculated sum of individuals.
The result for sum should be interpreted with caution

Sample Deviation Report

Analytical Report Number : 25-006110

Project / Site name: Halsnead Gardens

This deviation report indicates the sample and test deviations that apply to the samples submitted for analysis.Please note that the associated result(s) may be unreliable and should be interpreted with care.

Key: a - No sampling date b - Incorrect container c - Holding time d - Headspace e - Temperature

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
TP135	ES	L	448273	a	Chloride 10:1 WAC	L082B	a
TP135	ES	L	448273	a	Dissolved organic carbon 10:1 WAC	L037B	a
TP135	ES	L	448273	a	Fluoride 10:1 WAC	L033B	a
TP135	ES	L	448273	a	Metals in leachate by ICP-OES	L039B	a
TP135	ES	L	448273	a	Monohydric phenols 10:1 WAC	L080-PL	a
TP135	ES	L	448273	a	Sample Preparation	L043B	a
TP135	ES	L	448273	a	Total dissolved solids 10:1 WAC	L031B	a
TP135	ES	L	448273	a	WAC Leachate 10:1	L043B	a
TP135	ES	S	448273	a	Acid neutralisation capacity of soil	L046B	a
TP135	ES	S	448273	a	BTEX and/or Volatile organic compounds in soil	L073B	a
TP135	ES	S	448273	a	Loss on ignition of soil @ 450°C	L047-PL	a
TP135	ES	S	448273	a	Moisture Content	L019B	a
TP135	ES	S	448273	a	PCB's By GC-MS in soil	L027B	a
TP135	ES	S	448273	a	Sample preparation	L019B	a
TP135	ES	S	448273	a	Soil Descriptions	L019B	a
TP135	ES	S	448273	a	Speciated PAHs and/or Semi-volatile organic compounds in soil	L064B	a
TP135	ES	S	448273	a	Stones content of soil	L019B	a
TP135	ES	S	448273	a	Total organic carbon (Automated) in soil	L009B	a
TP135	ES	S	448273	a	Total petroleum hydrocarbons by GC-FID/GC-MS HS in soil	L076B/L088-PL	a
TP135	ES	S	448273	a	pH at 20°C in soil	L005B	a
WS109A	ES	L	448274	a	Chloride 10:1 WAC	L082B	a
WS109A	ES	L	448274	a	Dissolved organic carbon 10:1 WAC	L037B	a
WS109A	ES	L	448274	a	Fluoride 10:1 WAC	L033B	a
WS109A	ES	L	448274	a	Metals in leachate by ICP-OES	L039B	a
WS109A	ES	L	448274	a	Monohydric phenols 10:1 WAC	L080-PL	a
WS109A	ES	L	448274	a	Sample Preparation	L043B	a
WS109A	ES	L	448274	a	Total dissolved solids 10:1 WAC	L031B	a
WS109A	ES	L	448274	a	WAC Leachate 10:1	L043B	a
WS109A	ES	S	448274	a	Acid neutralisation capacity of soil	L046B	a
WS109A	ES	S	448274	a	BTEX and/or Volatile organic compounds in soil	L073B	a
WS109A	ES	S	448274	a	Loss on ignition of soil @ 450°C	L047-PL	a
WS109A	ES	S	448274	a	Moisture Content	L019B	a
WS109A	ES	S	448274	a	PCB's By GC-MS in soil	L027B	a
WS109A	ES	S	448274	a	Sample preparation	L019B	a
WS109A	ES	S	448274	a	Soil Descriptions	L019B	a
WS109A	ES	S	448274	a	Speciated PAHs and/or Semi-volatile organic compounds in soil	L064B	a
WS109A	ES	S	448274	a	Stones content of soil	L019B	a
WS109A	ES	S	448274	a	Total organic carbon (Automated) in soil	L009B	a
WS109A	ES	S	448274	a	Total petroleum hydrocarbons by GC-FID/GC-MS HS in soil	L076B/L088-PL	a
WS109A	ES	S	448274	a	pH at 20°C in soil	L005B	a

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APPENDIX C - STATEMENT ON THE IDENTIFICATION OF LAND AS 'ANCIENT WOOD PASTURE

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Statement on the identification of land as 'Ancient Wood Pasture'

Prepared by Liam Podbury (Associate Director, Historic Environment) BA (Hons) MA ACIfA

March 2026

Introduction

Lanpro was commissioned by United Living to prepare a letter in relation to the identification of land off Windy Arbor Road, Whiston, Merseyside (centred at SJ 4717 9019) as Ancient Wood Pasture (MER-427), as recorded within the Ancient Woodland Inventory (AWI).

While the Site is recorded in the Ancient Woodland Inventory as 'Ancient Wood Pasture' (AWP), it is important to note that AWP is not a statutory designation like Ancient Woodland. Ancient Woodland is recognised in the National Planning Policy Framework (NPPF) as an irreplaceable habitat, with strong protection against development unless very exceptional circumstances exist and requires continuity of tree cover since at least c.1600. By contrast, 'Ancient Wood Pasture' is included in the AWI as a non-statutory, evidence-based dataset and is identified as a JNCC priority habitat, but its protection is policy-based rather than statutory. While AWP is a material consideration in planning, it carries less legal weight than Ancient Woodland and can be subject to development consent if impacts are considered acceptable.

The purpose of this statement is to review the evidential basis for that classification and to assess whether the Site demonstrates the continuity of management and characteristic features typically associated with AWP, including the persistence of a tree component within a grazed landscape over an extended period. In doing so, the assessment considers whether the available historic and landscape evidence supports the identification, or whether it instead indicates a history of land-use change, management, or disturbance, such that the classification may not be justified. The findings are intended to support informed engagement with the Local Planning Authority and other relevant consultees.

Ancient Wood Pasture Definition

The Site has been identified as containing AWP (MER-427) as recorded within the AWI. The AWI is a non-statutory dataset maintained by Natural England which identifies land considered to be of potential ancient woodland or wood-pasture origin, based on available historic and environmental evidence.

Wood-pasture and parkland is a priority habitat characterised by the Joint Nature Conservation Committee (JNCC) as areas managed by a long-established tradition of grazing, supporting the survival of multiple generations of trees, typically including veteran or historically managed specimens. The tree component may occur as scattered individuals, small groups, or open canopy cover, often forming a mosaic with grassland, scrub, or other semi-natural habitats.

This definition establishes that wood-pasture is not defined by grazing alone, but by the combination of long-term grazing management and a persistent tree or shrub component, resulting in a structurally diverse landscape.

Guidance set out in *A Handbook for Updating the Ancient Woodland Inventory for England* further clarifies that:

- Wood-pasture should be identified on the basis of discernible tree cover, whether as scattered individuals, groups, or open canopy structure;
- It is the wooded component of the landscape that is critical to its identification, rather than wider areas of pasture or grazing land-use; and
- Extensive pasture lacking a meaningful tree component, or where such a component has been substantially altered or removed, should not be characterised as wood-pasture.

The 'ancient' qualifier, as applied within the AWI, reflects an interpretation that the site may have long-term continuity of woodland or wood-pasture character, typically informed by evidence extending back to at least the early post-medieval period (c.1600), although this threshold is more directly applicable to 'Ancient Woodland'. For AWP, which may exhibit more complex and dynamic land-use histories, the emphasis is on the enduring association between grazing and tree cover over time, rather than continuous woodland cover. Accordingly, land identified as ancient wood-pasture would be expected to demonstrate evidence of long-established wood-pasture structure and management, which may include historic mapping showing open or scattered tree cover, the survival of veteran or multi-generational trees, and/or landscape characteristics consistent with long-term grazing beneath a tree canopy.

Where such evidence is absent – particularly where there is indication of enclosure, plantation woodland, formal landscaping, agricultural improvement, or later clearance – the attribution of AWP may not be supported by the available evidence.

This framework provides a clear and proportionate basis against which the Site has been assessed.

Historic Cartographic Analysis

Mapping sources reviewed include Yates' Map of 1787, the 1842 Tithe Plan of Whiston, and subsequent Ordnance Survey editions from 1892, 1907, 1937, 1959, and 1993. Mapping pre-dating Yates' map of 1787 is available but does not provide sufficient detail regarding tree cover, canopy structure, or grazing management to establish the presence or absence of long-established AWP. In the absence of clear cartographic evidence from this period, there is no positive basis to support the assertion of early continuity of wood-pasture at the Site, and greater weight must therefore be given to the later, more detailed mapping evidence.

While the general area of the Site is depicted on Yates' Map of 1787 (Plate A), the small scale of the map prevents an in-depth analysis of land use. Notwithstanding this, Yates' mapping does depict areas of parkland and significant woodland elsewhere, and the absence of any such representation at the Site suggests that it was not characterised by notable woodland or parkland at this time.

The 1842 Tithe Plan of the Township of Whiston provides the first detailed representation of the area (Plate B). Much of the recorded AWP is recorded within Plot 462, associated with Prince's House, and is described within the tithe apportionment as comprising '*plantation'*. Visually, it represents a managed woodland block, likely part of the estate's structured landscape, rather than an open, grazed, veteran-tree environment. The south-western portion of the AWP, however, is situated within Plot 463

associated with Prince's House. This plot, in contrast, is recorded as comprising the *'garden'* of Prince's House within the tithe apportionment.

The 1892 Ordnance Survey mapping (Plate C) depicts evenly spaced broadleaved woodland symbol, The trees are drawn as tight, continuous clusters of individual broadleaved symbols, with no breaks, glades, or scattered-tree spacing. There is no symbology for scattered trees, no open brushwood, and no mosaic of rough pasture. The woodland is shown as a solid block, bounded by clear parcel lines, which is typical of managed estate woodland or long-established enclosed wood. The aforenoted Plot 463 depicted within the tithe map continuous to be best described as a garden area associated with Prince's House.

The 1907 (Plate D) mapping likewise depicts the south-western plot as a garden. Elsewhere, the wider enclosure continues to be shown as broadleaved woodland, using the same evenly spaced but somewhat sparser tree symbols characteristic of representation of closed-canopy wood. The woodland is again presented as a continuous block with no breaks, glades, or scattered-tree spacing, and the parcel boundaries remain clearly defined. The symbology shows no indication of mixed woodland, scrub, or transitional vegetation.

The Halsnead Estate Sale Catalogue of 1929 (Plate E; Archive Ref. GB1076.ESTA/1/1) identifies Prince's House Farm as a significant agricultural unit, described as a 'valuable and exceedingly fertile dairy stock and corn farm' in excellent condition. The area corresponding to the identified AWP encompasses Plots 95, 108, and 108a. Plot 95, previously recorded as garden within the 1842 tithe map, is again associated with the farmhouse and is not identified as woodland. In contrast, Plots 108 and 108a are described as '*woodland*', whereas the adjacent Plot 110, located to the west of the AWP area, is recorded as '*pasture'* and presents as sparsely wooded pasture, highlighting a clear distinction between enclosed woodland and open grazed land within the historic estate landscape.

The 1937 (Plate F) mapping continues to depict the wider enclosure as broadleaved woodland, using the same dense, evenly spaced tree symbols characteristic of closed-canopy wood on mapping of this period. The woodland remains shown as a continuous block with no breaks, glades, or scattered-tree spacing. The gardened plot associated with Prince's House is still shown as an open, managed space, with the surrounding woodland forming a consistent backdrop.

The 1959 (Plate G) mapping shows a clear change in the character of the former woodland compartment. The dense, continuous broadleaved woodland symbology used on earlier editions is no longer present. Instead, the area is depicted as open ground with scattered individual tree symbols, spaced irregularly and without any canopy fill. This indicates a marked reduction in tree cover and a transition away from enclosed woodland toward a more open landscape with limited, dispersed trees. No symbols for scrub, furze, or regenerating woodland are shown, and the parcel reads as a consciously maintained open space with ornamental tree cover rather than a wooded enclosure. By 1993 (Plate H), the mapping shows the area as predominantly open ground, with only a small number of isolated tree symbols retained.

The 1842 Tithe Plan shows the Site largely comprising managed estate woodland ('plantation') and formal garden associated with Prince's House, rather than open grazed woodland. The woodland is depicted as dense, enclosed blocks, typical of structured estate planting, with no indication of scattered trees, glades, or mosaic habitats beneath the canopy – features expected in semi-natural wood-pasture. Subsequent Ordnance Survey mapping from 1892 to 1937, in addition to the Halsnead Estate Sale Catalogue of 1929, continues to depict the area as dense, continuous woodland, bounded by clear parcel lines, with no symbology for scattered trees or evidence of long-established grazing

under a woodland canopy. The garden plot associated with Prince's House remains clearly delineated throughout this period. These characteristics are inconsistent with the persistent tree and grazing mosaic required for Ancient Wood Pasture.

By the mid-20th century there appears to have been only a small number of trees present in the site (Plate G), and by the 1990s no trees or woodland are depicted on the Ordnance Survey mapping (Plate H). Aerial photographic imagery shows that the Site was largely open ground by 2000 (Plate I), with a number of dispersed trees at its centre and along its boundaries, and a comparison with recent aerial photography indicates that much of the existing tree cover has developed over the last 25 years (Plate J).

Conclusion

In summary, the historic mapping demonstrates that the Site does not meet the criteria for AWP.

The Site has experienced significant landscape change over the last two centuries, transitioning from managed woodland and garden to largely open ground. There is no evidence that characteristic features of AWP – long-established tree-grazing management or structural diversity – have persisted continuously, and the non-statutory classification is not supported by the available evidence.

There is no evidence that grazing and tree cover coexisted continuously across the period necessary to meet the definition of AWP, which, in line with AWI principles, is generally expected to show continuity from c.1600 or earlier. Indeed, by the middle of the 20th century, much of the tree cover within the site had been removed, none is shown on mapping from the 1990s, and few trees are present on aerial imagery dating to 2000. Therefore, even if there had been continual woodland present between 1600 and the 19th century, the woodland was largely removed in the latter half of the 20th century and this possible continuity lost. Much of the present tree cover within the Site is in part due to its reestablishment over the last 25 years.

Therefore, it is considered that, further to any other planning constraints, the Site's identification as AWP should not prevent future development.

References

Joint Nature Conservation Committee 2011, *UK Priority Habitat Descriptions: Wood-Pasture and Parkland*

Natural England 2022, *A Handbook for Updating the Ancient Woodland Inventory for England*. Natural England



Plate A. Excerpt of Yates' Map of 1787



Plate B. Excerpt of the 1842 Tithe Plan of the Township of Whiston

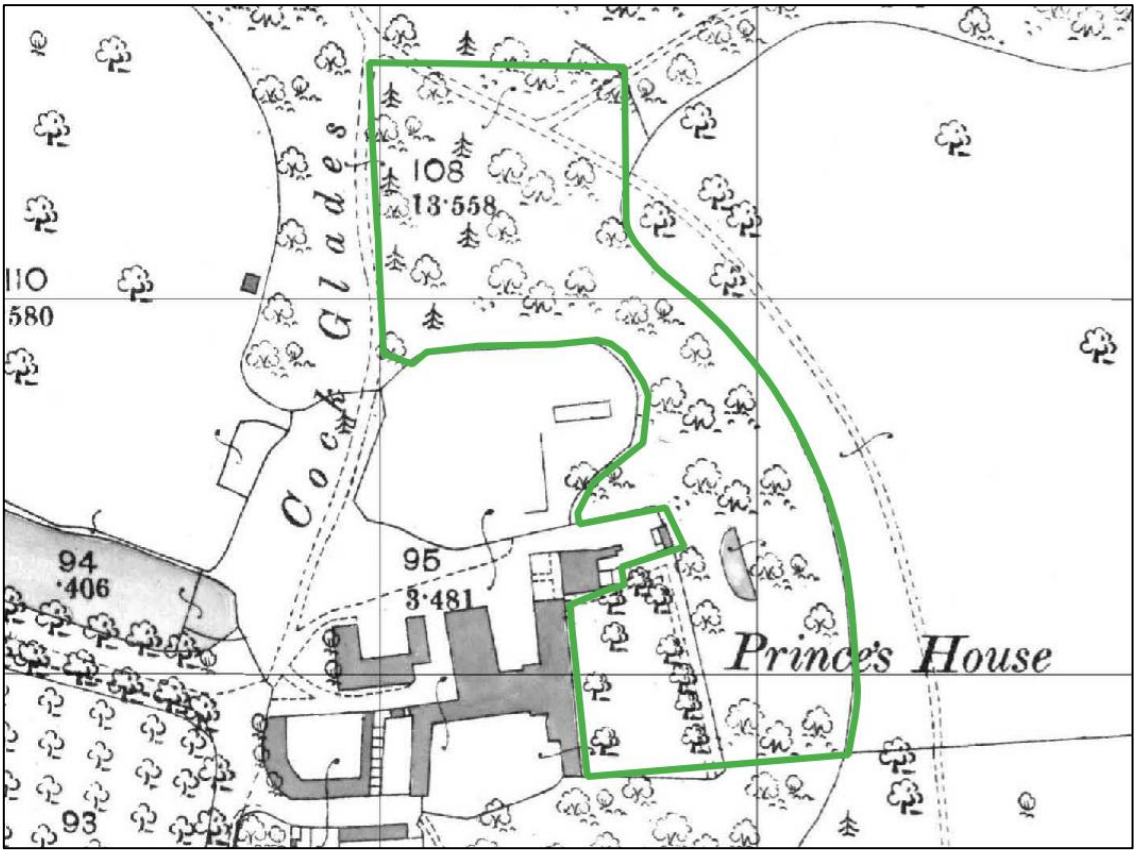


Plate C. Excerpt of the 1892 Ordnance Survey map

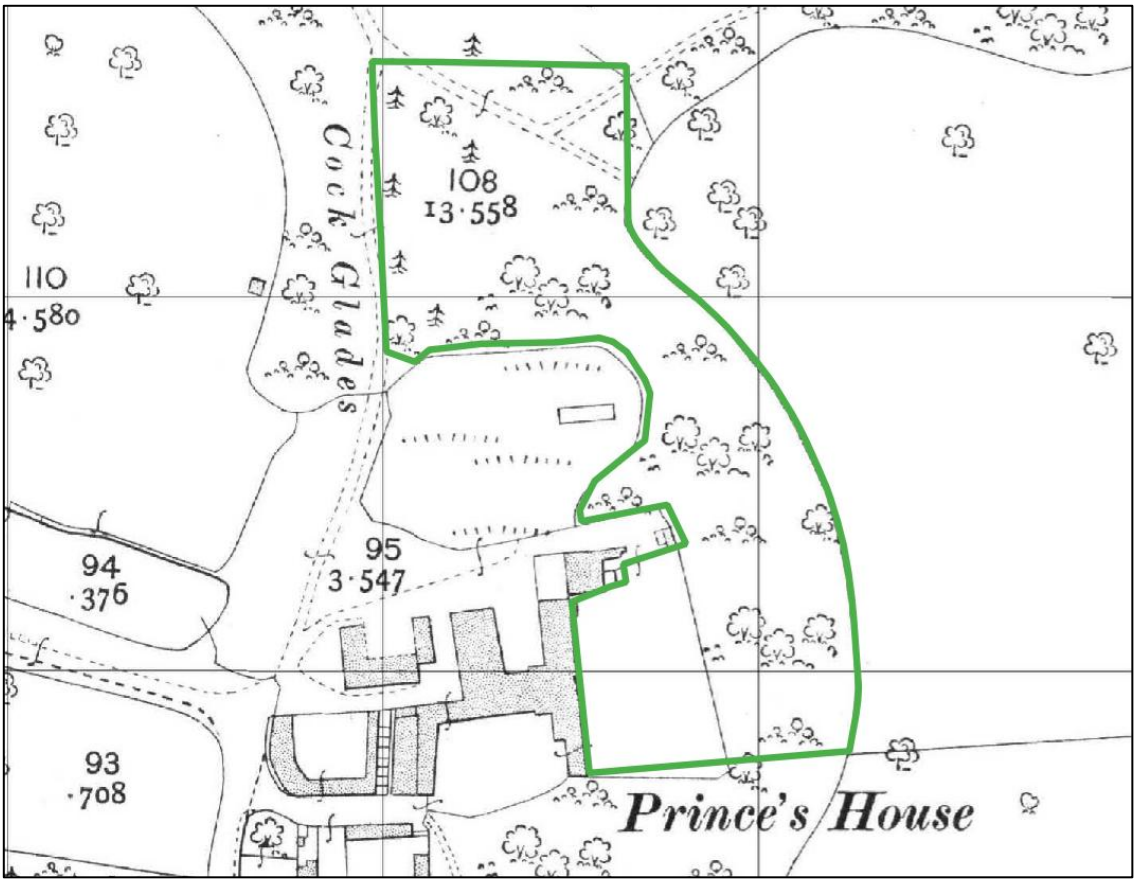


Plate D. Excerpt of the 1907 Ordnance Survey map

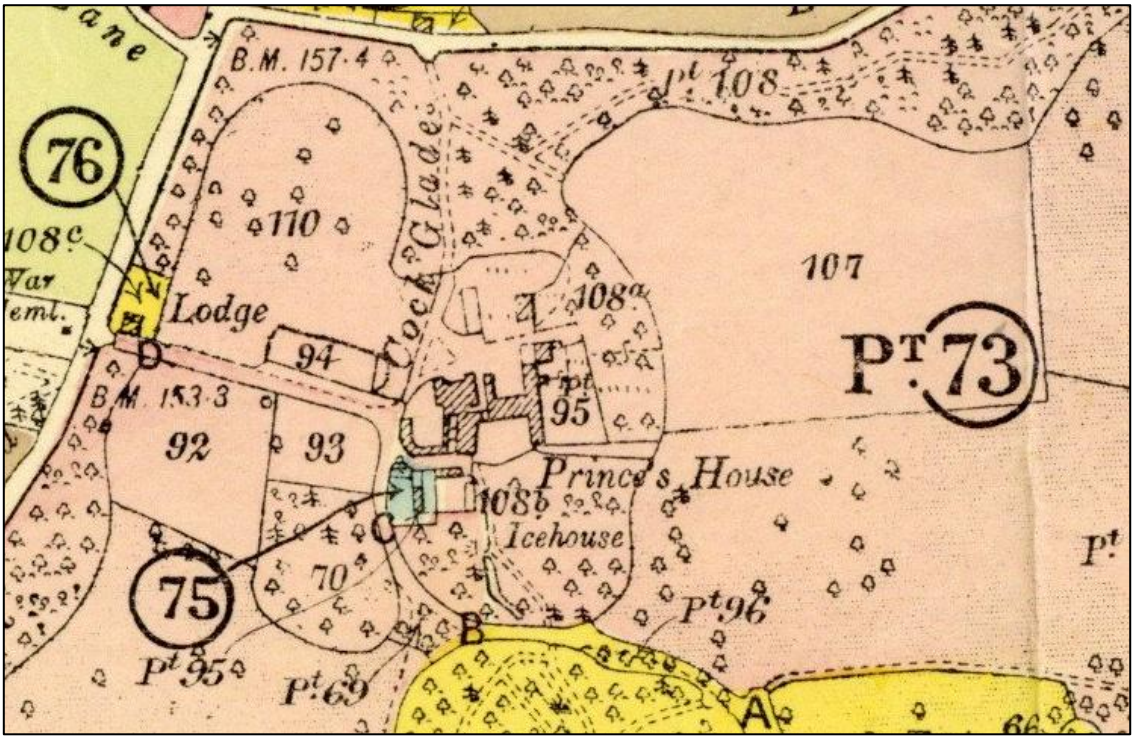


Plate E. Excerpt of the plan within the Halsnead Estate Sale Catalogue of 1929 (Archive Ref. GB1076.ESTA/1/1)



Plate F. Excerpt of the 1937 Ordnance Survey map

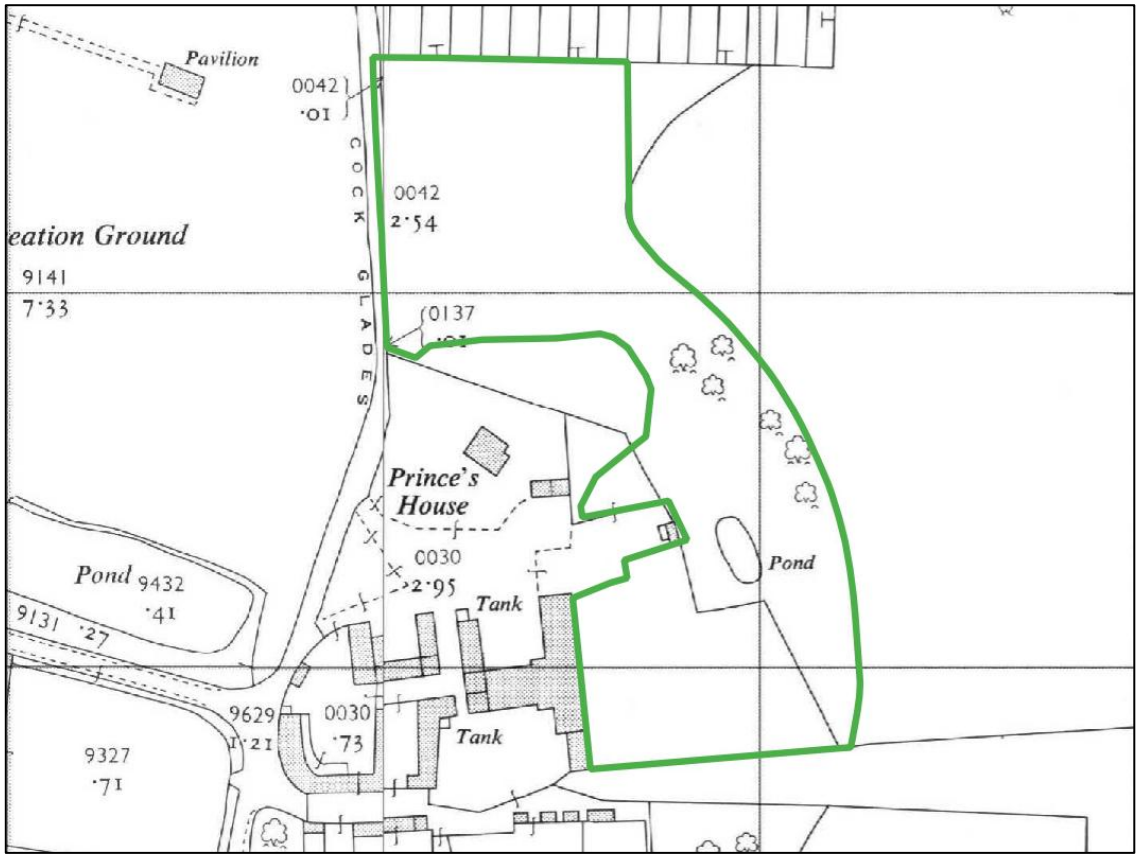


Plate G. Excerpt of the 1959 Ordnance Survey map

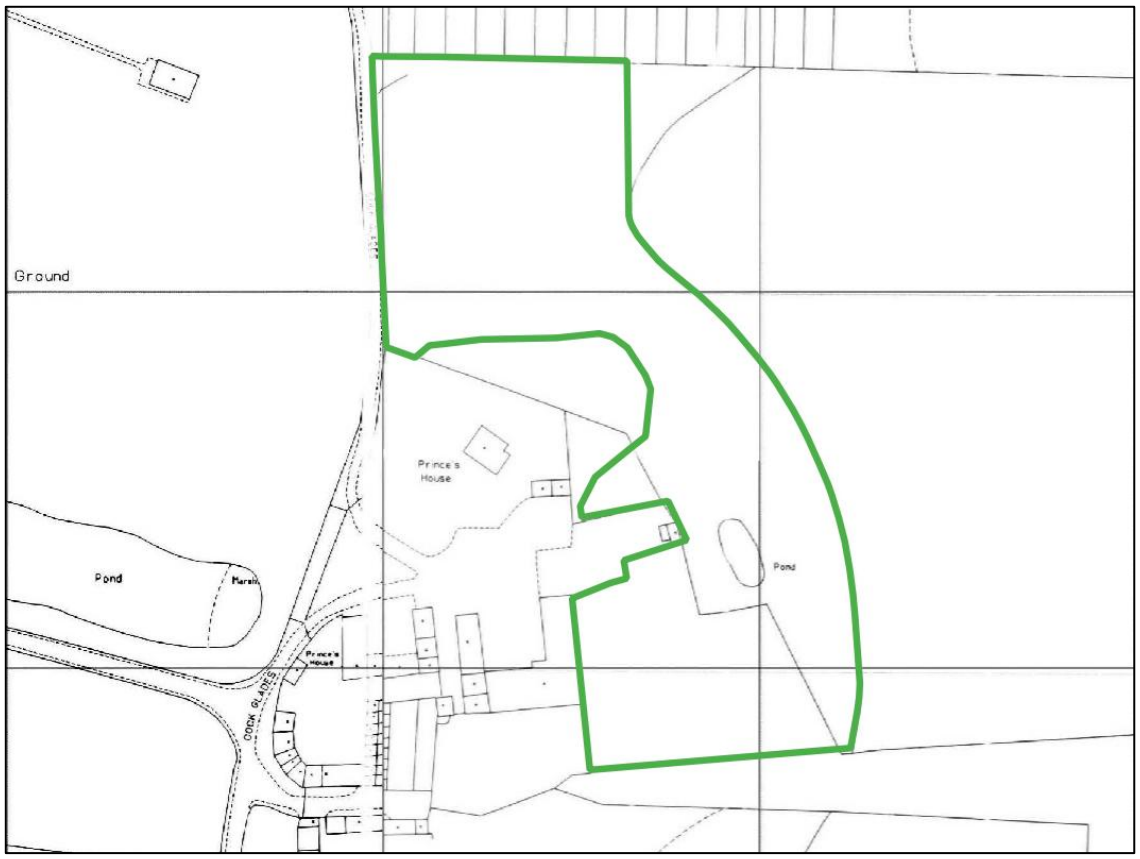


Plate H. Excerpt of the 1993 Ordnance Survey map



Plate I. 2000 Aerial Photography of the AWP



Plate J. 2024 Aerial Photography of the AWP