Preliminary Risk Assessment

Commonside Tip, Alvanley, Cheshire

Cheshire West and Chester Council

Project number: 60747912
60747912_ACM_EN_REP_001

Final

March 2026

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Revision	Revision date	Details	Authorized	Name	Position
Final	05/03/2026	Final Version			Associate Director Geo-Environmental

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The site reconnaissance consisted of a general external inspection of the site aimed at identifying any obvious signs of geotechnical hazards and potential sources of ground contamination affecting the site. An environmental compliance audit and/or detailed structural inspection of existing buildings were outside the project brief. Similarly, the site visit excluded detailed consideration of the ecological or archaeological aspects of the site, and if such are believed to be of potential significance then it is recommended that specialist advice is sought.

Any risks identified in this Report are perceived risks, based on the information reviewed during the desk study and therefore partially based on conjecture from available information. The study is limited by the non-intrusive nature of the work and actual risks can only be assessed following a physical investigation of the site.

The opinions expressed in this Report concerning any contamination found and the risks arising there from are based on current good practice simple statistical assessment and comparison with available soil guideline values, AECOM generic assessment criteria and other guidance values.

It should be noted that the effects of ground and water borne contamination on the environment are constantly under review, and authoritative guidance values are potentially subject to change. The conclusions presented herein are based on the guidance values available at the time this Report was prepared, however, no liability by AECOM can be accepted for the retrospective effects of any changes or amendments to these values.

The opinions expressed in this Report and the comments and recommendations given are based on a desk assessment of readily available information and an initial site reconnaissance by an AECOM Engineer. At this stage intrusive investigations have yet to be undertaken at site to establish actual ground and groundwater conditions and to provide data for an assessment of the geo-environmental status of the site.

Unless otherwise stated in this Report, the assessments made assume that the sites and facilities will continue to be used for their current purpose without significant changes.

Reference to historical Ordnance Survey (OS) maps and/or data provides invaluable information regarding the land use history of a site. However, it should be noted that historical evidence will be incomplete for the period pre-dating the first edition and between the release of successive maps and/or data.

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Tables

1. Introduction

1.1 Terms of Reference

On the instructions of Cheshire West and Chester Council (CWCC) (the Client), AECOM Limited (AECOM) has carried out a Land Contamination Preliminary Risk Assessment (PRA) of the site known as Commonside Tip, Alvanley, near Helsby in Cheshire (herein referred to as 'the site').

The assessment is required to support CWCC in its decision-making process as to whether Commonside Tip meets the definition of contaminated land as specified under Part IIA of the Environmental Protection Act (EPA) 1990. The work has been carried out in accordance with the AECOM response to CWCC's Request for Quotation (RFQ) dated February 2025. The Client's instruction was confirmed under email of appointment dated March 2025.

The site location is shown on Figure 1 in Appendix A.

1.2 Background

The site has a long history of regulatory intervention and investigation. Following the implementation of Part IIA of the EPA 1990, Vale Royal Borough Council (VRBC) which was a predecessor to CWCC, prioritised the site for investigation which began in 2005. Detailed assessments focussed primarily on risks to human health and were ended in 2009 when CWCC concluded that there was insufficient evidence to demonstrate significant possibility of significant harm (SPOSH).

CWCC began a review of the site in autumn 2023. As part of this work, CWCC commissioned sampling of Foxhill Brook to further its understanding of the current environmental condition, which was carried out by RSK in February 2024. The sampling exercise confirmed both the ongoing presence of Polychlorinated Biphenyls (PCBs) in Foxhill Brook and locally strong odours along the watercourse. The work established that the previously identified pathway to the Brook (below-ground land drain and outfall pipe to the Brook) appeared to be compromised. The sump at the northern end of the landfill had reportedly been removed and there was ponded water understood to be at the former sump location.

Recent development in the vicinity of the site, means that new human health receptors / linkages associated with the site may now exist. In 2025, CWCC commissioned AECOM to undertake additional works comprising a conceptual site model, preliminary risk assessment (inclusive of an initial round of surface water sampling at select locations) and a detailed specification of site investigation work to investigate potentially significant pollutant linkages. The PRA has been prepared to support the first phase of these works through completion of the scope of works specified in Section 1.4.

1.3 Legislative Context

Part IIA of the EPA 1990 was introduced in 2000 to address the legacy of land affected by contamination associated with historical land uses.

The regime requires that a risk-based approach be used for the inspection of potentially contaminated sites and the identification of unacceptable risks to human health and environmental receptors. Unacceptable risks are assessed in the context of the land being "suitable for use", where that land use is the established current use. Where unacceptable risks are identified, they must be addressed through appropriate remediation.

Within England & Wales, Part IIA of the EPA 1990 requires the identification and inspection of potentially contaminated land by local authorities, and, if necessary, the instigation of remediation paid for by responsible parties.

Before the local authority can make a decision that land appears to be contaminated land, it must identify a significant contaminant linkage (i.e. a contaminant linkage that satisfies the Part IIA legal test in Section 78A (2) of the EPA 1990).

- A contaminant source – a substance that is in, on or under the land and has the potential to cause harm or to cause pollution of controlled waters.

- A receptor – something that could be adversely affected by a contaminant, such as people, an ecological system, property or a water body.
- A pathway – a route or means by which a receptor can be exposed to, or affected by, a contaminant.

The Part IIA regime is based on the "suitable for use" approach and focuses on the risks caused by land contamination to defined receptors including human health, controlled waters, buildings and other forms of property, and certain specified ecosystems. Under Section 78A (2) of the Environmental Protection Act 1990 (as amended), contaminated land is defined follows.

> *"any land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land, that….*
>
> *a) significant harm is being caused or there is a significant possibility of such harm being caused, or*
>
> *b) significant pollution of controlled waters is being caused, or there is a significant possibility of such pollution being caused;"*

A revision to the wording of the Act (within The Water Act 2003) has modified definition (b) to 'significant' pollution of controlled waters; the word significant was missing from the original Act.

The Contaminated Land (England) Regulations 2006, as amended by the Contaminated Land (England) Amendment Regulations 2012, set out the requirements for the designation of Special Sites, based on the nature and complexity of the candidate site and the likelihood of significant pollution of controlled waters. The regulations define specific categories of sites that qualify as Special Sites and specific descriptions, and qualifying conditions apply to each category listed.

If land is regarded by the local authority and the Environment Agency (EA) as a potential Special Site, the EA takes the lead regulatory role, but the final decision on determination remains the responsibility of the local authority. Once determined as contaminated land, the EA becomes the enforcing regulatory authority for sites designated as Special Sites and are responsible for securing reasonable remediation, assigning liability, and where possible, recovering costs.

The 2012 Part IIA Statutory Guidance sets out how to establish the significance of harm posed to human health (and significant possibility of significant harm (SPOSH) – ranked according to four categories), non-human receptors including ecological and property receptors and the significance of pollution of controlled waters (and significant possibility of significant pollution (SPOSP), again ranked according to four categories). Set procedures are specified for regulators to follow in deciding if land is not contaminated land and for determining land as contaminated land, including defining the extent, sub-divisions, requirements for notification and recording.

Contaminated land investigations undertaken under Part IIA require a rigorous approach to provide robust and defensible technical data to support the risk assessment and determination decision making process, as well as demonstrating that the prescribed regulatory process has been correctly followed.

Key aspects of the Part IIA Statutory Guidance that influence AECOM's approach are as follows:

- Land should only be considered as meeting the definition of contaminated land where unacceptable risks are clearly identified, having undertaken a risk assessment in accordance with the statutory guidance.
- Decisions may not be straightforward, and where unavoidable uncertainty exists, a reasonable balance should be taken between costs and benefits. A precautionary approach should be taken, such that the results of the decision are proportionate, manageable and compatible with the principles of sustainable development.

1.4 Objectives and Scope of Work

The work will be split into two phases (Phase 1 and Phase 2). The overall objective of the work is to produce the necessary technical assessments so that CWCC can make a decision as to whether Commonside Tip meets the definition of contaminated land as specified under Part IIA of the EPA 1990.

This PRA report has been prepared in support of Phase 1 of the work, in accordance with the Part IIA Statutory Guidance and the EA guidance provided in Land Contamination Risk Management (LCRM) [1]. The scope of work included the following:

- Summarise the site history and environmental setting, including review of publicly available geological, hydrogeological and hydrological information to assess ground and groundwater conditions.

- Summarise historical investigations and other reports provided by the Client, including commentary on the findings and, where there have been updates to guidance and assessment criteria since those reports were prepared, consideration of how any updates could affect the findings.
- Site walkover survey across accessible areas of the site and the surrounding area known to have been impacted by odours thought to originate from the site.
- Discussion with local residents during site walkover.
- Initial round of surface water sampling at selected locations from Foxhill Brook and nearby drainage ditches.
- Development of an initial Conceptual Site Model (CSM) using the source-pathway-receptor approach for the prevailing ground conditions.
- Completion of a preliminary qualitative risk assessment based on the initial CSM, addressing human health, controlled waters, ecological and property receptors.
- Part IIA risk evaluation, to put the conclusions of the PRA in the context of the potential for significant harm/pollution and SPOSH/SPOSP.
- Development of recommendations for undertaking further surveys / investigation to provide more detailed assessment to address potentially significant pollutant linkages.

1.5 Sources of Information

This report has been prepared using a combination of published records (e.g. British Geological Survey (BGS), EA, Department for Environment, Food & Rural Affairs (Defra)), information provided by the Client, (particularly historical reports associated with previous assessments and investigations at the site) and information gathered during a site walkover visit.

The information includes statutory records and historical mapping supplied within a Groundsure Report, published geological and hydrogeological mapping, historical borehole records and observations made and verbal information from residents collected during the site reconnaissance.

Specific information sources are referenced throughout the document. A full list of references is included in Section 14.

1.6 AECOM Report Approach

Detailed information relating to AECOM's approach to this report is included within Appendix B. This should be read in conjunction with the report, and contains information on the general approach to reporting, specific limitations of relevant sections and information on the approach to risk assessment utilised.

2. Site Information

2.1 Site Location

The site is located circa 400m northeast of the village of Alvanley and 1.5km southeast of the town of Helsby. The site is approximately centred on easting 350416 and northing 374551 (National Grid Reference (NGR) SJ 50416 74551).

A site location plan is provided as Figure 1 within Appendix A.

2.2 Site Description and Layout

The site comprises an approximately rectangular landfill 350m long and 80m wide at the southern end, narrowing to 40m wide at its northern end. The site area is approximately 2.55 hectares (ha) The site is covered by rough grassland and shrubbery/trees around the perimeter. Waste was deposited in a former steep-sided valley that contained rough grassland and a tributary to Foxhill Brook (see Section 4.3) [2]. Following infill of the valley, the current topography of the site slopes down from south to north from circa 86m above Ordnance Datum (AOD) in the south to circa 59m AOD in the north. Further detail on the site topography is provided in Section 4.2.

2.3 Current Land Use

The site is currently used informally by a local tree surgeon, with evidence of freshly cut vegetation in the southern part of the site observed during the site walkover. CWCC reported that the tree surgeon has said that he intends to use the site for hosting landscape and vegetation management classes though it is not clear if such activities have commenced. The site walkover observed the site in general to be heavily vegetated, with no evidence of desire paths or evidence of dog walkers using the site. Anecdotal evidence of dirt bike use on the site was reported by several sources.

2.4 Adjacent Land Use

The site is bordered by Commonside Lane directly to the south, beyond which is agricultural land. Commonside Farm is located directly south of the site on the opposite side of the lane and comprises the farm house (17m south of the site), several outbuildings and a large pond which is approximately 60m long by 53m wide with a surface area of approximately 2,100m^2.

On the north side of Commonside Lane (and west of the site), is a residential property (Hollytree Cottage) and a commercial property (Cheshire Woodworking).

Bank House Farm Landfill is located circa 75m west of the site, and is approximately centred on NGR 350292, 374671. The remainder of the land to the east and west is predominantly agricultural, with the exception of a small number of properties, most notably Alvanley Residential Caravan Park located circa 220m west of Bank House Farm Landfill.

To the north, the land is predominantly agricultural. Teuthill Farm and the adjacent Teuthill Cottages are located circa 275m to the north-northwest of the site, residential properties on Burrows Lane are located circa 120m northeast of the site, Foxhill Pumping Station is located circa 225m northeast of the site and Foxhill Farm and the adjacent residential properties at Foxhill Barns are located circa 290m north-northeast of the site.

2.5 Site Walkover

2.5.1 Initial Site Walkover

An initial site walkover was undertaken on the 3rd of April 2025 by two AECOM site staff alongside two CWCC representatives. The walkover consisted of Commonside Tip and the surrounding area. The aim of this walkover included the following:

- Visual assessment of Commonside Tip and surrounding area;
- Discussions with local residents/landowners from adjacent land;

- Assessment of locations for preliminary surface water sampling; and
- Olfactory identification of odours against descriptors as published in BS5930.

The following account is to be read in conjunction with the photographic record and map (Figures 2 and 3), presented in Appendix A**.**

Entry to Commonside Tip was in the southwest corner of the site, through a gate off Commonside Road. Parts of the southern end of the site had been de-vegetated by a local tree surgeon. It was reported by the client that the tree surgeon does not have ownership rights to the site, but controls access and has informal use of the site. Stockpiles of logs and tree cuttings were seen close to the eastern boundary in the south of the site (see Figure 3, Photograph 27). The ground was slightly undulating underfoot but generally flat, raised centrally.

Moving northwards, site surface began to slope down to the north, with a substantial drop in ground elevation between the southern and northern ends of the site. In addition, vegetation became denser, and consisted of brambles, scrub and trees. Remnants of a dilapidated caravan were seen, alongside evidence of tents (see Photograph 24).

Numerous corroded metal drums were identified on the ground surface, in the east but were seen to be empty (see Photographs 25 and 26). There was no visual or olfactory evidence of contamination.

Where visible, the surface soil on rare occasions contained boulders and gravels of concrete. A heavily corroded metal trough-like tank/drum was observed close to the northwest site boundary, partially buried and also empty. There was no visual or olfactory evidence of nearby contamination. Numerous examples of metal, rubber and plastic debris were identified on the surface of the site, either partially embedded in surficial soils or relatively loose on the ground surface. it was unclear whether the material was partially capped waste from the original landfill, or whether it was fly-tipped during a later time (see Photographs 16 and 17).

A sweet, floral/fruity, but slightly acetic odour was first noticed approximately 100m south of the northern site boundary.

On the approach to the northern site boundary, large concrete structures with red metal outfall covers were observed. It is noted that these are not thought to be in-situ or associated with site drainage, and are more likely to have been dumped previously. However, water was observed to be seeping from the downhill corner of one of these large concrete structures at the point where the site gradient began to level off immediately adjacent to the northern site boundary (see Photographs 14 and 15).

In addition, orange-rust like staining was observed on the ground surface to the west of the same concrete structure, providing evidence of overground water flowing over the site surface in a northeastern direction down a steep slope at the northwest edge of site.

The water seeping from the base of the concrete structure drained to an area of standing / ponded water located on the northern site boundary. The orange-stained ground to the west of the concrete structure also suggested overground flow into the ponded area, although water was not flowing across this area at the time of the site visit (see Photographs 12 and 13).

The area of standing / ponded water observed was at the location of the ‘sump’ as described in previous reports.

The water seeping from Commonside Tip and flowing into the sump was observed to have an orange tinge and had an iridescent sheen. Vegetation locally had an orange staining where it had been in contact with the sump water. A strong sweet chemical odour was noted around the sump area. A single vertical plastic pipe was observed extending above the surface of the standing water in the sump, however AECOM was unable to identify if this is / was part of the former sump infrastructure.

A drainage ditch to the west of the sump area running west to east, was noted to be wet, however there was no evidence of visual or olfactory contamination within this ditch in line with what was observed at the sump.

There is evidence of overland flow of water from the sump which runs in a northerly direction, across the field to the north of site towards a drainage ditch. Evidence of the overland flow was observed in the form of small pockets of orange staining and iridescent sheen in saturated areas of the field; however, evidence of the overland flow ceased partway across the field and did not appear to extend as far as the drainage ditch (see Photograph 11).

Between the sump and the drainage ditch to the north, there is reportedly a below ground drain consisting of a 6-inch pipe.

. No evidence was provided to confirm

this statement.

An outfall from the drainage pipe (thought to be connected to the sump) drains into the drainage ditch (west-east flowing) at the northern end of the field boundary. It was noted that there is a public right of way adjacent to this ditch. It was reported that the drain previously used to run beneath the east-west ditch and beneath fields further north to outfall in Foxhill Brook near road junction (as annotated on Figure 2), but this is thought to have been either severed, damaged or is blocked up.
At the point that the drain discharged into the ditch, there was evidence of an iridescent sheen and scum on the water surface with a mild sweet-ish chemical odour. There was also evidence of some sediment / vegetation build up and blockages within this ditch, where the landowner reported that he has dredged the ditch on occasions to maintain water flow (see Photographs 6-10). It was also noted that the ditch upstream of the discharge point showed no visual or olfactory evidence of contamination.

There is a secondary ditch (running south-north) which feeds into the ditch east-west ditch. This is located to the east of the pipe route between the sump area and the east-west ditch and is marked on Figure 2. There has been no previous report of contamination here,

. The sheen was observed by the AECOM staff during the site walkover, although the likely source of the sheen (e.g. a migration route from Commonside Tip or another source off-site) could not be ascertained.

The ditch running west to east into which water discharges from the landfill was observed to flow toward Foxhill Brook close to the junction of Burrows Lane and The Ridgeway. Foxhill Brook flows in a north-northwestern direction alongside The Ridgeway and is culverted under the driveway and garden of Foxhill Farm and Foxhill Barns (see Photograph 1). The barns were renovated and converted into residential properties after 2016.

A faint ‘sweet-ish’ chemical odour was noted during the time of the walkover. Additionally, staining was present on the driveway (see Photograph 4).

Downstream of Foxhill Barns, Foxhill Brook is culverted under Tarvin Road, and this road is known to have surface water flooding even in dry weather. The historical discharge point of the suspected original drainage pipe that reportedly connected the sump to Foxhill Brook was seen to be capped with concrete. It is noted that RSK has previously sampled at this location. There was no visual or olfactory evidence of contamination or seepage from this discharge point during the walkover.

2.6 Supplementary Site Walkover

A supplementary site walkover was undertaken on 15th May 2025 by two AECOM site staff, coinciding with the initial surface water sampling visit. The walkover included a comprehensive inspection of potential surface water sampling locations, as well as a broader assessment of the wider site area including nearby receptors such as Foxhill Brook and adjacent residential properties. Results of this sampling event are contained within Section 7 with the sampling locations displayed on Figure 6 (Appendix A). Samples were obtained from 3 locations SW02 SW04B and SW05.

3. Historical Land Use

3.1 Introduction

Historical Ordnance Survey (OS) and County Series maps of the site and the wider environs were provided in the Groundsure Map Insight Report (scales 1:1,250, 1:2,500, 1:10,560 and 1:10,000) and from publicly accessible aerial photography and these are reviewed in this section. Copies of these maps are presented as part of the Groundsure Map Insight Report in Appendix C.

The historical OS and County Series maps obtained with the Groundsure report date between 1873 and 2025.

3.2 Site and Surrounding Area History

The earliest mapping dated 1873 (1:2,500 scale), shows the site as comprising an undeveloped field, with trees shown around the perimeter. This remains unchanged until the map dated 1970 (1:2,500 scale) which shows a refuse tip within the original field boundaries. The site is also labelled as a refuse tip on later large-scale mapping (1993, 1:2,500 scale and 2003, 1:1,250 scale). The 1878 map (1:10,560 scale) shows the 200 foot (61m) topographical contour as forming a 'V' shape in the northern part of the site, reflecting the original valley feature prior to tipping.

The surrounding area has been characterised by undeveloped agricultural land since the earliest mapping dated 1873 (1:2,500 scale). The following notable buildings were identified in the surrounding area:

- Buildings (labelled as Commonside Farm by 1970) were present since 1873, approximately 25m south of the site on the opposite side of Commonside to the site. One large and one small pond were present to the west of Commonside Farm from 1970.
- Two clusters of unlabelled buildings circa 75m and 125m west of the site were present since 1873. By 1970, maps showed an additional building directly east of the former, labelled as a garage. The garage was no longer labelled by 2001. A pond (Mill Pond) was mapped at the latter between 1872 and 2010, with a second pond mapped between 1970 and 2010.
- Bowlingalley Farm was present since 1873, approximately 150m southeast of the site.
- A cluster of buildings (labelled as Alderhall by 1970) were present since 1873, approximately 105m northeast of the site.
- Foxhill Pumping Station was present by 1970 circa 200m northeast of the site.
- Alvanley Caravan Park was present by 2001, approximately 220m west of the site.
- A cluster of buildings (labelled as Teuthill Farm by 1968) was present since 1873, approximately 275m north-northwest of the site.
- Foxhill Farm was present since 1873, approximately 290m north-northeast of the site.
- A cluster of buildings in Teuthill were present since 1873, approximately 325m northwest of the site.
- The Ridgeway Country Holiday Park was present by 2001, approximately 400m east of the site.

Aerial photography included in the Groundsure report dating between 2000 and 2025 shows the site initially covered by rough grassland as of 2000 and becoming progressively more vegetated by shrubs and trees as time progressed.

3.3 History of Landfilling Operations

This section gives information on landfilling operations at the site and within the wider area (>250m). The following information was retrieved from the 2000 GeoDelft Desk Study [2] which was provided by the Client.

It is important to note that the information presented in this section reflects waste types as detailed by GeoDelft, based on Environment Agency and Vale Royal Borough Council documentation. However, no primary supporting evidence, such as analytical data, site records, or waste transfer documentation was provided within the referenced reports to verify the presence or composition of the listed materials. As such, the information may be anecdotal or hearsay and should be treated with appropriate caution in subsequent assessments.

Operational Period (1956 to c.1975)

Planning consents were granted in 1956 for tipping of ash and lime, 1958 for tipping of pulverised fuel ash and 1960 for tipping of rubble, asbestos and waste pipe lagging etc. at the site. In the planning consent dated 1960, no specific environmental conditions were applied other than access, the finished tip height and requirement for soil cover on completion and dust minimisation. Local authority records indicated that tipping had commenced by December 1960.

VRBC records dating from 1963 suggested that paraffin tanks were present on the site for the purpose of operating a paraffin delivery round, and the tip was reported as having been on fire.

In 1970, Runcorn Rural District Council (RRDC) wrote to the operators stating that "the site was a nuisance under the Public Health Act and tipping should cease and the site be covered over. According to EA records reviewed by GeoDelft, the covering material used on the tip in 1971 was reportedly deposited solid material from the cooling towers at the chemical plant at Shell Stanlow.

Correspondence between the Mersey and Weaver River Authority (MWRA) and RRDC dating from 1972 indicated that the site had been levelled and that tipping could continue as there was sufficient room to do so. In 1973 the MWRA wrote to RRDC to advise that Foxhill Pumping Station could be at risk of contamination from the site. Drainage above the site was reportedly impeded by the tipping activities.

By January 1975, tipping had ceased. Whilst correspondence with the operators advised them to begin works to cover the tip, GeoDelft did not review any evidence that this work was completed during 1975.

Post-Operational Period (c.1975 to present)

A solicitors' letter from the firm acting for the site operators dated October 1978 reviewed by GeoDelft stated that a land drain was put in place running through the centre of the original valley at the commencement of tipping, with feeder lines from both sides and ultimately running into a sump at the northern end of the site, from which water was piped to ditches on the adjacent fields. The letter also stated that the operators had agreed to remove the *"thirty or so oil drums on the site which have been neatly stacked for removal"*. However, while these actions were reported, no supporting primary evidence such as photographic records, site inspection reports, or third-party verification has been provided.

Letters dating from 1980 and 1981 referred to the need to excavate drainage around the site and the finding of a barrel containing white material (not identified) during these excavations. NWW carried out an investigation in 1980 comprising six boreholes surrounding the tip – the results of which are discussed further in Appendix D.

A news article provided by CWAC from 1994 reports that the site owner was prosecuted by the former National Rivers Authority (NRA) for 'the discharge of PCBs into a tributary of the River Weaver'. The article also reports an NRA statement that it 'had no powers to demand remedial action and no responsibility or resources to carry out the work' and that the site owner was also without the resources for remedial work. Due to the age of the matter, the associated prosecution file is no longer available. Following the implementation of Part IIA of the EPA 1990, VRBC prioritised the site for investigation which began in 2005. These investigations are summarised in Appendix D.

Waste Deposited

Table 3-1 lists the wastes deposited at the site, as identified by GeoDelft from EA and VRBC documentation.

Table 3-1 Deposited Materials

Year	Waste Details
1956	Ash and lime.
1958	Pulverised fuel ash.
1960	Rubble, asbestos and waste pipe lagging etc. 28-40 gallon drums of cut back bitumen (tile adhesive) daily, tipped by Mealors for the Flintkote Co. Ltd..
1961	Carbon black, builders' refuse, pitch fibre manufacture waste, dye works waste in paper bags, waste dye in solid form, fly ash, tins of paint, oil, foodstuffs. Black liquid. Wet fly ash, carbon black, oil/paint cans

Year	Waste Details
1963	Paraffin tanks present on-site for delivery round. Cardboard boxes, paper, metal and oily rags from Vauxhall Motors.
1964	Paper and “oily content” from Vauxhall Motors. Paper, card, rubber hoses and drums. Stated that there was to be no more carbon black deposited from this point.
1969	Paper, metal, drums, waste wood, paint residues, various plastic waste. Wastes from Epicote Plant (Shell Chemicals, Stanlow). Wastes from Shell Star Fertiliser Plant.
1970	Commercial waste including cardboard and empty food tins, from Purle Waste Disposal. Orange/faun solid, possibly from Shell Chemicals. Discontinued tipping of waste paper, oil contaminated metal, waste and paint residue (paint residue from Vauxhall Motors). Bobatex (white substance) – detergent and deposit from water treatment plant at Shell. Waste from Shell Stanlow in skips.
1971	Waste non-compliant with planning conditions, from Shell. Covering material on the lower section of the tip was solid material for the cooling towers at the chemical plant at Shell Stanlow, which had been placed in lagoons for two years to dry out. The cooling tower used D water and borehole water. Fly ash (lead <50 mg/kg, other metals and COD very low), from Shell Stanlow. At least three loads of oily residues, thought to be from Purle Waste Disposal. Three loads of brick, rubble and scrap metal, from Shell Oil Refinery. Isolated loads of oily waste. Oily matter. Occasional load of greasy waxy fatty matter.
1972	Waste from haulage firms Riley and Galley. Possibility of cyanide being tipped. Oily material and Fullers earth. Solid deposit (pure paraffin wax), oily sludge with a phenol content of approximately 1%. Tip discharge contained a few ppm of low boiling point organic material (possibly thiols). Drums containing scrap metal, deposits of oily material and fatty matter,
1973	Substances for which Shell submitted Section 3 notices under the Deposit of Poisonous Wastes Act. Paraffin tanks present on-site for delivery round. Approximately 50 empty 20 gallon drums at the north end of the tip.
1974	Bitumen. Water softening plant wastes, from Shell.
1985	PCBs from BICC (as discussed in more detail below) and Monsanto.
1990	PCBs from BICC AND Central Electricity Generating Board. Asbestos (VRBC Meeting Minutes). Sewage sludge unsuitable for agricultural use deposited on the tip from Vauxhall, Shell, Burma, Kelvanator and various industrial sites from Ellesmere Port.

Source: 2000 GeoDelft Desk Study [2]. Note: no primary supporting evidence, may be anecdotal information.

PCBs

Documentation from British Insulated Callender's Cables (BICC) reviewed by GeoDelft dated 1985 estimated that they had deposited 50-100kg per week of material containing PCBs to the site, over the period approximately 1955-1971. BICC estimated the total mass as circa 100 tonnes, and potentially up to 200 tonnes. In 1990, solicitors acting for the site operators stated that two companies which deposited waste at the site were concerned with PCBs – BICC and the Central Electricity Generating Board. VRBC meeting minutes from 1990 indicated that asbestos was deposited. The EA also noted that sewage sludge unsuitable for agricultural use was deposited.

A 2001 study [3] indicated that the waste was reportedly deposited to a depth of circa 13m at the centre of the site, resulting in a total waste volume of at least 300,000 m^3.

A historical landfill site (Bank House Farm) was also identified approximately 40 metres west of the site, as highlighted in the Groundsure report. However, there is limited information available regarding its former operations.

3.4 Summary of Potential Historical Contamination Sources

This section summarises potential contamination on-site and in the vicinity associated with historical features identified in Section 3.2 and Section 3.3. These include:

- **Landfilled material on the site:** The site was used as a landfill between 1956 and circa 1975 and received a variety of types of waste, as summarised in Section 3.3, with a range of associated potential contaminant groups, such as asbestos, cyanide, phenols, thiols, oils, paints, dyes, adhesives, detergents and water treatment plant residues, as well as PCBs which are known to have been deposited, with a total mass of PCB-containing waste of circa 100-200 tonnes.

4. Environmental Setting

4.1 Introduction

The environmental setting including the topography, geology, hydrogeology and hydrology are the key factors that influence the way in which contaminants in the soil or groundwater can be transported on or off-site, and also the way in which contamination can affect applicable receptors including controlled waters, users of the site, and off-site residents.

The environmental setting of the site has been assessed by making reference to the information sources detailed in Section 1.5.

4.2 Topography

The site is located on the north-facing slope of an east-west orientated valley. The surface elevation of the site varies from circa 86m above Ordnance Datum (AOD) in the south to circa 59m AOD in the north. Foxhill Brook flows through the base of this valley, at an elevation of circa 40m where the stream from the site joins the brook. A steep northward-facing valley was originally present at the northern end of the site but was infilled during tipping activities. Estimated original contours for the valley based on 1947 aerial photography are present in the 2000 GeoDelft Desk Study [2] as drawing number 118. 09 WD 06.

4.3 Hydrology

4.3.1 Surface Water Features

The EA Catchment Data Explorer [4], the Groundsure report and other publicly available sources have been reviewed to identify relevant hydrological features on-site and in the surrounding area. The hydrology of the area is summarised in Table 4-1 below. A plan detailing the surface water features from publicly available sources in presented on Figure 5.

Table 4-1 Summary of On-site and Surrounding Area Hydrology

Feature	Distance & Direction*	Flow Direction	Description
Unnamed pond	Directly north	North	Area of ponded surface water observed during the site walkover at the location of the sump at the foot of the landfill (see Section 2.5).
Pond at Commonside Farm	8m south	North (via overflow culvert)	Large pond situated west of the buildings at Commonside Farm. Anecdotally, an overflow culvert from the pond may run under Commonside Lane and into the site.
Unnamed pond	70m east	N/A	Pond situated in the field between the site and Burrows Lane.
Unnamed drainage ditch	100m east	North	Drainage ditch along field boundary which flows into the ditch listed below. Classified by the EA as an ordinary watercourse.
Mill Pond	120m southwest	N/A	Pond situated south of property on Commonside Lane.
Pond at Bowlingalley Farm	125m southeast	N/A	Pond situated west of the buildings at Bowlingalley Farm.
Unnamed surface water feature	166m southwest	Unknown	Surface water feature identified in the Groundsure Report as an ‘inland river’, however this feature is not visible on maps or aerial imagery of this area.
Unnamed drainage ditch	175m north	East	Drainage ditch along field boundary which flows into Foxhill Brook. Classified by the EA as an ordinary watercourse.
Foxhill Brook	280m northwest	Northwest	Small stream which follows “The Ridgeway” road close to the site and flows northwest towards Helsby. Classified by the EA as an ordinary watercourse.

**All distances measured at closest point to site area.*

Foxhill Brook runs into the Mersey Marshes approximately 3km north of the site, from where flow is via a complex network of drainage channels.

VRBC documentation reviewed by GeoDelft in the production of the 2000 Desk Study [2] indicated that six inch diameter land drains and a central six inch pipe were installed on the ground at the site prior to the commencement of tipping, and reportedly discharged along the route of a stream which originally flowed north through the infilled valley. The course of this stream through the site was interpreted by GeoDelft from a 1947 aerial photograph and can also be seen on a historical aerial photograph dating from December 1945 available via Google Earth. No supporting evidence has been provided to substantiate these claims; therefore, the reported drainage arrangements remain unconfirmed.

As described in Section 2.5, AECOM observed an area of standing surface water (former sump) at the northern end of the site, with an adjacent drainage ditch orientated west-east. Evidence of overland flow towards the unnamed drainage ditch 175m north was observed. An outfall from a drainage pipe was observed to flow into this drainage ditch.

In addition, the site walkover identified another stream / drainage ditch flowing south to north approximately 100m to the east of the sump area via a drain under the access road / footpath, this stream / ditch also flowed into the west to east flowing drainage ditch located approximately 175m north of the sump.

4.3.2 Surface Water Abstractions and Discharges

No surface water abstractions are recorded in the Groundsure report within 500m of the site boundary. There are nine abstractions recorded within 2km of the site, however all are listed as historical.

Two discharge consents to surface waters are recorded in the Groundsure report within 500m of the site boundary:

- Discharge to Lordship Marsh at Commonside Caravan Park, 383m northwest of the site, i.e. downstream of the site. This is recorded as a pumping station sewage discharge. The status is given as ‘historic’ and a significant time period has elapsed since the application (circa 30 years). As such, this is considered unlikely to represent a potential source of contamination.
- Discharge to a ditch appearing to be connected to Foxhill Brook at Foxhill Water Treatment Works, 461m north of the site, i.e. downstream. This is recorded as a water treatment works process effluent discharge. This is considered unlikely to represent a potential source of contamination that could affect the assessment of Commonside Tip.

4.4 Geology

4.4.1 Published Geology

The published BGS 1:50,000 scale geological maps (Sheet 109, “Chester”, 1965 (Solid) [6] and 1990 (Drift) [7]) and the BGS Onshore GeoIndex have been reviewed along with the Groundsure GeoInsight Report (Appendix C) to determine the published geology underlying the site.

Table 4-2 Geological Succession from Published Mapping

Group	Stratum	Published Description
Superficial Deposits	**Glacial Till** Present in the southeast, extending north along the eastern boundary and southwest of the site only.	*“Diamicton”* (a term meaning a poorly-sorted sediment with a wide clast size range).
	Glaciofluvial Deposits Present in the north and central sections of the site and shown outcropping as a finger southwards beyond the southern boundary of the site, along the original stream valley.	*“Sand and gravel”.*
Bedrock	**Tarporley Siltstone Formation** Present in the southwest of the site only.	*“Interlaminated and interbedded siltstones, mudstones and sandstones in approximately equal proportions”.*
	Helsby Sandstone Formation Does not immediately underlie the superficial deposits on-site but is likely to be present in the	*“Fine- to medium-grained, locally micaceous, cross-bedded and flat-bedded sandstones, weathering to sand near surface”.*

Group	Stratum	Published Description
	southwest underlying the Tarporley Siltstone Formation.	
	Wilmslow Sandstone Formation Present across the majority of the site immediately underlying the superficial deposits. Likely to also be present at depth in the southwest underlying the above strata.	*"Red-brown to brick-red, fine- to medium-grained, generally pebble-free, cross-bedded sandstones, with sporadic siltstones".*

A fault passes through the site, orientated northwest-southeast and downthrows to the west, juxtaposing outcrops of the Tarporley Siltstone Formation and Wilmslow Sandstone Formation.

Whilst the BGS does not map areas of Made Ground in the vicinity of the site, the landfilled deposits form an area of Made Ground and comprise a variety of types of waste (described further in Section 3.3).

4.4.2 Information from Previous Reports and Investigations

- A 1980 investigation [8] by NWW included five boreholes around the perimeter of the landfill and one 150m to the north adjacent to the drainage ditch. It determined that the glacial deposits extended to about 25m depth at the northern end of the site, thickening to over 33m below the original valley floor at the southern end. The deposits were described as primarily consisting of "boulder clay", with hard, over-consolidated clays with gravels and cobbles present at depth. In higher areas, glacial sands and clays were identified overlying the boulder clay and thickened westwards. The glacial sands and clays identified by GeoDelft may represent the Glaciofluvial Deposits now mapped by the BGS on-site.

- The 2000 GeoDelft Desk Study [2] reviewed this investigation and considered that some of the deposits identified by NWW as superficial may have been completely weathered Tarporley Siltstone bedrock, noting the glacial deposits to be at least 34m to 40.5m thick on the eastern edge of the site and 20.5m to 29.9m thick on the western edge of the site. In the borehole (BH1) 150m north of the site, superficial deposits were at least 10m thick. Additionally, GeoDelft assumed that the superficial deposits were thinner in the original valley bottom than around the perimeter of the site.

- Further investigation carried out by GeoDelft in 2005 [9] included seven boreholes around the perimeter of the site and identified 3-4m of brown coarse clayey sand overlying 5-7m of brown soft sandy clay, comparable with the shallow geology identified in 1980.

- A 2009 Environmental Assessment by RSK [10] identified the superficial deposits in the vicinity of Foxhill Brook to the north of the site as being commonly less than 1m thick but extending locally to up to 10m.

- The NWW 1980 investigation [8] encountered bedrock (as very weak and friable, very poorly cemented sandstone) in only one location, at a depth of 29.9m bgl on the northwestern edge of the site. GeoDelft identified this as the "Upper Mottled Sandstone" (a previous name for the Wilmslow Sandstone Formation) and concluded that the fault crossed the site further south than previously mapped [2].

4.4.3 BGS Borehole Records

AECOM has searched the BGS historical borehole record database for relevant records relating to the site and immediate surrounding area. Relevant borehole logs in the vicinity of the site include those for the 1980 NWW boreholes which have been included in the summary above. Logs for two of the three Foxhill Pumping Station boreholes were available for review and are summarised in Table 4-3 below.

Table 4-3 Summary of BGS Historical Borehole Records

Borehole No.	Strata	Depths	Description
SJ57SW1 – located 223m northeast	Topsoil	0m to 0.3m bgl	*Soil*
	Glaciofluvial Deposits	0.3m to 9.14m bgl	*Clay and sand; sand and marl with pebbles; sand and gravel (making water)*
	Wilmslow Sandstone Formation	9.14m to 243.84m bgl	*Soft red sandstone, becoming soft grey sandstone at 191.72m bgl*
	Glaciofluvial Deposits	0m to 8.5m bgl	*Drift*

Borehole No.	Strata	Depths	Description
SJ57SW3 – located 256m northeast	Wilmslow Sandstone Formation	8.5m to 271m bgl	*Soft red sandstone, becoming mixed red and grey sandstone at 187m bgl and soft grey sandstone at 229m bgl*

The BGS records are consistent with the published geology. The superficial deposits recorded at Foxhill Pumping Station are thinner than those recorded on-site, reflecting the position of the BGS boreholes closer to the Foxhill Brook valley floor.

4.4.4 Quarrying

There are no records of quarrying operations, past or present that have taken place within 250m of the site within the Groundsure report.

4.5 Hydrogeology

4.5.1 Aquifer Classification & Groundwater Vulnerability

The EA's Groundwater Protection Policy adopts aquifer designations that are consistent with the Water Framework Directive. Definitions of the various aquifer types can be found on the Environment Agency section of the gov.uk website. Data presented in the Groundsure report and the Defra MAGIC Map viewer [11] indicates the following classifications:

- Glacial Till – classified as a Secondary (Undifferentiated) Aquifer and has a high vulnerability to pollution.
- Glaciofluvial Deposits – classified as a Secondary A Aquifer and have a high vulnerability to pollution.
- Tarporley Siltstone Formation – classified as a Secondary B Aquifer and has a medium vulnerability to pollution.
- Helsby Sandstone Formation – classified as a Principal Aquifer and has a medium vulnerability to pollution.
- Wilmslow Sandstone Formation – classified as a Principal Aquifer and has a medium vulnerability to pollution.

The bedrock Principal Aquifer underlying the site is a sensitive receptor, however the presence of the overlying superficial deposits provide some degree of protection from pollution given their medium vulnerability to pollution. Secondary aquifers, such as the superficial deposits and the Tarporley Siltstone Formation are less sensitive than Principal Aquifers but are still a potential receptor for contamination.

4.5.2 Licensed Groundwater Abstractions, Discharges and Source Protection Zones

One groundwater abstraction has been identified within 1km of the site and is listed as active. This is summarised in Table 4-4 and relates to the abstraction at Foxhill Pumping Station. A further four abstractions are recorded within 2km of the site, however all are listed as historical.

Table 4-4 Environment Agency Licensed Groundwater Abstractions on or Within 1km of Site)

National Grid Reference	Distance (m) and Direction	Operator	Use
350600, 374800	178m northeast	United Utilities Water Ltd	Potable water supply

One discharge consent to groundwater is recorded in the Groundsure report within 500m of the site boundary, at The Ridgeway Country Holiday Park. This is described as final/treated effluent sewage discharge to groundwater via an infiltration system. The permit was issued in May 2024.

The northern part of the site lies within a Source Protection Zone (SPZ) 3 (total catchment) and SPZ2 (outer catchment). The closest SPZ1 is located 66m north, associated with the above potable abstraction at Foxhill Pumping Station.

The potable water abstraction is positioned theoretically hydraulically downgradient of the site and is a sensitive receptor for contamination originating from the site.

The Environment Agency has confirmed in its letter dated 11 September 2024 (ref: INSO1_2LRB) that it is satisfied there does not appear to be a significant contaminant linkage between the Commonside Tip site and the underlying Principal Aquifer. This conclusion is based on information provided by the local utility company, which indicates that groundwater in the vicinity is not impacted by Polychlorinated Biphenyls (PCBs). This assessment is consistent with the findings of the Geodelft report dated March 2005. However, it is important to note that, at this stage, no laboratory certificates or supporting documentation have been provided by the utility provider to substantiate this claim. As such, there is currently no verifiable evidence available to confirm its accuracy.

4.5.3 Groundwater Elevations

The NWW 1980 investigation [8] identified shallow groundwater within the superficial deposits in four of six boreholes at the following depths: 8.7m bgl / 58.8m AOD (BH3), 2m bgl / 75.5m AOD (BH4), 6.5m bgl / 76.5m AOD (BH5) and 5.5m bgl / 41m AOD (BH6). The hydraulic conductivity of three of the sandy strata within these deposits was also measured, with results of 1.58×10^{-6} m/s, 2.86×10^{-6} m/s and 9.6×10^{-7} m/s. Seepages identified in the surrounding fields were attributed to these sandy strata. GeoDelft considered it likely that similar seepages were also present beneath the site [2]. During the 2005 GeoDelft investigation [9], water strikes during drilling indicated an approximate water level within the superficial deposits of between 3 and 6m bgl. Monitoring carried out in November 2004 indicated water levels between 0.55m (GDBH1A) and 6.11m bgl (GDBH6A) with groundwater contours showing flow to the north towards Foxhill Brook.

It is also noted that the BGS borehole record SJ57SW1 for Foxhill Borehole No.1 dated 1939 describes the superficial deposits near the surface (0.3m to 9.14m bgl) as ‘making water’.

During the site walkover, residents indicated to AECOM that at Foxhill Barns, water emerges through the driveway surface and through a low retaining wall, potentially indicating mobile shallow groundwater and spring type conditions.

The BGS borehole records SJ57SW1 and SJ57SW3 for Foxhill Pumping Station borehole indicates that in 1939, the resting water levels in bedrock were 30 feet (9.1m) below the ground level of 158 feet AOD (48.2m AOD) in Foxhill Borehole No.1 and 29 feet and 1 inch (8.9m) below the ground level of 160 feet AOD (48.8m AOD) in Foxhill Borehole No.3, giving groundwater elevations of 39.1m AOD and 39.9m AOD respectively.

4.5.4 Preliminary Hydrogeological Model and Flow Direction

Groundwater flow direction within the shallow superficial aquifer will likely be influenced by the local topography. Mapping indicates that the local topography falls downwards to the north towards Foxhill Brook. As such, groundwater is anticipated to flow in an approximate north-northeasterly direction towards Foxhill Brook.

The groundwater flow direction within the bedrock is likely to be regionally towards the north or northwest and the Mersey Estuary. However, groundwater within the bedrock is likely to be affected by a local cone of depression around the Foxhill Pumping Station boreholes, drawing groundwater towards the northeast.

The NWW 1980 investigation [8] compared the chemistry of the water in the superficial deposits to the water abstracted at Foxhill Pumping Station which suggested that the groundwater within the superficial deposits was not derived from the underlying bedrock. Both NWW and GeoDelft [2] considered that the superficial deposits formed an aquiclude which was somewhat protective of the underlying bedrock aquifer, however fractures and/or more permeable areas had the potential to allow downward migration.

There is currently no available information on the presence and/or elevation of perched water within the landfill mass.

5. Regulatory Information and Consultation

5.1 Introduction

The key relevant features that characterise the site and surrounding area are summarised in this section, along with an indication of the risk to the land quality of the site. Generally, any regulated activities within 250m of the site could, depending upon their nature, represent potential off-site sources of contamination.

5.2 Regulatory Database Review

Table 5-1 summarises information obtained from the regulatory database information contained in the Groundsure report (Appendix C). All data suppliers are referenced in the Groundsure report.

Regulatory information is excluded from the table below where it is not within the specified distances, where there is no information for the given topic or where entries are duplicated.

Table 5-1 Summary of Regulatory Information

Subject	Number present		Details
	On-site	0-250m	
Licensed Waste Management Facilities and Industrial Land Uses			
Historical Landfills	1	1	BGS, EA and historical mapping identify Commonside Tip on-site. BGS records also identify Bank House Farm Landfill to the west.
Sensitive Land Uses			
Green Belt	1	0	Merseyside and Greater Manchester Green Belt
Nitrate Vulnerable Zones (NVZ)	2	0	Surface water NVZ: Peckmill Brook, Hoolpool Gutter at Ince Marshes Groundwater NVZ: Delamere Sandstone
Listed Buildings	0	2	Commonside Farmhouse, Grade II, 30m south Holly Tree Cottage, Grade II, 70m southwest

No entries were recorded within 250m for the following: petrol stations, electricity cables, gas pipelines, sites determined as Contaminated Land, Control of Major Accident Hazards Sites (COMAH), regulated explosive sites, hazardous substance storage/usage, historical IPC licenced industrial activities, licenced industrial activities (Part A(1)), licensed pollutant releases (Part A(2)/B), pollutant releases to surface waters (Red List), pollutant releases to public sewer, List 1 or List 2 Dangerous Substances, EA pollution incidents, pollution inventory substances, pollution inventory waste transfer, pollution inventory radioactive waste, Sites of Special Scientific Interest (SSSI), conserved wetland sites (Ramsar), Special Areas of Conservation (SAC), Special Protection Areas (SPA), National Nature Reserves (NNR), Local Nature Reserves (LNR), designated ancient woodland, biosphere reserves, forest parks, marine conservation zones, proposed Ramsar sites, possible SACs, potential SPAs, world heritage sites, areas of outstanding natural beauty, national parks, conservation area, scheduled ancient monuments or registered parks and gardens.

The regulatory database review has not identified any additional sources of contamination beyond Commonside Tip on the site itself.

5.3 Regulatory Consultation

5.3.1 Environment Agency Flooding Data

The EA Flood Map for Planning website [12] was accessed on 24th April 2025 and confirmed that the site lies within Flood Zone 1, with a low probability of flooding from rivers and sea. A formal flood risk assessment is outside the scope of this report.

5.3.2 Coal Authority and Preliminary Mine Gas Risks

AECOM have reviewed the Coal Authority web-based interactive map, which indicates that the site is not located within the Coal Authority Coal Mining Reporting Area. This indicates that risks from historical coal mining are low, with no further assessment required.

5.3.3 Unexploded Ordnance

To assess the potential risks from Unexploded Ordnance (UXO) at the site, the Zetica Unexploded Bomb Risk Map [13] was used on 24th April 2025. The Zetica Bomb Risk Map for the site and surrounding area indicated that Low risk area, which is defined by Zetica as an '*area indicated as having 15 bombs per 1000 acres or less*'.

5.4 Radon

The UK Health Security Agency's UK Radon website [14] was reviewed on 24th April 2025 to determine potential radon risks for the Site.

According to the website and the Groundsure report, the site is located within an area where less than 1% of homes are above the action level for radon gas.

5.5 Non-Coal Mining

No records of non-coal mining were identified in the Groundsure report within 500m of the site.

5.6 Stability Hazards

The ground stability hazards at the site have been identified as very low to negligible in the Groundsure report, with the exception of an area in the central eastern part of the site and extending off-site to the east which has a low risk of landslide hazards.

Information provided by CWCC indicates that a landslide occurred off-site to the east in October 2009. A plan provided by CWCC indicated the landslide source as being directly north of the pond 70m east of the site, with the slip area extending north to the southern boundary of Foxhill Farm and round to the northeast of the farm to meet The Ridgeway road. Photographs of the incident provided by CWCC show a stream flowing through the centre of the slip area, potentially representing a groundwater spring or overflow from the pond. The area of the landslide is recorded by the BGS as 'very low' risk. The 'moderate' BGS classification on-site could suggest similar or more susceptible conditions in this area of the site.

The February 2000 GeoDelft report [2] includes drawings from the NWW 1980 report showing a stream channel running south to north through the middle of the site prior to tipping, as well as areas of suspected seepages to ground surface within the site boundary. The potential ongoing presence of these seepages and channel flow buried beneath the tipped waste has the potential to increase ground instability at the boundary of the natural ground and overlying waste material.

6. Review of Historical Reports

CWCC provided AECOM with a total of 13 No. historical reports relating to the site and its surrounding area. AECOM has conducted a thorough review of these documents and prepared detailed summaries for each, which are presented in Appendix D. Where relevant, the content of these reports has been used to inform the understanding of ground conditions and to support the development of the conceptual model presented in this report.

7. Initial Surface Water Sampling

After reviewing the historical reports provided by the client (Summaries within Appendix D), including relevant information relating to previous surface water sampling activities conducted in the vicinity of the site and undertaking an initial site walkover on 3rd April 2025 (as detailed in Section 2.5), AECOM undertook an initial round of surface water sampling. The objective of the monitoring and sampling was to begin to develop an understanding of potential contaminant migration pathways and assess the likely significance of potential contaminant groups that were not generally assessed during previous phases of investigation. While the data set obtained directly for this report is limited, it has been used to inform initial recommendations and guide the scope of future investigative work. Further monitoring may be required to establish baseline conditions, assess variability, and support robust risk evaluation.

This sampling visit occurred on 15th May 2025 and comprised nine surface water monitoring locations (SW01-SW08), one of which was dry (SW03). At locations where there was sufficient water, water quality parameters were recorded. In addition, three locations were selected for obtaining a surface water sample which was then sent to an accredited laboratory for offsite analysis (namely SW02, SW04B & SW05). The surface water sampling locations are shown in Figure 6.

Weather conditions during sampling and monitoring were generally mild and settled, with highs of 19°C and lows of 7°C, light winds between 6 - 9 mph, moderate humidity ranging from 46% to 64%, slightly cloudy skies with sunny intervals, and high pressure between 1026 and 1028 mbar.

The samples SW02, SW04B & SW05 were analysed for the following suite of analysis based on observations from the site walkover, site history and professional judgement:

- **Alcohols / Acetates:** Ethyl acetate, i-propyl acetate, methyl acetate, n-butyl acetate, n-propyl acetate, ethyl alcohol(ethanol), i-propyl alcohol(IPA), methyl alcohol(methanol), n-butyl alcohol, n-heptyl alcohol, n-hexyl alcohol, n-propyl alcohol, n-pentyl alcohol
- **Ketones, Ethers, and Other Solvents:** Acetone (propanone), Cyclohexane, Tetrahydrofuran (THF), Methyl ethyl ketone (MEK) and Acetonitrile
- **Volatile Organic Compounds (VOCs):** BTEX (Benzene, Toluene, Ethylbenzene, Xylenes), MTBE (Methyl tert-butyl ether), Tentatively Identified Compounds (TICs) including: MIBK (Methyl isobutyl ketone) & Vinyl acetate
- **Semi-Volatile Organic Compounds (SVOCs):** Polycyclic Aromatic Hydrocarbons (PAHs), Phenol and chlorinated phenols and Tentatively Identified Compounds (TICs)
- **Speciated Phenols:** Resorcinol, Catechol, Phenol, M/p-cresol, O-cresol, Total cresols, Total xylenols, 1-napthol, 2,3,5-trimethyl phenol and 2-isopropylphenol,
- **Aldehydes:** Formaldehyde, Acetaldehyde, Benzaldehyde and Glutaraldehyde
- **Polychlorinated Biphenyls (PCBs):** PCB 7 congeners, PCB WHO 12 congeners (dioxin like PCBs), Total PCBs (Aroclor 1254 or 1260) and 2,4 Dichlorobiphenyl (PCB 008) (CAS 34883-43-7)

A summary of the field observations recorded during monitoring is detailed below Table 7-1 and the field parameters are summarised in Table 7-2.

Table 7-1 Surface Water Sampling Observations

Location	Comments
SW01	No visual or olfactory evidence of contamination at time of sampling.
SW02	Locally very strong chemical, sweet, apply and floral odour. Surface water exhibiting a yellowish-brown (ochreous) floating precipitate with an iridescent sheen noted. **Sample taken for laboratory testing.**
SW03	Drainage ditch dry. No water parameters or sample obtained.

Location	Comments
SW04	Surface water stagnant. No visual or olfactory evidence of contamination.
SW04B	Locally strong floral or apple-like odour detected during monitoring, along with reddish-brown, cloudy colour of surface water. Slow flow. **Sample taken for laboratory testing.**
SW05	Locally Strong floral or apple-like odour detected during monitoring, along with black colour of surface water. **Sample taken for laboratory testing.**
SW06	Strong floral or apple-like odour detected during monitoring, along with slight yellowish tinge of surface water.
SW07	Strong floral or apple-like odour detected during monitoring. No visual evidence of contamination of the surface water.
SW08	Strong floral or apple-like odour detected during monitoring. No visual evidence of contamination of the surface water.

Water quality parameters were recorded at all sampling locations using an Aqua TROLL 500 multiparameter sonde. The monitored parameters included pH, temperature (°C), specific conductivity (µS/cm), dissolved oxygen concentration (RDO, mg/L), turbidity (NTU), and oxidation-reduction potential (ORP, mV). A summary of the parameters can be found below in Table 7-2.

Table 7-2 Surface Water Sampling Field Parameters

Location	pH	Temperature (°C)	Specific Conductivity (µS/cm)	RDO Concentration (mg/L)	Turbidity (NTU)	ORP (mV)
SW01	7.19	19.50	292.01	5.70	10.98	157.3
SW02	7.01	11.32	981.24	0.18	65.53	102.8
SW03	No parameters recorded – sampling point dry					
SW04	8.15	17.72	527.02	9.01	79.18	142.3
SW04B	7.08	13.52	791.04	2.17	382.44	113.2
SW05	7.69	13.89	724.71	7.13	239.77	107.7
SW06	7.70	12.67	436.71	8.55	87.76	137.8
SW07	7.95	13.40	564.19	9.77	7.68	150.3
SW08	7.78	14.18	394.41	9.34	10.42	159.9

The detailed results from the laboratory analysis are presented in Appendix F, while the associated laboratory certificates are provided in Appendix G. A summary of the analytes that exceeded the limit of detection (LOD) is shown below in Table 7-3.

Table 7-3 Analytes detected above the Limit of Detection

Analyte	Units	LOD	Number of Results	Number of Detects above LOD	Minimum Concentration	Maximum Concentration
Polychlorinated Biphenyls						
PCB 28	ug/l	0.1	3	3	0.4	3.6

Analyte	Units	LOD	Number of Results	Number of Detects above LOD	Minimum Concentration	Maximum Concentration
Xylenols	µg/L	60	3	2	190	5680
Total Speciated Phenols	µg/L	100	3	2	200	5700
benzaldehyde	µg/L	0.1	3	2	100	300
2,4'-dichlorobiphenyl (PCB-8)	µg/L	0.005	3	3	0.339	4.52
SVOCs						
2,4-dimethylphenol	µg/L	1	3	1	2	2
Benzene	µg/L	0.5	3	2	1.7	9.6
Xylene (m & p)	µg/L	2	3	1	3	3
Xylene (o)	µg/L	1	3	2	3	47
1,3,5-trimethylbenzene	µg/L	3	3	1	3	3

Surface water sampling was undertaken on a single occasion as part of the preliminary assessment. The results presented herein reflect conditions at the time of sampling and have not been subject to comprehensive temporal screening or trend analysis.

8. Preliminary Data Screening

8.1 Introduction

In order to provide context to the historical water and sediment quality data sets, a preliminary data screening exercise has been undertaken as an initial conservative screening exercise based on default assumptions about land use, soil type and pathway. The most recent quantitative risk assessment was undertaken by RSK in 2009 and was based on guidance and screening values that have since been superseded. Furthermore, no interpretation of the results collected in 2024 (by RSK) or 2025 (by AECOM) has so far been undertaken and the preliminary screening exercise provides context for these results. The preliminary screening exercise has been undertaken in accordance with the principles set out in the LCRM guidance [1] on Stage 1, Tier 2 GQRA using the historical and more recent sampling and analytical data derived from the sampling exercises carried out by RSK between 2006 and 2024 (summarised in Reports D.9 to D.12 in Appendix D), and by AECOM in 2025.

8.2 Human Health

8.2.1 Risk Assessment Framework

Category 4 Screening Levels (C4SLs) were derived in order to provide a test to identify when a site falls into Category 4 with regard to human health as defined in the Part IIA Statutory Guidance [15] and is definitely not contaminated land. However, there are very few C4SLs available and therefore it is reasonable to carry out a generic risk assessment for Part IIA using other industry validated Generic Assessment Criteria (GAC) such as those published by Land Quality Management (LQM) / Chartered Institute of Environmental Health (CIEH) [16] or Contaminated Land: Applications in Real Environments (CL:AIRE) / Association of Geotechnical and Geoenvironmental Specialists (AGS) / Environmental Industries Commission (EIC) [17], as a starting point. These screening values are widely adopted by industry and regulators and have been peer-reviewed. These screening values are representative of a lower level of risk than the C4SLs.

For the purposes of this investigation, the soil GAC have been derived for a residential land use without consumption of homegrown produce, considered to be the most representative standard land use of risks to human health receptors i.e. residents of adjacent properties. Consumption of homegrown produce is excluded given that the samples being assessed are brook sediments rather than typical garden soils.

The soil and sediment data used for the assessment comprises a total of 45 samples; 39 brook sediment samples, four pipe sediment samples, one garden soil sample and one drainage ditch sediment sample. Only analytes detected in one or more of these samples have been taken forward for the screening exercise.

A total of 21 of the sediment samples were analysed for total organic carbon (TOC) with a geometric mean reported TOC of 0.46%, equating to a soil organic matter (SOM) of 0.79%. Therefore, the residential GAC have been derived for a SOM of 1% as the closest available option and also the lowest and most precautionary available. The assessment categorises the soil as a sandy loam which is considered the best approximation of shallow soils at the site which have been identified to comprise a mixture of sands and finer sediments.

In accordance with UK risk assessment guidance, AECOM has adopted a hierarchal approach to the selection of GAC for assessing risk to human health. For soils and sediments, the following sources have been used:

- LQM/CIEH Suitable 4 Use Levels (2015). Residential with Homegrown Produce. 1% SOM.
- EIC/AGS/CL:AIRE GAC. Residential, Sandy Loam, 1% SOM, Plant Uptake.
- Soil Guideline Value (SGV) for the sum of polychlorinated dibenzodioxins (PCDDs), polychlorinated dibenzofurans (PCDFs) and dioxin-like PCBs in soil (EA Science Report [18]).
- Defra/ CL:AIRE Category 4 Screening Levels (C4SLs). Residential with Homegrown Produce.
- For a limited number of contaminants, there are no UK published GAC. The significance of these therefore needs to be considered initially qualitatively, and if necessary, as part of more detailed risk assessment during subsequent phases beyond this PRA.

Consideration has also been given to the risks to human health associated with contamination in brook water. The water data used for the assessment comprises a total of 31 samples; 21 brook water samples, two pipe water

samples, four sump water samples and four drainage ditch water samples. Only analytes detected in one or more of these samples have been taken forward for the screening exercise.

An assessment of the risks to human health from surface water (the sump, drainage ditch, outfall pipe and Foxhill Brook) has been made through comparison of the water data with two sets of criteria:

- Groundwater vapour GAC published by the Society of Brownfield Risk Assessment (SoBRA) for assessing vapour risks to human health from volatile contaminants in groundwater [19]. These criteria were developed in line with UK risk assessment guidance as a conservative screening tool to assess the long-term (chronic) risks to human health from inhalation of vapours arising from groundwater for a generic residential land use scenario. These criteria are not directly applicable to the site, given that the data being assessed is for a surface water body and the assumptions made in the derivation of the GAC differ from the actual conditions at the site. However, they provide an initial indication of where further assessment of vapour risks may be warranted.
- UK Drinking Water Standards (DWS) to provide an indication of where risks associated with ingestion of contaminants in water may warrant further assessment. This pathway may be applicable if children or pets enter the brook. DWS values were selected from the following source:
    - Water, England & Wales - Water Supply (Water Quality) Regulations, 2016 No. 614

8.2.2 Discussion

8.2.2.1 Soil and Sediment

PCBs

Samples have previously been analysed for the EC-7 PCBs which are considered to be the most prevalent in the environment (PCBs 28, 52, 101, 118, 153 and 180) as well as the 12 PCB congeners which, whilst less prevalent in the environment, are considered by the WHO to be ‘dioxin-like’ due to their toxicity and structure and therefore pose a greater risk to human health than other congeners.

For assessment of the risks associated with the 12 dioxin-like PCBs, the SGV for the sum of dioxins, furans and dioxin-like PCBs has been used. Review of the results indicates that 18 of the samples exhibit exceedances of the SGV across sampling locations downstream of input from the drainage ditch and outfall pipe (BS3-BS6 and SS104, SS106-SS111, SS113 and SS115), as well as samples collected in 2009 from the outfall pipe. Only one of the samples collected in 2024, BS5R, showed a concentration above the SGV. It is noted that use of the default SGV requires the soil profile to be consistent with the generic profile assumed in its derivation, and further assessment considering toxic equivalency factors (TEFs) is required where the congener profile is different from this pattern. In addition, the SGV includes PCDDs and PCDFs for which analysis has not previously been carried out.

Risks associated with the EC-7 PCBs have not been assessed through screening due to the absence of UK-based criteria. Whilst the 12 dioxin-like PCB congeners are typically considered to represent some of the more toxic PCBs, the fact that the EC-7 PCBs have been detected in many soil and sediment samples at concentrations higher than dioxin-like PCBs indicates that they will require further assessment in subsequent stages of the site investigation.

PAHs

A concentration in exceedance of the S4UL was reported for dibenz(a,h)anthracene in one sediment sample, PS1, collected in 2009 from the outfall pipe which was understood to be connected to the site. This result was not identified as a GAC exceedance in the 2009 report [10]. Dibenz(a,h)anthracene was not detected in the replicate sample PS1R collected in 2024.

The concentration of benzo(a)pyrene in PS1 (1.58 mg/kg) was identified to exceed the GAC of 1.02 mg/kg used by RSK and applicable at the time. However, this result does not exceed the S4UL of 3.2 mg/kg. The concentration of benzo(a)pyrene detected in sample PS1R of 0.08 mg/kg is also below the S4UL.

It is noted that the Health Security Agency currently recommends the use of a surrogate marker approach to assess the risk posed by soil contaminated with PAHs. This approach is based on toxicological benchmarks derived from the data for two coal tar mixtures presented in Culp et.al. (1998) (36). For the surrogate marker approach to be valid, the PAH profile at the site should be similar to that seen in the Culp et al. oral carcinogenicity study.

The data sets from 2024 and 2006 show a PAH profile which is within the ranges of the Culp et al. study. The S4UL for benzo(a)pyrene as a surrogate marker is 1.2 mg/kg. The maximum result in 2024 was 0.5 mg/kg, below the

surrogate marker S4UL. The maximum result in 2006 was 1.914 mg/kg, above the surrogate marker S4UL. However, when the less conservative surrogate marker C4SL of 5.3 mg/kg, the 2006 maximum is below this value.

SVOCs and VOCs

One exceedance of the EIC/AGS/CL:AIRE GAC for dichloromethane was identified in sample BS1 (upstream of the outfall pipe), at a concentration of 14 mg/kg. This result was not identified as a GAC exceedance in the 2009 report [10]. Dichloromethane was not detected in the 2024 replicate sample BS1R.

8.2.2.2 Water

Vapour GAC

None of the samples showed any concentrations in excess of the SoBRA groundwater vapour GAC. However, given that odours have been observed at numerous locations, further consideration of the vapour risk is considered warranted.

DWS

PCBs

No UK published DWS is available for PCBs. The presence of PCBs in water and potential risk to human health will require further assessment during subsequent stages of site investigation.

PAHs

The concentrations of benzo(a)pyrene (0.04 mg/kg) and the sum of 4 PAHs, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene and indeno(1,2,3-c,d)pyrene (0.12 mg/kg), in sample BW3R were greater than their respective DWS values of 0.01 mg/kg and 0.1 mg/kg. These contaminants were detected at five other locations along the brook in 2024 but were not detected in 2006 or 2009.

Petroleum Hydrocarbons

The concentrations of benzene were above DWS in the sump sample collected in 2024. None of the other samples from 2024 showed detections of these analytes. No data from 2006 or 2009 was available for comparison. The AECOM 2025 sampling points SW02 and SW04B also reported benzene concentrations that exceeded the DWS.

Based on the above results, there is the potential for an unacceptable risk to human health, pets or livestock associated with consumption of brook water. Further assessment of this risk is considered warranted. The assessment should take into account the applicability of the above criteria to the site.

8.3 Controlled Waters

8.3.1 Risk Assessment Framework

For groundwater compliance points which may support potable abstraction the DWS are used to assess risk, whilst for surface water compliance points or non-potable aquifer units EQS are adopted. As the site is located within a Principal aquifer and SPZ2 DWS are applicable to the assessment, however given that the only historical groundwater data dates from 2005 and showed no detections of PCBs, SVOCs or VOCs, no quantitative assessment has been undertaken. EQS are also applicable to the assessment, given the presence of drainage ditches and Foxhill Brook to the north of the site. The surface water data has therefore been compared to EQS values derived for a fresh waterbody. The water data used for the assessment comprises a total of 28 samples; 21 brook water samples, two pipe water samples, three sump water samples and two drainage ditch water samples. Only analytes detected in one or more of these samples have been taken forward for the screening exercise.

The following sources of EQS values have been used in order of preference:

- The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015. Annual Average (AA) EQS, Inland.
- The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015. Maximum Allowable Concentration (MAC) EQS, Inland.
- The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015. Freshwater Standards

- Scottish Environment Protection Agency (SEPA) Supporting Guidance (WAT-SG-53) Environmental Quality Standards for Discharges to Surface Waters. v6. Dec 2015. Fresh EQS – AA.

For PCBs, there are no UK published criteria for assessment of risks to controlled waters. The risk posed to controlled waters by the documented presence of PCBs in the waters and sediments of Foxhill Brook will therefore require quantitative assessment as part of subsequent more detailed stages of site investigation.

8.3.2 Discussion

8.3.2.1 Sediment

PCBs

Total PCB concentrations in the 37 sediment samples where PCBs were detected ranged between 0.011 mg/kg (BS2) and 17.436 mg/kg (PS1). In the absence of available UK-based assessment criteria, further evaluation of the PCBs in sediments is required as part of a more detailed stage of site investigation.

8.3.2.2 Water

PCBs

Total PCB concentrations in the 19 water samples where PCBs were detected ranged between 0.002 µg/l (BW2) and 7.362 µg/l (PW1). In the absence of available UK-based assessment criteria, further evaluation of the PCBs in water is required as part of a more detailed stage of site investigation.

Metals

The water samples collected in 2024 were analysed for heavy metals in order to provide information to potential disposal sites. Concentrations of copper (7 µg/l), nickel (12 µg/l) and zinc (24 µg/l) exceeded the EQS in sample S02 which was collected from ponded surface water in the area of the sump at the site. Copper and nickel were not detected in any of the samples collected from Foxhill Brook. Zinc was detected in several brook water samples and was marginally above the EQS of 10.9 µg/l in the sample collected closest to the outfall pipe, BW3R (11 µg/l). There is no 2006 or 2009 data for comparison. The results for metals suggest localised contamination at the sump that does not persist into Foxhill Brook.

PAHs

Exceedances of the EQS were identified in all 2024 samples from Foxhill Brook, with the exception of BW1R which is the furthest upstream. Concentrations were generally highest at BW3R, immediately downstream of the outfall pipe, however it is noted that concentrations also exceeded the EQS at BW2R, upstream of the outfall pipe. Fluoranthene was the most widely distributed of the four PAHs. The EQS for fluoranthene was exceeded at BW4 in 2009 (0.01 µg/l), albeit at a concentration lower than that reported in 2024 (0.03 µg/l). The pipe water sample PW1 exhibited fluoranthene concentrations above the EQS in 2009 (0.01 µg/l) but it was not detected in the corresponding 2024 sample. Further consideration of PAH concentrations and the associated risk to surface water is considered necessary.

Other Organic Contaminants

The xylene concentration of 50µg/l in the AECOM 2025 sample SW02 (sump at northern end of the site) exceeded the EQS of 30µg/l. Other contaminants detected in AECOM 2025 samples for which EQS values are not available included PCB 8, PCB 28, benzaldehyde, xylenols (sum of dimethylphenol isomers), 2,4-dimethylphenol (individual isomer) and 1,3,5-trimethylbenzene. In the absence of EQS for these compounds, further evaluation is required as part of a more detailed stage of site investigation.

9. Conceptual Site Model and Preliminary Risk Assessment

9.1 Introduction

The Conceptual Site Model (CSM) identifies the current source-pathway-receptor potential Contaminant Linkages (CLs) based on information about the site's history, its environmental setting and evidence from previous ground investigations. The CSM covers the site itself, as well as the surrounding area that could potentially have been affected by contamination originating from the site. It is intended to provide the basis for designing the quantitative stages of risk assessment, which evaluates each potential CL further to allow an assessment of the linkage significance with respect to the regulatory tests of "suitability for use" and "unacceptable risk". The development of this CSM has been undertaken in general accordance with EA LCRM guidance [1], the Part IIA Statutory Guidance [15] and BS EN ISO 21365:2020 on conceptual site models for potentially contaminated sites [20]. The term 'potentially significant' has been used throughout Section 9 to describe CLs, or individual elements of CLs, that are considered to result in a reasonable possibility of a significant contaminant linkage (SCL). In accordance with the Statutory Guidance for Part IIA of the EPA 1990 [15], an SCL is defined as contaminant linkage which gives rise to a level of risk sufficient to justify a piece of land being determined as contaminated land.

9.2 Potential Sources

The following potential sources of contamination have been identified:

- Commonside Tip (S1): A wide range of industrial wastes were reportedly deposited at the site during its operation from the 1950s-1970s, as summarised in Section 3.3, including but not limited to, ash, lime, pulverised fuel ash, rubble, asbestos, waste pipe lagging, PCB-containing materials, paint and paint residues, tile adhesives, wood and waste wood, dye works waste, oil refinery waste, rubber hoses and plastics. Cover soil in the lower section of the landfill is understood to comprise solid material from the cooling towers at the chemical plant at Shell Stanlow. The need for further capping was referenced in correspondence from 1975 and the origin and composition of these soils is unknown [2]. Site derived water from the former landfill was reported to contain a range of potential contaminants, including PCBs, chlorinated benzenes, ketones (such as 4-methyl-2-pentanone (MIBK)), phthalate esters, thiophenes, petroleum hydrocarbons, butadienes (such as hexachlorobutadiene) and phenolic compounds [2]. It is noted that a contaminant source for Part IIA in regard to controlled waters requires the contaminant to be present in the unsaturated zone. Contaminants that have already entered groundwater, and are not continuing to do so, are not relevant to Part IIA legislation. At this stage, the limited groundwater data available suggests that the site derived water is chemically distinct from the groundwater in the surrounding superficial aquifer and it is considered to be a source that is separated hydraulically from the surrounding groundwater in the superficial aquifer.
- Foxhill Brook (S2): Foxhill Brook has been identified as a potential secondary, off-site source of contamination. Previous sampling of surface water and sediment within the brook has recorded elevated concentrations of PCBs, PAHs, VOCs & SVOCs. The brook may contribute to contaminant migration via associated pathways to sensitive receptors, including human health, controlled waters, and ecological receptors (biota). In accordance with the Source-Pathway-Receptor (SPR) model outlined in LCRM guidance and the statutory framework of Part IIA, this potential pollutant linkage requires further evaluation. The current understanding represents a known data gap, and additional investigation is necessary to substantiate the presence, extent, and significance of contamination and to determine whether a SPOSH or significant pollution of controlled waters exists.

9.2.1 Ground Gas Sources

The identified sources of ground gas within Section 9.2 above have been further characterised in Table 9-1 below using BS 8576:2013, Figure 6 [21] to determine the ground gas generation potential of the sources.

Table 9-1 Potential Sources of Contamination

Source	BS 8576 Ground Gas Generation Potential	Justification
Commonside Tip (S1)	High	Landfilling ceased in circa 1975. BS 8576 indicates that landfills dating from the mid-1960s to early 1990s should be considered high risk. Landfill gas monitoring carried out in 2005 indicated a minimum oxygen concentration of 9.1% and a maximum carbon dioxide concentration of 7.8%. Methane was detected at one well at a concentration of 0.3%. No gas monitoring is known to have taken place since this time to confirm current levels of risk.

9.2.2 Contaminants of Potential Concern (COPC)

Groups of COPC that have been identified as contaminants of concern associated with the site, based on both the review of historical information presented in Section 3 and the previous investigations summarised in Section 6, are listed in Table 9-2 below along with examples of specific analytes that fall within each group. It is noted that not all of these analytes have been tested for in recent sampling exercises.

Table 9-2 Summary of COPC

COPC Category	Justification
PCBs (EC-7 and WHO-12 PCBs)	PCB-containing wastes reported to have been deposited on-site.
Biphenyl	Precursor compound in PCB manufacture, previously identified as a potential source of odours in Foxhill Brook.
Asbestos	Planning consents granted for the site included deposition of asbestos.
Inorganics (e.g. cyanide, sulphates, phosphates, nitrates, chloride)	Possibility of cyanide being tipped in 1972. Other inorganics potentially present associated with deposited fertiliser plant wastes and water softening plant wastes.
Dioxins	VRBC records dating from 1963 indicate that the tip was reportedly on fire around this time.
Metals	Metal waste reportedly deposited at the site, may be a constituent of other wastes (e.g. fly ash, fertiliser plant wastes, water softening plant wastes).
High pH conditions	Planning consents granted for the site included deposition of lime.
Petroleum hydrocarbons	Paraffin tanks reportedly present on site. Records of bitumen, carbon black, unidentified black liquid, oils and oily wastes being deposited. PAH potentially associated with fertiliser plant wastes.
PAHs	
Thiols	Records of low boiling point organic material (possibly thiols) being deposited.
Ketones (e.g. acetone, methyl ethyl ketone, MIBK)	May be present associated with wastes reportedly deposited e.g. paints, dyes, adhesives, detergents, rubber and plastics. A number of these compounds also have odours that could be likened to sweet chemical odours.
Phenols (e.g. phenol, bisphenol A, cresol, ethylphenol)	
Acetates (e.g. propanone, ethyl acetate, vinyl acetate, butyl acetate)	
Aldehydes (e.g. formaldehyde, benzaldehyde, glutaraldehyde, acetaldehyde, phenylacetaldehyde)	
Alcohols (e.g. n-propanol, 3-methyl-1-butanol, n-pentanol, ethanol, isopropanol, methanol, phenylethanol)	
Phthalate Esters (e.g. bis(2-ethylhexyl) phthalate, diethyl phthalate, dibutyl phthalate, dimethyl phthalate)	
Butadienes (e.g. hexachlorobutadiene)	
Organochlorine compounds (e.g. hexachlorobenzene, trichlorobenzene)	
Other VOCs and SVOCs	
Thiophenes	Presence of thiophenes previously detected in water samples.

COPC Category	Justification
Acids (e.g. octanoic acid, phenyl acetic acid, phenyl propionic acid, decanoic acid)	Presence of organic acids previously detected in water samples. May be associated with fatty materials or other organic constituents reportedly deposited (e.g. fertiliser plant wastes).

9.3 Potential Receptors

The potentially relevant receptors are split into four main groups (human health, controlled waters, property, and ecological) in accordance with the Statutory Guidance [15]. Further receptor type breakdowns within these groups are summarised below, with each individual receptor type allocated an 'R' code for subsequent ease of discussion.

9.3.1 Human Health

- Residents (R1):
    - This group includes residents living in properties with private gardens where cultivation of produce is a possibility, those living in properties with no private outdoor space without any possibility of growing produce and those living and working on farms in the local area.
- Visitors (R2):
    - This group includes visitors to the area either to visit local residents or use local public open spaces and leisure services (e.g. public footpath along Foxhill Brook and nearby caravan parks). The majority of visitors are off-site receptors.
- Commercial workers (R3):
    - This group includes workers in local businesses or other services that are not resident in the local area. The group is split into on-site and off-site receptors, with the only known on-site receptor being local tree surgery operations that uses the site. It is not expected these workers would widely disturb the ground.
- Maintenance workers (R4):
    - This group includes workers that are not resident in the local area but who work in the area carrying out regular maintenance jobs that involve more disturbance of the soil/ground (such as farm workers who travel to their workplace) than workers in a commercial business.

9.3.2 Property

- Livestock and pets (R5):
    - This group includes livestock such as sheep or horses which may graze the surrounding fields, dogs which may be walked on the footpath along the brook and other pets which may come into contact with contamination in the home.
- Crops and homegrown produce (R6):
    - This group includes crops which are grown on the fields to the north of the site as well as any fruit and vegetables which may be grown in residents' gardens.
- Buildings (R7)[1]:
    - This group includes surrounding properties, particularly those to the north (downgradient) such as Foxhill Farm and Foxhill Barns. In the context of Part IIA, this includes any part of a building including those below ground level, i.e. foundations.

9.3.3 Controlled Waters

- Groundwater in superficial Glacial Till and Glaciofluvial Deposits (Secondary Undifferentiated / Secondary A aquifer) (R8).
- Groundwater in bedrock of the Tarporley Siltstone Formation (Secondary B aquifer) (R9).

[1] Statutory guidance for Part IIA explicitly excludes buried services such as sewers, water pipes or electricity cables as receptors under the definition of property.

- Groundwater in bedrock of the Wilmslow / Helsby Sandstone Formations (Principal aquifer) and potable groundwater abstraction at Foxhill Pumping Station (R10).
- Surface waters (R11):
    - This includes the unnamed drainage ditches located 100m east and 175m north of the site which flow into Foxhill Brook, as well as Foxhill Brook itself which is located 280m northwest of the site.

9.3.4 Ecological

The closest protected area that could constitute an ecological receptor in accordance with the Part IIA Statutory guidance [21] is the Mersey Estuary (R12), which is designated as an SSSI, Ramsar site and SPA [14]. Water in Foxhill Brook is understood to ultimately flow into the estuary via drainage channels on the Mersey Marshes.

9.4 Pathways

9.4.1 Human Health

Potential human health exposure pathways have been defined based on the land-uses and likely exposure scenarios in the vicinity of the site and taking into account the primary guidance for human health risk assessment in the UK [22]:

- Ingestion of: (i) soil, sediment and soil-derived indoor dust (P1s); and (ii) groundwater and/or surface water (P1w).
- Inhalation of soil-derived dust (indoor and outdoor) (P2).
- Dermal contact with: (i) soil, sediment and soil-derived indoor dust (P3s); and (ii) groundwater and/or surface water (P3w).

These pathways relate to people accessing the site itself (the landowner and other authorised users) along with off-site exposure to soil-derived dust which has been wind-dispersed through the surrounding area.

The ingestion and dermal contact pathways also relate to exposure to water which discharges from the base of the landfill across the field to the north and . Ingestion and dermal contact exposure to soils impacted by the overground flow of water is also possible. If people (or pets) were to enter Foxhill Brook (and ditches) then there is also the potential for ingestion or dermal contact with the brook water and sediments in the brook.

- Consumption of produce and attached soil (P4).
    - This pathway relates to produce grown in residents' gardens which may have been impacted by soil-derived dust which has been dispersed from the site or contamination in shallow groundwater.
    - The pathway could also be related to consumption of crops grown in fields that may be impacted by overland flow of water, or shallow groundwater or sediments impacted by flow of impacted water.
- Inhalation of vapours (indoor and outdoor) (P5).
    - This pathway relates to exposure to soil or groundwater derived vapours of people accessing the site itself (the landowner and other authorised users) along with off-site exposure to vapours derived from groundwater or Foxhill Brook.
- Landfill gas ingress – explosive atmosphere (P6).
    - This pathway relates to the migration of explosive gases (i.e. methane) from the site through the subsurface and accumulation inside adjacent properties.
- Inhalation of landfill gas (indoor and outdoor) (P7).
    - This pathway relates to the migration of ground gases such as carbon dioxide and methane from the site through the subsurface and accumulation inside adjacent properties, resulting in depleted oxygen conditions / asphyxiant atmospheres.

9.4.2 Property

9.4.2.1 Livestock and Pets

Potential exposure pathways for livestock and pets are considered to be the same as those for human health as described in Section 9.4.1.

9.4.2.2 Crops and Homegrown Produce

Potential exposure pathways that could cause crops and homegrown produce to be affected by the COPC in soil and sediments include:

- Deposition and absorption (P8).
- Root uptake (P9).
- Vapour uptake/permeation (P10).

9.4.2.3 Buildings

The exposure pathways that have the potential for COPC in soil to affect building structures include:

- Leaching and migration in unsaturated zone (see P13-P15 below) towards sub-surface structure (e.g. foundations), followed by chemical interaction with structural building materials causing corrosion, weakening or other effect that could cause structural failure, substantial damage or substantial interference with right of occupation (P11).
- Ingress of ground gas to off-site buildings to create explosive (methane) atmospheres (P12).

9.4.3 Controlled Waters

The following potential controlled waters migration pathways are considered to exist taking into account the site setting:

- Leaching of contaminants from landfill material and from Foxhill Brook sediments (P13).
- Vertical migration in the unsaturated zone (P14).
- Lateral migration of groundwater within the superficial deposits (P15).
- Baseflow from groundwater to surface water (including partitioning into sediments) (P16).
- Run-off to surface water (including partitioning into sediments) and transport through surface water (P17).
- Migration along land drain / pipes (P18).
- Vertical migration of groundwater and/or DNAPL through higher permeability horizons in the superficial deposits (P19).
- Lateral migration in bedrock aquifer to potable abstraction (P20).

9.4.4 Ecological

Pathways for ecological receptors are considered to be the same as those for controlled water above (P13-18), followed by:

- Downstream migration of contamination in Foxhill Brook (P21).

9.5 Preliminary Risk Assessment

AECOM's approach to the preliminary risk assessment follows the guidance outlined in Construction Industry Research and Information Association (CIRIA) C552 [23] and is described in further detail in Appendix B.

The qualitative preliminary risk assessment of the possible linkages of the above sources, exposure and transport pathways and receptors is provided in Table 9-3 below.

Table 9-3 Summary of Preliminary CSM and Risk Assessment

Source	Receptor		Exposure Pathway	Probability	Consequence	Risk Category	Justification
Commonside Tip (S1) Foxhill Brook (S2)	**Human Heath**	Residents (R1)	Ingestion of soil/sediment and soil-derived dust (P1s)	Low	Medium	**Moderate / Low Risk**	There is the potential for an unacceptable risk to human health to exist where on-site receptors (likely restricted to the owner/user of the site only) or off-site receptors come into contact with soil or soil-derived dust. The landfilled material is generally separated from site users and adjacent receptors by a cover layer of soils of varying thickness, except the northern part where capping may have been more limited or absent in places. The vegetation present across the site is likely to also mitigate the generation of dust from the capped area. Soil samples collected in the uncapped area of the site in 2001 exhibited total EC-7 PCB concentrations above the laboratory detection limit. Other COPC were not tested for in these samples. There is the potential for a risk to human health associated with direct contact with Foxhill Brook, particularly during warmer months when children or other individuals may engage in recreational activities in the area. Exposure could occur through dermal contact or accidental ingestion of contaminated surface water and/or sediments during activities such as paddling. Only a limited number of VOCs and SVOCs were detected in brook water or sediment samples. PCBs in brook sediments and water were detected at concentrations above laboratory detection limits. Concentrations of PAH in water were above DWS values. There is also a potential inhalation risk from volatile compounds released near stagnant or disturbed water bodies, where volatile organics may become airborne, contributing to further exposure pathways. There is the potential for a risk to human health to exist where people may come into contact with water discharging to the ground surface from the sump at the base of the landfill Anecdotal evidence and walkover observations have indicated potentially contaminated water running off across fields from the sump at the base of the landfill towards the drainage ditch, which may come into contact with landowners accessing their fields, as well as emerging through driveways at Foxhill Barns and through a retaining wall in the gardens of these properties. There is limited shallow groundwater data for the site and surrounding area, but the 2005 data showed no detections of PCBs, SVOCs and VOCs in shallow groundwater. . This well could act as a source of contaminated groundwater potentially used for human consumption or watering of livestock, crops or homegrown produce.
			Ingestion of groundwater and/or surface water (P1w)	Low	Medium	**Moderate / Low Risk**	
	Human Heath	Visitors (R2)	Ingestion of soil/sediment and soil-derived dust (P1s)	Unlikely	Medium	**Low Risk**	
			Ingestion of groundwater and/or surface water (P1w)	Unlikely	Medium	**Low Risk**	
	Human Heath	Commercial workers (R3)	Ingestion of soil and soil-derived dust (P1)	Low	Medium	**Moderate / Low Risk**	
	Human Heath	Maintenance workers (R4)	Ingestion of soil/sediment and soil-derived dust (P1s)	Low	Medium	**Moderate / Low Risk**	
			Ingestion of groundwater and/or surface water (P1w)	Low	Medium	**Moderate / Low Risk**	
	Human Heath	Residents (R1)	Inhalation of soil-derived dust (outdoor and indoor) (P2)	Low	Medium	**Moderate / Low Risk**	
	Human Heath	Visitors (R2)	Inhalation of soil-derived dust (outdoor and indoor) (P2)	Unlikely	Medium	**Low Risk**	
	Human Heath	Commercial workers (R3)	Inhalation of soil-derived dust (outdoor and indoor) (P2)	Low	Medium	**Moderate / Low Risk**	
	Human Heath	Maintenance workers (R4)	Inhalation of soil-derived dust (outdoor and indoor) (P2)	Low	Medium	**Moderate / Low Risk**	
	Human Heath	Residents (R1)	Dermal contact with soil/sediment and soil-derived indoor dust (P3s)	Low	Medium	**Moderate / Low Risk**	
			Dermal contact with groundwater and/or surface water (P3w)	Low	Medium	**Moderate / Low Risk**	
	Human Heath	Visitors (R2)	Dermal contact with soil/sediment and soil-derived indoor dust (P3s)	Unlikely	Medium	**Low Risk**	
			Dermal contact with groundwater and/or surface water (P3w)	Unlikely	Medium	**Low Risk**	
	Human Heath	Commercial workers (R3)	Dermal contact with soil and soil-derived indoor dust (P3)	Low	Medium	**Moderate / Low Risk**	
	Human Heath	Maintenance workers (R4)	Dermal contact with soil and soil-derived indoor dust (P3s)	Low	Medium	**Moderate / Low Risk**	
			Dermal contact with groundwater and/or surface water (P3w)	Low	Medium	**Moderate / Low Risk**	
Commonside Tip (S1) Foxhill Brook (S2)	**Human Heath**	Residents (R1)	Consumption of produce and attached soil (P4)	Unlikely	Medium	**Low Risk**	It is possible that adjacent residents may grow and consume produce. There is the potential for dust originating from the site to be dispersed and deposited in residents' gardens, however as stated above the partial cap and vegetation present across the site is likely to mitigate the generation of dust which could migrate towards gardens in the surrounding area, so there are unlikely to be unacceptable risks to human health in a residential scenario. The preliminary data screening exercise considered a scenario without the consumption of homegrown produce, but inclusion of this pathway does not substantially increase the risk for key contaminants. Given the evidence of water discharging through the ground surface , there is also the potential for homegrown produce to be affected by uptake of contaminants. Downstream of the site, Foxhill Brook may be used locally for irrigating homegrown produce. . This well could act as a source of contaminated groundwater potentially used for human consumption or watering of livestock, crops or homegrown produce.
	Human Heath	Residents (R1)	Vapour inhalation and intrusion (outdoor and indoor) (P5)	Low	Medium	**Moderate / Low Risk**	There is the potential for an unacceptable risk to human health to exist associated with vapours originating from the site. The risks associated with vapour originating from the site are likely to be greater to off-site receptors than on-site receptors (likely restricted to the owner/user of the site only), given that there are no buildings on-site, whereas accumulation indoors in off-site buildings would be likely to result in higher risks than from outdoor exposure. The cap placed across part of the site is unlikely to mitigate
	Human Heath	Visitors (R2)	Vapour inhalation and intrusion (outdoor and indoor) (P5)	Unlikely	Medium	**Low Risk**	

Source	Receptor		Exposure Pathway	Probability	Consequence	Risk Category	Justification
Commonside Tip (S1)	**Human Heath**	Commercial workers (R3)	Vapour inhalation and intrusion (outdoor and indoor) (P5)	Low	Medium	**Moderate / Low Risk**	vapour exposure as it is likely to consist of a cover layer of soil rather than a low-permeability material which would limit vapour migration. Only a limited number of VOCs and SVOCs were detected in brook sediment samples and the preliminary screening exercise indicated that there are unlikely to be unacceptable risks to human health in a residential scenario from these analytes. Brook water results were below groundwater vapour GAC protective of human health in a residential scenario. However, odours have been observed along the route of Foxhill Brook and there is the potential for other volatile contaminants to be present which have not previously been tested for. Vapour monitoring (active and passive) undertaken by RSK in 2009 at locations along Foxhill Brook downstream of the site did not detect PCBs. SVOCs and VOCs were detected, primarily long chain alkanes and methyl alkanes, as well as pyrene, naphthalene, methyl naphthalenes and biphenyl. RSK concluded that due to the low concentrations detected, there was not considered to be a significant human health risk. AECOM notes that this does not entirely reduce the potential risk for indoor air, given that indoor concentrations would be likely to be much higher than the outdoor concentrations assessed.
	Human Heath	Maintenance workers (R4)	Vapour inhalation and intrusion (outdoor and indoor) (P5)	Low	Medium	**Moderate / Low Risk**	
	Human Heath	Residents (R1)	Landfill gas ingress – explosive atmosphere (P6)	Unlikely	Severe	**Moderate / Low Risk**	The presence of methane within a certain range poses an explosion risk within enclosed spaces. The limits of flammability, i.e. the Lower Explosion Limit (LEL) and Upper Explosion Limit (UEL) are 5% v/v and 15% v/v, respectively. Where methane concentrations are encountered between these two ranges there is the possibility of ignition/explosion. Methane was detected at one location in 2005 at 0.3%, well below the LEL. There is no anecdotal evidence of gas ingress to nearby buildings and lower permeability clayey strata within the superficial deposits are likely to somewhat prevent lateral gas migration towards buildings. However, there is limited gas data available for review and therefore the risk cannot be entirely discounted.
	Human Heath	Visitors (R2)	Landfill gas ingress – explosive atmosphere (P6)	Unlikely	Severe	**Moderate / Low Risk**	
	Human Heath	Commercial workers (R3)	Landfill gas ingress – explosive atmosphere (P6)	Unlikely	Severe	**Moderate / Low Risk**	
	Human Heath	Maintenance workers (R4)	Landfill gas ingress – explosive atmosphere (P6)	Unlikely	Severe	**Moderate / Low Risk**	
Commonside Tip (S1)	**Human Heath**	Residents (R1)	Inhalation of landfill gas (indoor and outdoor) (P7)	Unlikely	Severe	**Moderate / Low Risk**	Elevated concentrations of carbon dioxide (7.8%) were detected at the site in 2005. To provide context to this result, it is above the 8-hour and 150minute timeweighted average workplace exposure limits (WELs) set by the Health and Safety Executive (HSE) of 5,000 ppm (0.5%) and 15,000 ppm (1.5%) respectively. However, there is no anecdotal evidence of gas ingress to nearby buildings and lower permeability clayey strata within the superficial deposits are likely to somewhat prevent lateral gas migration towards buildings. However, there is limited gas data available for review and therefore the risk cannot be entirely discounted.
	Human Heath	Visitors (R2)	Inhalation of landfill gas (indoor and outdoor) (P7)	Unlikely	Severe	**Moderate / Low Risk**	
	Human Heath	Commercial workers (R3)	Inhalation of landfill gas (indoor and outdoor) (P7)	Unlikely	Severe	**Moderate / Low Risk**	
	Human Heath	Maintenance workers (R4)	Inhalation of landfill gas (indoor and outdoor) (P7)	Unlikely	Severe	**Moderate / Low Risk**	
Commonside Tip (S1) Foxhill Brook (S2)	**Property**	Livestock and pets (R5)	Ingestion of soil and soil-derived dust (P1s)	Low	Mild	**Low Risk**	The detailed discussion of exposure pathways presented in relation to human health in the rows above applies in general to livestock and pet receptors, although the specific proportion of exposure from each pathway will vary. However, it is considered that the key pathways will be the same as for humans. It is noted that many pets may be closer to the ground than a typical human receptor and in addition, pets and livestock are more likely to ingest or come into contact with surface water bodies or impacted sediments than humans.The risks associated with outdoor vapour inhalation and ingestion of or dermal contact with groundwater and surface water may therefore be slightly greater. . This well could act as a source of contaminated groundwater potentially used for human consumption or watering of livestock, crops or homegrown produce.
			Ingestion of groundwater and/or surface water (P1w)	Low	Mild	**Low Risk**	
			Inhalation of soil-derived dust (outdoor and indoor) (P2)	Low	Mild	**Low Risk**	
			Dermal contact with soil and soil-derived indoor dust (P3s)	Low	Mild	**Low Risk**	
			Dermal contact with groundwater and/or surface water (P3w)	Low	Mild	**Low Risk**	
			Consumption of produce and attached soil (P4)	Unlikely	Mild	**Very Low Risk**	
			Vapour inhalation and intrusion (outdoor and indoor) (P5)	Low	Mild	**Low Risk**	
			Landfill gas ingress – explosive atmosphere (P6)	Unlikely	Medium	**Low Risk**	
			Inhalation of landfill gas (indoor and outdoor) (P7)	Unlikely	Medium	**Low Risk**	
	Property	Crops and homegrown produce (R6)	Deposition and absorption (P8) Root uptake (P9)	Unlikely	Mild	**Very Low Risk**	The fields adjacent to the north and northeast of the site (i.e. downgradient of the site with regard to shallow groundwater in superficial deposits) appear to be used for growing crops. Part of the field to the north of the site is also affected by overland flow of water

Source	Receptor		Exposure Pathway	Probability	Consequence	Risk Category	Justification
			Vapour uptake/permeation (P10)				where the sump at the base of the landfill overflows. This overflowing sump water then infiltrates into the soils of the agricultural field and contaminants within that water would be retained by the shallow soils to varying degrees. This would provide a source of contamination in the shallow agricultural soils for any crops grown there. Crops and produce may also uptake shallow groundwater via their roots. Shallow groundwater samples collected in 2005 from boreholes around the perimeter of the site did not exhibit detections of PCBs, SVOCs or VOCs. It is considered unlikely that concentrations of contaminants are present which could result in a reduction in crop yield or loss of value or a reduction in produce quality. However there is limited groundwater and soil data available for review and therefore the risk cannot be entirely discounted. Residents of properties to the north and northeast may also grow produce in their gardens. There is the potential for dust originating from the site to be dispersed and deposited in residents' gardens, however as stated above the partial cap and vegetation present across the site is likely to mitigate dust generation. . This well could act as a source of contaminated groundwater potentially used for human consumption or watering of livestock, crops or homegrown produce.
Commonside Tip (S1)	**Property**	Buildings (R7)	Chemical interaction with structural building materials (P11)	Unlikely	Mild	**Very Low Risk**	Residential properties are located 120m northeast and 190m north of the site, downgradient with respect to shallow groundwater in superficial deposits. These buildings are likely to have subsurface foundation structures. Anecdotal evidence and walkover observations have indicated potentially contaminated water running off across fields from the landfill towards the drainage ditch, which may come into contact with land owners accessing their fields, . Shallow groundwater samples collected in 2005 from boreholes around the perimeter of the site did not exhibit detections of PCBs, SVOCs or VOCs. It is considered unlikely that aggressive ground conditions that would cause corrosion of building materials are present, however there is limited groundwater data available for review and therefore the risk cannot be entirely discounted.
			Ingress of ground gas resulting in explosive atmospheres (P12)	Unlikely	Severe	**Moderate / Low Risk**	The presence of methane within a certain range poses an explosion risk within enclosed spaces. The limits of flammability, i.e. the Lower Explosion Limit (LEL) and Upper Explosion Limit (UEL) are 5% v/v and 15% v/v, respectively. Where methane concentrations are encountered between these two ranges there is the possibility of ignition/explosion. Methane was detected at one location in 2005 at 0.3%, well below the LEL. There is no anecdotal evidence of gas ingress to nearby buildings and lower permeability clayey strata within the superficial deposits are likely to somewhat prevent lateral gas migration towards buildings. However there is limited gas data available for review and therefore the risk cannot be entirely discounted.
Commonside Tip (S1) Foxhill Brook (S2)	**Controlled Waters**	Groundwater in superficial deposits (Secondary Undifferentiated / Secondary A aquifer) (R8)	Leaching of contaminants from landfill material (P13) Vertical migration in the unsaturated zone (P14) Lateral migration of groundwater within the superficial deposits (P15)	Likely	Medium	**Moderate Risk**	Site derived water from the former landfill has been reported to contain a range of contaminants. Whilst a drainage system is understood to have been installed at the commencement of tipping, the site is not lined and therefore entry of the site derived water into the underlying groundwater is possible. Shallow groundwater samples collected in 2005 from boreholes around the perimeter of the site did not exhibit detections of PCBs, SVOCs or VOCs. A Tier 1 QRA performed via DG>HydroScreen for the contaminants analysed in this site investigation did not indicate any potential risks of impact to groundwater. However, the walkover and anecdotal evidence have identified odours and discolouration of water off-site where it emerges at surface in the fields . Contamination may also now be present in the groundwater closer to the site. Therefore, there is the potential for an unacceptable risk to shallow groundwater to exist.
	Controlled Waters	Groundwater in bedrock of the Tarporley Siltstone Formation (Secondary B aquifer) (R9)	Leaching of contaminants from landfill material (P13) Vertical migration in the unsaturated zone (P14) Vertical migration of groundwater and/or DNAPL (if present) through higher permeability horizons in the superficial deposits (P19)	Likely	Medium	**Moderate Risk**	Previous assessments have indicated that low-permeability superficial deposits are likely to act as an aquiclude, offering a degree of protection to the underlying bedrock aquifer. However, the potential for vertical migration of contaminants remains, particularly where more permeable sandy strata may be present. The extent and continuity of these sandy layers are currently uncertain due to limited site-specific data, representing a notable data gap.
	Controlled Waters	Groundwater in bedrock of the Wilmslow / Helsby Sandstone Formations (Principal aquifer) and potable groundwater abstraction at Foxhill Pumping Station (R10)	Leaching of contaminants from landfill material (P13) Vertical migration in the unsaturated zone (P14) Vertical migration of groundwater and/or DNAPL (if present) through higher permeability horizons in the superficial deposits (P19) Lateral migration in bedrock aquifer to potable abstraction (P20)	Likely	Medium	**Moderate Risk**	Groundwater within the bedrock aquifer is likely to be drawn toward an abstraction point located approximately 178 m northeast of the site. This abstraction is associated with a Principal Aquifer. According to the EA, the utility provider has reported no detectable impact from PCBs in the abstracted groundwater, and the EA concluded that there does not appear to be a significant contaminant linkage from the site to the Principal Aquifer. However, no supporting evidence or monitoring data has been provided to substantiate this conclusion. Given the uncertainty surrounding the integrity of the superficial deposits, the potential presence of permeable pathways, and the lack of confirmatory data regarding groundwater quality at the abstraction point, a moderate risk classification is considered

Source	Receptor		Exposure Pathway	Probability	Consequence	Risk Category	Justification
							appropriate. This reflects a plausible contaminant linkage, particularly due to the sensitivity of the controlled waters receptor and the potential for abstraction-related exposure.
Commonside Tip (S1) Foxhill Brook (S2)	**Controlled Waters**	Surface waters (R11)	Leaching of contaminants from landfill material (P13) Vertical migration in the unsaturated zone (P14) Lateral migration of groundwater within the superficial deposits (P15) Baseflow from groundwater to surface water (P16)	Likely	Medium	**Moderate Risk**	Migration of shallow groundwater towards Foxhill Brook is possible via the more permeable sandy horizons which have been identified. Shallow groundwater samples collected in 2005 from boreholes around the perimeter of the site did not exhibit detections of PCBs, SVOCs or VOCs. A Tier 1 QRA performed via DG>HydroScreen for the contaminants analysed in this site investigation did not indicate any potential risks of impact to surface water. However, the walkover and anecdotal evidence have identified odours and discolouration of water where it emerges at surface in the fields There is the potential for an unacceptable risk to surface water via contamination in shallow groundwater, either via baseflow to the brook During the walkover, AECOM observed evidence of iridescent sheen and scum on water surface and odours at the sump and in the drainage ditch to the north. Anecdotal evidence of contamination of the drainage ditch to the east and Foxhill Brook has also been reported. Previous studies observed sheens and odours at several sites along Foxhill Brook downstream of the site.
			Run-off to surface water (P17)	High	Medium	**High Risk**	Given the topography of the site which slopes down towards Foxhill Brook, it is likely that run off from the site will enter the drainage ditches and an iridescent sheen and orange staining was observed during the walkover as evidence of run off. Water in the sump at the northern end of the landfill has been reported to contain concentrations of metals in excess of EQS values and PCBs above laboratory detection limits. PCBs have also been identified in the waters and sediments of Foxhill Brook at concentrations above detection limits. During the walkover, AECOM observed evidence of iridescent sheen and scum on water surface and odours at the sump and in the drainage ditch to the north. Anecdotal evidence of contamination of the drainage ditch to the east and Foxhill Brook has also been reported. Previous studies observed sheens and odours at several sites along Foxhill Brook downstream of the site. These observations, along with findings from previous studies, indicate that contaminants present in the brook's surface water and sediments may be subject to migration downstream via surface water flow. There is also a risk of mobilisation during high flow events or flooding, where contaminants may be transported via overland flow, potentially impacting adjacent land and connected watercourses. This supports the identification of potential pollutant linkages and highlights the need for further investigation to assess the extent and significance of contaminant transport and associated risks to controlled waters.
			Migration along land drain / pipes (P18)	High	Medium	**High Risk**	It is understood that a land drain was put in place at the site, running into a sump at the northern end of the site, from which water was piped to ditches on the adjacent fields, i.e. the ditch 175m north of the site. The drain previously used to run further north to outfall in Foxhill Brook but this is thought to have been severed, damaged or is blocked up. Water in the sump at the northern end of the landfill has been reported to contain concentrations of metals in excess of EQS values and PCBs above laboratory detection limits. PCBs have also been identified in the waters and sediments of Foxhill Brook at concentrations above detection limits. During the walkover, AECOM observed evidence of iridescent sheen and scum on water surface and odours at the sump and in the drainage ditch to the north. Anecdotal evidence of contamination of the drainage ditch to the east and Foxhill Brook has also been reported. Previous studies observed sheens and odours at several sites along Foxhill Brook downstream of the site.
Commonside Tip (S1) Foxhill Brook (S2)	**Ecological**	Mersey Estuary SSSI, Ramsar site and SPA (R12)	Leaching of contaminants from landfill material (P13) Vertical migration in the unsaturated zone (P14) Lateral migration of groundwater within the superficial deposits (P15) Baseflow from groundwater to surface water (P16) Run-off to surface water (P17) Migration along land drain / pipes (P18) Downstream migration of contamination in Foxhill Brook (P21)	Low	Mild	**Low Risk**	Contamination may enter Foxhill Brook via the pathways described for controlled waters CLs above. Water in Foxhill Brook is understood to ultimately discharge into the estuary via drainage channels across the Mersey Marshes. Historical data suggests the potential for downstream contaminant transport. A 1994 study, detected PCBs in surface water at a concentration of 0.03 µg/l at the point where drainage from the marsh is pumped into the River Weaver (i.e. the furthest downstream point sampled during this study). Additionally, in 2001, PCBs were detected in stream sediments 3km downstream of the site at a concentration circa 1000 µg/kg. Foxhill Brook as a potential source, may pose risks to ecological receptors through several exposure mechanisms. Contaminants such as PCBs and PAHs, present in surface water and sediments, can be taken up by aquatic organisms through bioaccumulation, where contaminants are absorbed directly from the water or sediment.

Source	Receptor	Exposure Pathway	Probability	Consequence	Risk Category	Justification
						Species, including invertebrates and bottom-dwelling fish, are particularly vulnerable due to their direct contact with contaminated sediments. Furthermore, the presence of toxic substances can lead to habitat degradation, affecting the health and diversity of aquatic flora and fauna, and potentially altering the structure and function of the local ecosystem. However, other regional sources of PCBs in the environment, and the very large scale dilution of water from Foxhill Brook into the River Weaver and Mersey Estuary, means that the potential for PCBs originating from Commonside Tip to cause significant pollution of the Mersey Estuary ecological receptor is low. Although no direct data for the Mersey Estuary was available for review, these findings suggest a potential contaminant linkage between the site and downstream receptors, but with a low risk of impact to the Mersey Estuary that would be significant under Part 2A of the EPA.

10. Data Gaps

10.1 Introduction

The Statutory Guidance for Part IIA [15] requires robust decisions based on scientifically based, authoritative, relevant and appropriate risk assessment. In reviewing the previous reports pertaining to this site various data gaps or conflicting information have been identified and these have been analysed to determine if the level of uncertainty is sufficient to overturn the conclusions of the reported risk assessments. The analysis in the following sections is divided into data gaps and inconsistencies relating to aspects of the conceptual model including ground conditions (geology and hydrogeology), landfilling operations at the site, and evidence of contaminants of potential concern.

10.2 Geology

- Only two of the boreholes constructed for environmental investigation of the site have proven the full sequence of superficial deposits and the upper section of the underlying bedrock.
- Sand horizons have been identified within the superficial deposits, however given the lack of borehole coverage in the area surrounding the site the vertical and lateral extent of these lenses is unknown.
- There are no records of the strata underlying the landfill itself; these may differ from those around the perimeter of the landfill and former stream valley e.g. superficial deposits may be thinner at the former valley floor.

10.3 Hydrogeology

- Limited groundwater level monitoring has been undertaken, most recently in 2005. Groundwater flow in shallow strata is likely to be towards the north however this has not been confirmed by recent data.
- Water quality data for the potable water abstraction has not been made available for review.
- There is a lack of information relating to the presence of water or water levels within the tipped material.

10.4 Landfilling Operations

- The dimensions of the waste mass and total thickness are not certain; anecdotally the waste was placed to a maximum of circa 13m thick in the centre of the former stream valley.
- It is possible that wastes other than those identified in the documents reviewed by GeoDelft in 2000 [2] could have been deposited.

10.5 Sources of Contamination

- Limited soil sampling has taken place across the landfill itself – sampling and analysis for PCBs only was undertaken in 2001 [3] and the original data from this analysis was not available for review. The potential for contaminants other than PCBs to be present in surface soils cannot be confirmed. Additionally, the age of this data represents a limitation in terms of the laboratory methods and limits of detection that were available at the time.
- Groundwater sampling and ground gas monitoring appears to have been undertaken on only one occasion in 2005. Current groundwater quality and ground gas conditions cannot be confirmed.
- The review of previous reports has identified additional potential contaminants that have not previously been tested for in soil, sediment or water samples. Furthermore, the confirmed presence of certain potential contaminants of concern cannot be verified due to the absence of supporting documentation, such as laboratory certificates and waste consignment notes.
- Foxhill Brook has been identified as a potential secondary source of contamination to downstream receptors. Historical site investigations have reported elevated concentrations of PCBs, TPHs, SVOCs, VOCs, and phenols within both the surface water and sediment of the brook. The sediment may be acting as a reservoir for these contaminants, with the potential for remobilisation into the water column under varying hydrodynamic

or environmental conditions. This mechanism may facilitate the downstream migration of pollutants, posing a risk to receptors who interact with the brook, including members of the public, pets, and livestock and biota.

- A potential off-site source of contamination has been identified at Bank House Farm Landfill, located approximately 40m west and upstream of the site. While the site is known to have a history of landfilling activity, the available documentation is insufficient to confirm the nature and composition of the deposited waste. This lack of reliable information introduces uncertainty regarding the potential for contaminant migration toward the site or into surrounding environment. To address this uncertainty, further investigation may be required at locations between the site and Bank House Farm Landfill. This would help to evaluate possible contaminant linkages and determine whether the Bank House Farm Landfill poses a credible risk to the site or to downstream receptors.

11. Part IIA Risk Evaluation

11.1 Potential Significance of Contaminant Linkages

The Part IIA Statutory Guidance [15] includes various tests of significance with respect to the assessment of contaminant linkages associated with sensitive receptors. Paragraph 2.13 states that if at any stage the local authority considers, on the basis of the information obtained from inspection activities, that there is no longer a reasonable possibility that a significant contaminant linkage exists on the land, the authority should not carry out any further inspection in relation to that linkage.

For human health, paragraphs 4.4-4.29 define significant harm and significant possibility of significant harm and four categories of land; categories 1-4. Category 4 is associated with a range of risk from none to low. Category 3 is associated with a range of risk from "not low" to not unacceptable. Categories 1 and 2 are associated with an unacceptable risk.

Paragraphs 4.30-4.43 define significant harm and SPOSH for non-human (ecological and property) receptors.

For controlled waters, paragraphs 4.38-4.46 define significant pollution and SPOSP. Similar to the approach for human health, the decision for SPOSP is made with reference to four categories of land; categories 1-4. Category 4 is associated with a range of risk from none to low. Category 3 is associated with linkages where it is very unlikely that serious pollution would occur, or where there is a low likelihood that less serious types of significant pollution might occur. Categories 1 and 2 are associated with an unacceptable risk.

These definitions have been considered in the context of the definitions of risk defined by CIRIA C552 [23] and used for the PRA in Table 9-3 to help with prioritisation for further assessment of potentially significant contaminant linkages. This prioritisation matrix is illustrated below:

Table 11-1 Prioritisation Matrix

PRA Risk (CIRIA C552)	Possibility of SCL being present	Potential Part IIA Risk	HH and CW possible land category	Priority
Very Low	Much less than reasonable possibility	None / Negligible	4	Lowest
Low	Less than reasonable possibility	Low	4	
Moderate/Low	Reasonable possibility	Not Low	3 (more likely) or 2 (less likely)	
Moderate	More than reasonable possibility	Unacceptable (on a precautionary basis)	2 (more likely) or 3 (less likely)	
High	High possibility	Unacceptable	SH / SP or Cat 2	
Very High	Already demonstrated, or very high possibility	Unacceptable	SH / SP or Cat 1	Highest

It is noted that paragraph 2.9 of the Part IIA Statutory Guidance indicates that a local authority should inspect land where there is a reasonable possibility of a significant contaminant linkage, and should cease the inspection once sufficient information has been gathered to demonstrate that there is no longer a reasonable possibility of a significant contaminant linkage.

Factors that can be used to assess the possibility of the presence of an SCL include:

- Confirmed direct measurements of contaminants at source and at receptors;
- Proportion of contaminant concentrations that exceed GAC;
- The degree to which COPC concentrations exceed GAC[2];
- Comparison of reported COPC soil concentrations with local, regional and national background levels; and
- The level of confidence in the available data (what uncertainties or data gaps remain).

Based on the prioritisation matrix and the factors for assessing the presence of an SCL, the contaminant linkages presented in Table 9-3 have been summarised below indicating the possibility of the linkage being significant, along with its priority for further inspection.

Table 11-2 Contaminant Linkage Prioritisation

Linkage summary	Part IIA prioritisation	Part IIA potential land category	CIRIA C552 risk	Comments
Human health risks to visitors (all pathways except gas inhalation, explosive atmosphere)	Less than reasonable possibility	Likely 4	Low	Assessment of risks to visitors can be covered by investigation and assessment of risks to residents and commercial and maintenance workers.
Human health risks to visitors (gas inhalation, explosive atmosphere)	Reasonable possibility of SCL	Likely 3 (or lower), possibly 2	Moderate to Low Risk	Assessment of risks to visitors from landfill gas can be covered by investigation and assessment of risks to residents and commercial and maintenance workers.
Human health risks to residents, and commercial and maintenance workers	Reasonable possibility of SCL	Likely 3 (or lower), possibly 2	Moderate to Low Risk	High uncertainty due to lack of recent data for site soils, groundwater, landfill gas and vapour. Medium priority for further investigation; investigation and assessment of risks to be included in future ground investigation (GI).
Risks to livestock and pets (consumption of homegrown produce / vegetation)	Much less than reasonable possibility	Very likely acceptable risk	Very Low Risk	Assessment of risks to pets and livestock can be covered by investigation and assessment of risks to human health.
Risks to livestock and pets (all pathways except consumption of homegrown produce / vegetation	Less than reasonable possibility	Very likely acceptable risk	Low	Assessment of risks to pets and livestock can be covered by investigation and assessment of risks to human health.
Risks to crops and homegrown produce	Much less than reasonable possibility	Very likely acceptable risk	Very Low Risk	No further investigation required as evidence suggests that there is unlikely to be a reasonable possibility of SCL.
Risks to buildings due to aggressive ground conditions	Much less than reasonable possibility	Very likely acceptable risk	Very Low Risk	No further investigation required as evidence suggests that there is unlikely to be a reasonable possibility of SCL.
Risks to buildings due to explosive atmosphere	Reasonable possibility of SCL	Likely acceptable risk	Moderate to Low Risk	High uncertainty due to lack of recent landfill gas data. Assessment of risks to buildings from landfill gas can be covered by investigation and assessment of risks to human health receptors from landfill gas.
Risks to Superficial Deposits Secondary aquifers	More than reasonable possibility of SCL	Likely 2, possibly 3 or lower	Moderate Risk	High priority for further investigation; investigation and assessment of risks to be included in future GI.

[2] Footnote 2 of paragraph 3.29 of the statutory guidance states that the level of risk posed by land contamination will depend on more than simply the amount of contaminant in the soil; it will also depend on what form the contaminants take, where they are in the soil, the efficiency of the pathway by which receptors may be exposed, the sensitivity of receptors, the likely degree and duration of exposure, and the dose-response relationship of that contaminant. These factors will vary from case to case, sometimes very substantially. Footnote 3 goes on to state that SGVs and other GAC (because of the variability in how they are derived) can be exceeded by a substantial degree (sometimes by orders of magnitude) but in other cases there may be a considerably smaller margin and in some cases it may be that GAC are only exceeded by a few times for land to fall outside of Category 4.

Linkage summary	Part IIA prioritisation	Part IIA potential land category	CIRIA C552 risk	Comments
Risks to Bedrock Secondary aquifer	Much less than reasonable possibility	Likely 4	Very Low Risk	No further investigation required as evidence suggests that there is unlikely to be a reasonable possibility of SCL.
Risks to Bedrock Principal aquifer	Less than reasonable possibility	Likely 4	Low Risk	Lower priority for further investigation; however some limited investigation of potential risks to principal aquifer is considered prudent given the sensitivity of the receptor
Risks to surface waters via groundwater baseflow	Reasonable possibility of SCL	Likely 3 (or lower), possibly 2	Moderate to Low Risk	Medium priority for further investigation; investigation and assessment of risks to be included in future GI.
Risks to surface waters via drains and direct run-off	High possibility of SCL	Cat 2 or higher	High risk	Highest priority for further investigation; investigation and assessment of risks to be included in future GI for waters and sediments within the site, and adjacent Foxhill Brook and drainage channels.
Risks to ecology of Mersey Estuary	Less than reasonable possibility of SCL	Likely 4	Low Risk	The further assessment of risks to Foxhill Brook can be used to confirm whether the expected low risk to the Mersey Estuary (i.e. not significant in the context of Part 2A) remains valid or whether further sampling specifically to assess the Mersey Estuary is required during a subsequent stage of investigation.

12. Summary Conceptual Site Model

Following completion of the PRA, a number of CLs have been identified for which it is considered that there remains a reasonable possibility of a significant CL. This does not imply that an unacceptable risk necessarily exists, rather that further assessment should be considered in order to more reliably assess the potential significance of these linkages.

Based on the prioritisation matrix shown in Table 11-1, these linkages are summarised in Table 12-1 and identify the potential SCLs that could be considered for further assessment. This includes linkages with a medium, high or highest priority (as defined in Table 11-1) plus those either (i) where assessment of other higher priority linkages will facilitate assessment through collection of data that is relevant to the linkage or (ii) which are considered to have a sufficiently high level of uncertainty that further investigation should be considered on the uncertainty basis alone.

Given that CLs relating to controlled waters receptors are considered to be of the highest priority for further assessment, a visual CSM has been produced for controlled waters and is included as Figure 4b within Appendix A.

Table 12-1 Summary of Contaminant Linkages That Could Warrant Further Assessment

Sources		Pathways		Receptors	
S1	Commonside Tip	P1s	Ingestion of soil and soil-derived dust	R1	Residents
		P1w	Ingestion of groundwater and/or surface water	R3	Commercial workers
		P2	Inhalation of soil-derived dust (outdoor and indoor)	R4	Maintenance workers
		P3s	Dermal contact with soil and soil-derived indoor dust		
		P3w	Dermal contact with groundwater and/or surface water		
		P4	Consumption of produce and attached soil		
		P5	Vapour inhalation and intrusion (outdoor and indoor)		
		P6	Landfill gas ingress – explosive atmosphere		
		P7	Inhalation of landfill gas (indoor and outdoor)		
S1	Commonside Tip	P1s	Ingestion of soil and soil-derived dust	R2	Visitors
		P1w	Ingestion of groundwater and/or surface water		
		P2	Inhalation of soil-derived dust (outdoor and indoor)		
		P3s	Dermal contact with soil and soil-derived indoor dust		
		P3w	Dermal contact with groundwater and/or surface water		
		P4	Consumption of produce and attached soil		
		P5	Vapour inhalation and intrusion (outdoor and indoor)		
S1	Commonside Tip	P6	Landfill gas ingress – explosive atmosphere	R2	Visitors
		P7	Inhalation of landfill gas (indoor and outdoor)		
S1	Commonside Tip	P1s	Ingestion of soil and soil-derived dust	R5	Livestock and pets
		P1w	Ingestion of groundwater and/or surface water		
		P2	Inhalation of soil-derived dust (outdoor and indoor)		
		P3s	Dermal contact with soil and soil-derived indoor dust		
		P3w	Dermal contact with groundwater and/or surface water		
		P4	Consumption of produce and attached soil		
		P5	Vapour inhalation and intrusion (outdoor and indoor)		
		P6	Landfill gas ingress – explosive atmosphere		

Sources		Pathways		Receptors	
		P7	Inhalation of landfill gas (indoor and outdoor)		
S1	Commonside Tip	P12	Ingress of ground gas resulting in explosive atmospheres	R7	Buildings
S1	Commonside Tip	P13	Leaching of contaminants from landfill material	R8	Groundwater in superficial deposits (Secondary aquifer)
		P14	Vertical migration in the unsaturated zone		
		P15	Lateral migration of groundwater within the superficial deposits		
S1	Commonside Tip	P13	Leaching of contaminants from landfill material	R10	Groundwater in bedrock (Principal aquifer)
		P14	Vertical migration in the unsaturated zone		
		P19	Vertical migration of groundwater and/or DNAPL (if present) through higher permeability horizons in the superficial deposits		
		P20	Lateral migration in bedrock aquifer to potable abstraction		
S1	Commonside Tip	P13	Leaching of contaminants from landfill material	R11	Foxhill Brook
		P14	Vertical migration in the unsaturated zone		
		P15	Lateral migration of groundwater within the superficial deposits		
		P16	Baseflow from groundwater to surface water		
S1	Commonside Tip	P17	Run-off to surface water	R11	Foxhill Brook
S1	Commonside Tip	P18	Migration along land drain / pipes	R11	Foxhill Brook
S1	Commonside Tip	P13	Leaching of contaminants from landfill material	R12	Mersey Estuary SSSI, Ramsar site and SPA
		P14	Vertical migration in the unsaturated zone		
		P15	Lateral migration of groundwater within the superficial deposits		
		P16	Baseflow from groundwater to surface water		
		P17	Run-off to surface water		
		P18	Migration along land drain / pipes		
		P21	Downstream migration of contamination in Foxhill Brook		
S2	Foxhill Brook				
		P1s	Ingestion of soil/sediment and soil-derived dust	R1	Residents

Sources		Pathways		Receptors	
		P1w	Ingestion of groundwater and/or surface water	R3	Commercial workers
		P2	Inhalation of soil-derived dust (outdoor and indoor)	R4	Maintenance workers
		P3s	Dermal contact with soil/sediment and soil-derived indoor dust	R5	Livestock and pets
		P3w	Dermal contact with groundwater and/or surface water	R2	Visitors
		P4	Consumption of produce grown near impacted sediment or where water from Foxhill Brook has been used locally for irrigation.		
S2	Foxhill Brook	P13	Leaching/ partitioning of contaminants sorbed to sediments into surface water	R11	Foxhill Brook
		P21	Downstream migration of contaminants in surface water	R12	Mersey Estuary SSSI, Ramsar site and SPA

[Those linkages that are shaded grey are included on the basis of reducing uncertainty where relevant data will be collected through assessment of higher priority linkages already as opposed to the reasonable possibility of a SCL]

13. Conclusions and Recommendations

13.1 Conclusions

Following completion of the PRA, a number of CLs have been identified for which it is considered that there remains a reasonable possibility of a significant CL. This does not imply that an unacceptable risk necessarily exists, rather that further assessment should be considered in order to more reliably assess the potential significance of these linkages.

The source of contamination is Commonside Tip: a wide range of industrial wastes were deposited at the site during its operation from the 1950s-1970s, including but not limited to ash, lime, pulverised fuel ash, rubble, asbestos, waste pipe lagging, PCB-containing materials, paint and paint residues, tile adhesives, wood and waste wood, dye works waste, oil refinery waste, rubber hoses and plastics. Given the age of the site and the reported presence of persistent contaminants likely associated with the site accumulated in sediments of Foxhill Brook, Foxhill Brook has also been considered as a secondary source of potential contamination.

COPC associated with the wastes deposited may include PCBs, biphenyl, asbestos, dioxins, metals, high pH conditions, inorganics, petroleum hydrocarbons, PAHs, thiols, SVOCs, VOCs, thiophenes and organic acids. Site derived water from the former landfill has previously been reported to contain a range of potential contaminants, including PCBs, chlorinated benzenes, ketones (such as MIBK), phthalate esters, thiophenes, petroleum hydrocarbons, butadienes (such as hexachlorobutadiene) and phenolic compounds.

Several potential CLs where there is considered to be a reasonable possibility of a SCL have been identified relating to controlled waters receptors. The linkages which are considered to be the highest priority for further assessment are associated with direct run-off and migration along the land drain / subsurface pipes from the site to surface water features (drainage ditches and Foxhill Brook). Given the topography of the site, it is likely that run off from the site will enter the drainage ditches. The area of ponded water at the sump has been identified to contain concentrations of metals in excess of UK EQS values and PCBs above laboratory detection limits. AECOM observed evidence of run-off from the area of the sump towards the drainage ditch 175m to the north during the walkover.

PCBs have also been identified in the waters and sediments of Foxhill Brook downstream of the outfall pipe at concentrations above laboratory detection limits. Iridescent sheens, scum and a chemical odour were observed along Foxhill Brook during the walkover.

It is considered that there is a more than a reasonable possibility of an SCL relating to the superficial Secondary aquifer, given the reported contaminant concentrations in the site derived water from the former landfill

. Whilst it is unlikely that there is an SCL relating to the bedrock Principal aquifer, given the information reported to the EA by the utility company, it is recommended that investigation of this CL be undertaken to confirm whether contamination is present at elevated concentrations.

There are also several potential CLs where there is considered to be a reasonable possibility of a SCL relating to human health receptors (residents, visitors, commercial and maintenance workers). These relate to ingestion, inhalation and dermal contact with contaminated soils and soil-derived dust and surface waters, vapour inhalation and landfill gas inhalation and accumulation (explosive atmospheres). Whilst the landfilled material is generally separated from site users and adjacent receptors by a cover layer of soils of varying thickness, this is not complete across the whole site and is unlikely to mitigate gas and vapour migration.

Soil samples collected in the uncapped area of the site in 2001 exhibited total EC-7 PCB concentrations above laboratory detection limits. Only a limited number of VOCs and SVOCs were detected in brook sediment samples and one garden soil sample collected in 2009 and the preliminary screening exercise indicated that there are unlikely to be unacceptable risks to human health in a residential scenario from these analytes. However, odours have been observed along the route of Foxhill Brook and there is the potential for other volatile contaminants to be present which have not previously been tested for. Vapour sampling undertaken in 2009 concluded that, whilst concentrations of contaminants were not above human health assessment criteria, the odour issue required further consideration.

There is also a possibility of an SCL relating to explosive atmospheres in buildings, however this can be assessed through collection of gas data which is also necessary to assess risks to human health.

13.2 Recommendations

A land contamination ground investigation should be designed with due consideration of the requirements of BS 10175:2011 (+A2 2017) to support the further assessment of the potential SCLs summarised in Section 12.

It is suggested that the ground investigation may include, but is not necessarily limited to, the following activities. These recommendations are indicative only and should not be interpreted as a definitive scope or commitment to undertake all listed elements:

- Drilling of boreholes to allow characterisation of the superficial geology in the area around the site, particularly downgradient to the north, to allow further assessment of gas, vapour and groundwater migration pathways.
- Installation of groundwater and ground gas monitoring wells in the above boreholes to allow groundwater and ground gas monitoring and sampling and confirm the presence / absence of contamination and elevated ground gas concentrations. Inclusion of at least one monitoring well extending to the Principal aquifer downgradient of the site to allow groundwater monitoring and sampling.
- Excavation of trial pits on the site to allow soil sampling within the deposited waste material;
- Drilling and installation of shallow groundwater monitoring wells on-site within the waste material to characterise the dissolved phase impacts to groundwater within the waste;
- Tracer dye testing to evaluate the water flow pathways from the pond at Commonside Farm through to discharges into the drains, ditches and Foxhill Brook;
- Collection and analysis of samples to confirm the presence / absence of contaminants, including:
    - Soils across the site surface, particularly in the uncapped area and at depth in boreholes and trial pits.
    - Water where it emerges at the base of the tip and in monitoring wells installed within the waste.
    - Groundwater from the shallow superficial aquifer from accessible existing monitoring wells around the site perimeter and any new monitoring wells.
    - Groundwater from the Principal aquifer downgradient of the site.
    - Surface water and sediment at the pond at Commonside Farm, the sump, areas of run-off, the drainage ditches to the north and east and Foxhill Brook.
- Preparation of a generic quantitative assessment of risks to human health and controlled waters, with subsequent detailed quantitative assessment where the generic assessment indicates that it is necessary.

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Appendix A Figures

Figure 1: Site Location Plan

Figure 2: Site Walkover Features Plan

Figure 3: Site Walkover Photographic Plan

Figure 4a: CSM – Site Setting

Figure 4b: CSM – Potential Contaminant Linkages

Figure 5: Surface Water Features Plan

Figure 6: Surface Water Sampling Points Features Plan

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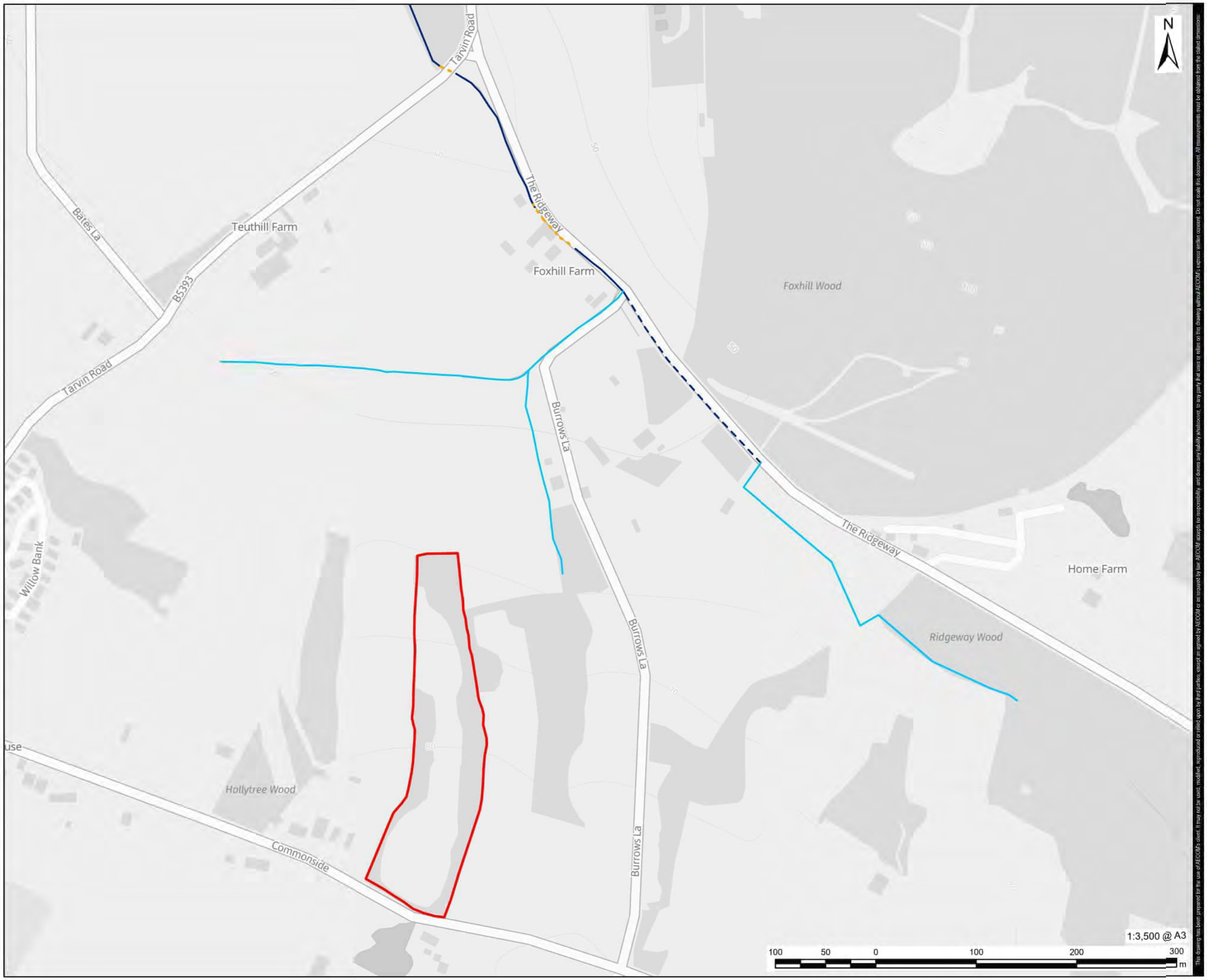

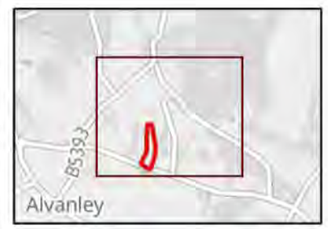

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LEGEND

- Commonside Tip Boundary
- Foxhill Brook
- Likely continuation of Foxhill Brook
- Drainage Ditch
- Foxhill Brook Culverted Section

NOTES

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FIGURE TITLE

Site Location Plan

FIGURE NUMBER

Figure 1

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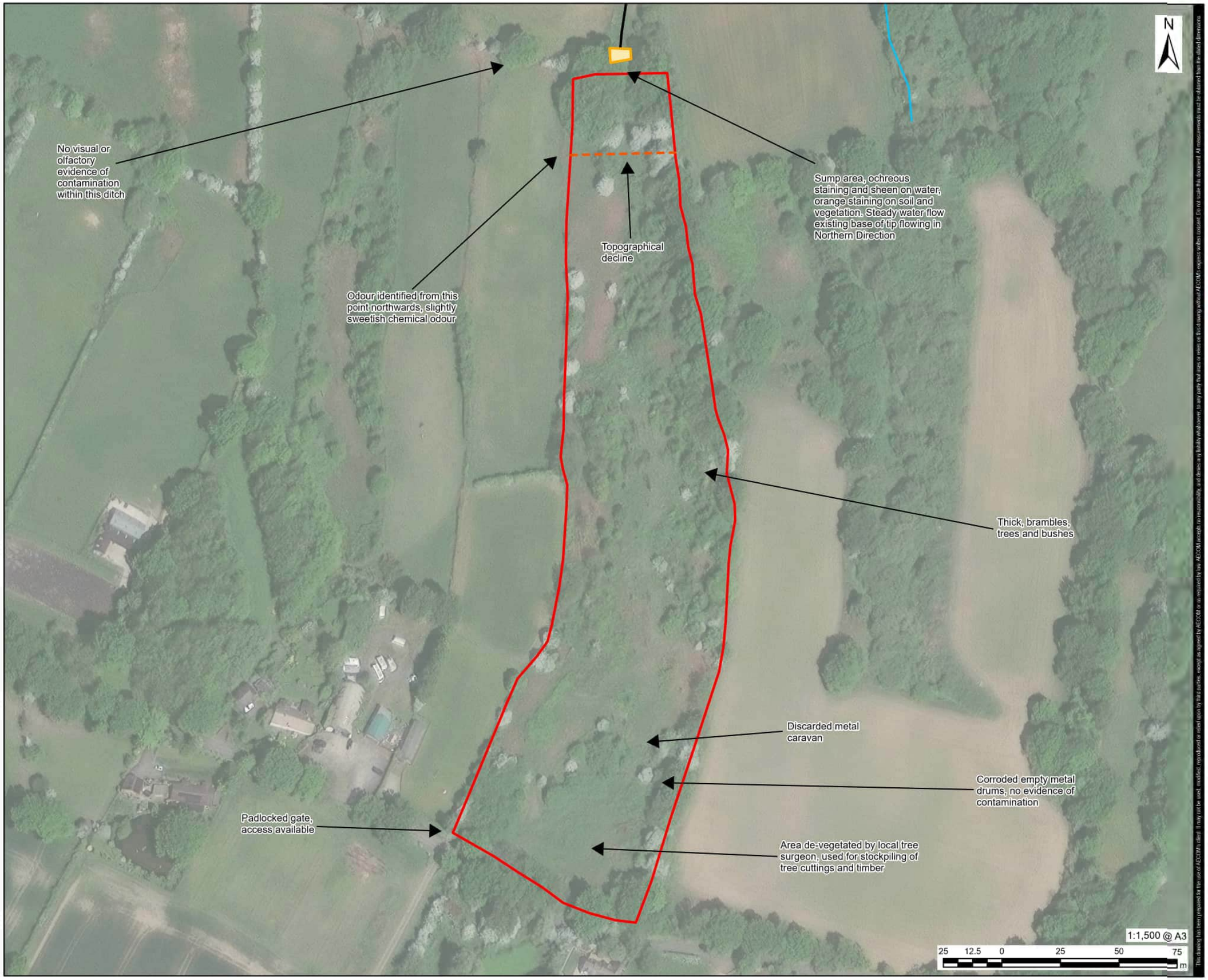

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LEGEND

- Commonside Tip Boundary
- Topographical Decline

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FIGURE TITLE

Commonside Tip Walkover Photographic Plan - Overview Sheet 1 of 2

FIGURE NUMBER

Figure 2

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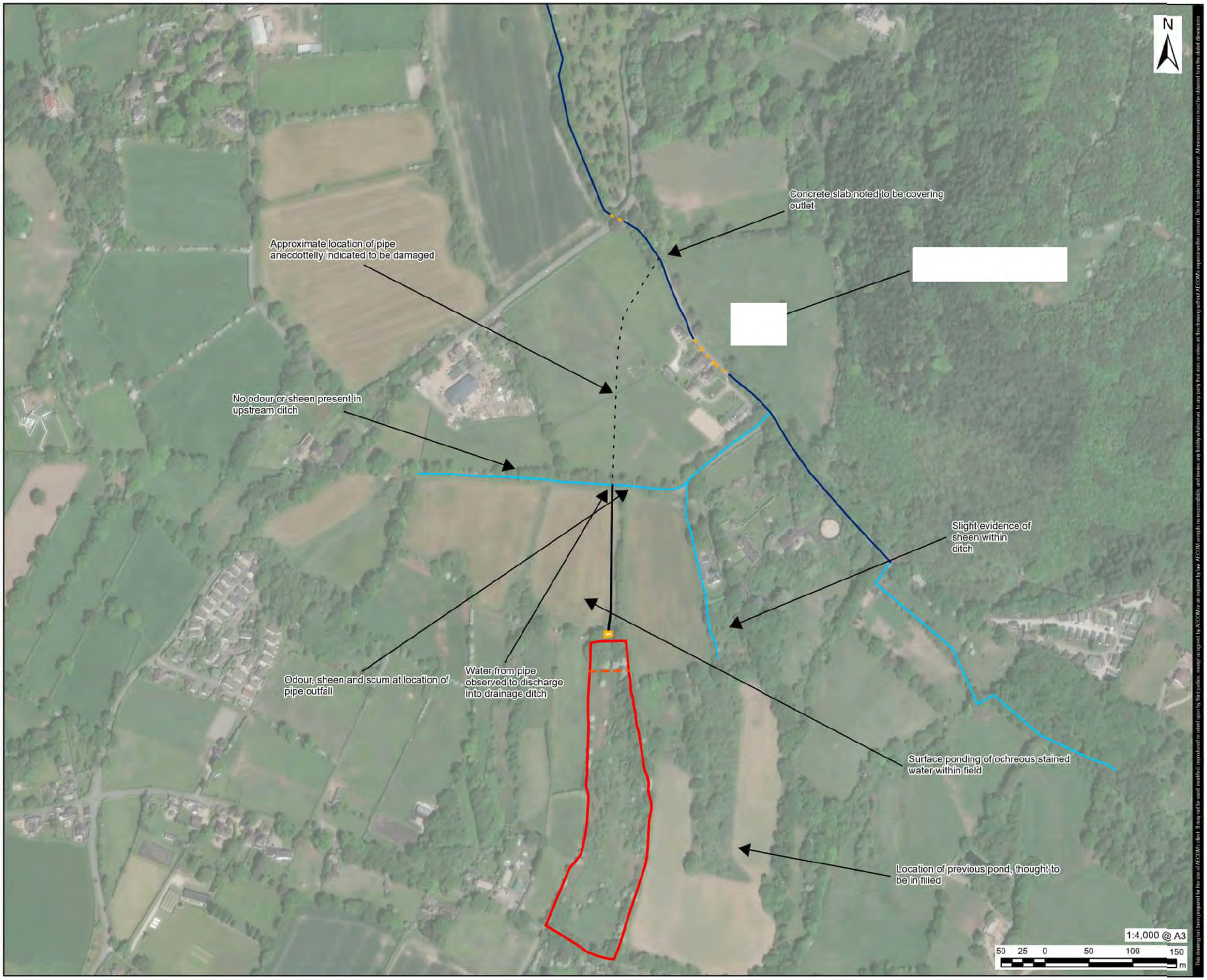

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LEGEND

- Commonside Tip Boundary
- Foxhill Brook
- Drainage Ditch
- Foxhill Brook Culverted Section
- Tip Buried Drainage Pipe
- Approximate location of drainage pipe – may be damaged based on anecdotal information
- Tip Drainage Sump
- Groundwater Well

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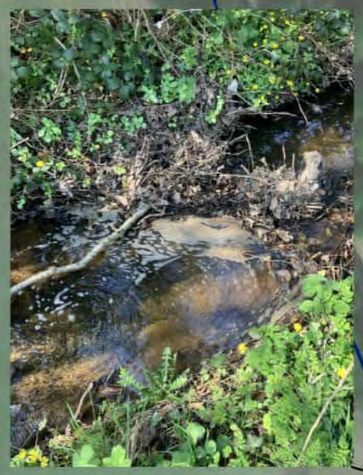
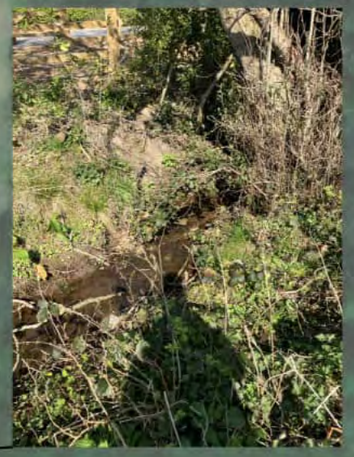
FIGURE TITLE

Commonside Tip Walkover Photographic Plan - Overview Sheet 2 of 2

FIGURE NUMBER

Figure 2





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LEGEND

- Commonside Tip Boundary
- Survey Photo Locations
- Foxhill Brook
- Likely continuation of Foxhill Brook
- Drainage Ditch
- Foxhill Brook Culverted Section

NOTES

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FIGURE TITLE

Commonside Tip Walkover Photographic Plan
Sheet 1 of 6

FIGURE NUMBER

Figure 3

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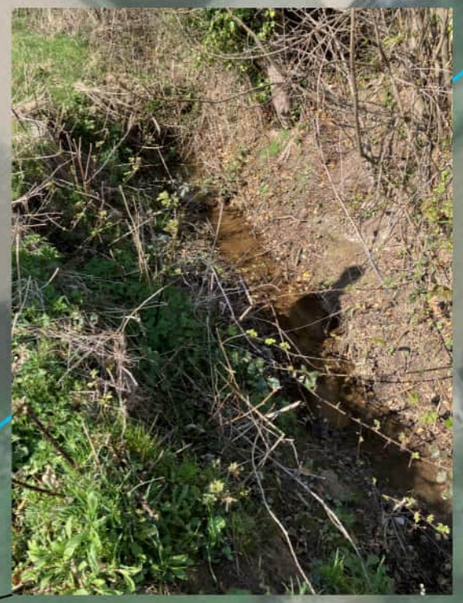

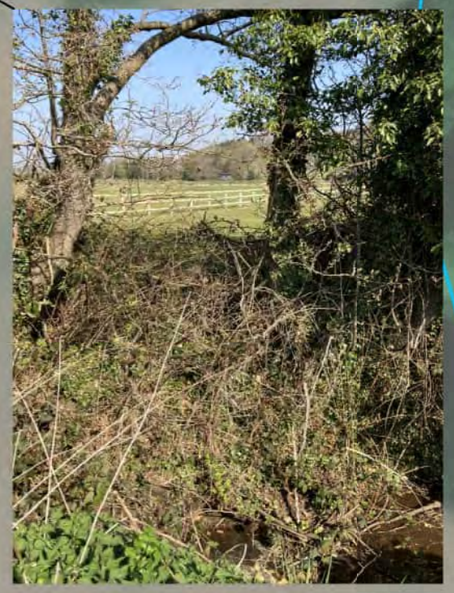

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LEGEND

- Commonside Tip Boundary
- Survey Photo Locations
- Foxhill Brook
- Drainage Ditch

NOTES

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FIGURE TITLE

Commonside Tip Walkover Photographic Plan
Sheet 2 of 6

FIGURE NUMBER

Figure 3

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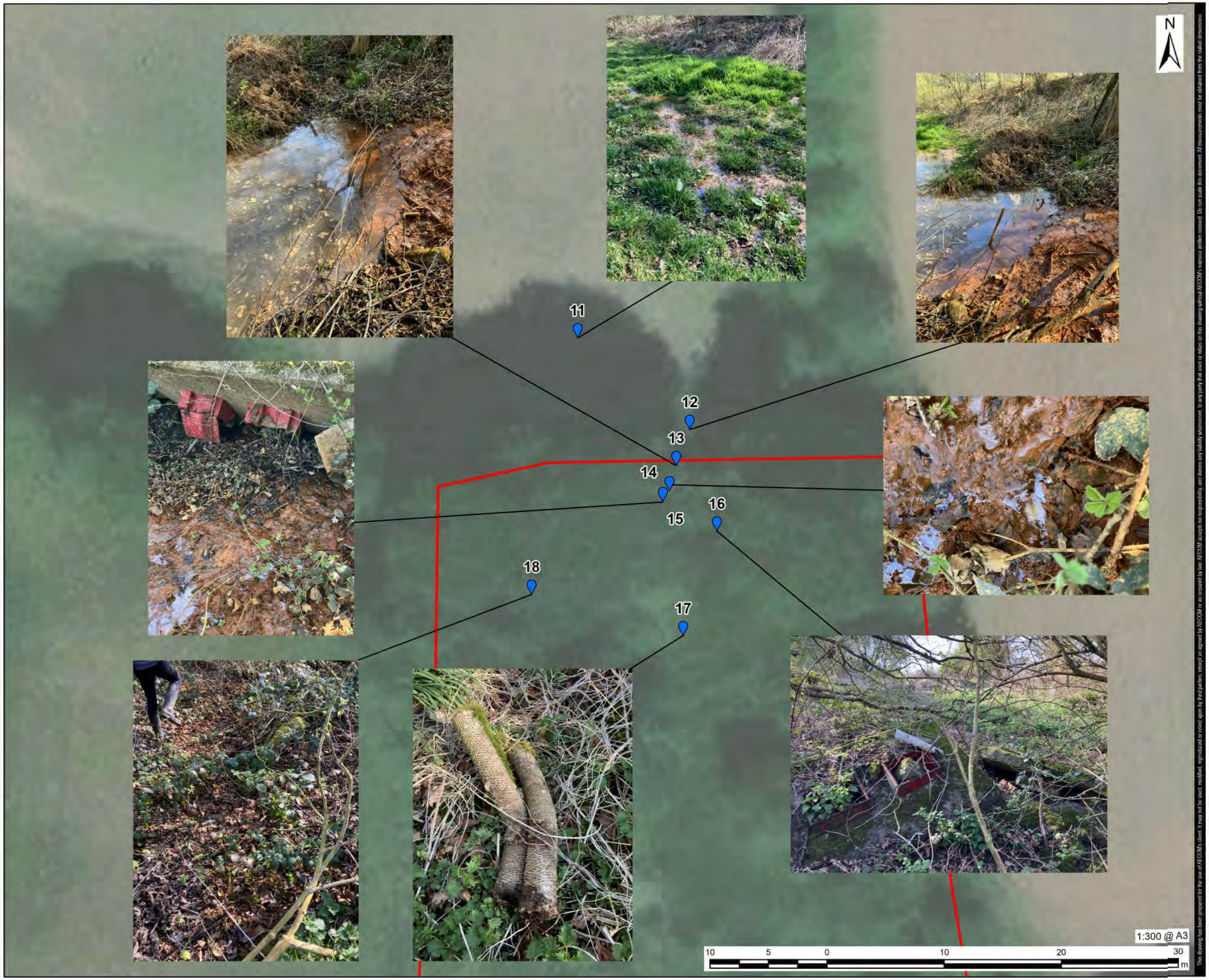

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LEGEND

Commonside Tip Boundary

Survey Photo Locations

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FIGURE NUMBER

Figure 3

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LEGEND

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- Survey Photo Locations

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FIGURE TITLE

Commonside Tip Walkover
Photographic Plan
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FIGURE NUMBER

Figure 3

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LEGEND

Commonside Tip Boundary

Survey Photo Locations

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FIGURE TITLE

Commonside Tip Walkover
Photographic Plan
Sheet 5 of 6

FIGURE NUMBER

Figure 3

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Cheshire West and Chester

CONSULTANT

AECOM Limited
100 Embankment
Cathedral Approach
Manchester, M3 7FB
www.aecom.com

LEGEND

- Commonside Tip Boundary
- Survey Photo Locations

NOTES

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Contains data from OS Zoomstack, Maxar, Microsoft

ISSUE PURPOSE

FINAL

PROJECT NUMBER

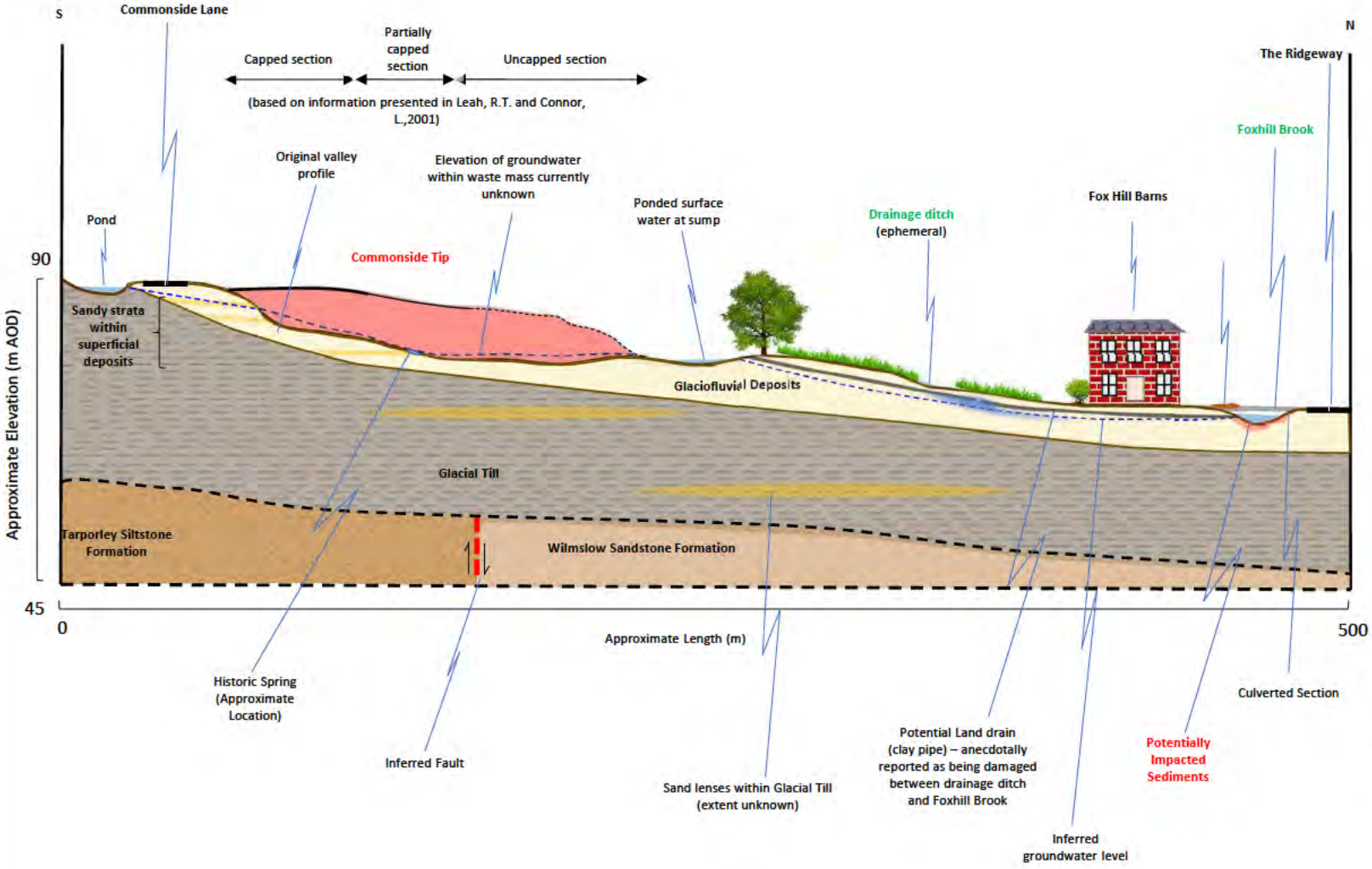
60747912

FIGURE TITLE

Commonside Tip Walkover
Photographic Plan
Sheet 6 of 6

FIGURE NUMBER

Figure 3



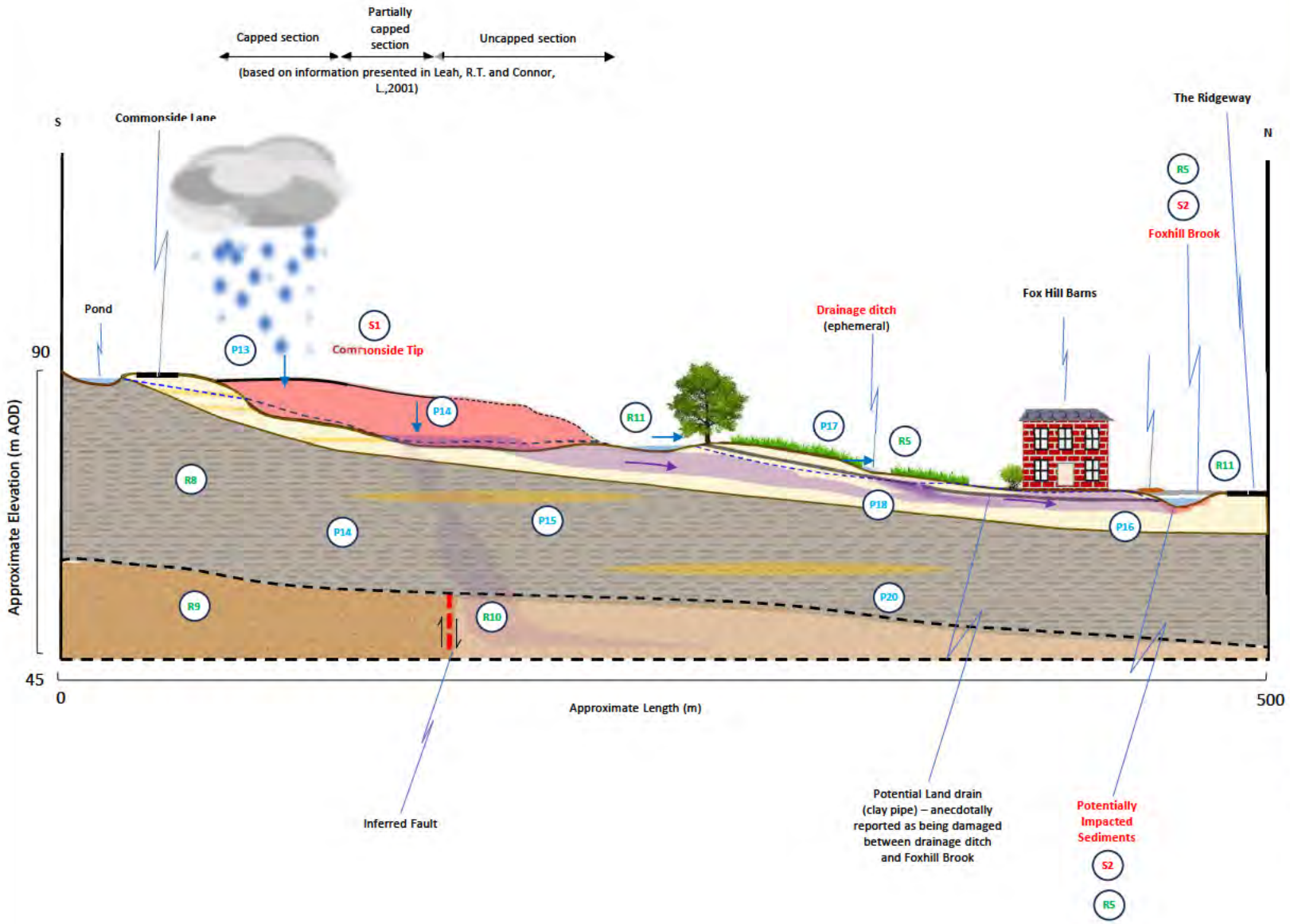
Key

- Indicative Groundwater Elevation
- Commonside Tip
- Bedrock
- Superficial Deposits (Glacial till)
- Superficial Deposits (Glaciofluvial)
- Surface Water Feature
- Residential Property
- Where present dashed lines indicate inferred features

Disclaimer:
This Conceptual Site Model (CSM) is a simplified representation intended to highlight key pertinent points relevant to the site's geo-environmental context. It is not a full geological section or a comprehensive depiction of all site conditions. The CSM serves as a communication tool to support understanding and decision-making, and should be interpreted alongside detailed site investigation data and technical reports.

Title	Conceptual Site Model - Geology
Location	Commonside Tip, Alvanley, Cheshire
Client	Cheshire West and Chester Council

AECOM	App'd: TL	Drawn: KW/LM	Date: Sept 2025
	Scale: NOT TO SCALE		Version: 2.1
	Final		Project No: 60747912
	Drawing Size: A3		FIGURE 4a



Key

Sources:

- Commonside Tip **(S1)**
- Foxhill Brook (sediments) **(S2)**

Potential Pathways:

- Leaching of contaminants in landfill material **(P13)**
- Vertical migration in the unsaturated zone **(P14)**
- Lateral migration in superficial groundwater **(P15)**
- Baseflow from groundwater to surface water **(P16)**
- Run off to surface water **(P17)**
- Migration via land drain **(P18)**
- Vertical migration in superficial deposits **(P19)**
- Lateral migration in bedrock groundwater **(P20)**

Potential Receptors:

- Livestock/Pets/Crops from contact with sediments, waters or foodstuffs potentially impacted **(R5)**
- Groundwater within superficial deposits (Secondary aquifer) **(R8)**
- Groundwater within bedrock (Secondary aquifer) **(R9)**
- Groundwater within bedrock (Principal aquifer) and potable abstraction (offline of section) **(R10)**
- Surface water **(R11)**:
  - Drainage ditch
  - Foxhill Brook

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This Conceptual Site Model (CSM) is a simplified representation intended to highlight key pertinent points relevant to the site's geo-environmental context. It is not a full geological section or a comprehensive depiction of all site conditions. The CSM serves as a communication tool to support understanding and decision-making, and should be interpreted alongside detailed site investigation data and technical reports.

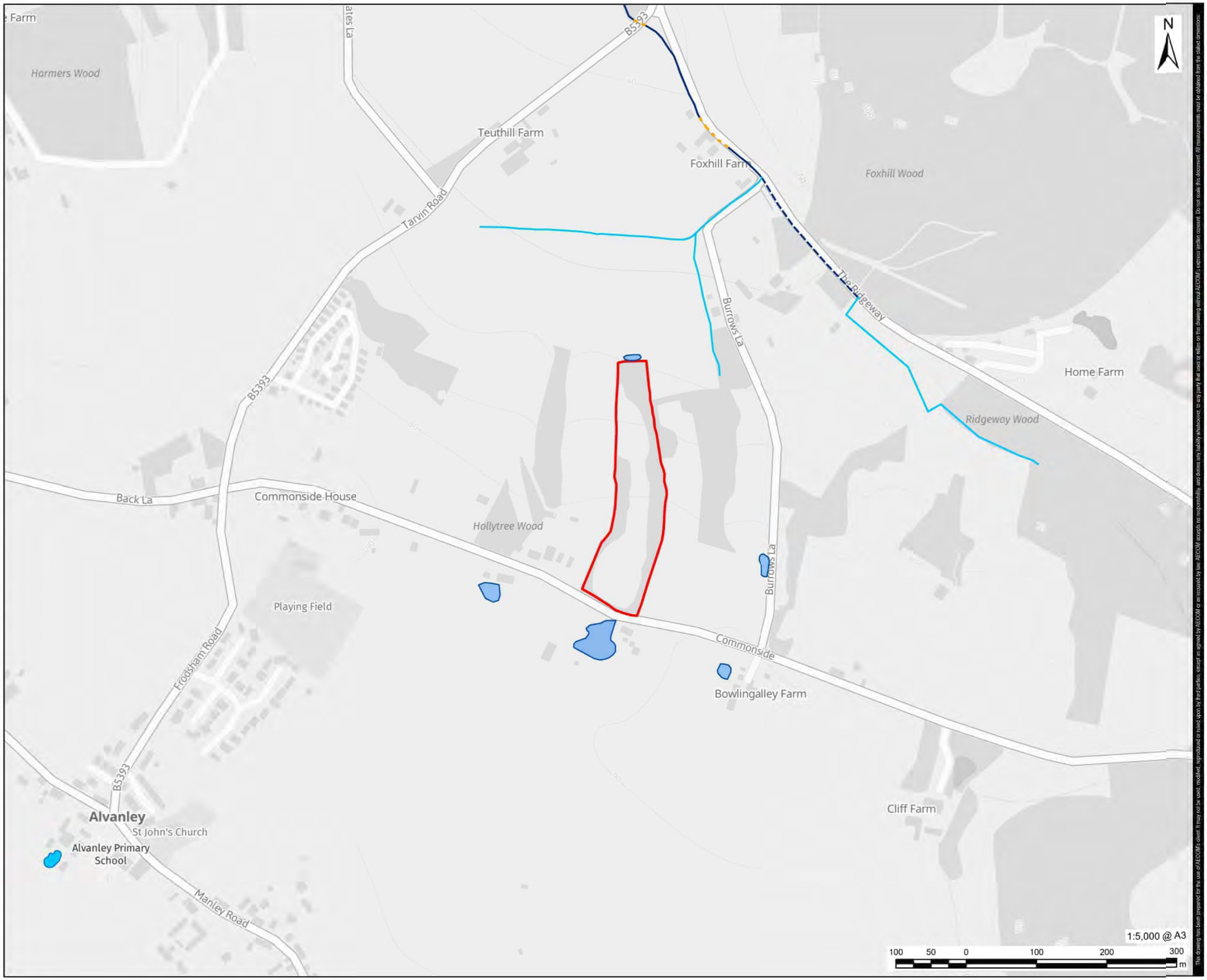
Note: Only potential contaminant linkages relating to controlled waters receptors are shown within the CSM this includes those that are considered viable and those that may need further investigation

Title	Conceptual Site Model - Linkages
Location	Commonside Tip, Alvanley, Cheshire
Client	Cheshire West and Chester Council

AECOM	App'd: TL	Drawn: KW/LM	Date: Sept 2025
	Scale: NOT TO SCALE		Version: 2.1
	Final		Project No: 60747912
	Drawing Size: A3		FIGURE 4b

Revision: 01 Drawn: WC Checked: EB Approved: LM Date: 2025-09-18

Filename: C:\Users\CoxW1\OneDrive - AECOM\Documents\Projects\2025\Commonside Tip GIS\02_Maps\PRA Report\CommTip_PRA_Fig5_CommonsideTip_Hydrological_Features_Plan_20250917_WC.aprx



AECOM

PROJECT

Commonside Tip CWCC Part II A.

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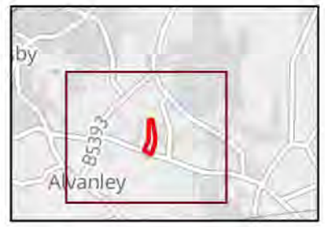
LEGEND

- Commonside Tip Boundary
- Foxhill Brook
- Likely continuation of Foxhill Brook
- Drainage Ditch
- Foxhill Brook Culverted Section
- Priority Ponds
- Approximate locations of unnamed ponds



NOTES

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PROJECT NUMBER

60747912

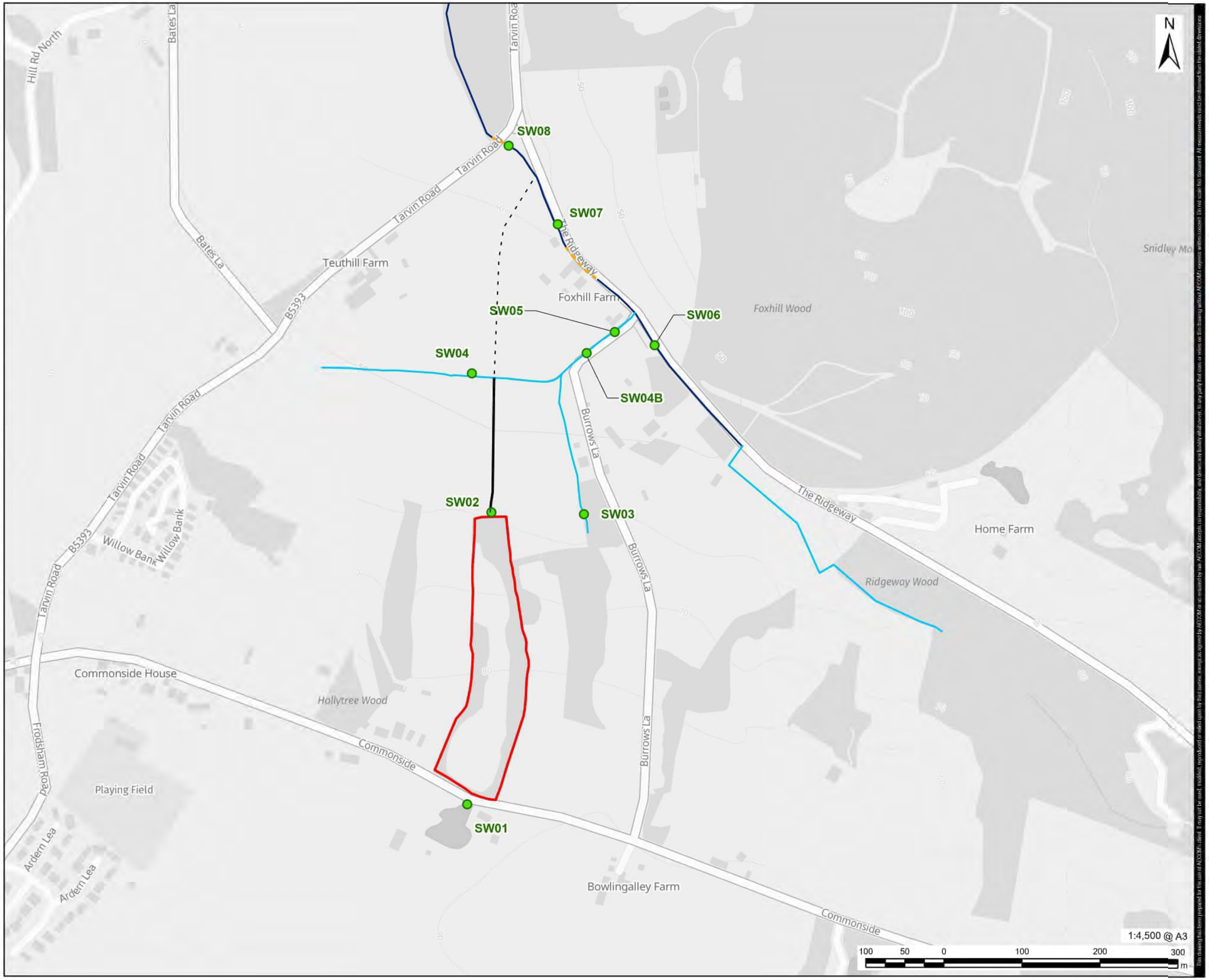
FIGURE TITLE

Hydrological Features Plan

FIGURE NUMBER

Figure 5

Revision: 01 Drawn: HS Checked: EB Approved: LM Date: 2026-01-16



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LEGEND

- Commonside Tip Boundary
- Water Sampling Location
- Foxhill Brook
- Drainage Ditch
- Foxhill Brook Culverted Section
- Tip Buried Drainage Pipe
- Approximate location of drainage pipe – may be damaged based on anecdotal information

NOTES

ISSUE PURPOSE

DRAFT

PROJECT NUMBER

60747912

FIGURE TITLE

Commonside Tip Water Sampling Locations

FIGURE NUMBER

Figure 6

Filename: \\na.aecomnet.com\LFS\EMEA\Manchester-UKMCR1\Legacy\UKMCR1FP002-V1\E\Proposal\3512\Commonside Tip GIS\02_Maps\PRA Report\CommTip_PRA_Fig6_CommonsideTip_Sampling_Locations_20260115_HS.aprx

Appendix B Approach to Reporting

B.1 Legislative Context and Guidance

This report has been prepared in accordance with the guidance described in the Defra *Environmental Protection Act 1990: Part IIA Contaminated Land Statutory Guidance (2012)* and the UK Government guidance *Land Contamination Risk Management (2020, last updated July 2023)*.

B.2 Historical Map Review

AECOM notes that only indicative map scales are provided. Where dates are stated, these refer to the dates of maps on which the features are present, have changed use or are no longer annotated, and do not necessarily refer to the exact dates of existence of a particular feature. Development that may have occurred between map editions is recorded as occurring on the latter published map, hence there are some limitations to the accuracy to the date of development unless supplementary evidence is available.

B.3 Conceptual Site Model Derivation

The CSM is aimed at identifying possible risks, if any, arising from substances used or deposited on-site, or from other sources of land contamination. Both past and current potentially contaminative land uses have been considered.

Assessment Framework

The site, in terms of potential land contamination, will be regulated by the Local Authority under Part IIA of the EPA 1990.

Current best practice recommends that the determination of health hazards due to contaminated land is based on the principle of risk assessment, as outlined in the Statutory Guidance to Part IIA (2012) and Land Contamination Risk Management (LCRM).

The “suitable for use” approach is adopted (as outlined in the Contaminated Land Statutory Guidance) for the assessment of contaminated land where remedial measures are undertaken where unacceptable risks to human health or the environment are realised taking into account the use (or proposed use) of the land in question and the environmental setting.

The risk assessment process for environmental contaminants is based on a source-pathway-receptor analysis. These terms can be defined as follows:

- Source: hazardous substance that has the potential to cause adverse impacts;
- Pathway: route whereby a hazardous substance may come into contact with the receptor: examples include ingestion of contaminated soil and leaching of contaminants from soil into watercourses; and
- Receptor: target that may be affected by contamination: examples include human occupants/ users of site, water resources (surface waters or groundwater), or structures.

For a risk to be present, there must be a relevant / viable contaminant linkage; i.e. a mechanism whereby a source impacts on a sensitive receptor via a pathway.

AECOM have determined the potential sources, pathways and receptors to assess potential risks associated with the site in its current condition.

B.4 Approach to Risk Assessment

Current good practice recommends that the evaluation of hazards due to contaminated land is based on the principle of risk assessment, as outlined in the Environment Agency LCRM guidance.

For a risk to be present, there must be a viable contaminant linkage; i.e. a mechanism whereby a source impacts on a sensitive receptor via a pathway.

Assessments of risks associated with each of these contaminant linkages are discussed in the following sections.

Using criteria broadly based on those presented in the CIRIA C552, the magnitude of the risk associated with potential contamination at the Site has been assessed. To do this an estimate is made of:

- The magnitude of the potential consequence (i.e. severity);
- The magnitude of probability (i.e. likelihood).

The severity of the risk is classified according to the criteria in Table B-1.

Table B-1 Description of Severity of Risk

Severity	Definition	Examples (as defined by C552)
Severe	Short-term (acute) risk to human health likely to result in "significant harm" as defined by Environmental Protection Act 1990, Part IIA. Short-term risk of pollution (note: Water Resources Act contains no scope for considering significance of pollution) of sensitive water resource. Catastrophic damage to buildings \ property. A short-term risk to a particular ecosystem, or organism forming part of such ecosystem (note: the definitions of ecological systems Within the Draft Circular on Contaminated Land, DETR, 2000).	• High concentrations of cyanide on the surface of an informal recreation area. • Major spillage of contaminants from site into controlled water. • Explosion, causing building collapse (can also equate to a short-term human health risk if buildings are occupied).
Medium	Chronic damage to Human Health ("significant harm" as defined in DETR 2000). Pollution of sensitive water resources (note: Water Resources Act contains no for considering significance of pollution). A significant change in a particular ecosystem, or organism forming part of such ecosystem. (note: the definitions of ecological systems within Draft Circular on Contaminated Land, DETR, 2000).	• Concentrations of a contaminant from site exceed the generic, or site-specific assessment criteria. • Leaching of contaminants from a site to a major or minor aquifer. • Death of a 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 the Draft Circular on Contaminated Land, DETR, 2000). Damage to sensitive buildings / structures / services or the environment.	• Pollution of non-classified groundwater. • Damage to building rendering it unsafe to occupy (e.g. foundation damage resulting in instability).
Minor	Harm, although not necessarily significant harm, which may result in a financial loss, or expenditure to resolve. Non-permanent health effects to human health (easily prevented by means such as personal protective clothing etc). Easily repairable effects of damage to buildings, Structures and services.	• The presence of contaminants at such concentrations that protective equipment is required during site works. • The loss of plants in a landscaping scheme. • Discoloration of concrete.

The probability of the risk occurring is classified according to the criteria in Table B-2.

Table B-2 Likelihood of Risk Occurrence

Likelihood	Definition	Example
High	There is a pollutant linkage and an event that either 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.	• The contaminant linkage exists or is very likely to exist in the short term, and / or may also be linked to visual / olfactory evidence of that linkage being present and active in some cases. • The conditions are such that there is no foreseeable reason to suggest that a source-pathway-receptor linkage is not occurring and required mediums for a contamination source to pass through / within to reach a receptor are all present.
Likely	There is pollutant linkage and all the elements are present and in the right place which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short-term and likely over the long-term.	• The conditions are such that there are very few foreseeable reasons to suggest that a source-pathway-receptor linkage is not occurring, and that all or most of the required mediums for a contamination source to pass through / within to each a receptor are present.
Low Likelihood	There is pollutant linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a long period such an event would take place, and is less likely in the shorter term.	• The source, pathway and receptor linkage may exist and it is possible that contamination could reach a receptor in certain circumstances. The site conditions indicate that there are limiting factors in the pathway mediums / generation potential of the source / or presence of the receptor.
Unlikely	There is pollutant linkage but circumstances are such that it is improbable that an event would occur even in the very long-term.	• The source, pathway and receptor may exist in certain circumstances, but the contaminant linkage is improbable in the short term and in the long term.

An overall evaluation of the level of risk is gained from a comparison of the severity and probability, as shown in Table B-3.

Table B-3 Risk based on Comparison of Likelihood and Severity

Likelihood \ Severity	SEVERE	MEDIUM	MILD	MINOR
HIGH	Very High	High	Moderate	Moderate/Low
LIKELY	High	Moderate	Moderate/Low	Low
LOW	Moderate	Moderate/Low	Low	Very Low
UNLIKELY	Moderate/Low	Low	Very Low	Very Low

Further description of the classified risks as defined by CIRIA C552 is provided below.

Very high risk

There is a high probability that severe harm could arise to a designated receptor from an identified hazard at the site without remediation action OR there is evidence that severe harm to a designated receptor is already occurring. Realisation of that risk is likely to present a substantial liability to be site owner/or occupier. Investigation is required as a matter of urgency and remediation works likely to follow in the short-term.

High risk

Harm is likely to arise to a designated receptor from an identified hazard at the site without remediation action. Realisation of the risk is likely to present a substantial liability to the site owner/or occupier. Investigation is required as a matter of urgency to clarify the risk. Remediation works may be necessary in the short-term and are likely over the longer term.

Moderate risk

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, and if any harm were to occur it is more likely, that the harm would be relatively mild. Further investigative work is normally required to clarify the risk and to determine the potential liability to site owner/occupier. Some remediation works may be required in the longer term.

Low risk

It is possible that harm could arise to a designated receptor from identified hazard, but it is likely at worst, that this harm if realised would normally be mild. It is unlikely that the site owner/or occupier would face substantial liabilities from such a risk. Further investigative work (which is likely to be limited) to clarify the risk may be required. Any subsequent remediation works are likely to be relatively limited.

Very low risk

It is a low possibility that harm could arise to a designated receptor, but it is likely at worst, that this harm if realised would normally be mild or minor.

Appendix C Groundsure Report

Boundary Disclaimer: Please note that the redline boundary used to procure this third-party report from Groundsure represents an approximate site boundary and does not correspond to the legal ownership boundary as defined in the registered title deeds. This indicative boundary was used solely for the purposes of environmental data procurement only.

Groundsure LOCATION INTELLIGENCE

Enviro+Geo Insight

COMMONSIDE TIP, COMMONSIDE 44M FROM COMMONSIDE, COMMONSIDE, ALVANLEY, FRODSHAM, CHESHIRE WEST AND CHESTER, WA6 9HB

Order Details

Date: 18/03/2025

Your ref: 60747912

Our Ref: GS-OWD-2GV-I6V-PL4

Site Details

Location: 350408 374553

Area: 2.55 ha

Authority: Cheshire West and Chester Council ↗

Contact us with any questions at:
info@groundsure.com ↗
01273 257 755

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 >	1	1	2	11	-
16 >	1.2 >	Historical tanks >	0	0	0	3	-
17	1.3	Historical energy features	0	0	0	0	-
17	1.4	Historical petrol stations	0	0	0	0	-
17 >	1.5 >	Historical garages >	0	1	0	0	-
18	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**
19 >	2.1 >	Historical industrial land uses >	1	1	2	13	-
20 >	2.2 >	Historical tanks >	0	0	0	5	-
21	2.3	Historical energy features	0	0	0	0	-
21	2.4	Historical petrol stations	0	0	0	0	-
21 >	2.5 >	Historical garages >	0	1	0	0	-
Page	**Section**	**Waste and landfill >**	**On site**	**0-50m**	**50-250m**	**250-500m**	**500-2000m**
22	3.1	Active or recent landfill	0	0	0	0	-
22 >	3.2 >	Historical landfill (BGS records) >	0	0	1	0	-
23 >	3.3 >	Historical landfill (LA/mapping records) >	1	0	0	0	-
23 >	3.4 >	Historical landfill (EA/NRW records) >	1	1	0	0	-
24	3.5	Historical waste sites	0	0	0	0	-
24	3.6	Licensed waste sites	0	0	0	0	-
24 >	3.7 >	Waste exemptions >	0	0	1	19	-
Page	**Section**	**Current industrial land use >**	**On site**	**0-50m**	**50-250m**	**250-500m**	**500-2000m**
26 >	4.1 >	Recent industrial land uses >	1	0	2	-	-
27	4.2	Current or recent petrol stations	0	0	0	0	-
27	4.3	Electricity cables	0	0	0	0	-
27	4.4	Gas pipelines	0	0	0	0	-
27	4.5	Sites determined as Contaminated Land	0	0	0	0	-

27	4.6	Control of Major Accident Hazards (COMAH)	0	0	0	0	-
28	4.7	Regulated explosive sites	0	0	0	0	-
28	4.8	Hazardous substance storage/usage	0	0	0	0	-
28	4.9	Historical licensed industrial activities (IPC)	0	0	0	0	-
28	4.10	Licensed industrial activities (Part A(1))	0	0	0	0	-
28	4.11	Licensed pollutant release (Part A(2)/B)	0	0	0	0	-
29	4.12	Radioactive Substance Authorisations	0	0	0	0	-
29 >	4.13 >	Licensed Discharges to controlled waters >	0	0	0	3	-
30	4.14	Pollutant release to surface waters (Red List)	0	0	0	0	-
30	4.15	Pollutant release to public sewer	0	0	0	0	-
30	4.16	List 1 Dangerous Substances	0	0	0	0	-
30	4.17	List 2 Dangerous Substances	0	0	0	0	-
30	4.18	Pollution Incidents (EA/NRW)	0	0	0	0	-
31	4.19	Pollution inventory substances	0	0	0	0	-
31	4.20	Pollution inventory waste transfers	0	0	0	0	-
31	4.21	Pollution inventory radioactive waste	0	0	0	0	-

Page	Section	Hydrogeology >	On site	0-50m	50-250m	250-500m	500-2000m
32 >	5.1 >	Superficial aquifer >	Identified (within 500m)				
34 >	5.2 >	Bedrock aquifer >	Identified (within 500m)				
36 >	5.3 >	Groundwater vulnerability >	Identified (within 50m)				
37	5.4	Groundwater vulnerability- soluble rock risk	None (within 0m)				
38	5.5	Groundwater vulnerability- local information	None (within 0m)				
39 >	5.6 >	Groundwater abstractions >	0	0	1	0	4
41 >	5.7 >	Surface water abstractions >	0	0	0	0	9
43 >	5.8 >	Potable abstractions >	0	0	1	0	0
44 >	5.9 >	Source Protection Zones >	2	0	1	0	-
44	5.10	Source Protection Zones (confined aquifer)	0	0	0	0	-

Page	Section	Hydrology >	On site	0-50m	50-250m	250-500m	500-2000m
45 >	6.1 >	Water Network (OS MasterMap) >	0	0	2	-	-

46 >	6.2 >	Surface water features >	0	1	1	-	-
46 >	6.3 >	WFD Surface water body catchments >	1	-	-	-	-
46 >	6.4 >	WFD Surface water bodies >	0	0	0	-	-
47 >	6.5 >	WFD Groundwater bodies >	1	-	-	-	-

Page	Section	River and coastal flooding	On site	0-50m	50-250m	250-500m	500-2000m
48	7.1	Risk of flooding from rivers and the sea	None (within 50m)				
48	7.2	Historical Flood Events	0	0	0	-	-
48	7.3	Flood Defences	0	0	0	-	-
49	7.4	Areas Benefiting from Flood Defences	0	0	0	-	-
49	7.5	Flood Storage Areas	0	0	0	-	-
50	7.6	Flood Zone 2	None (within 50m)				
50	7.7	Flood Zone 3	None (within 50m)				

Page	Section	Surface water flooding >	
51 >	8.1 >	Surface water flooding >	1 in 30 year, 0.3m - 1.0m (within 50m)

Page	Section	Groundwater flooding >	
53 >	9.1 >	Groundwater flooding >	Moderate (within 50m)

Page	Section	Environmental designations >	On site	0-50m	50-250m	250-500m	500-2000m
54 >	10.1 >	Sites of Special Scientific Interest (SSSI) >	0	0	0	0	1
55	10.2	Conserved wetland sites (Ramsar sites)	0	0	0	0	0
55	10.3	Special Areas of Conservation (SAC)	0	0	0	0	0
55	10.4	Special Protection Areas (SPA)	0	0	0	0	0
55	10.5	National Nature Reserves (NNR)	0	0	0	0	0
56 >	10.6 >	Local Nature Reserves (LNR) >	0	0	0	0	1
56 >	10.7 >	Designated Ancient Woodland >	0	0	0	0	3
56	10.8	Biosphere Reserves	0	0	0	0	0
57	10.9	Forest Parks	0	0	0	0	0
57	10.10	Marine Conservation Zones	0	0	0	0	0
57 >	10.11 >	Green Belt >	1	0	0	0	0
57	10.12	Proposed Ramsar sites	0	0	0	0	0

58	10.13	Possible Special Areas of Conservation (pSAC)	0	0	0	0	0
58	10.14	Potential Special Protection Areas (pSPA)	0	0	0	0	0
58	10.15	Nitrate Sensitive Areas	0	0	0	0	0
58 >	10.16 >	Nitrate Vulnerable Zones >	2	0	0	0	5
60 >	10.17 >	SSSI Impact Risk Zones >	1	-	-	-	-
61 >	10.18 >	SSSI Units >	0	0	0	0	1
Page	Section	Visual and cultural designations >	On site	0-50m	50-250m	250-500m	500-2000m
63	11.1	World Heritage Sites	0	0	0	-	-
64	11.2	Area of Outstanding Natural Beauty	0	0	0	-	-
64	11.3	National Parks	0	0	0	-	-
64 >	11.4 >	Listed Buildings >	0	1	1	-	-
65	11.5	Conservation Areas	0	0	0	-	-
65	11.6	Scheduled Ancient Monuments	0	0	0	-	-
65	11.7	Registered Parks and Gardens	0	0	0	-	-
Page	Section	Agricultural designations >	On site	0-50m	50-250m	250-500m	500-2000m
66 >	12.1 >	Agricultural Land Classification >	Grade 2 (within 250m)				
67	12.2	Open Access Land	0	0	0	-	-
67	12.3	Tree Felling Licences	0	0	0	-	-
67	12.4	Environmental Stewardship Schemes	0	0	0	-	-
68 >	12.5 >	Countryside Stewardship Schemes >	0	0	1	-	-
Page	Section	Habitat designations	On site	0-50m	50-250m	250-500m	500-2000m
69	13.1	Priority Habitat Inventory	0	0	0	-	-
69	13.2	Habitat Networks	0	0	0	-	-
69	13.3	Open Mosaic Habitat	0	0	0	-	-
69	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
70 >	14.1 >	10k Availability >	Identified (within 500m)				
72	14.2	Artificial and made ground (10k)	0	0	0	0	-
73 >	14.3 >	Superficial geology (10k) >	2	1	2	4	-

74	14.4	Landslip (10k)	0	0	0	0	-
75 >	14.5 >	Bedrock geology (10k) >	3	0	1	8	-
76 >	14.6 >	Bedrock faults and other linear features (10k) >	1	0	0	6	-
Page	Section	Geology 1:50,000 scale >	On site	0-50m	50-250m	250-500m	500-2000m
77 >	15.1 >	50k Availability >	Identified (within 500m)				
78	15.2	Artificial and made ground (50k)	0	0	0	0	-
78	15.3	Artificial ground permeability (50k)	0	0	-	-	-
79 >	15.4 >	Superficial geology (50k) >	2	1	3	1	-
80 >	15.5 >	Superficial permeability (50k) >	Identified (within 50m)				
80	15.6	Landslip (50k)	0	0	0	0	-
80	15.7	Landslip permeability (50k)	None (within 50m)				
81 >	15.8 >	Bedrock geology (50k) >	2	1	3	3	-
82 >	15.9 >	Bedrock permeability (50k) >	Identified (within 50m)				
82 >	15.10 >	Bedrock faults and other linear features (50k) >	1	0	3	3	-
Page	Section	Boreholes >	On site	0-50m	50-250m	250-500m	500-2000m
84 >	16.1 >	BGS Boreholes >	1	4	3	-	-
Page	Section	Natural ground subsidence >					
86 >	17.1 >	Shrink swell clays >	Very low (within 50m)				
88 >	17.2 >	Running sands >	Very low (within 50m)				
89 >	17.3 >	Compressible deposits >	Negligible (within 50m)				
90 >	17.4 >	Collapsible deposits >	Very low (within 50m)				
91 >	17.5 >	Landslides >	Low (within 50m)				
93 >	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
95	18.1	BritPits	0	0	0	0	-
96 >	18.2 >	Surface ground workings >	1	1	1	-	-
96	18.3	Underground workings	0	0	0	0	0
96	18.4	Underground mining extents	0	0	0	0	-
96	18.5	Historical Mineral Planning Areas	0	0	0	0	-

97	18.6	Non-coal mining	0	0	0	0	0
97	18.7	JPB mining areas	None (within 0m)				
97	18.8	The Coal Authority non-coal mining	0	0	0	0	-
97	18.9	Researched mining	0	0	0	0	-
98	18.10	Mining record office plans	0	0	0	0	-
98	18.11	BGS mine plans	0	0	0	0	-
98	18.12	Coal mining	None (within 0m)				
98	18.13	Brine areas	None (within 0m)				
98	18.14	Gypsum areas	None (within 0m)				
99	18.15	Tin mining	None (within 0m)				
99	18.16	Clay mining	None (within 0m)				

Page	Section	Ground cavities and sinkholes	On site	0-50m	50-250m	250-500m	500-2000m
100	19.1	Natural cavities	0	0	0	0	-
100	19.2	Mining cavities	0	0	0	0	0
100	19.3	Reported recent incidents	0	0	0	0	-
100	19.4	Historical incidents	0	0	0	0	-

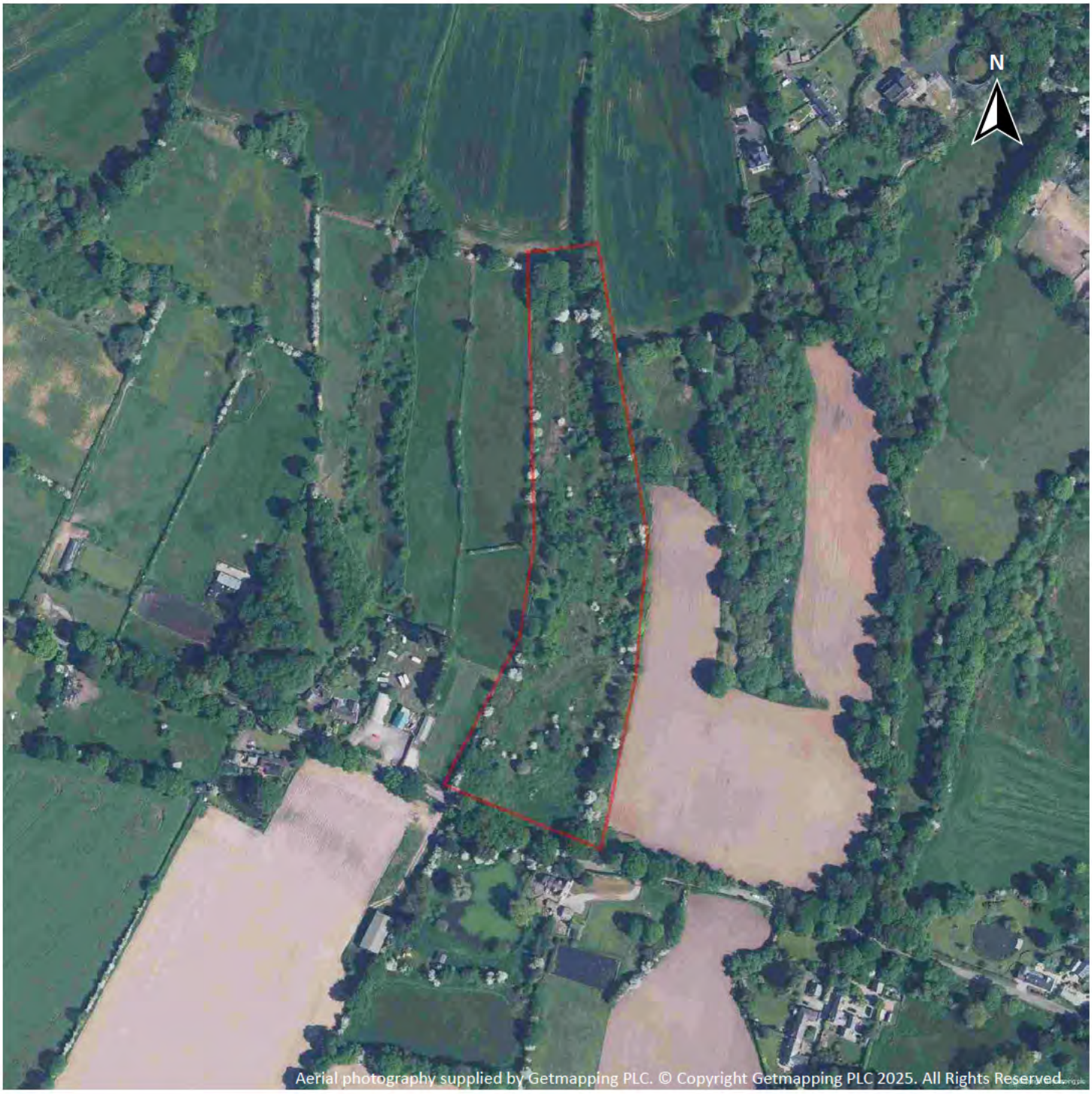
Page	Section	Radon >	
102 >	20.1 >	Radon >	Less than 1% (within 0m)

Page	Section	Soil chemistry >	On site	0-50m	50-250m	250-500m	500-2000m
104 >	21.1 >	BGS Estimated Background Soil Chemistry >	7	7	-	-	-
105	21.2	BGS Estimated Urban Soil Chemistry	0	0	-	-	-
105	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
106	22.1	Underground railways (London)	0	0	0	-	-
106	22.2	Underground railways (Non-London)	0	0	0	-	-
106	22.3	Railway tunnels	0	0	0	-	-
106	22.4	Historical railway and tunnel features	0	0	0	-	-
106	22.5	Royal Mail tunnels	0	0	0	-	-
107	22.6	Historical railways	0	0	0	-	-

107	22.7	Railways	0	0	0	-	-
107	22.8	Crossrail 2	0	0	0	0	-
107	22.9	HS2	0	0	0	0	-

Recent aerial photograph



Capture Date: 20/05/2023

Site Area: 2.55ha

Recent site history - 2020 aerial photograph

Capture Date: 31/05/2020

Site Area: 2.55ha

Recent site history - 2010 aerial photograph

Capture Date: 11/10/2010

Site Area: 2.55ha

Recent site history - 2001 aerial photograph

Capture Date: 01/05/2001

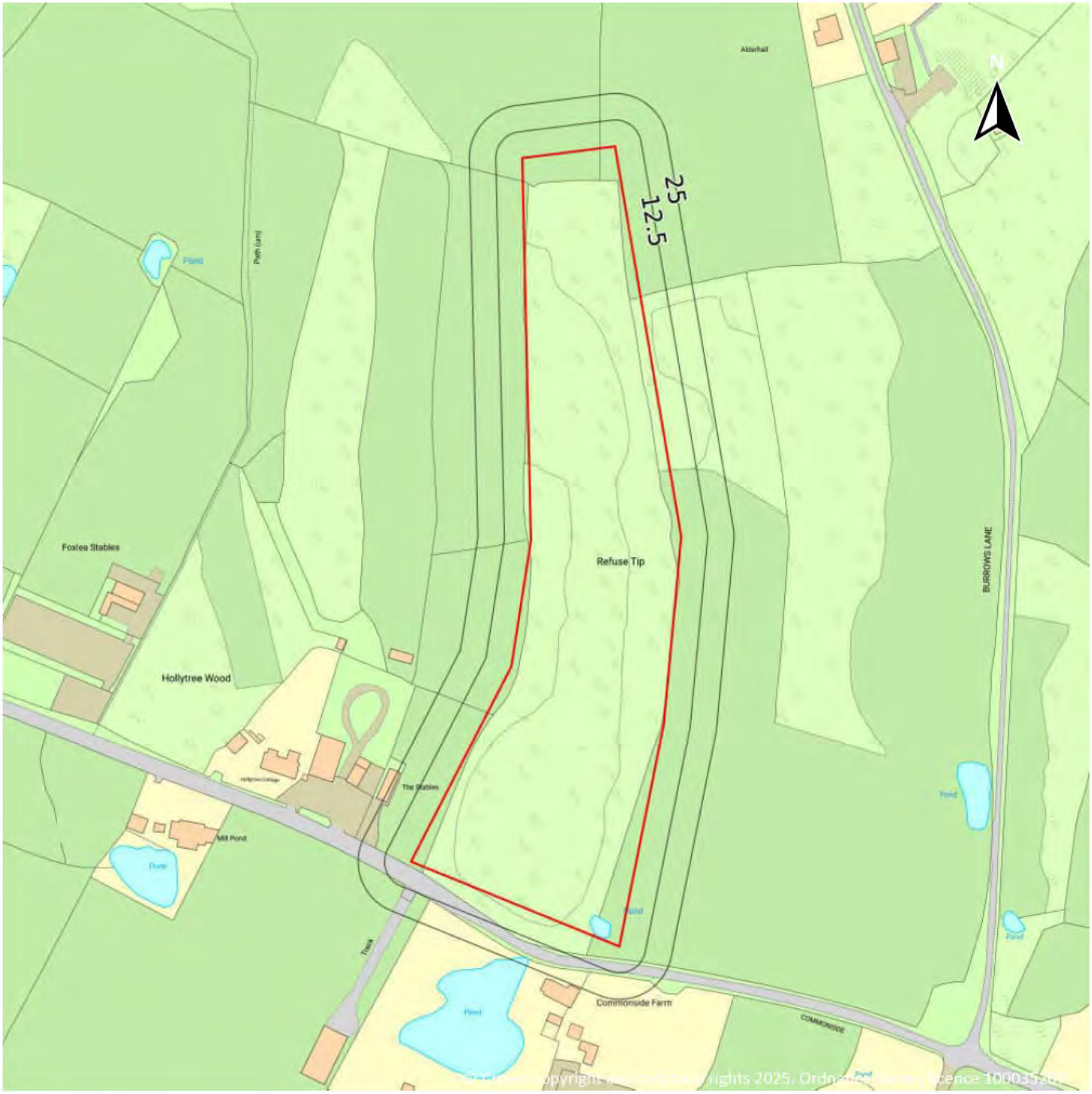
Site Area: 2.55ha

Recent site history - 2000 aerial photograph

Capture Date: 21/07/2000

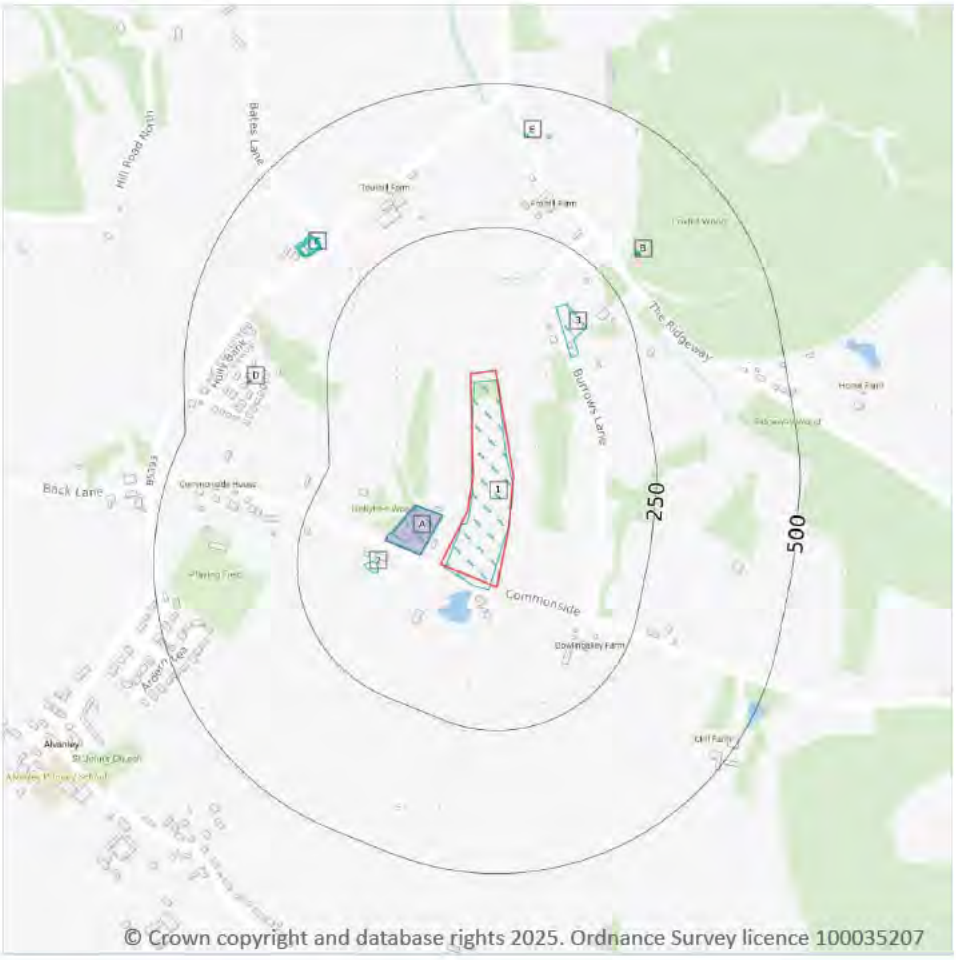
Site Area: 2.55ha

OS MasterMap site plan



Site Area: 2.55ha

1 Past land use



1.1 Historical industrial land uses

Records within 500m	15

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
1	On site	Refuse Heap	1972	809919

ID	Location	Land use	Dates present	Group ID
A	34m SW	Garage	1972	826541
2	110m SW	Mill Pond	1972	811694
3	133m NE	Pumping Station	1972	858556
B	316m NE	Water Tank	1897	858074
B	316m NE	Unspecified Tank	1911	923538
B	318m NE	Unspecified Tank	1949	946394
B	319m NE	Unspecified Tank	1909	876513
C	339m NW	Unspecified Ground Workings	1949	890531
C	344m NW	Unspecified Ground Workings	1911	960050
C	345m NW	Unspecified Ground Workings	1909	876804
C	346m NW	Unspecified Heap	1911	844333
C	351m NW	Unspecified Pit	1911	830756
E	410m N	Disused Hydraulic Rams	1909	817612
E	415m N	Disused Hydraulic Rams	1909	817611

This data is sourced from Ordnance Survey / Groundsure.

1.2 Historical tanks

Records within 500m	3

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
B	316m NE	Unspecified Tank	1910	120757
D	384m NW	Unspecified Tank	1970 - 1993	132859
D	385m NW	Unspecified Tank	1964 - 1970	144603

This data is sourced from Ordnance Survey / Groundsure.

1.3 Historical energy features

Records within 500m	0

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'.

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	1

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'.

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

ID	Location	Land use	Dates present	Group ID
A	37m SW	Garage	1970	22474

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

2.1 Historical industrial land uses

Records within 500m	17

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 19 >**

ID	Location	Land Use	Date	Group ID
1	**On site**	**Refuse Heap**	**1972**	**809919**
A	34m SW	Garage	1972	826541
2	110m SW	Mill Pond	1972	811694

ID	Location	Land Use	Date	Group ID
3	133m NE	Pumping Station	1972	858556
B	316m NE	Unspecified Tank	1911	923538
B	316m NE	Water Tank	1897	858074
B	318m NE	Unspecified Tank	1949	946394
B	319m NE	Unspecified Tank	1909	876513
B	322m NE	Unspecified Tank	1911	923538
C	339m NW	Unspecified Ground Workings	1949	890531
C	344m NW	Unspecified Ground Workings	1911	960050
C	344m NW	Unspecified Ground Workings	1911	960050
C	345m NW	Unspecified Ground Workings	1909	876804
C	346m NW	Unspecified Heap	1911	844333
C	351m NW	Unspecified Pit	1911	830756
E	410m N	Disused Hydraulic Rams	1909	817612
E	415m N	Disused Hydraulic Rams	1909	817611

This data is sourced from Ordnance Survey / Groundsure.

2.2 Historical tanks

Records within 500m	5

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 19 >

ID	Location	Land Use	Date	Group ID
B	316m NE	Unspecified Tank	1910	120757
D	384m NW	Unspecified Tank	1993	132859
D	385m NW	Unspecified Tank	1964	144603
D	385m NW	Unspecified Tank	1970	144603
D	385m NW	Unspecified Tank	1970	132859

This data is sourced from Ordnance Survey / Groundsure.

2.3 Historical energy features

Records within 500m	0

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'.

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	1

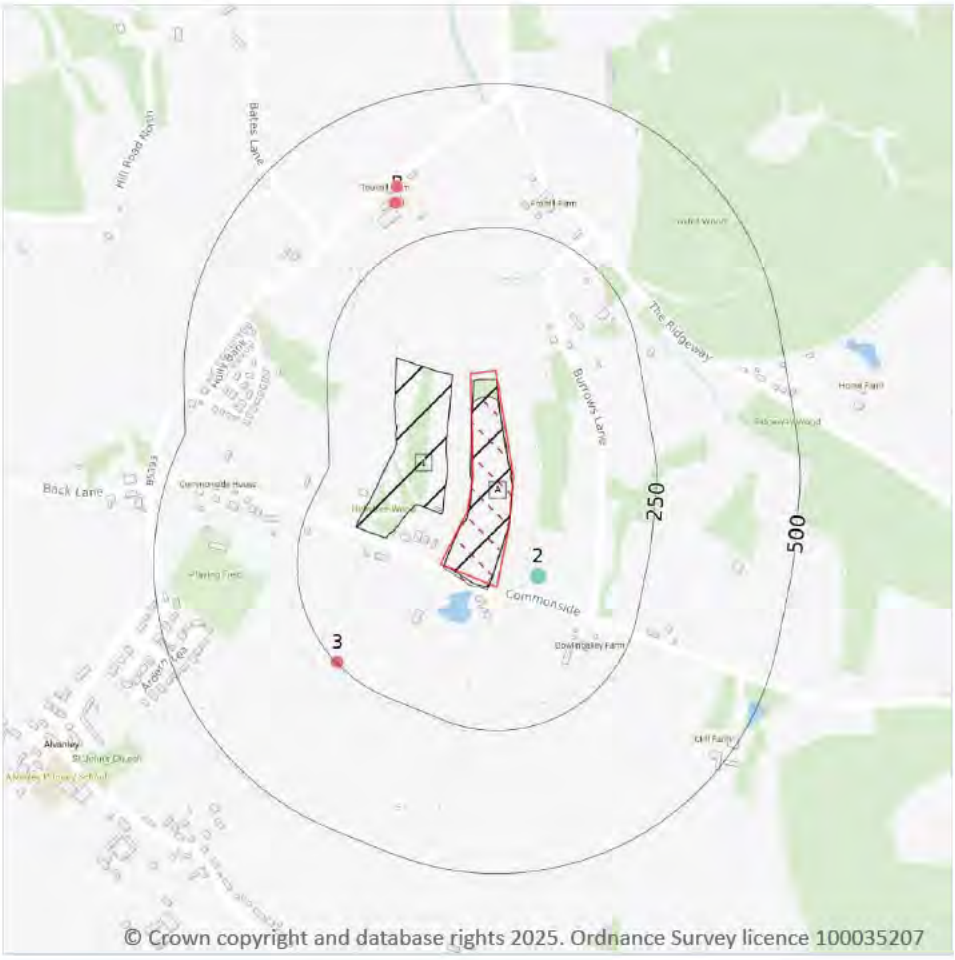
Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 19 >**

ID	Location	Land Use	Date	Group ID
A	37m SW	Garage	1970	22474

This data is sourced from Ordnance Survey / Groundsure.

3 Waste and landfill



Site Outline

Search buffers in metres (m)

Historical landfill (EA/NRW)

Historical landfill (BGS)

Historical landfill (LA/OS)

Waste exemptions

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	1

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.

Features are displayed on the Waste and landfill map on page 22 >

ID	Location	Address	BGS Number	Risk	Waste Type
2	67m SE	Commonside Farm, Alvanley, Runcorn, Cheshire	3055	No risk to aquifer	N/A

This data is sourced from the British Geological Survey.

3.3 Historical landfill (LA/mapping records)

Records within 500m	1

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

Features are displayed on the Waste and landfill map on **page 22 >**

ID	Location	Site address	Source	Data type
A	**On site**	**Refuse Tip**	**1969 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	2

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 22 >**

ID	Location	Details		
A	**On site**	**Site Address: Bank House Farm, Commonside Road, Alvanley, Near Warrington, Cheshire Licence Holder Address: Bank House Farm, Alvanley, near Warrington**	**Waste Licence: - Site Reference: V374,60451 Waste Type: Industrial Environmental Permitting Regulations (Waste) Reference: - Licence Issue: - Licence Surrender: -**	**Operator: Roberts Brothers Licence Holder: Mr W J Snelson First Recorded 31/12/1960 Last Recorded: -**
1	31m N	Site Address: Bank House Farm, Commonside Road, Alvanley, Near Warrington, Cheshire Licence Holder Address: Bank House Farm, Alvanley, near Warrington	Waste Licence: - Site Reference: V374,60451 Waste Type: Industrial Environmental Permitting Regulations (Waste) Reference: - Licence Issue: - Licence Surrender: -	Operator: - Licence Holder: Mr W J Snelson First Recorded - Last Recorded: -

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	20

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.

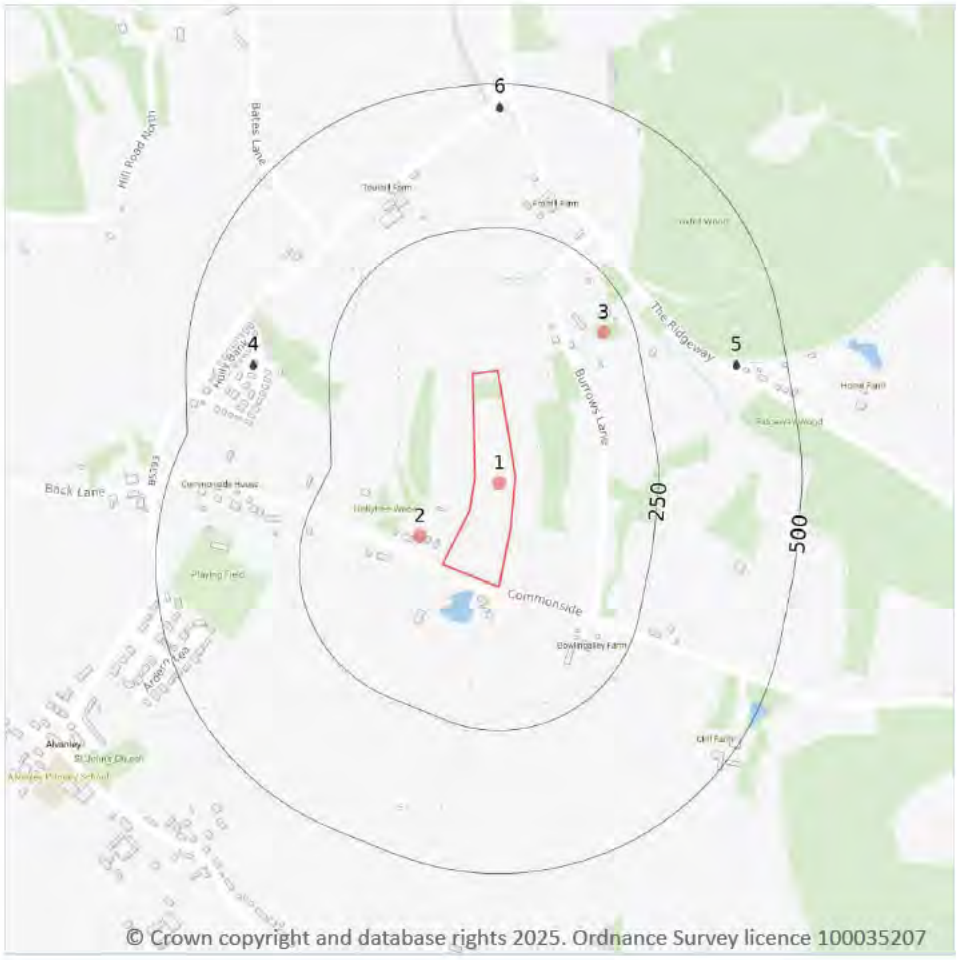
Features are displayed on the Waste and landfill map on page 22 >

ID	Location	Site	Reference	Category	Sub-Category	Description
3	249m SW	-	WEX114967	Storing waste exemption	On a farm	Storage of sludge
B	323m N	Teuthill Farm, Tarvin Road, Frodsham, Wa6 6xh	WEX249423	Using waste exemption	On a farm	Use of waste in construction
B	323m N	Teuthill Farm, Tarvin Road, Frodsham, Wa6 6xh	WEX095046	Treating waste exemption	On a farm	Treatment of non-hazardous pesticide washings by carbon filtration for disposal
B	323m N	Teuthill Farm, Tarvin Road, Frodsham, Wa6 6xh	WEX095046	Disposing of waste exemption	On a farm	Burning waste in the open
B	323m N	Teuthill Farm, Tarvin Road, Frodsham, Wa6 6xh	WEX095046	Using waste exemption	On a farm	Spreading waste on agricultural land to confer benefit
B	323m N	Teuthill Farm, Tarvin Road, Frodsham, Wa6 6xh	WEX095046	Disposing of waste exemption	On a farm	Deposit of waste from dredging of inland waters
B	323m N	Teuthill Farm, Tarvin Road, Frodsham, Wa6 6xh	WEX095046	Storing waste exemption	On a farm	Storage of waste in secure containers

ID	Location	Site	Reference	Category	Sub-Category	Description
B	323m N	Teuthill Farm, Tarvin Road, Frodsham, Wa6 6xh	WEX095046	Treating waste exemption	On a farm	Treatment of waste wood and waste plant matter by chipping, shredding, cutting or pulverising
B	325m N	-	WEX242494	Storing waste exemption	On a farm	Storage of waste in secure containers
B	325m N	-	WEX242494	Disposing of waste exemption	On a farm	Deposit of waste from dredging of inland waters
B	325m N	-	WEX242494	Treating waste exemption	On a farm	Treatment of waste wood and waste plant matter by chipping, shredding, cutting or pulverising
B	325m N	-	WEX242494	Disposing of waste exemption	On a farm	Burning waste in the open
B	325m N	-	WEX242494	Treating waste exemption	On a farm	Treatment of non-hazardous pesticide washings by carbon filtration for disposal
B	325m N	-	WEX242494	Using waste exemption	On a farm	Spreading waste on agricultural land to confer benefit
B	350m N	Teuthill Farm Cheshire Wa6 6xh	EPR/LE5986DZ/A001	Disposing of waste exemption	Agricultural waste only	Deposit of waste from dredging of inland waters
B	350m N	Teuthill Farm Cheshire Wa6 6xh	EPR/LE5986DZ/A001	Treating waste exemption	Agricultural waste only	Treatment of waste wood and waste plant matter by chipping, shredding, cutting or pulverising
B	350m N	Teuthill Farm Cheshire Wa6 6xh	EPR/LE5986DZ/A001	Storing waste exemption	Non-agricultural waste only	Storage of waste in secure containers
B	350m N	Teuthill Farm Cheshire Wa6 6xh	EPR/LE5986DZ/A001	Disposing of waste exemption	Agricultural waste only	Burning waste in the open
B	350m N	Teuthill Farm Cheshire Wa6 6xh	EPR/LE5986DZ/A001	Treating waste exemption	Agricultural waste only	Treatment of non-hazardous pesticide washings by carbon filtration for disposal
B	350m N	Teuthill Farm Cheshire Wa6 6xh	EPR/LE5986DZ/A001	Using waste exemption	Agricultural waste only	Spreading waste on agricultural land to confer benefit

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

4 Current industrial land use



Site Outline

Search buffers in metres (m)

Recent industrial land uses

Licensed Discharges to controlled waters

4.1 Recent industrial land uses

Records within 250m	3

Current potentially contaminative industrial sites.

Features are displayed on the Current industrial land use map on page 26 >

ID	Location	Company	Address	Activity	Category
1	**On site**	**Refuse Tip**	**Cheshire, WA6**	**Refuse Disposal Facilities**	**Infrastructure and Facilities**
2	57m SW	Cheshire Woodworking	Alvanley Garage, Commonside, Alvanley, Frodsham, Cheshire, WA6 9HB	Furniture	Consumer Products

ID	Location	Company	Address	Activity	Category
3	196m NE	Pumping Station	Cheshire, WA6	Water Pumping Stations	Industrial Features

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	3

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

Features are displayed on the Current industrial land use map on page 26 >

ID	Location	Address	Details	
4	383m NW	COMMONSIDECARAVANPARKPS ,HELSBY,CHESHIRE	Effluent Type: SEWAGE DISCHARGES - PUMPING STATION - WATER COMPANY Permit Number: 016881723 Permit Version: 1 Receiving Water: LORDSHIP MARSH	Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: - Effective Date: 30/09/1994 Revocation Date: -
5	412m NE	THELODGESTP,THERIDGEWAYC OUNTRYHOLIDAYPARK,RIDGEW AY,FRODSHAM,CHESHIRE,WA66 XQ	Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: EPRCB3251TT Permit Version: 1 Receiving Water: GW VIA AN INFILTRATION SYSTEM	Status: NEW ISSUED UNDER EPR 2010 Issue date: 17/05/2024 Effective Date: 17/05/2024 Revocation Date: -
6	461m N	FOXHILLWATERTREATMENTWO RKS,THERIDGEWAY,ALVANLEY,H ELSBY,CHESHIRE,WA66XG	Effluent Type: TRADE DISCHARGES - PROCESS EFFLUENT - WATER COMPANY (WTW) Permit Number: 016892528 Permit Version: 1 Receiving Water: DITCH DISCHARGING TO TRIB OF	Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 29/11/2006 Effective Date: 29/11/2006 Revocation Date: -

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	0

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

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.

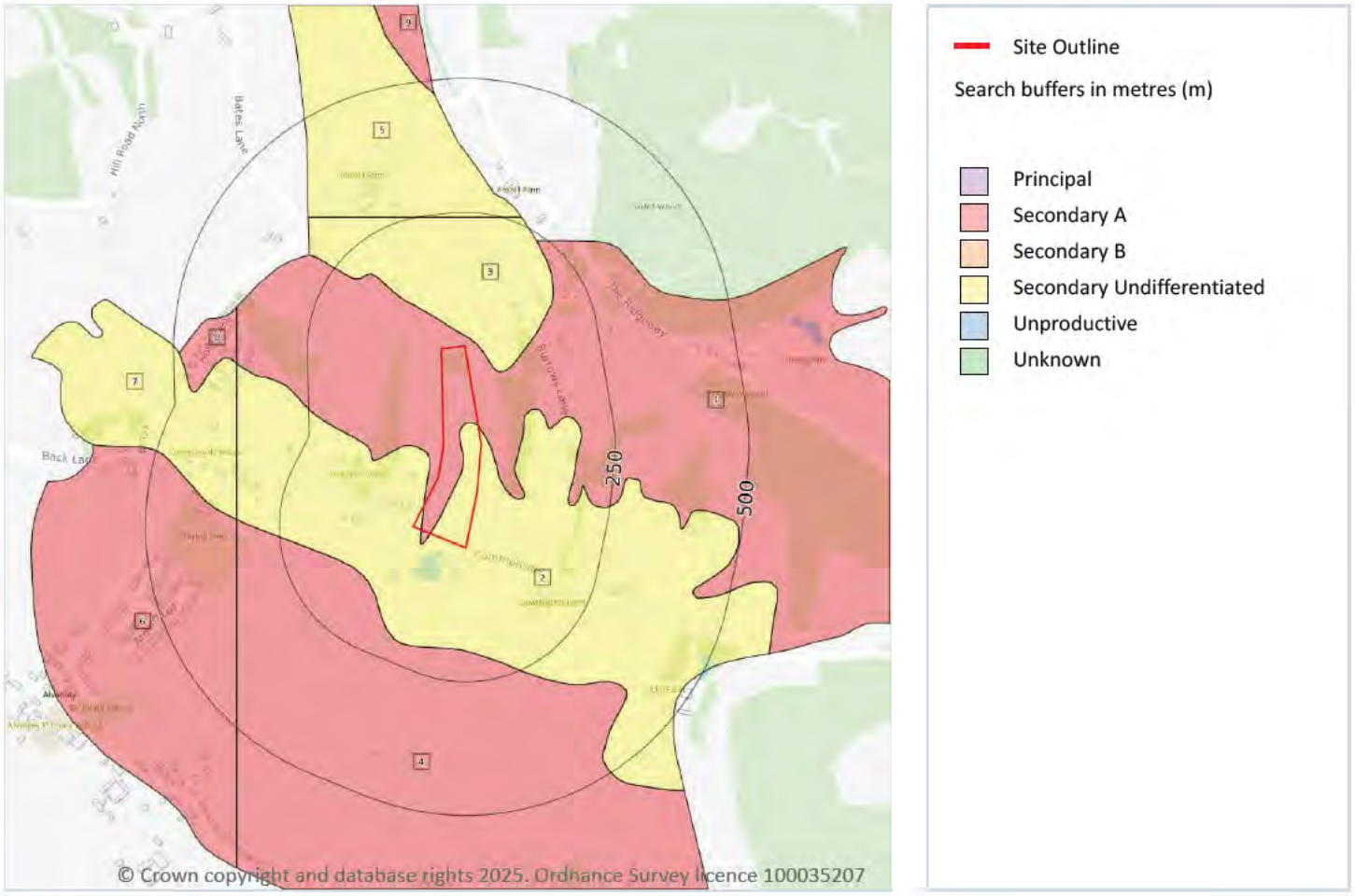
4.21 Pollution inventory radioactive waste

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



5.1 Superficial aquifer

Records within 500m	9

Aquifer status of groundwater held within superficial geology.

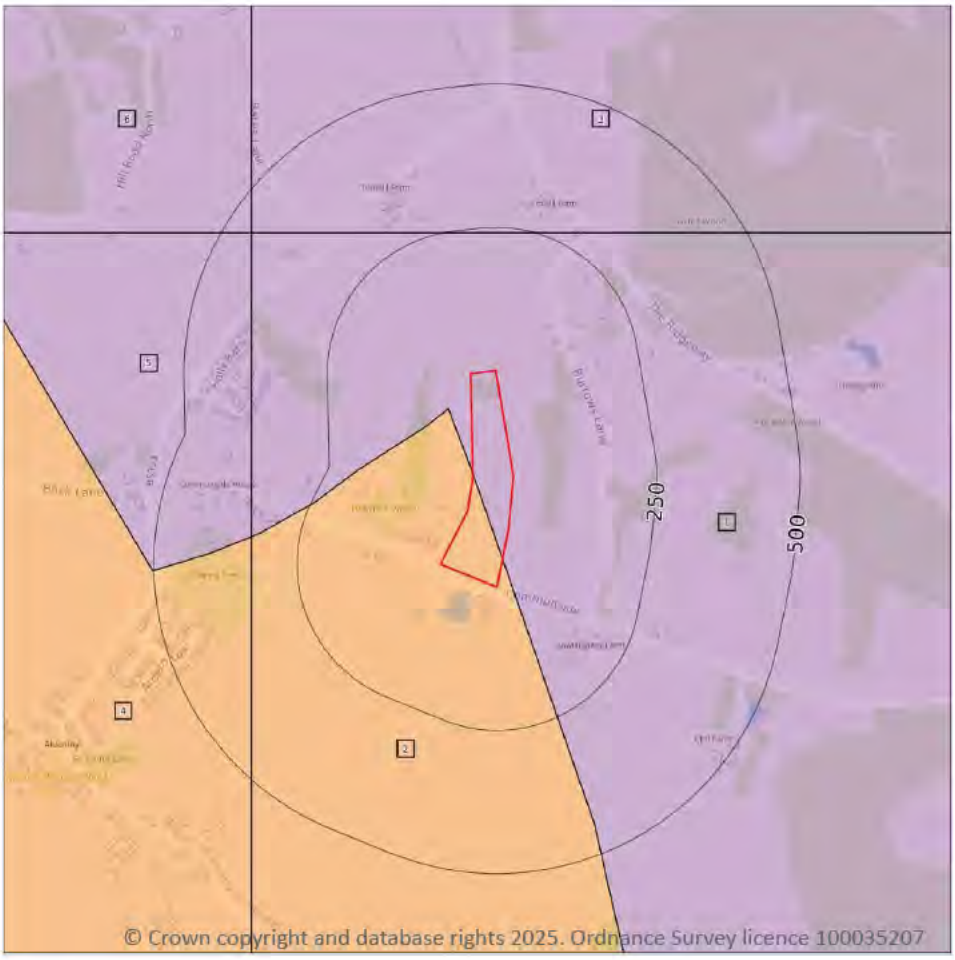
Features are displayed on the Hydrogeology map on page 32 >

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	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

ID	Location	Designation	Description
3	17m N	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
4	131m SW	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
5	241m N	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
6	330m W	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
7	330m W	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
8	383m NW	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
9	475m N	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



Site Outline

Search buffers in metres (m)

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

5.2 Bedrock aquifer

Records within 500m	6

Aquifer status of groundwater held within bedrock geology.

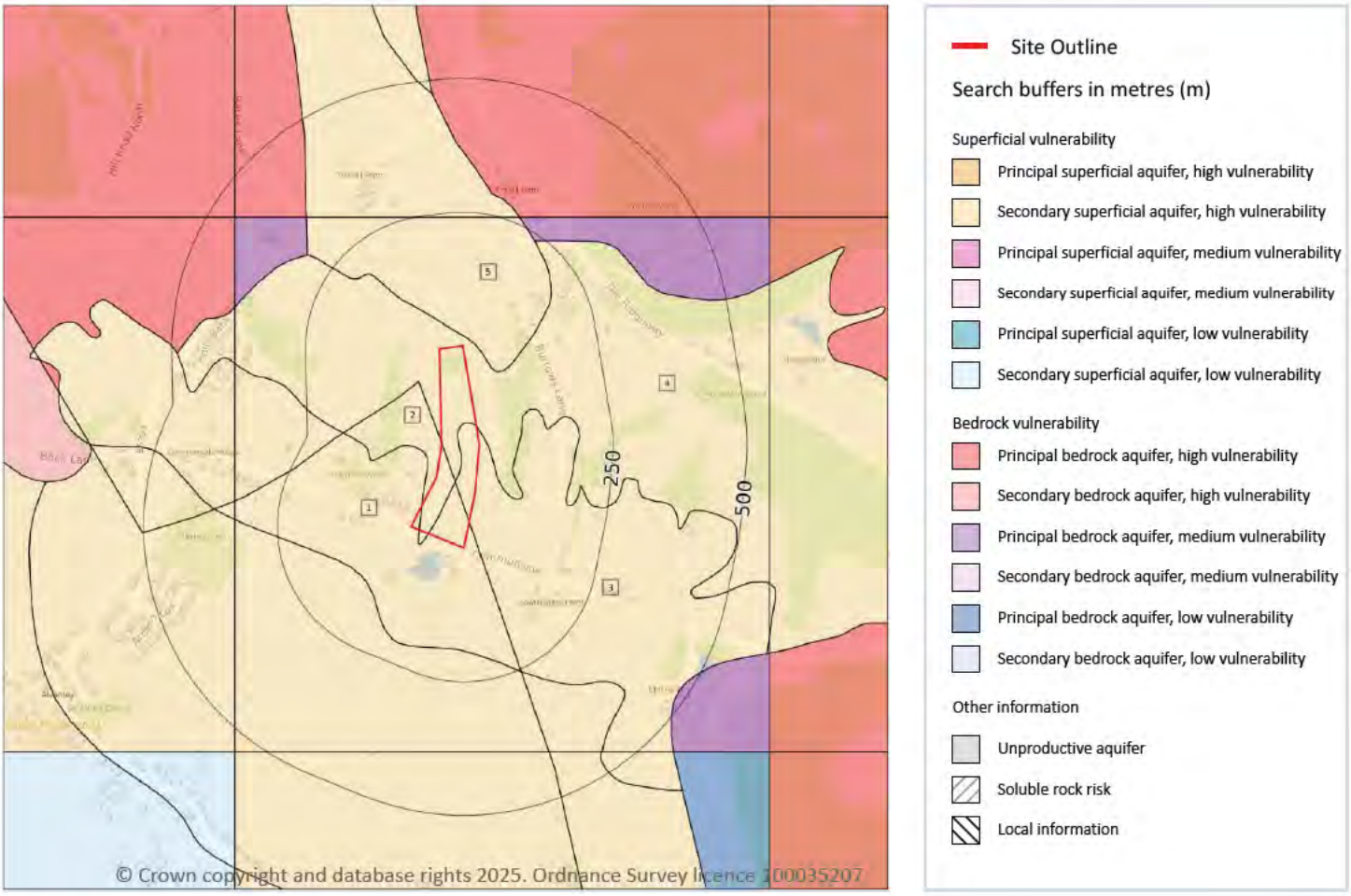
Features are displayed on the Bedrock aquifer map on page 34 >

ID	Location	Designation	Description
1	On site	Principal	Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers
2	On site	Secondary B	Predominantly lower permeability layers which may store/yield limited amounts of groundwater due to localised features such as fissures, thin permeablehorizons and weathering. These are generally the water-bearing parts of the former non-aquifers

ID	Location	Designation	Description
3	241m N	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
4	330m W	Secondary B	Predominantly lower permeability layers which may store/yield limited amounts of groundwater due to localised features such as fissures, thin permeablehorizons and weathering. These are generally the water-bearing parts of the former non-aquifers
5	334m W	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
6	455m NW	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	5

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 36 >

ID	Location	Summary	Soil / surface	Superficial geology	Bedrock geology
1	On site	Summary Classification: Secondary superficial aquifer - High Vulnerability Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer	Leaching class: High Infiltration value: >70% Dilution value: 300-550mm/year	Vulnerability: High Aquifer type: Secondary Thickness: >10m Patchiness value: <90% Recharge potential: Low	Vulnerability: Medium Aquifer type: Secondary Flow mechanism: Well connected fractures
2	On site	Summary Classification: Secondary superficial aquifer - High Vulnerability Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer	Leaching class: High Infiltration value: >70% Dilution value: 300-550mm/year	Vulnerability: High Aquifer type: Secondary Thickness: >10m Patchiness value: <90% Recharge potential: Low	Vulnerability: Medium Aquifer type: Secondary Flow mechanism: Well connected fractures
3	On site	Summary Classification: Secondary superficial aquifer - High Vulnerability Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer	Leaching class: High Infiltration value: >70% Dilution value: 300-550mm/year	Vulnerability: High Aquifer type: Secondary Thickness: >10m Patchiness value: <90% Recharge potential: Low	Vulnerability: Medium Aquifer type: Principal Flow mechanism: Well connected fractures
4	On site	Summary Classification: Secondary superficial aquifer - High Vulnerability Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer	Leaching class: High Infiltration value: >70% Dilution value: 300-550mm/year	Vulnerability: High Aquifer type: Secondary Thickness: >10m Patchiness value: <90% Recharge potential: Low	Vulnerability: Medium Aquifer type: Principal Flow mechanism: Well connected fractures
5	17m N	Summary Classification: Secondary superficial aquifer - High Vulnerability Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer	Leaching class: High Infiltration value: >70% Dilution value: 300-550mm/year	Vulnerability: High Aquifer type: Secondary Thickness: >10m Patchiness value: <90% Recharge potential: Low	Vulnerability: Medium Aquifer type: Principal 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.

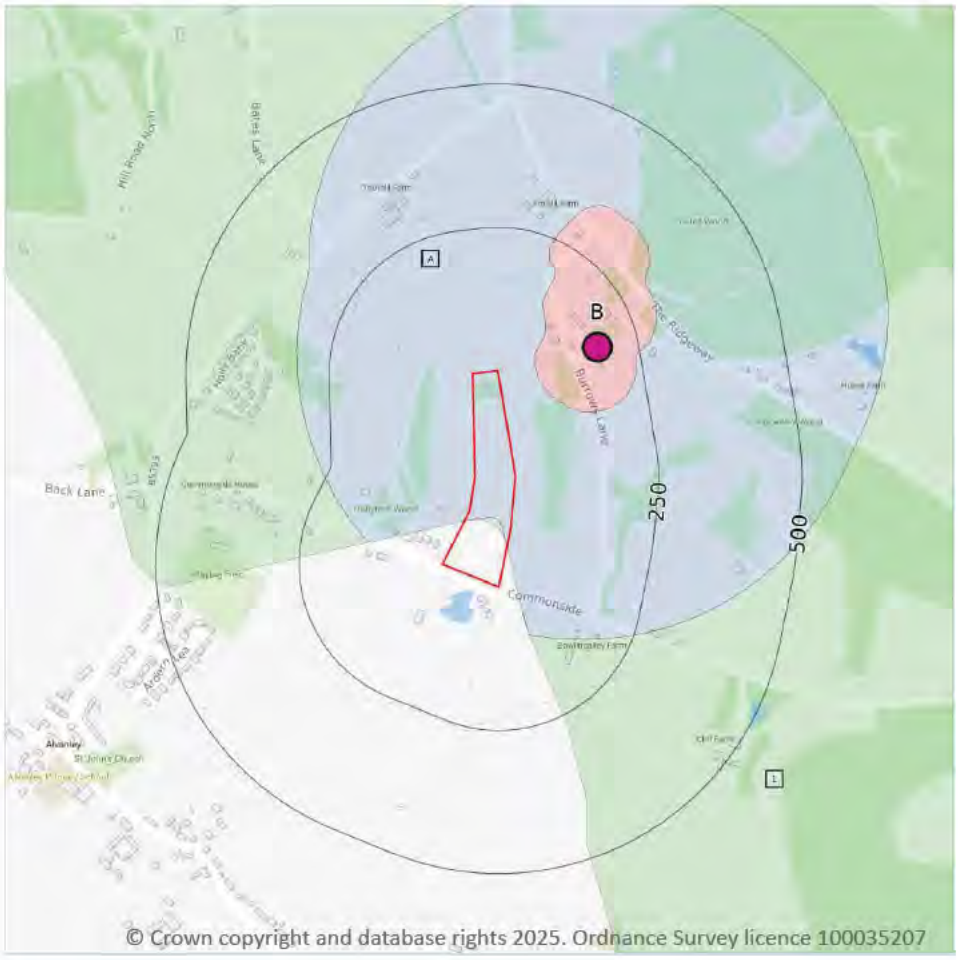
5.5 Groundwater vulnerability- local information

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	5

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 39 >

ID	Location	Details	
B	178m NE	Status: Active Licence No: 2568005009 Details: Potable Water Supply - Direct Direct Source: Ground Water - North West Region Point: BOREHOLES (3) AT FOXHILL PUMPING STATION Data Type: Point Name: United Utilities Water Ltd Easting: 350600 Northing: 374800	Annual Volume (m^3): 2728000 Max Daily Volume (m^3): 13700 Original Application No: 1556 Original Start Date: 15/03/1966 Expiry Date: - Issue No: 100 Version Start Date: 15/03/1966 Version End Date: -
-	1577m E	Status: Historical Licence No: 2568005018 Details: General use relating to Secondary Category (Medium Loss) Direct Source: Ground Water - North West Region Point: "B/HOLE ON LAND@ THE PADDOCKS, MANLEY RD, KINGSWOOD, FRODSHAM" Data Type: Point Name: STUBBOCK Easting: 352000 Northing: 374200	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 23/05/1994 Expiry Date: - Issue No: 100 Version Start Date: 23/05/1994 Version End Date: -
-	1577m E	Status: Historical Licence No: 2568005018 Details: General use relating to Secondary Category (Medium Loss) Direct Source: Ground Water - North West Region Point: B/HOLE ON LAND@ THE PADDOCKS, MANLEY RD, KINGSWOOD, FRODSHAM Data Type: Point Name: STUBBOCK Easting: 352000 Northing: 374200	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 23/05/1994 Expiry Date: - Issue No: 100 Version Start Date: 23/05/1994 Version End Date: -
-	1615m S	Status: Historical Licence No: 2568005010 Details: General use relating to Secondary Category (Medium Loss) Direct Source: Ground Water - North West Region Point: "SPRING AT MANLEY OLD HALL, MANLEY" Data Type: Point Name: G J FORD & SONS Easting: 350100 Northing: 372800	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 31/05/1966 Expiry Date: - Issue No: 100 Version Start Date: 01/01/1988 Version End Date: -

ID	Location	Details	
-	1615m S	Status: Historical Licence No: 2568005010 Details: General use relating to Secondary Category (Medium Loss) Direct Source: Ground Water - North West Region Point: SPRING AT MANLEY OLD HALL, MANLEY Data Type: Point Name: G J FORD & SONS Easting: 350100 Northing: 372800	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 31/05/1966 Expiry Date: - Issue No: 100 Version Start Date: 01/01/1988 Version End Date: -

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

5.7 Surface water abstractions

Records within 2000m 9

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 39 >

ID	Location	Details	
-	1573m S	Status: Historical Licence No: 2568005003 Details: Transfer between sources Direct Source: "Surface, Non-Tidal - North West Region" Point: "RESERVOIR FED BY MOORS BRK, MANLEY, WARRINGTON" Data Type: Point Name: G J FORD & SONS Easting: 349900 Northing: 372900	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 15/02/1966 Expiry Date: - Issue No: 100 Version Start Date: 03/03/1995 Version End Date: -
-	1573m S	Status: Historical Licence No: 2568005003 Details: Transfer Between Sources (Pre Water Act 2003) Direct Source: Surface, Non-Tidal - North West Region Point: RESERVOIR FED BY MOORS BRK, MANLEY, WARRINGTON Data Type: Point Name: FORD Easting: 349900 Northing: 372900	Annual Volume (m^3): 6819.14 Max Daily Volume (m^3): 227.30 Original Application No: 420 Original Start Date: 15/02/1966 Expiry Date: - Issue No: 101 Version Start Date: 16/07/2007 Version End Date: -

ID	Location	Details	
-	1876m S	Status: Historical Licence No: 2568005019 Details: Spray Irrigation - Direct Direct Source: Surface, Non-Tidal - North West Region Point: FOUR PONDS ON UNNAMED TRIBUTARY OF MOOR'S BROOK IN MANLEY [6 Data Type: Point Name: G J FORD & SONS Easting: 350200 Northing: 372520	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 21/06/1995 Expiry Date: - Issue No: 100 Version Start Date: 21/06/1995 Version End Date: -
-	1945m N	Status: Historical Licence No: 2568005017 Details: Spray Irrigation - Direct Direct Source: "Surface, Non-Tidal - North West Region" Point: "UNNAMED WATERCOURSE FEEDING A POND AT GODSCROFT HALL,FRODSH" Data Type: Point Name: T L WARBURTON & COMPANY Easting: 350300 Northing: 376700	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 25/09/1991 Expiry Date: - Issue No: 100 Version Start Date: 25/09/1991 Version End Date: -
-	1945m N	Status: Historical Licence No: 2568005017 Details: Spray Irrigation - Direct Direct Source: Surface, Non-Tidal - North West Region Point: UNNAMED WATERCOURSE FEEDING A POND AT GODSCROFT HALL,FRODSH Data Type: Point Name: T L WARBURTON & COMPANY Easting: 350300 Northing: 376700	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 25/09/1991 Expiry Date: - Issue No: 100 Version Start Date: 25/09/1991 Version End Date: -
-	1945m N	Status: Historical Licence No: 2568005017 Details: Spray Irrigation - Direct Direct Source: Surface, Non-Tidal - North West Region Point: UNNAMED WATERCOURSE FEEDING POND AT GODSCROFT HALL FRODSHAM Data Type: Point Name: WARBURTON Easting: 350300 Northing: 376700	Annual Volume (m^3): 9092 Max Daily Volume (m^3): 454.60 Original Application No: - Original Start Date: 25/09/1991 Expiry Date: - Issue No: 101 Version Start Date: 15/03/2007 Version End Date: -

ID	Location	Details	
-	1946m S	Status: Historical Licence No: 2568005019 Details: Spray Irrigation - Direct Direct Source: Surface, Non-Tidal - North West Region Point: FOUR PONDS ON UNNAMED TRIBUTARY OF MOOR'S BROOK IN MANLEY*20 Data Type: Point Name: G J FORD & SONS Easting: 350120 Northing: 372460	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 21/06/1995 Expiry Date: - Issue No: 100 Version Start Date: 21/06/1995 Version End Date: -
-	1958m S	Status: Historical Licence No: 2568005019 Details: Spray Irrigation - Direct Direct Source: Surface, Non-Tidal - North West Region Point: FOUR PONDS ON UNNAMED TRIBUTARYOF MOOR'S BROOK IN MANLEY64 Data Type: Point Name: G J FORD & SONS Easting: 350050 Northing: 372460	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 21/06/1995 Expiry Date: - Issue No: 100 Version Start Date: 21/06/1995 Version End Date: -
-	1971m S	Status: Historical Licence No: 2568005019 Details: Spray Irrigation - Direct Direct Source: Surface, Non-Tidal - North West Region Point: FOUR PONDS ON UNNAMED TRIBUTARY OF MOOR'S BROOK IN MANLEY Data Type: Point Name: G J FORD & SONS Easting: 349950 Northing: 372470	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 21/06/1995 Expiry Date: - Issue No: 100 Version Start Date: 21/06/1995 Version End Date: -

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

5.8 Potable abstractions

Records within 2000m	1

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 39 >

ID	Location	Details	
B	178m NE	Status: Active Licence No: 2568005009 Details: Potable Water Supply - Direct Direct Source: Ground Water - North West Region Point: BOREHOLES (3) AT FOXHILL PUMPING STATION Data Type: Point Name: United Utilities Water Ltd Easting: 350600 Northing: 374800	Annual Volume (m^3): 2728000 Max Daily Volume (m^3): 13700 Original Application No: 1556 Original Start Date: 15/03/1966 Expiry Date: - Issue No: 100 Version Start Date: 15/03/1966 Version End Date: -

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

5.9 Source Protection Zones

Records within 500m **3**

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 39 >

ID	Location	Type	Description
1	**On site**	**3**	**Total catchment**
A	**On site**	**2**	**Outer catchment**
A	66m N	1	Inner 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	2

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 45 >

ID	Location	Type of water feature	Ground level	Permanence	Name
A	161m N	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-

ID	Location	Type of water feature	Ground level	Permanence	Name
5	166m SW	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	2

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 45 >

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 45 >

ID	Location	Type	Water body catchment	Water body ID	Operational catchment	Management catchment
1	**On site**	**River**	**Weaver (Dane to Frodsham)**	**GB112068060500**	**Weaver Lower**	**Weaver Gowy**

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 45 >

ID	Location	Type	Name	Water body ID	Overall rating	Chemical rating	Ecological rating	Year
-	4394m N	River	Weaver (Dane to Frodsham)	GB112068060500 ↗	Moderate	Fail	Moderate	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 45 >

ID	Location	Name	Water body ID	Overall rating	Chemical rating	Quantitative	Year
2	**On site**	**Wirral and West Cheshire Permo-Triassic Sandstone Aquifers**	GB41101G202600 ↗	**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, 0.3m - 1.0m**
Highest risk within 50m	**1 in 30 year, 0.3m - 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 51 >

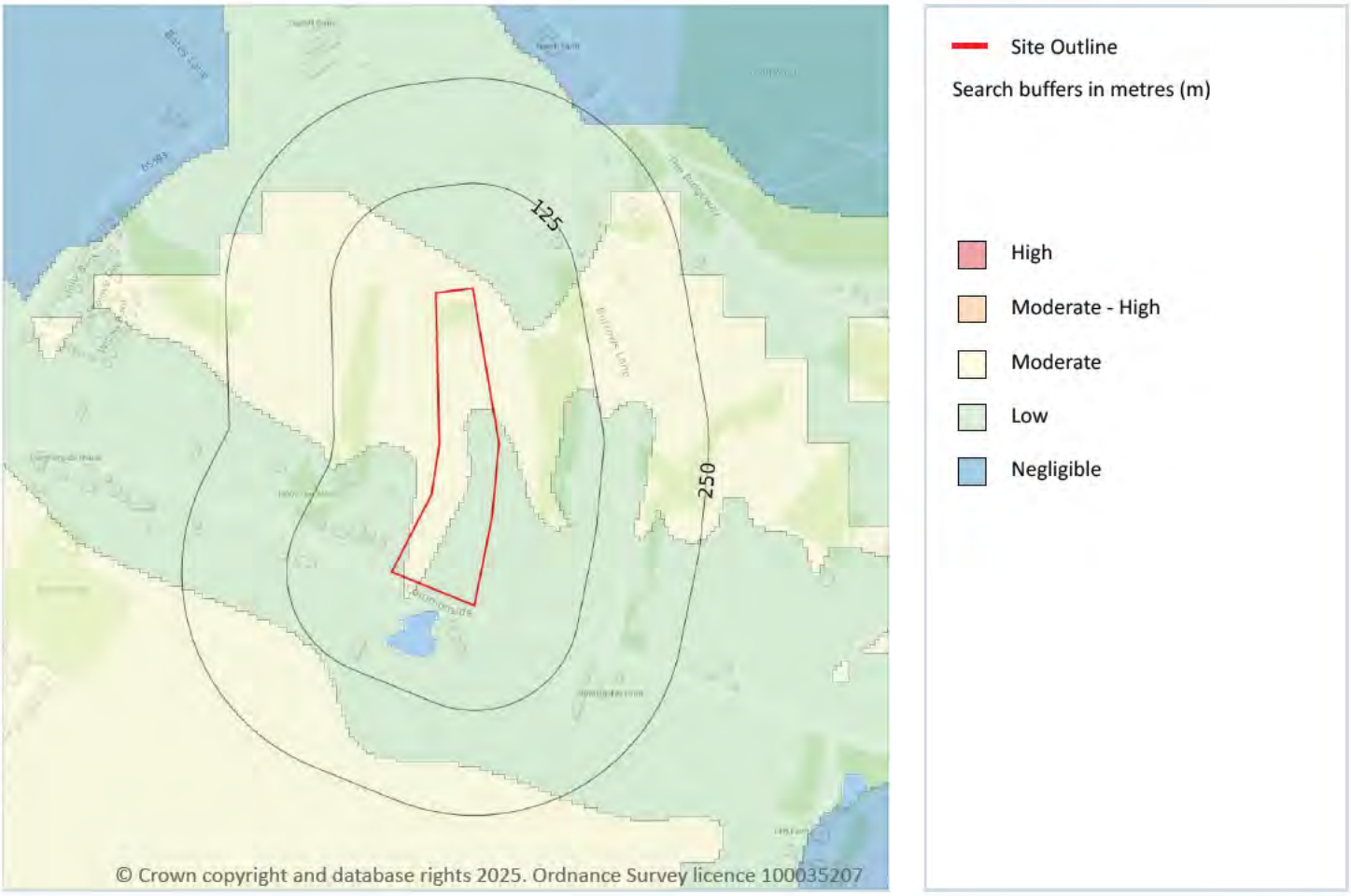
The data shown on the map and in the table above shows the highest likelihood of flood events happening at the site. Lower likelihood events may have greater flood depths and hence a greater potential impact on a site.

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	Between 0.3m and 1.0m
1 in 250 year	Between 0.3m and 1.0m
1 in 100 year	Between 0.3m and 1.0m
1 in 30 year	Between 0.3m and 1.0m

This data is sourced from Ambiental Risk Analytics.

9 Groundwater flooding



9.1 Groundwater flooding

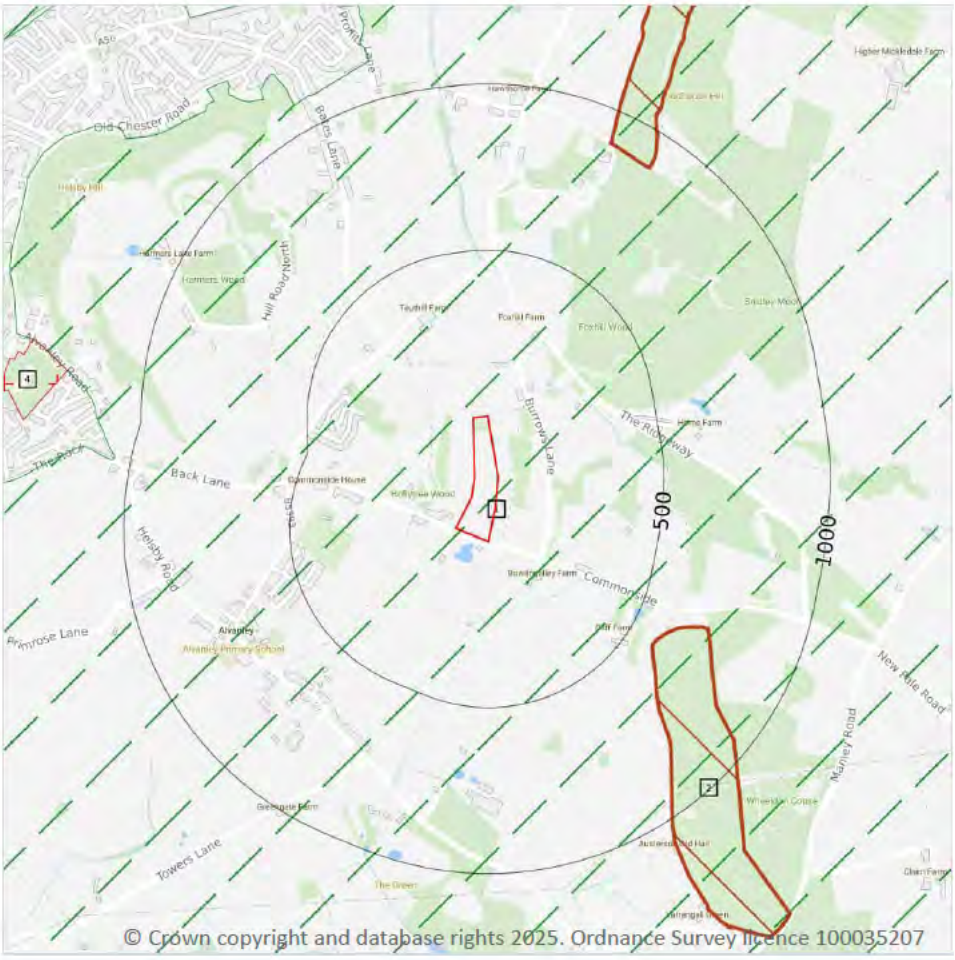
Highest risk on site	**Moderate**
Highest risk within 50m	**Moderate**

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 53 >**

This data is sourced from Ambiental Risk Analytics.

10 Environmental designations



Site Outline

Search buffers in metres (m)

- Sites of Special Scientific Interest (SSSI)
- Local Nature Reserves (LNR)
- Designated Ancient Woodland
- Green Belt

10.1 Sites of Special Scientific Interest (SSSI)

Records within 2000m	1

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.

Features are displayed on the Environmental designations map on page 54 >

ID	Location	Name	Data source
-	1585m NE	Dunsdale Hollow	Natural England

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	1

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.

Features are displayed on the Environmental designations map on page 54 >

ID	Location	Name	Data source
4	1231m W	Helsby Quarry	Natural England

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.7 Designated Ancient Woodland

Records within 2000m	3

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 54 >

ID	Location	Name	Woodland Type
2	584m SE	Alvanley Cliff	Ancient & Semi-Natural Woodland
3	891m NE	Dunsdale Hollow/overton Hill Woods	Ancient & Semi-Natural Woodland
-	1397m S	Moors Brook 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	1

Areas designated to prevent urban sprawl by keeping land permanently open.

Features are displayed on the Environmental designations map on page 54 >

ID	Location	Name	Local Authority name
1	On site	Merseyside and Greater Manchester Green Belt	Cheshire West and Chester

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	7

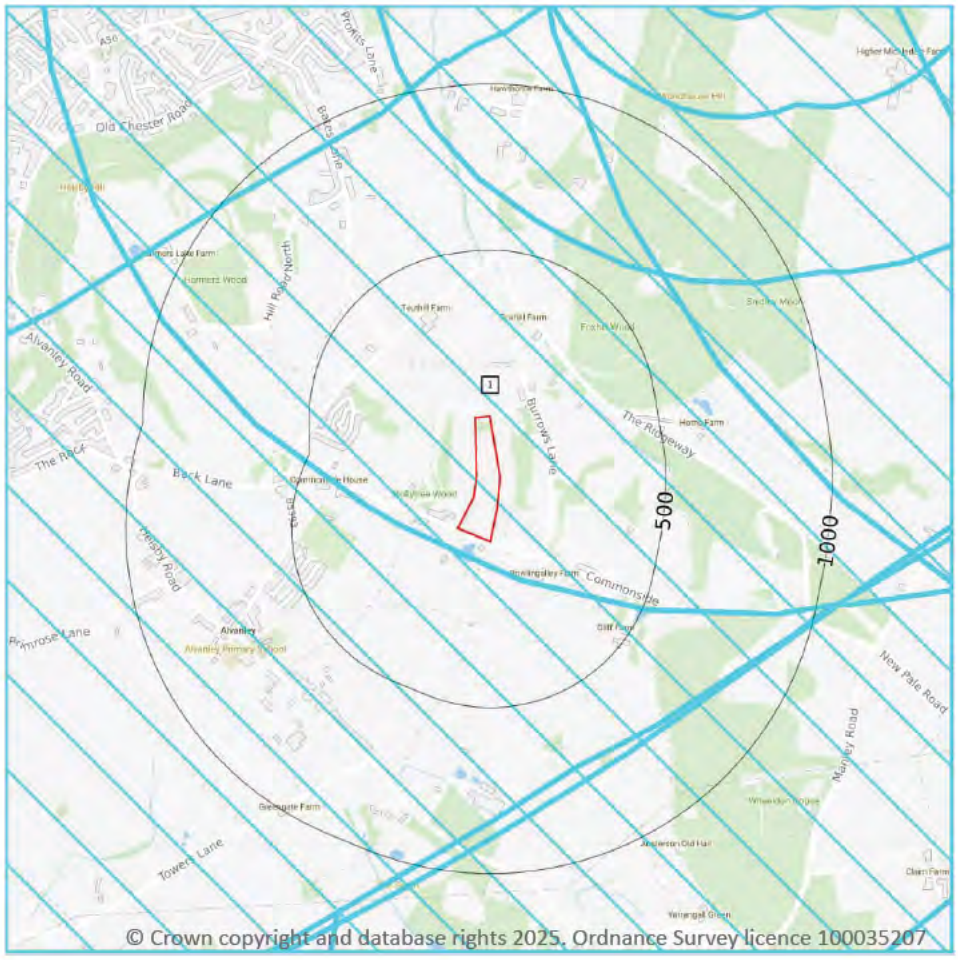
Areas at risk from agricultural nitrate pollution designated under the EC Nitrate Directive (91/676/EEC). These are areas of land that drain into waters polluted by nitrates. Farmers operating within these areas have to follow mandatory rules to tackle nitrate loss from agriculture.

Location	Name	Type	NVZ ID	Status
On site	**Peckmill Brook, Hoolpool Gutter at Ince Marshes. NVZ**	**Surface Water**	**635**	**Existing**

Location	Name	Type	NVZ ID	Status
On site	**Delamere Sandstone**	**Groundwater**	**46**	**Existing**
1222m N	Peckmill Brook, Hoolpool Gutter at Ince Marshes. NVZ	Surface Water	635	Existing
1248m N	Delamere Sandstone	Groundwater	46	Existing
1311m N	Delamere Sandstone	Groundwater	46	Existing
1500m NW	Delamere Sandstone	Groundwater	46	Existing
1604m E	River Weaver (Dane to Frodsham) NVZ	Surface Water	636	Existing

This data is sourced from Natural England and Natural Resources Wales.

SSSI Impact Zones and Units



Site Outline

Search buffers in metres (m)

SSSI Impact Risk Zones

SSSI Units

- Not recorded
- Favourable
- Unfavourable - Recovering
- Unfavourable - No change
- Unfavourable - Declining
- Partially destroyed
- Destroyed

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 60 >

ID	Location	Type of developments requiring consultation
1	On site	**Infrastructure - Pipelines and underground cables, pylons and overhead cables. Any transport proposal including road, rail and by water (excluding routine maintenance). Airports, helipads and other aviation proposals. Wind and Solar - Solar schemes with footprint > 0.5ha, all wind turbines. Minerals, Oil and Gas - Planning applications for quarries: new proposals or extensions, outside or extending outside existing settlements/urban areas affecting greenspace, farmland or semi natural habitats. Oil & gas exploration/extraction. Rural non-residential - Large non residential developments outside existing settlements/urban areas where footprint exceeds 1ha. Rural residential - Any residential development of 50 or more houses outside existing settlements/urban areas. Air pollution - Any industrial/agricultural development that could cause AIR POLLUTION (incl: industrial processes, livestock & poultry units with floorspace > 500m², slurry lagoons & digestate stores > 200m², manure stores > 250t). Combustion - General combustion processes >20MW 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. Composting - Any composting proposal with more than 75000 tonnes maximum annual operational throughput. Incl: open windrow composting, in-vessel composting, anaerobic digestion, other waste management. 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. Notes: New residential developments in this area should consider recreational disturbance impacts on the coastal designated sites. Please consider this issue in the HRA screening.**

This data is sourced from Natural England.

10.18 SSSI Units

Records within 2000m	1

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.

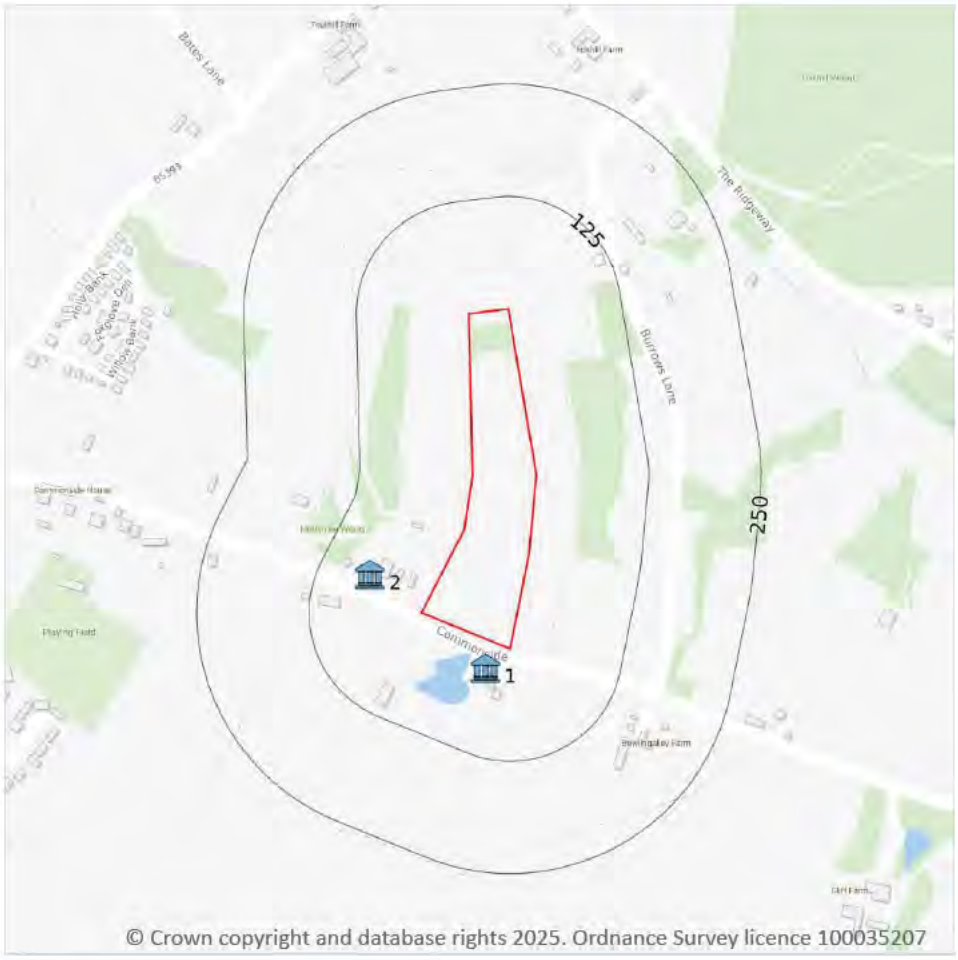
Features are displayed on the SSSI Impact Zones and Units map on page 60 >

ID:	-
Location:	1585m NE
SSSI name:	Dunsdale Hollow
Unit name:	Dunsdale Hollow
Broad habitat:	Broadleaved, Mixed And Yew Woodland - Lowland
Condition:	Favourable
Reportable features:	

Feature name	Feature condition	Date of assessment
Lowland mixed deciduous woodland	Favourable	06/10/2006

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	2

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.

Features are displayed on the Visual and cultural designations map on **page 63 >**

ID	Location	Name	Grade	Reference Number	Listed date
1	30m S	Commonside Farmhouse	II	1138481	08/07/1977
2	70m SW	Holly Tree Cottage	II	1138480	04/03/1982

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.

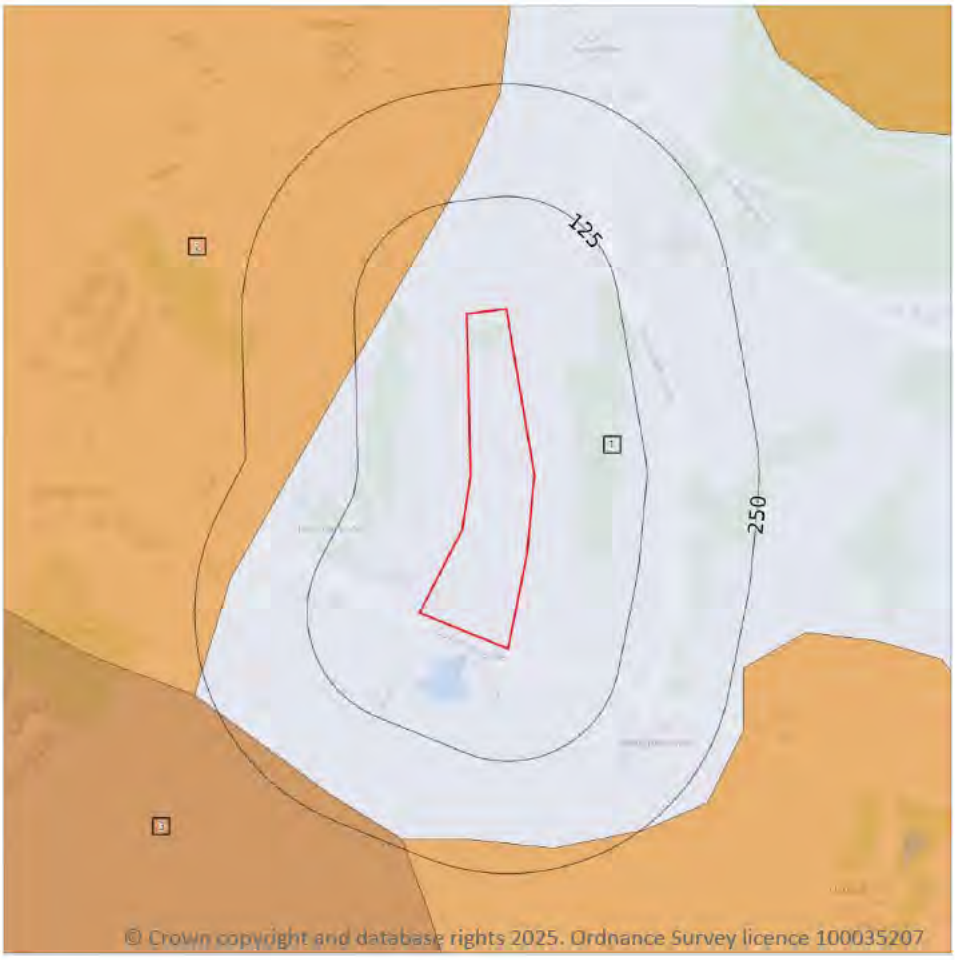
11.7 Registered Parks and Gardens

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	3

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 66 >

ID	Location	Classification	Description
1	On site	Grade 4	**Poor quality agricultural land. Land with severe limitations which significantly restrict the range of crops and/or level of yields. It is mainly suited to grass with occasional arable crops (e.g. cereals and forage crops) the yields of which are variable. In moist climates, yields of grass may be moderate to high but there may be difficulties in utilisation. The grade also includes very droughty arable land.**

ID	Location	Classification	Description
2	81m N	Grade 3	Good to moderate quality agricultural land. Land with moderate limitations which affect the choice of crops, timing and type of cultivation, harvesting or the level of yield. Where more demanding crops are grown yields are generally lower or more variable than on land in Grades 1 and 2.
3	222m SW	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.

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	0

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.

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	1

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.

Location	Reference	Scheme	Start Date	End Date
222m S	1239432	Countryside Stewardship (Middle Tier)	01/01/2022	31/12/2026

This data is sourced from Natural England.

13 Habitat designations

13.1 Priority Habitat Inventory

Records within 250m	0

Habitats of principal importance as named under Natural Environment and Rural Communities Act (2006) Section 41.

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.

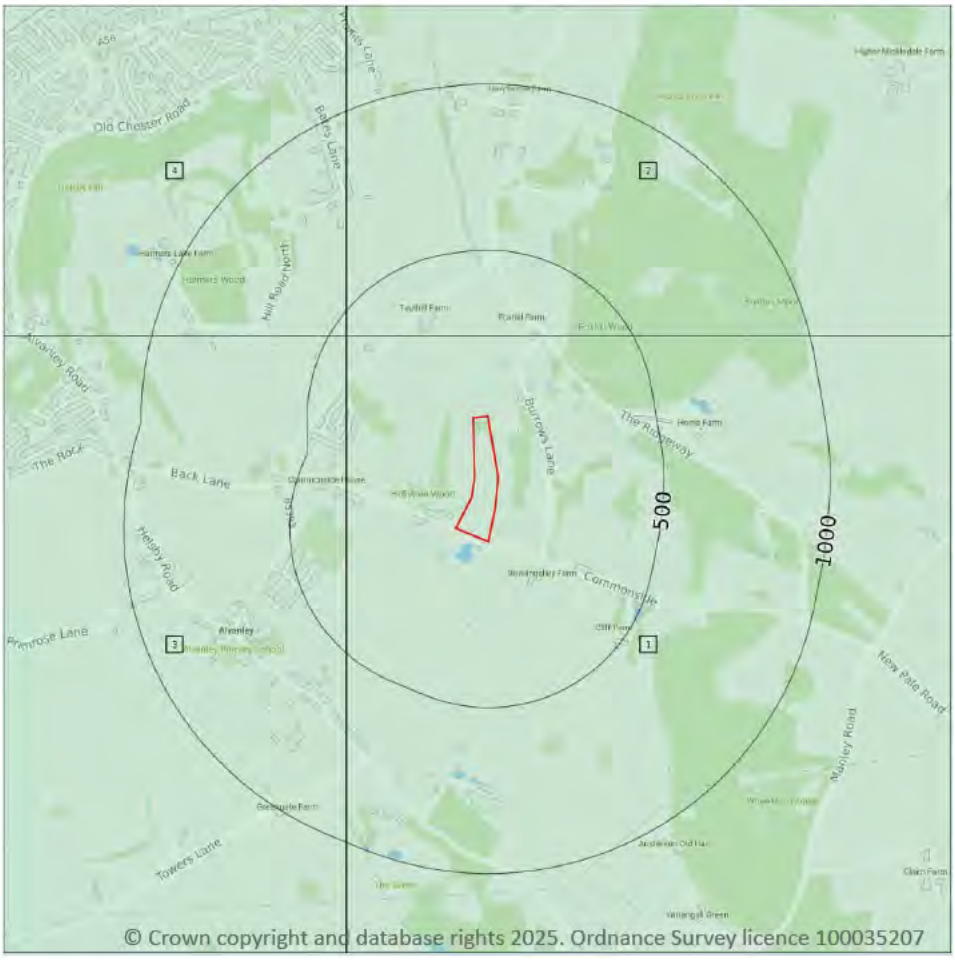
13.4 Limestone Pavement Orders

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



Site Outline

Search buffers in metres (m)

Full coverage

Partial coverage

No coverage

14.1 10k Availability

Records within 500m **4**

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 70 >

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	**On site**	**No coverage**	**Full**	**Full**	**No coverage**	**SJ57SW**
2	241m N	No coverage	Full	Full	No coverage	SJ57NW
3	330m W	No coverage	Full	Full	No coverage	SJ47SE
4	455m NW	No coverage	Full	Full	No coverage	SJ47NE

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Artificial and made ground

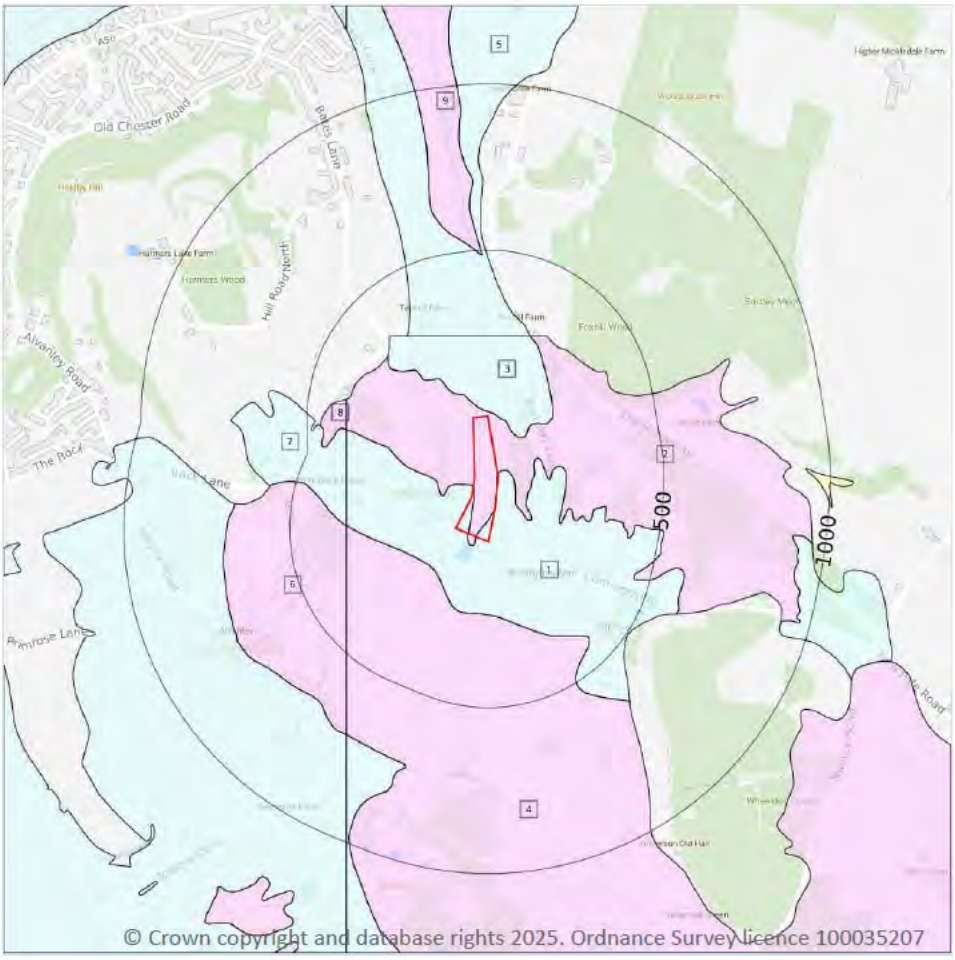
14.2 Artificial and made ground (10k)

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



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 9

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 73 >

ID	Location	LEX Code	Description	Rock description
1	**On site**	**TILLD-DMTN**	**Till, Devensian - Diamicton**	**Diamicton**
2	**On site**	**GFDUD-XSV**	**Glaciofluvial Deposits, Devensian - Sand And Gravel**	**Sand And Gravel**
3	13m N	TILLD-DMTN	Till, Devensian - Diamicton	Diamicton

ID	Location	LEX Code	Description	Rock description
4	137m SW	GFDUD-XSV	Glaciofluvial Deposits, Devensian - Sand And Gravel	Sand And Gravel
5	241m N	TILLD-DMTN	Till, Devensian - Diamicton	Diamicton
6	330m W	GFDUD-XSV	Glaciofluvial Deposits, Devensian - Sand And Gravel	Sand And Gravel
7	330m W	TILLD-DMTN	Till, Devensian - Diamicton	Diamicton
8	383m NW	GFDUD-XSV	Glaciofluvial Deposits, Devensian - Sand And Gravel	Sand And Gravel
9	486m N	GFSDD-XSV	Glaciofluvial Sheet Deposits, Devensian - Sand And Gravel	Sand And Gravel

This data is sourced from the British Geological Survey.

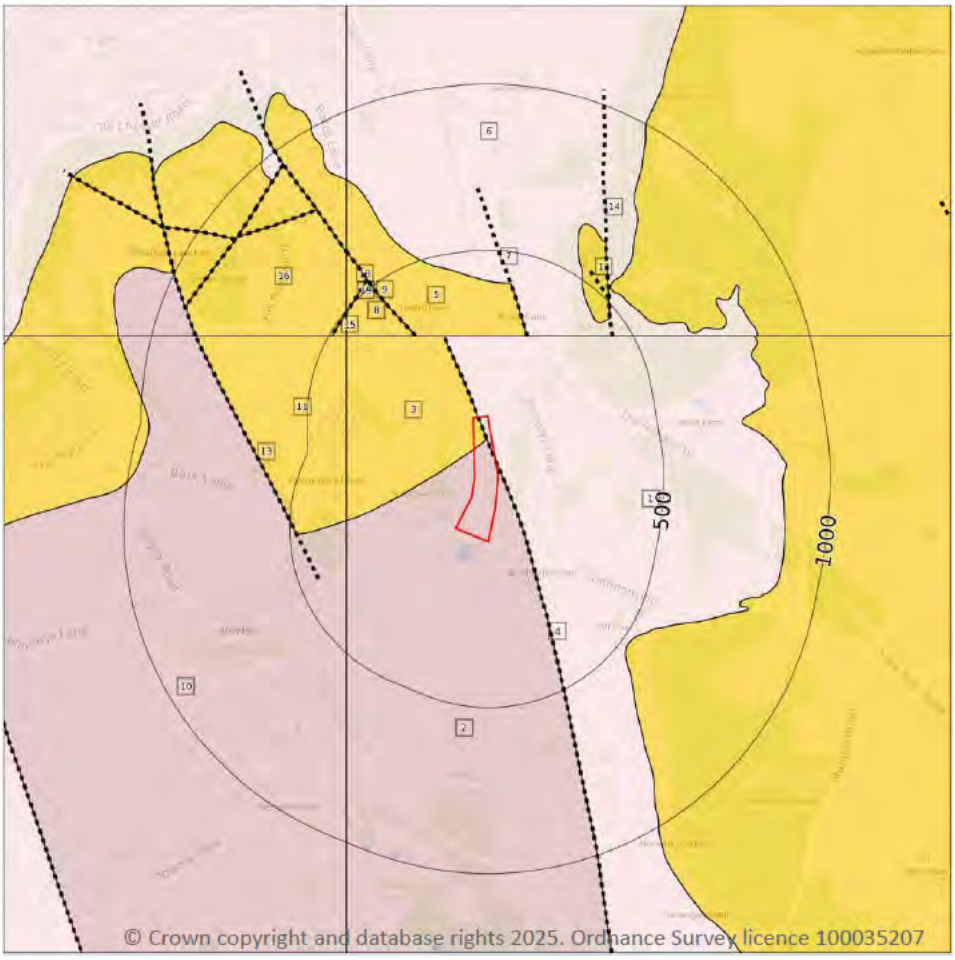
14.4 Landslip (10k)

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 **12**

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 75 >

ID	Location	LEX Code	Description	Rock age
1	On site	WLSF-SDST	Wilmslow Sandstone Formation - Sandstone	Early Triassic Epoch
2	On site	TPSF-SISD	Tarporley Siltstone Formation - Siltstone And Sandstone	Anisian Age - Olenekian Age
3	On site	HEY-PESST	Helsby Sandstone Formation - Pebbly (gravelly) Sandstone	Anisian Age - Early Triassic Epoch
5	241m N	HEY-PESST	Helsby Sandstone Formation - Pebbly (gravelly) Sandstone	Anisian Age - Early Triassic Epoch

ID	Location	LEX Code	Description	Rock age
6	268m N	WLSF-SDST	Wilmslow Sandstone Formation - Sandstone	Early Triassic Epoch
8	301m NW	HEY-PESST	Helsby Sandstone Formation - Pebbly (gravelly) Sandstone	Anisian Age - Early Triassic Epoch
10	330m W	TPSF-SISD	Tarporley Siltstone Formation - Siltstone And Sandstone	Anisian Age - Olenekian Age
11	331m W	HEY-PESST	Helsby Sandstone Formation - Pebbly (gravelly) Sandstone	Anisian Age - Early Triassic Epoch
12	433m NE	HEY-PESST	Helsby Sandstone Formation - Pebbly (gravelly) Sandstone	Anisian Age - Early Triassic Epoch
15	455m NW	HEY-PESST	Helsby Sandstone Formation - Pebbly (gravelly) Sandstone	Anisian Age - Early Triassic Epoch
16	492m NW	HEY-PESST	Helsby Sandstone Formation - Pebbly (gravelly) Sandstone	Anisian Age - Early Triassic Epoch
18	497m NW	HEY-PESST	Helsby Sandstone Formation - Pebbly (gravelly) Sandstone	Anisian Age - Early Triassic Epoch

This data is sourced from the British Geological Survey.

14.6 Bedrock faults and other linear features (10k)

Records within 500m	7

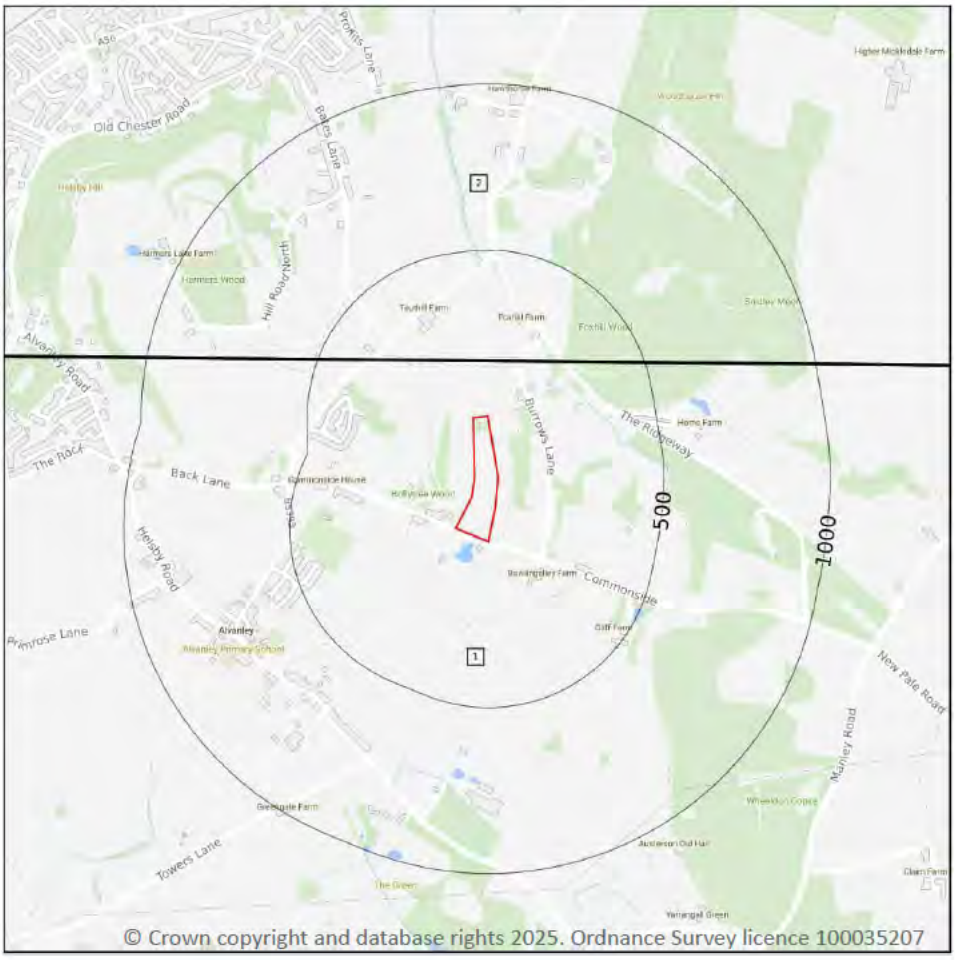
Linear features at the ground or bedrock surface at 1:10,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

Features are displayed on the Geology 1:10,000 scale - Bedrock map on page 75 >

ID	Location	Category	Description
4	**On site**	**FAULT**	**Normal fault, inferred; crossmarks on downthrow side**
7	268m N	FAULT	Normal fault, inferred; crossmarks on downthrow side
9	301m NW	FAULT	Normal fault, inferred; crossmarks on downthrow side
13	441m SW	FAULT	Normal fault, inferred; crossmarks on downthrow side
14	446m NE	FAULT	Normal fault, inferred; crossmarks on downthrow side
17	492m NW	FAULT	Normal fault, inferred; crossmarks on downthrow side
19	497m NW	FAULT	Normal fault, inferred; crossmarks on downthrow side

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	2

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 77 >

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	**On site**	**No coverage**	**Full**	**Full**	**No coverage**	**EW109_chester_v4**
2	166m N	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.

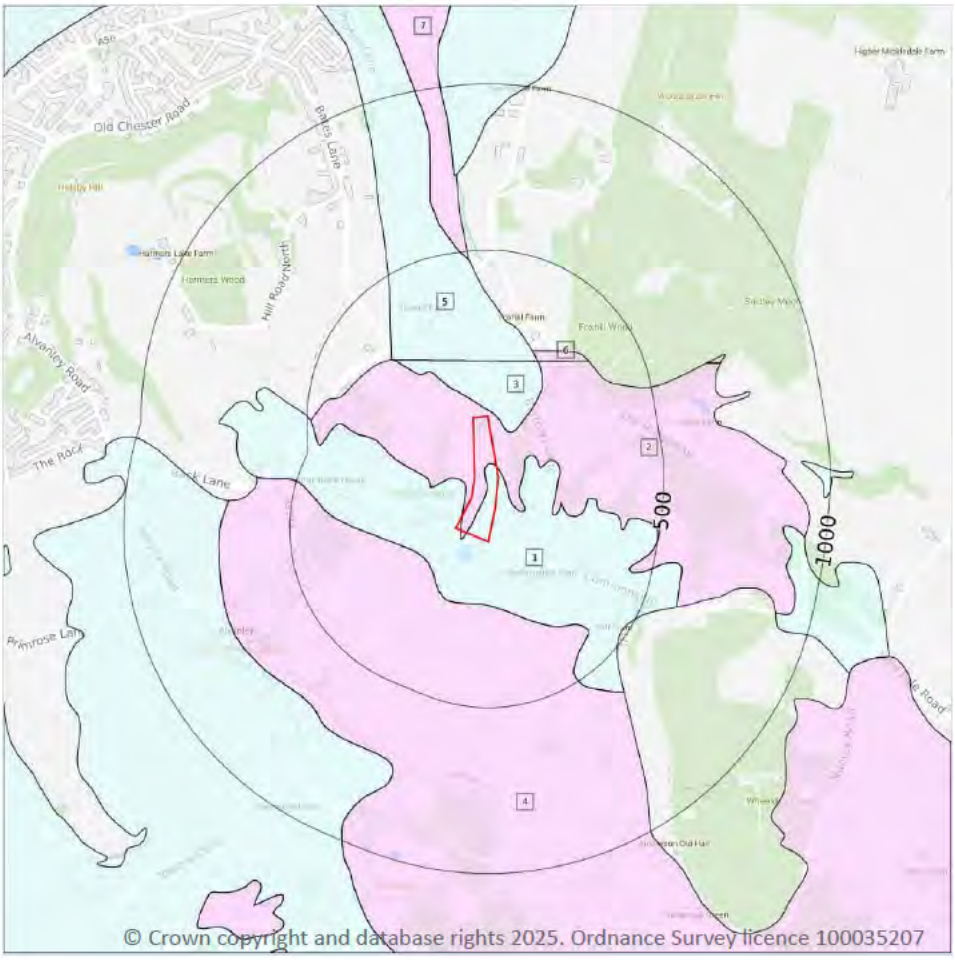
15.3 Artificial ground permeability (50k)

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 7

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 79 >

ID	Location	LEX Code	Description	Rock description
1	**On site**	**TILLD-DMTN**	**TILL, DEVENSIAN**	**DIAMICTON**
2	**On site**	**GFDUD-XSV**	**GLACIOFLUVIAL DEPOSITS, DEVENSIAN**	**SAND AND GRAVEL**
3	17m N	TILLD-DMTN	TILL, DEVENSIAN	DIAMICTON

ID	Location	LEX Code	Description	Rock description
4	131m SW	GFDUD-XSV	GLACIOFLUVIAL DEPOSITS, DEVENSIAN	SAND AND GRAVEL
5	167m N	TILLD-DMTN	TILL, DEVENSIAN	DIAMICTON
6	223m NE	GFDUD-XSV	GLACIOFLUVIAL DEPOSITS, DEVENSIAN	SAND AND GRAVEL
7	475m N	GFSDD-XSV	GLACIOFLUVIAL SHEET DEPOSITS, DEVENSIAN	SAND AND GRAVEL

This data is sourced from the British Geological Survey.

15.5 Superficial permeability (50k)

Records within 50m **3**

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**
On site	**Intergranular**	**Very High**	**High**
17m N	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.

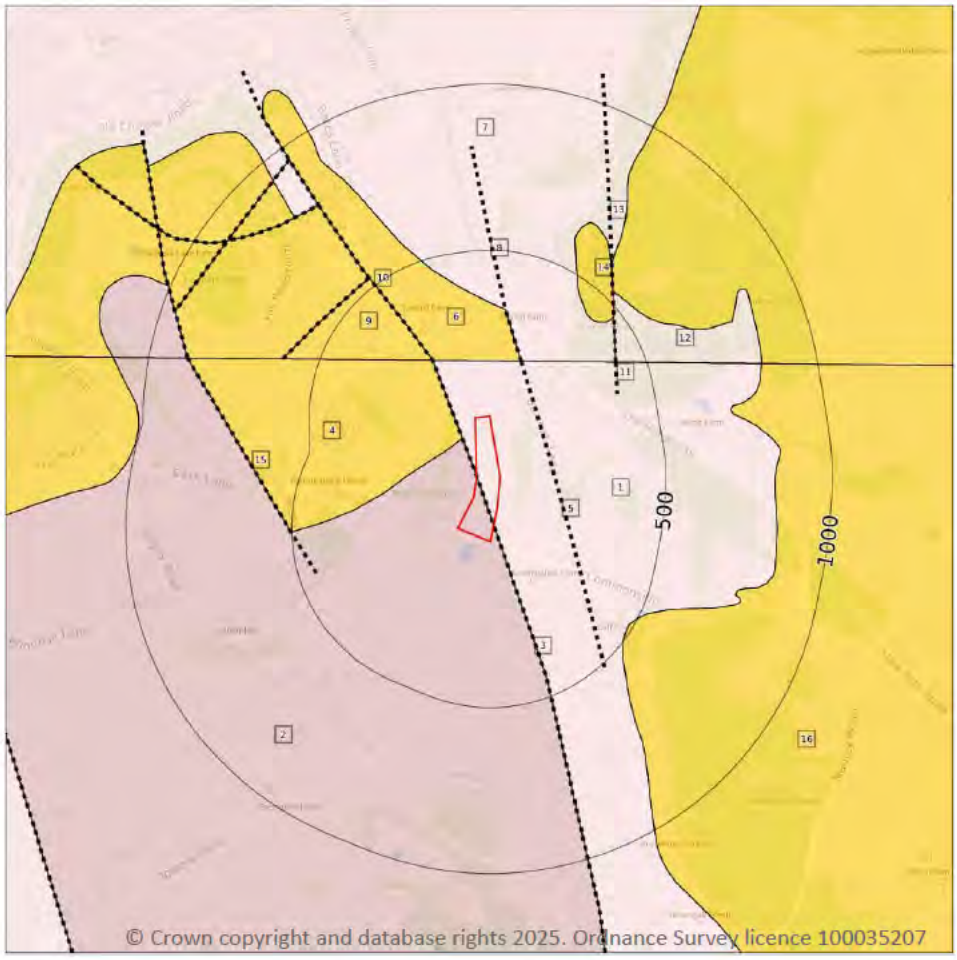
15.7 Landslip permeability (50k)

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 9

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 81 >

ID	Location	LEX Code	Description	Rock age
1	**On site**	**WLSF-SDST**	**WILMSLOW SANDSTONE FORMATION - SANDSTONE**	**-**
2	**On site**	**TPSF-SIMS**	**TARPORLEY SILTSTONE FORMATION - SILTSTONE, MUDSTONE AND SANDSTONE**	**OLENEKIAN**
4	40m NW	HEY-PESST	HELSBY SANDSTONE FORMATION - SANDSTONE, PEBBLY (GRAVELLY)	ANISIAN

ID	Location	LEX Code	Description	Rock age
6	167m N	HEY-PESST	HELSBY SANDSTONE FORMATION - SANDSTONE, PEBBLY (GRAVELLY)	ANISIAN
7	191m N	WLSF-SDST	WILMSLOW SANDSTONE FORMATION - SANDSTONE	-
9	215m N	HEY-PESST	HELSBY SANDSTONE FORMATION - SANDSTONE, PEBBLY (GRAVELLY)	ANISIAN
12	413m NE	WLSF-SDST	WILMSLOW SANDSTONE FORMATION - SANDSTONE	-
14	424m NE	HEY-PESST	HELSBY SANDSTONE FORMATION - SANDSTONE, PEBBLY (GRAVELLY)	ANISIAN
16	486m SE	HEY-PESST	HELSBY SANDSTONE FORMATION - SANDSTONE, PEBBLY (GRAVELLY)	ANISIAN

This data is sourced from the British Geological Survey.

15.9 Bedrock permeability (50k)

Records within 50m **3**

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**
On site	**Intergranular**	**High**	**High**
40m NW	Mixed	High	Moderate

This data is sourced from the British Geological Survey.

15.10 Bedrock faults and other linear features (50k)

Records within 500m **7**

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 81 >**

ID	Location	Category	Description
3	**On site**	**FAULT**	**Fault, inferred, displacement unknown**

ID	Location	Category	Description
5	138m NE	FAULT	Fault, inferred, displacement unknown
8	191m N	FAULT	Fault, inferred
10	215m N	FAULT	Fault, inferred
11	389m NE	FAULT	Fault, inferred, displacement unknown
13	413m NE	FAULT	Fault, inferred
15	446m SW	FAULT	Fault, inferred, displacement unknown

This data is sourced from the British Geological Survey.

16 Boreholes

16.1 BGS Boreholes

Records within 250m	8

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.

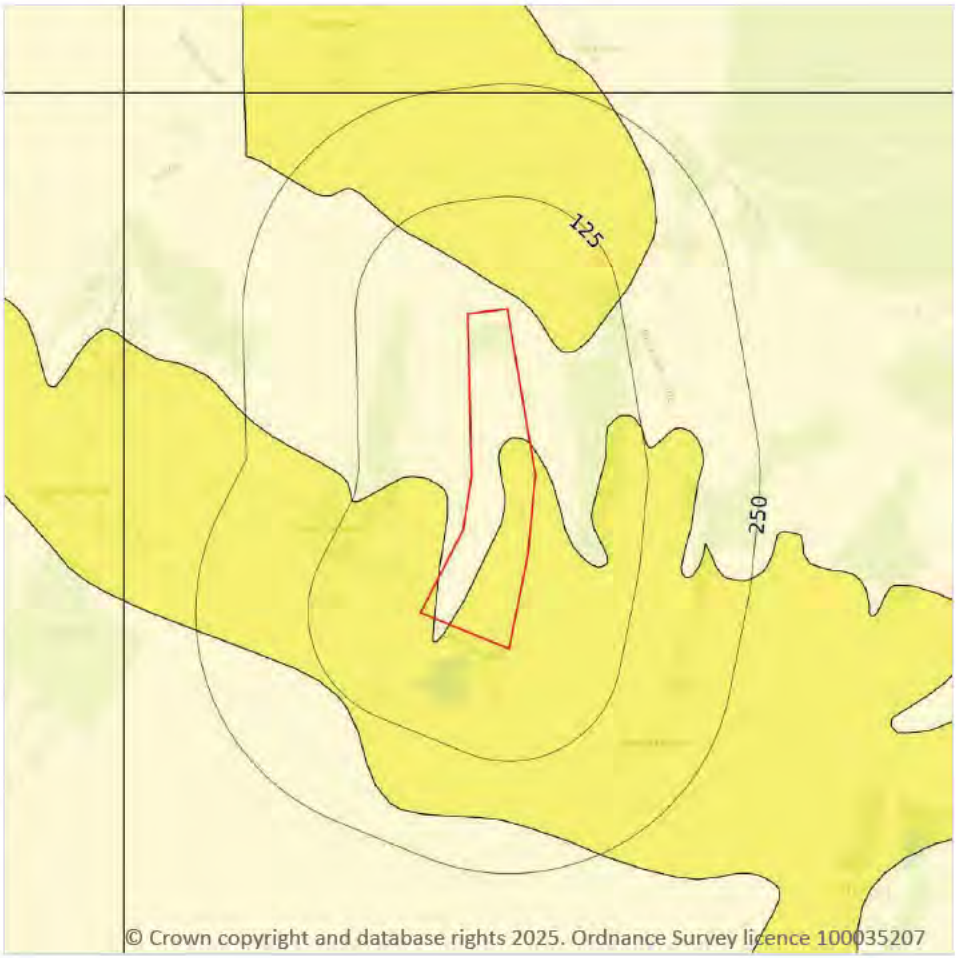
Features are displayed on the Boreholes map on page 84 >

ID	Location	Grid reference	Name	Length	Confidential	Web link
1	**On site**	**350430 374410**	**COMMONSIDE TIP ALVANLEY 6**	**40.0**	**N**	**167090**
2	2m N	350430 374750	COMMONSIDE TIP ALVANLEY 2	34.0	N	167086
3	3m NE	350460 374580	COMMONSIDE TIP ALVANLEY 4	40.5	N	167088

ID	Location	Grid reference	Name	Length	Confidential	Web link
4	5m N	350380 374670	COMMONSIDE TIP ALVANLEY 3	36.3	N	167087 ↗
5	5m SW	350360 374490	COMMONSIDE TIP ALVANLEY 5	20.5	N	167089 ↗
6	74m NW	350310 374770	TUET HILL FARM	-1.0	N	167098 ↗
7	157m N	350470 374910	COMMONSIDE TIP ALVANLEY 1	10.0	N	167085 ↗
8	223m NE	350634 374840	FOXHILL 1 ALVANLEY	274.62	N	167060 ↗

This data is sourced from the British Geological Survey.

17 Natural ground subsidence - Shrink swell clays



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.1 Shrink swell clays

Records within 50m	3

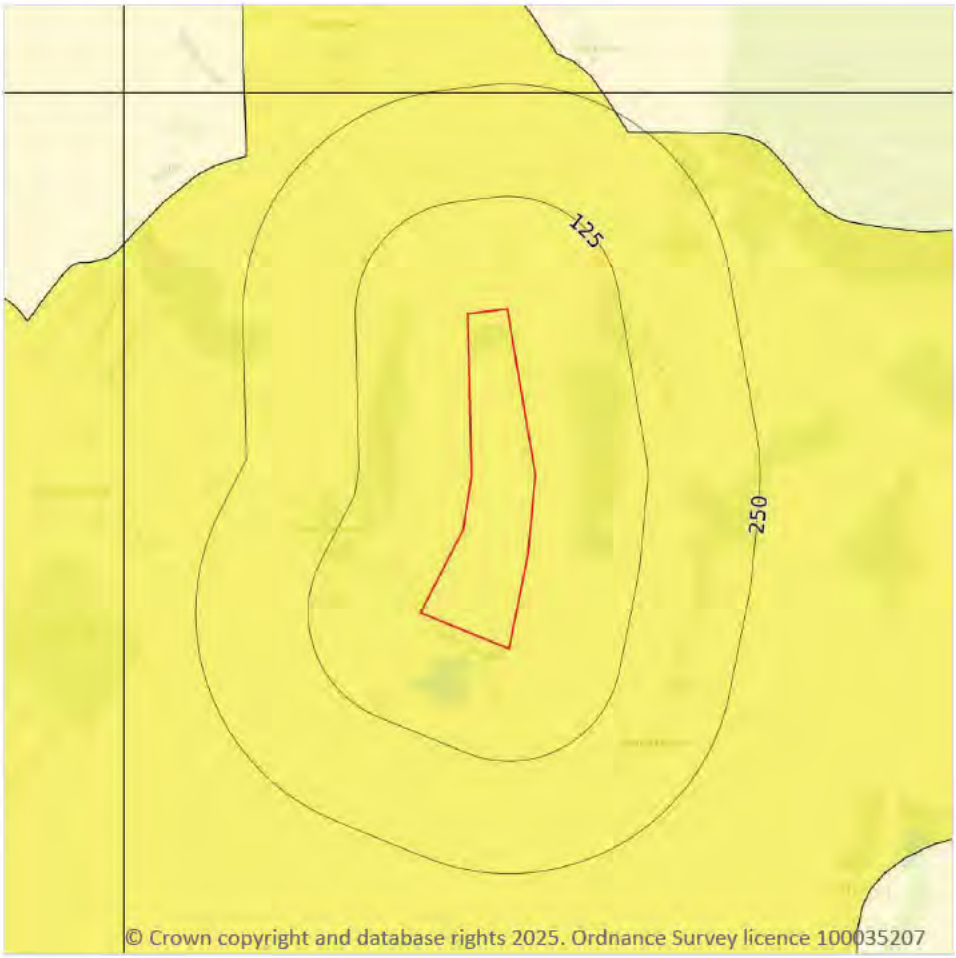
The potential hazard presented by soils that absorb water when wet (making them swell), and lose water as they dry (making them shrink). This shrink-swell behaviour is controlled by the type and amount of clay in the soil, and by seasonal changes in the soil moisture content (related to rainfall and local drainage).

Features are displayed on the Natural ground subsidence - Shrink swell clays map on page 86 >

Location	Hazard rating	Details
On site	**Negligible**	**Ground conditions predominantly non-plastic.**
On site	**Very low**	**Ground conditions predominantly low plasticity.**
17m N	Very low	Ground conditions predominantly low plasticity.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Running sands



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

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 88 >**

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

17.3 Compressible deposits

Records within 50m	1

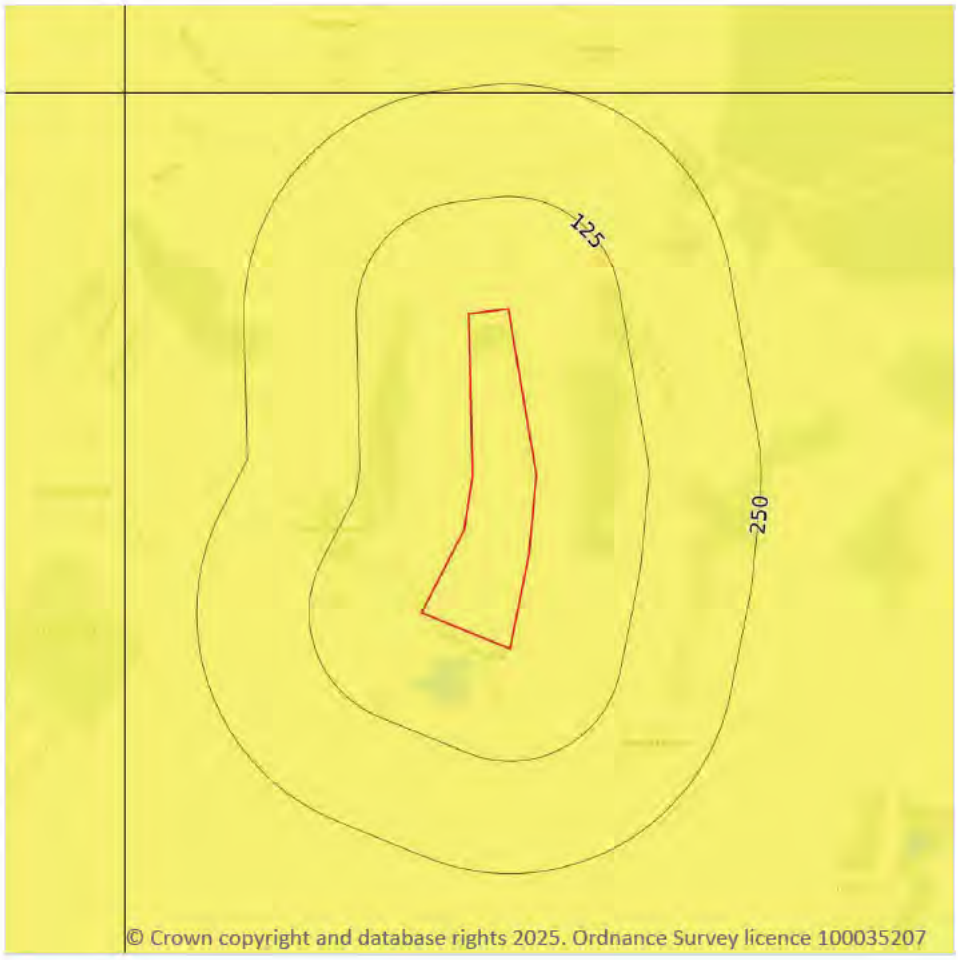
The potential hazard presented by types of ground that may contain layers of very soft materials like clay or peat and may compress if loaded by overlying structures, or if the groundwater level changes, potentially resulting in depression of the ground and disturbance of foundations.

Features are displayed on the Natural ground subsidence - Compressible deposits map on page 89 >

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



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.4 Collapsible deposits

Records within 50m	1

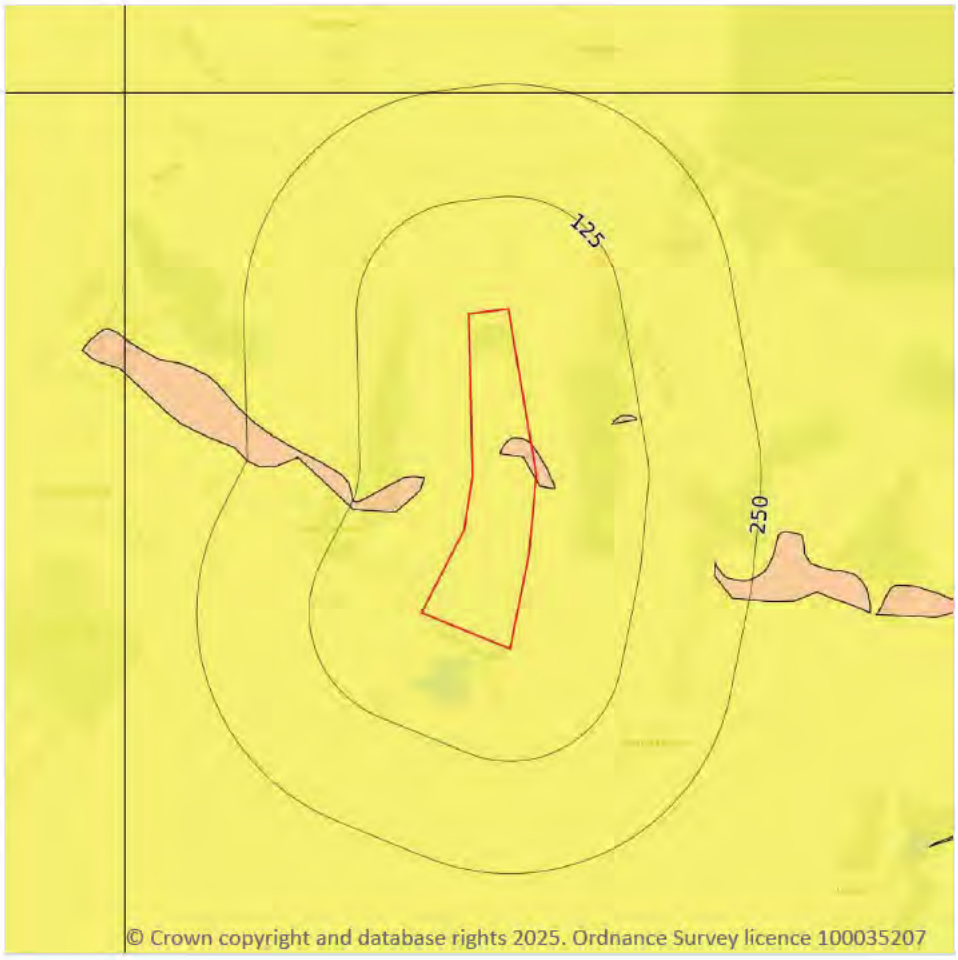
The potential hazard presented by natural deposits that could collapse when a load (such as a building) is placed on them or they become saturated with water.

Features are displayed on the Natural ground subsidence - Collapsible deposits map on page 90 >

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	2

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 91 >

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.**

Location	Hazard rating	Details
On site	**Low**	**Slope instability problems may be present or anticipated. Site investigation should consider specifically the slope stability of the site.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Ground dissolution of soluble rocks

Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.6 Ground dissolution of soluble rocks

Records within 50m	1

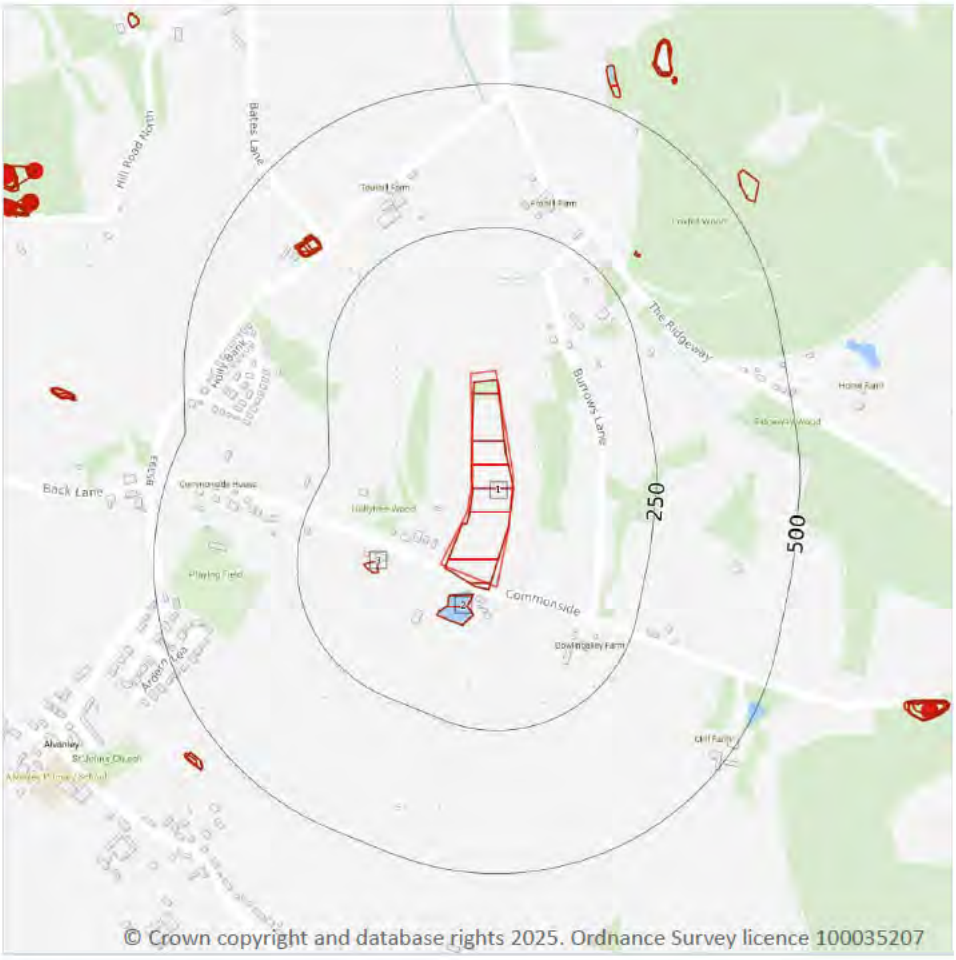
The potential hazard presented by ground dissolution, which occurs when water passing through soluble rocks produces underground cavities and cave systems. These cavities reduce support to the ground above and can cause localised collapse of the overlying rocks and deposits.

Features are displayed on the Natural ground subsidence - Ground dissolution of soluble rocks map on page 93 >

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	0

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.

This data is sourced from the British Geological Survey.

18.2 Surface ground workings

Records within 250m	3

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 95 >

ID	Location	Land Use	Year of mapping	Mapping scale
1	**On site**	**Refuse Heap**	**1972**	**1:10000**
2	28m S	Pond	1972	1:10000
3	110m SW	Mill Pond	1972	1:10000

This is data is sourced from Ordnance Survey/Groundsure.

18.3 Underground workings

Records within 1000m	0

Historical land uses identified from Ordnance Survey mapping that indicate the presence of underground workings e.g. mine shafts.

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	0

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.

This data is sourced from the British Geological Survey.

18.6 Non-coal mining

Records within 1000m	0

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).

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	0

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.

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	0

Areas which could be affected by past, current or future coal mining.

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 102 >

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 **14**

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**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**60 - 90 mg/kg**	**15 - 30 mg/kg**
On site	**15 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**60 - 90 mg/kg**	**15 - 30 mg/kg**
On site	**15 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**60 - 90 mg/kg**	**15 - 30 mg/kg**
On site	**15 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**60 - 90 mg/kg**	**15 - 30 mg/kg**
On site	**15 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**40 - 60 mg/kg**	**15 mg/kg**
On site	**15 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**40 - 60 mg/kg**	**15 mg/kg**
On site	**15 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**60 - 90 mg/kg**	**15 mg/kg**
13m SW	15 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
17m N	15 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
40m NW	15 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 mg/kg
42m E	15 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 mg/kg
47m SE	15 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 mg/kg
49m SE	15 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 mg/kg
50m SE	15 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 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 ↗.

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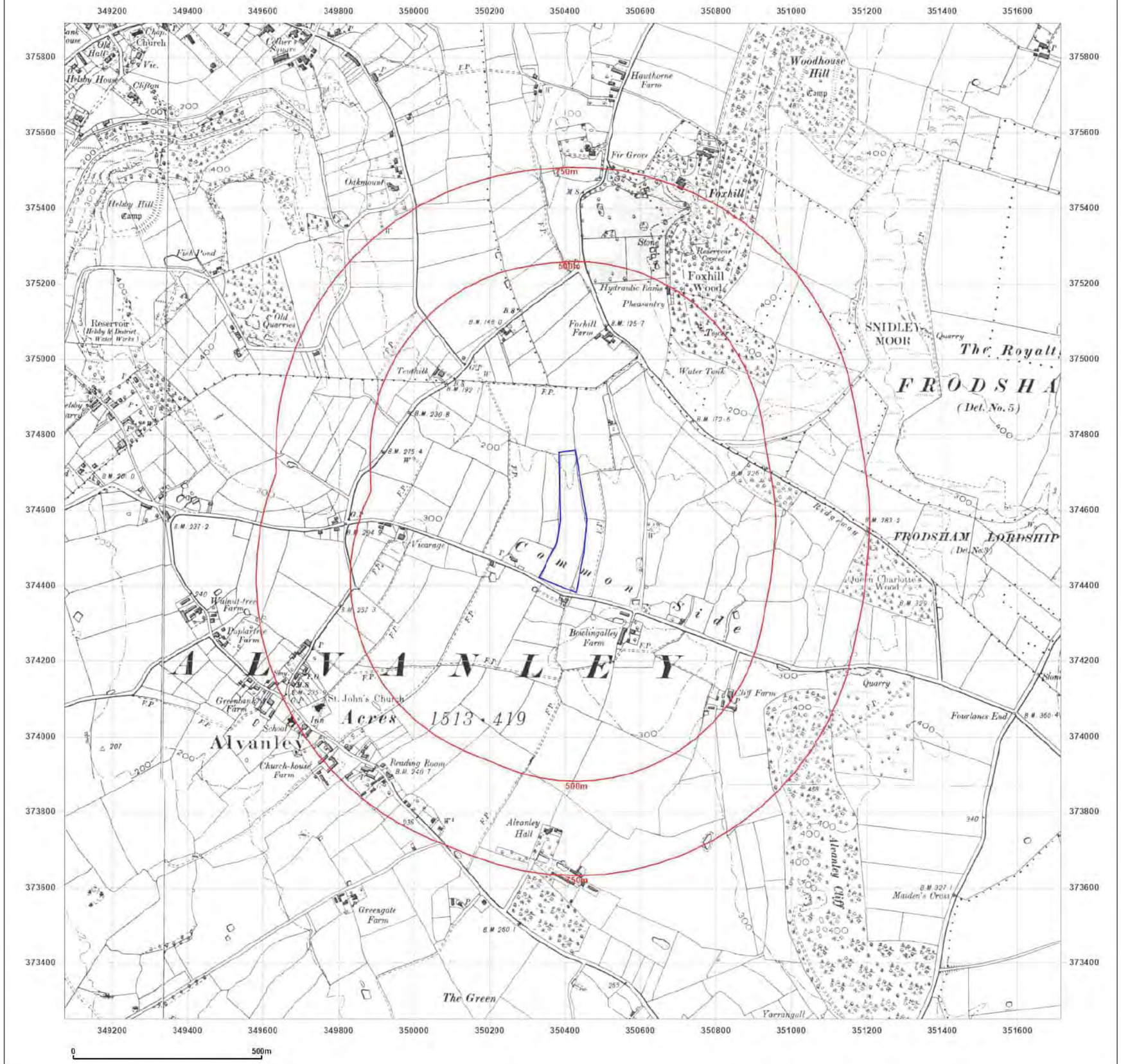
Groundsure's Terms and Conditions can be accessed at this link: www.groundsure.com/terms-and-conditions-april-2023/ ↗.



Groundsure INSIGHTS

Site Details:

COMMONSIDE TIP,
COMMONSIDE 44M FROM
COMMONSIDE, COMMONSIDE,
ALVANLEY, FRODSHAM,
CHESHIRE WEST AND
CHESTER, WA6 9HB

Client Ref: 60747912
Report Ref: GS-QIT-XM7-KWM-B77
Grid Ref: 350393, 374570

Map Name: County Series
Map date: **1897**
Scale: 1:10,560
Printed at: 1:10,560

N
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Surveyed 1873 Revised 1897 Edition N/A Copyright N/A Levelled N/A	Surveyed 1874 Revised 1897 Edition N/A Copyright N/A Levelled N/A
Surveyed 1873 Revised 1897 Edition N/A Copyright N/A Levelled N/A	Surveyed 1874 Revised 1897 Edition N/A Copyright N/A Levelled N/A

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Map legend available at:
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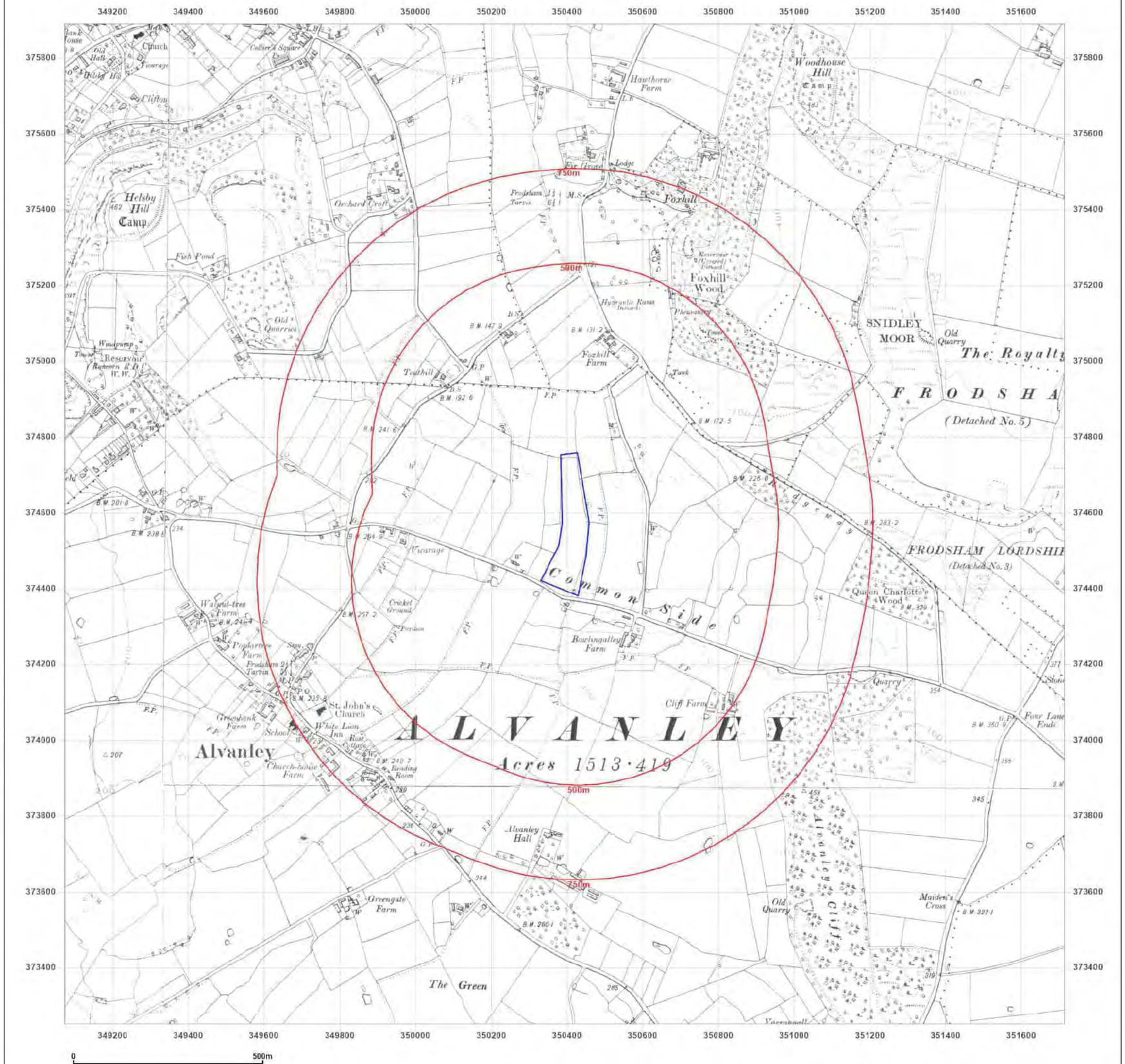

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Site Details:

COMMONSIDE TIP,
COMMONSIDE 44M FROM
COMMONSIDE, COMMONSIDE,
ALVANLEY, FRODSHAM,
CHESHIRE WEST AND
CHESTER, WA6 9HB

Client Ref: 60747912
Report Ref: GS-QIT-XM7-KWM-B77
Grid Ref: 350393, 374570

Map Name: County Series
Map date: **1908-1911**
Scale: 1:10,560
Printed at: 1:10,560

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Surveyed 1872
Revised 1908
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1874
Revised 1909
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1874
Revised 1911
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1874
Revised 1909
Edition N/A
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Levelled N/A

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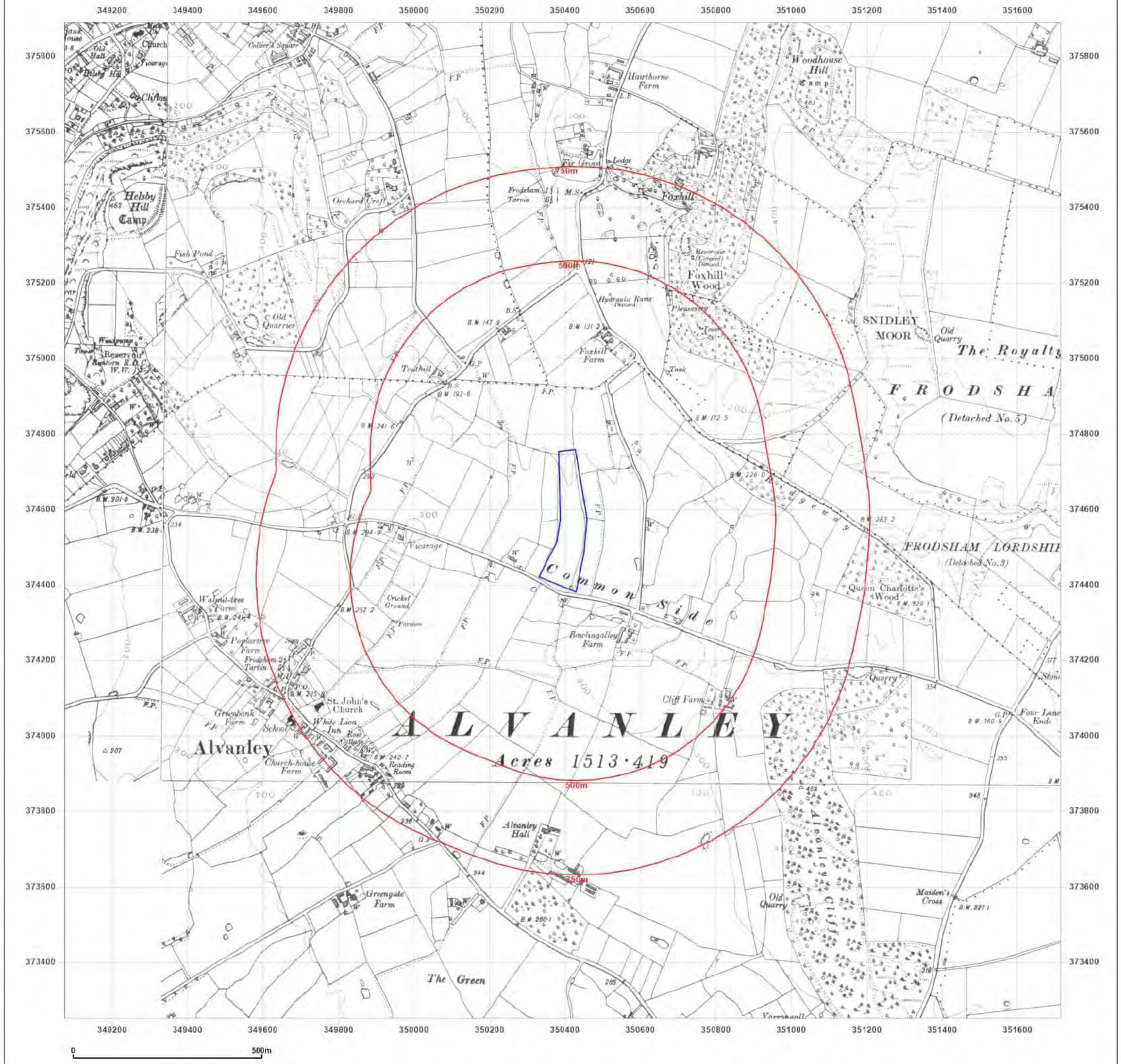

Groundsure INSIGHTS

Site Details:

COMMONSIDE TIP,
COMMONSIDE 44M FROM
COMMONSIDE, COMMONSIDE,
ALVANLEY, FRODSHAM,
CHESHIRE WEST AND
CHESTER, WA6 9HB

Client Ref: 60747912
Report Ref: GS-QIT-XM7-KWM-B77
Grid Ref: 350393, 374570

Map Name: County Series
Map date: **1908-1911**
Scale: 1:10,560
Printed at: 1:10,560

N
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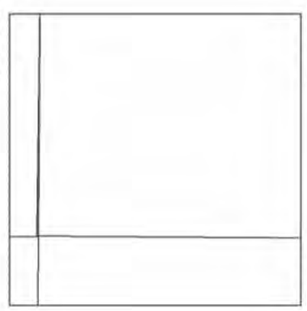
Surveyed 1872
Revised 1908
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1874
Revised 1911
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1874
Revised 1911
Edition N/A
Copyright N/A
Levelled N/A

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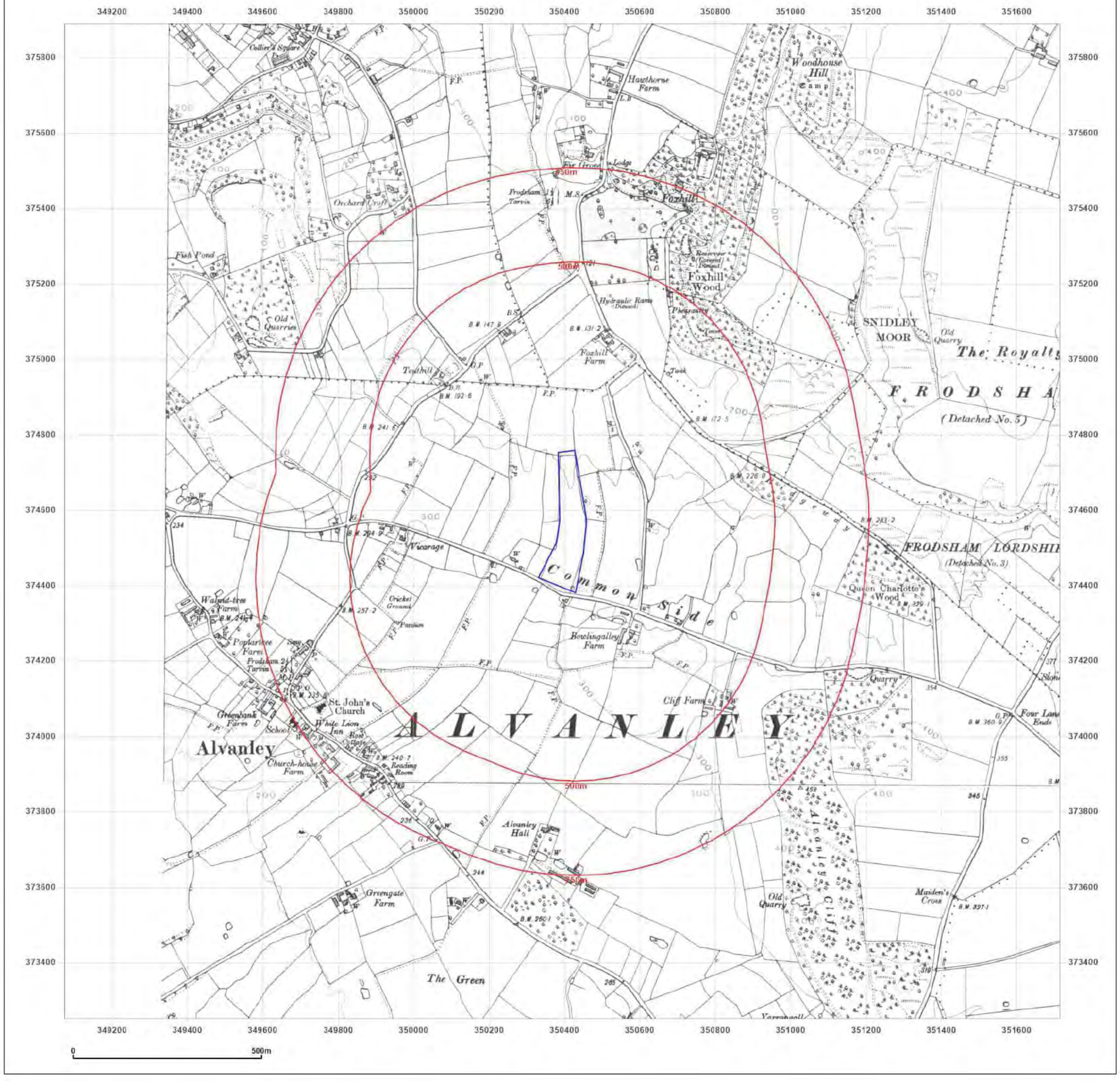

Groundsure INSIGHTS

Site Details:

COMMONSIDE TIP,
COMMONSIDE 44M FROM
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ALVANLEY, FRODSHAM,
CHESHIRE WEST AND
CHESTER, WA6 9HB

Client Ref: 60747912
Report Ref: GS-QIT-XM7-KWM-B77
Grid Ref: 350393, 374570

Map Name: County Series
Map date: **1911**
Scale: 1:10,560
Printed at: 1:10,560

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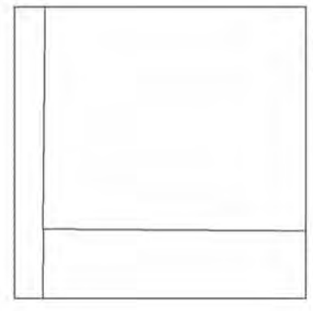

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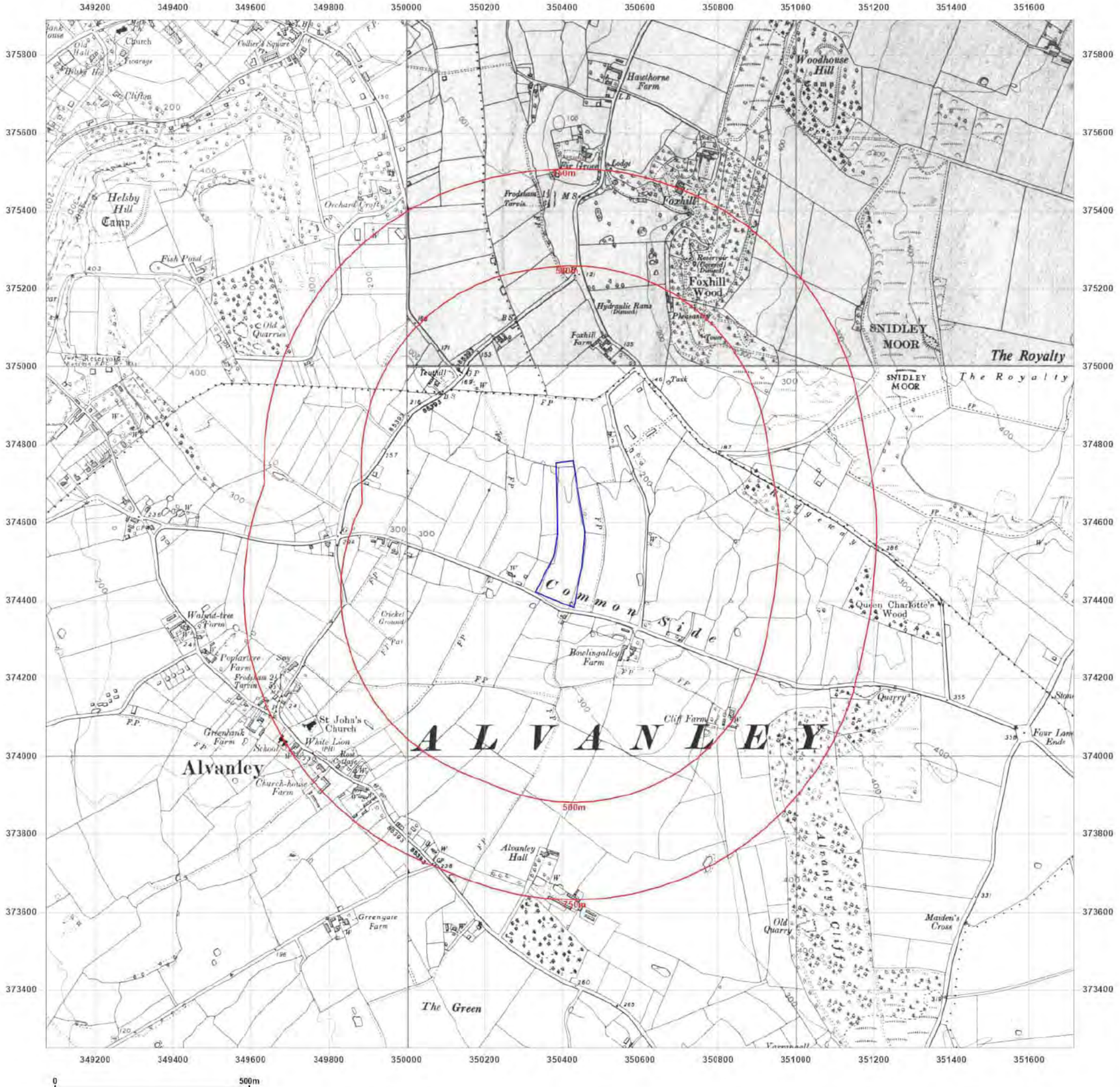

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Site Details:

COMMONSIDE TIP,
COMMONSIDE 44M FROM
COMMONSIDE, COMMONSIDE,
ALVANLEY, FRODSHAM,
CHESHIRE WEST AND
CHESTER, WA6 9HB

Client Ref: 60747912
Report Ref: GS-QIT-XM7-KWM-B77
Grid Ref: 350393, 374570

Map Name: Provisional
Map date: **1949-1954**
Scale: 1:10,560
Printed at: 1:10,560

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Surveyed 1949
Revised 1949
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1949
Revised 1953
Edition 1954
Copyright N/A
Levelled N/A

Surveyed 1949
Revised 1949
Edition N/A
Copyright N/A
Levelled N/A

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Revised 1949
Edition N/A
Copyright N/A
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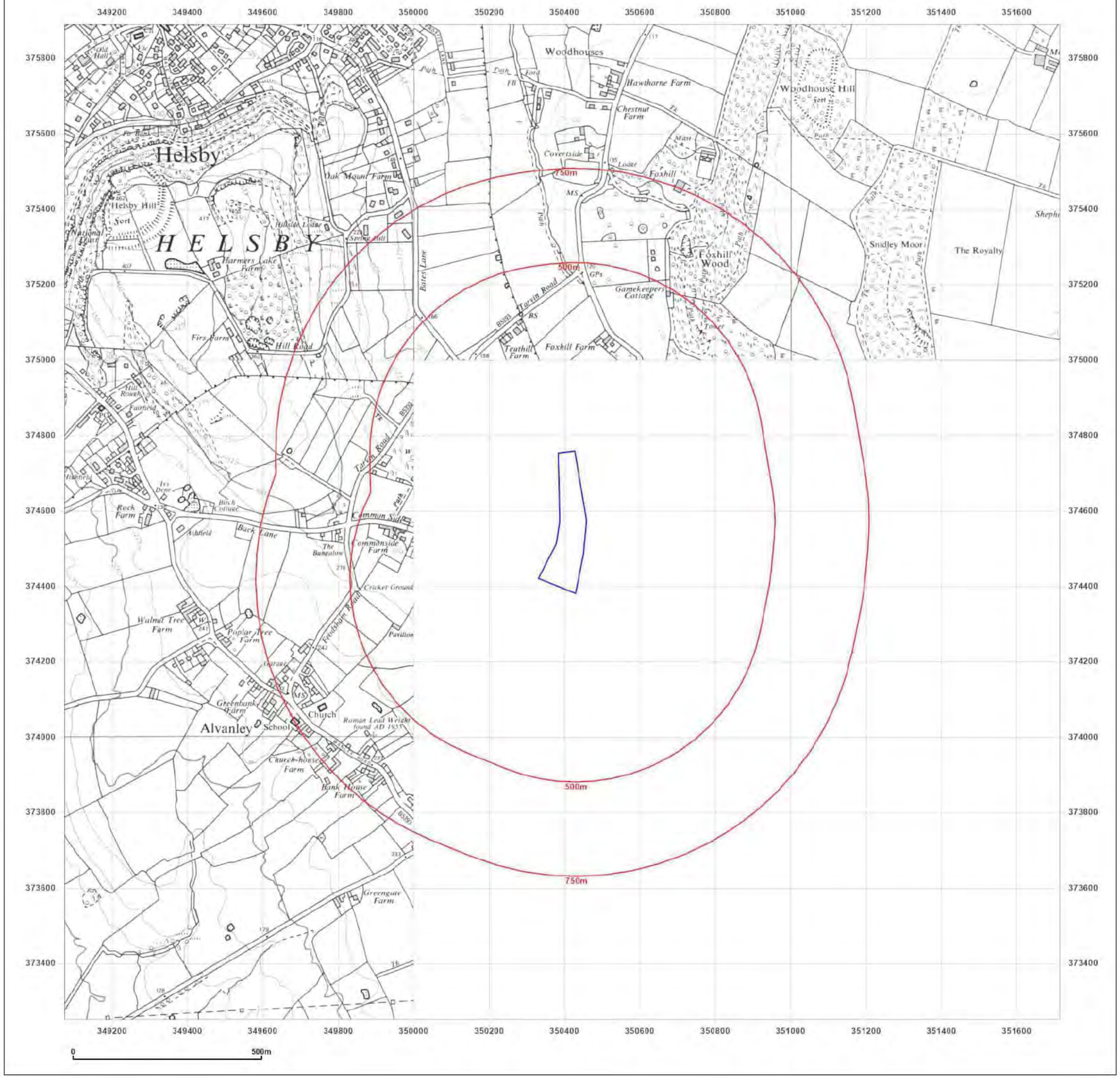

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Site Details:

COMMONSIDE TIP,
COMMONSIDE 44M FROM
COMMONSIDE, COMMONSIDE,
ALVANLEY, FRODSHAM,
CHESHIRE WEST AND
CHESTER, WA6 9HB

Client Ref: 60747912
Report Ref: GS-QIT-XM7-KWM-B77
Grid Ref: 350393, 374570

Map Name: Provisional
Map date: **1968**
Scale: 1:10,560
Printed at: 1:10,560

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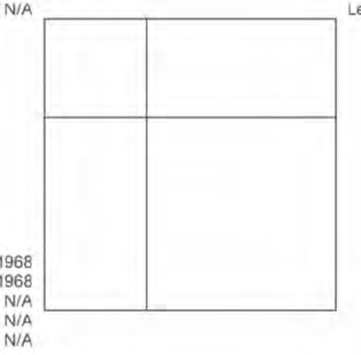
Surveyed 1968
Revised 1968
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1968
Revised 1968
Edition N/A
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Levelled N/A

Surveyed 1968
Revised 1968
Edition N/A
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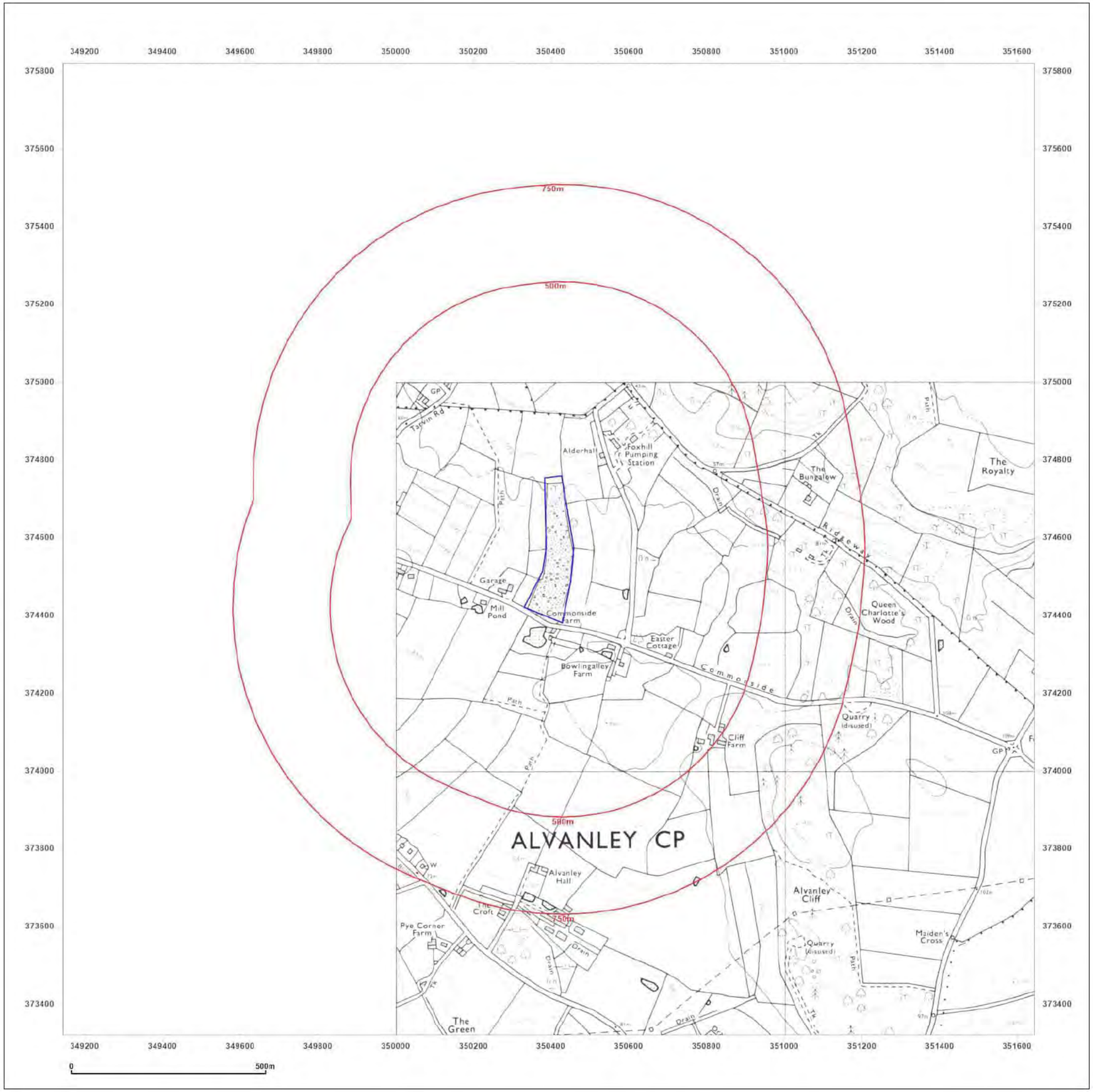

Groundsure INSIGHTS

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COMMONSIDE TIP,
COMMONSIDE 44M FROM
COMMONSIDE, COMMONSIDE,
ALVANLEY, FRODSHAM,
CHESHIRE WEST AND
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Client Ref: 60747912
Report Ref: GS-QIT-XM7-KWM-B77
Grid Ref: 350393, 374570

Map Name: National Grid
Map date: **1972**
Scale: 1:10,000
Printed at: 1:10,000

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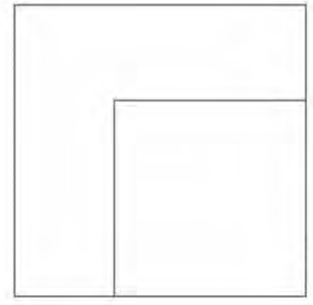

Surveyed 1971
Revised 1972
Edition N/A
Copyright 1972
Levelled 1971

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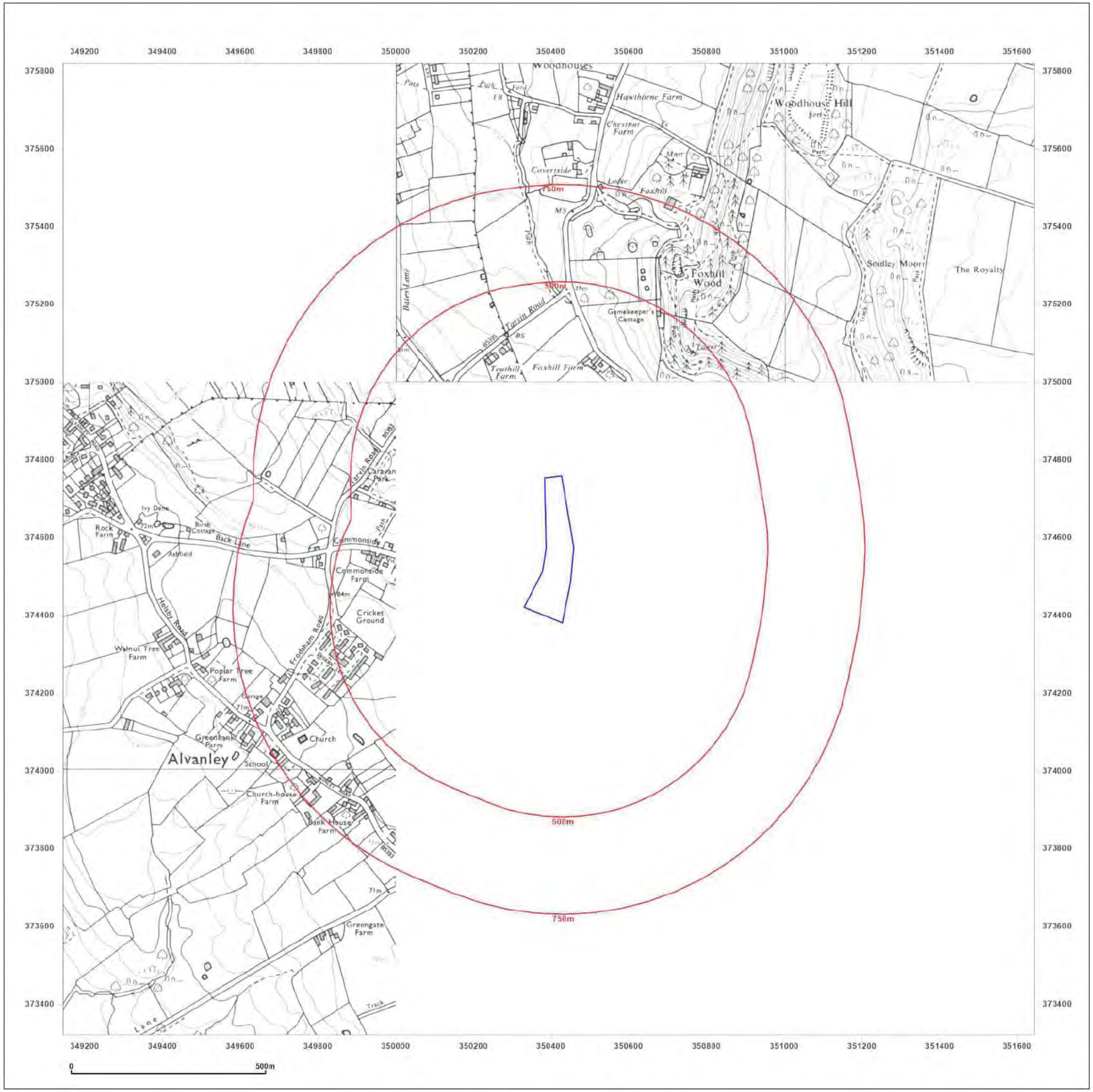

Groundsure INSIGHTS

Site Details:

COMMONSIDE TIP,
COMMONSIDE 44M FROM
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ALVANLEY, FRODSHAM,
CHESHIRE WEST AND
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Client Ref: 60747912
Report Ref: GS-QIT-XM7-KWM-B77
Grid Ref: 350393, 374570

Map Name: National Grid

Map date: **1982-1983**

Scale: 1:10,000

Printed at: 1:10,000

N
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Surveyed 1973
Revised 1981
Edition N/A
Copyright 1982
Levelled 1969

Surveyed 1983
Revised 1983
Edition N/A
Copyright N/A
Levelled N/A

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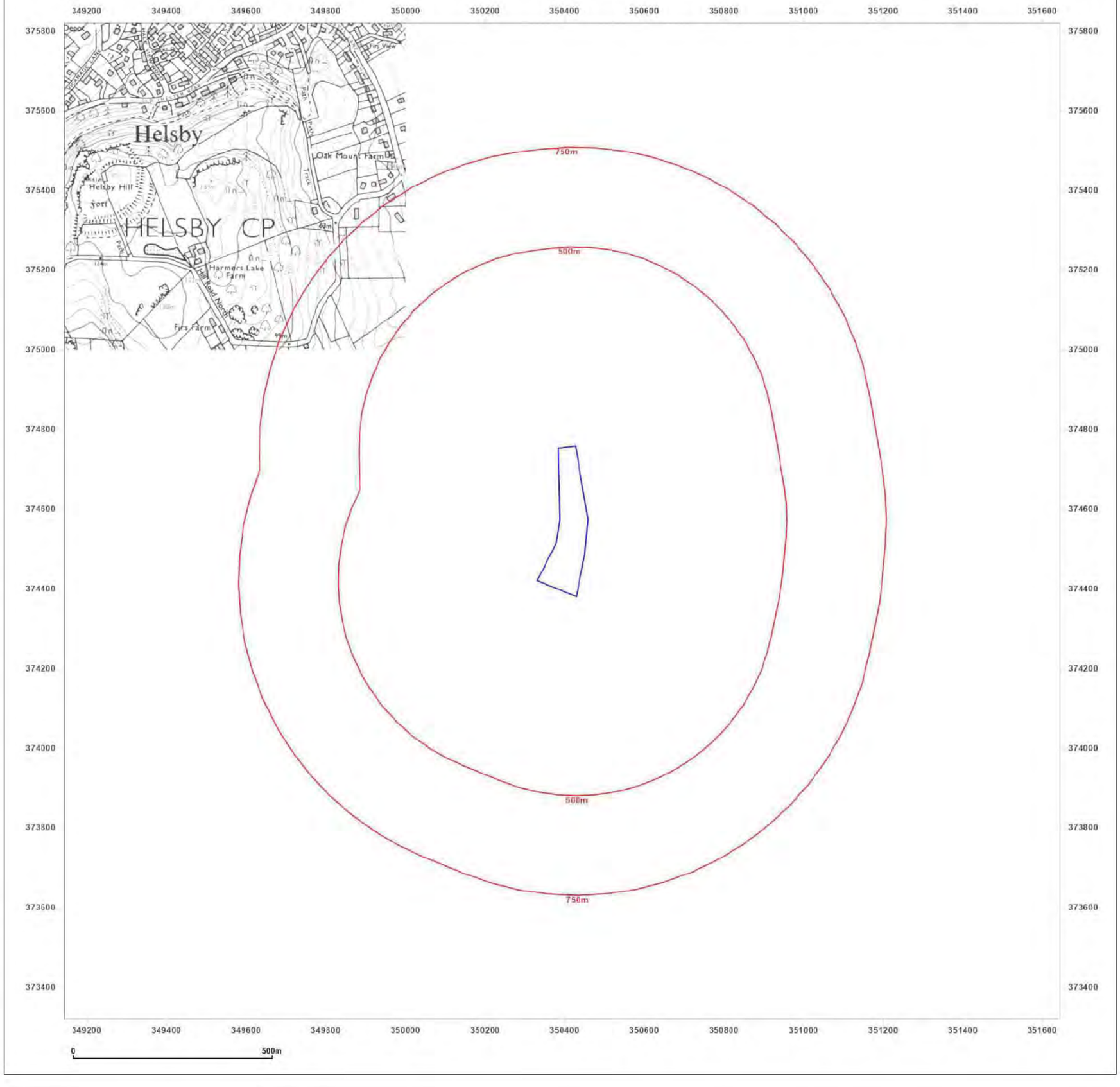

Groundsure INSIGHTS

Site Details:

COMMONSIDE TIP,
COMMONSIDE 44M FROM
COMMONSIDE, COMMONSIDE,
ALVANLEY, FRODSHAM,
CHESHIRE WEST AND
CHESTER, WA6 9HB

Client Ref: 60747912
Report Ref: GS-QIT-XM7-KWM-B77
Grid Ref: 350393, 374570

Map Name: National Grid
Map date: **1990**
Scale: 1:10,000
Printed at: 1:10,000

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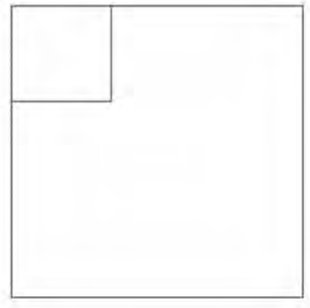
Surveyed 1985
Revised 1990
Edition N/A
Copyright N/A
Levelled N/A



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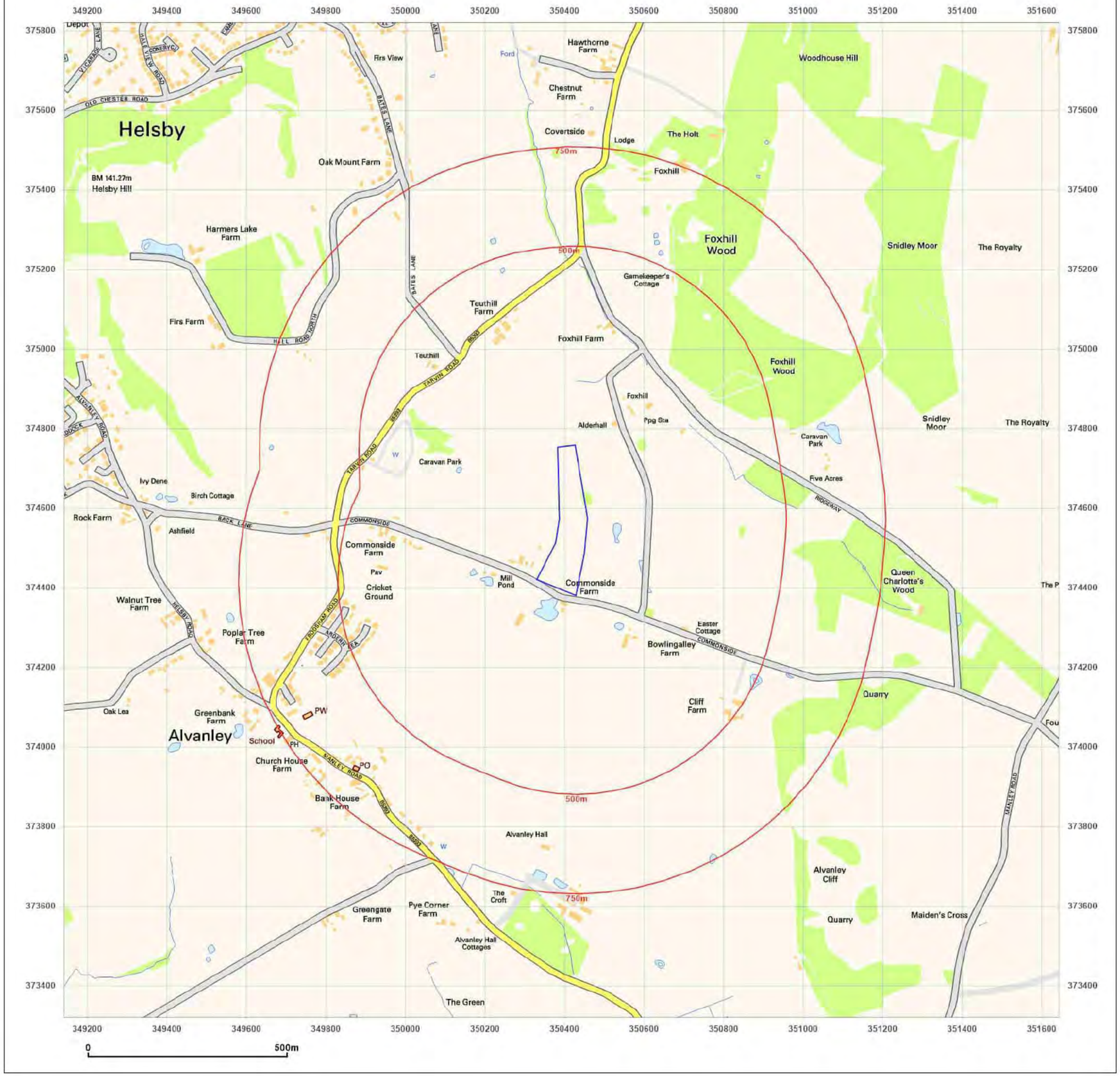

Groundsure INSIGHTS

Site Details:

COMMONSIDE TIP,
COMMONSIDE 44M FROM
COMMONSIDE, COMMONSIDE,
ALVANLEY, FRODSHAM,
CHESHIRE WEST AND
CHESTER, WA6 9HB

Client Ref: 60747912
Report Ref: GS-QIT-XM7-KWM-B77
Grid Ref: 350393, 374570

Map Name: National Grid
Map date: 2001
Scale: 1:10,000
Printed at: 1:10,000

N W E S

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Production date: 18 March 2025

Map legend available at:
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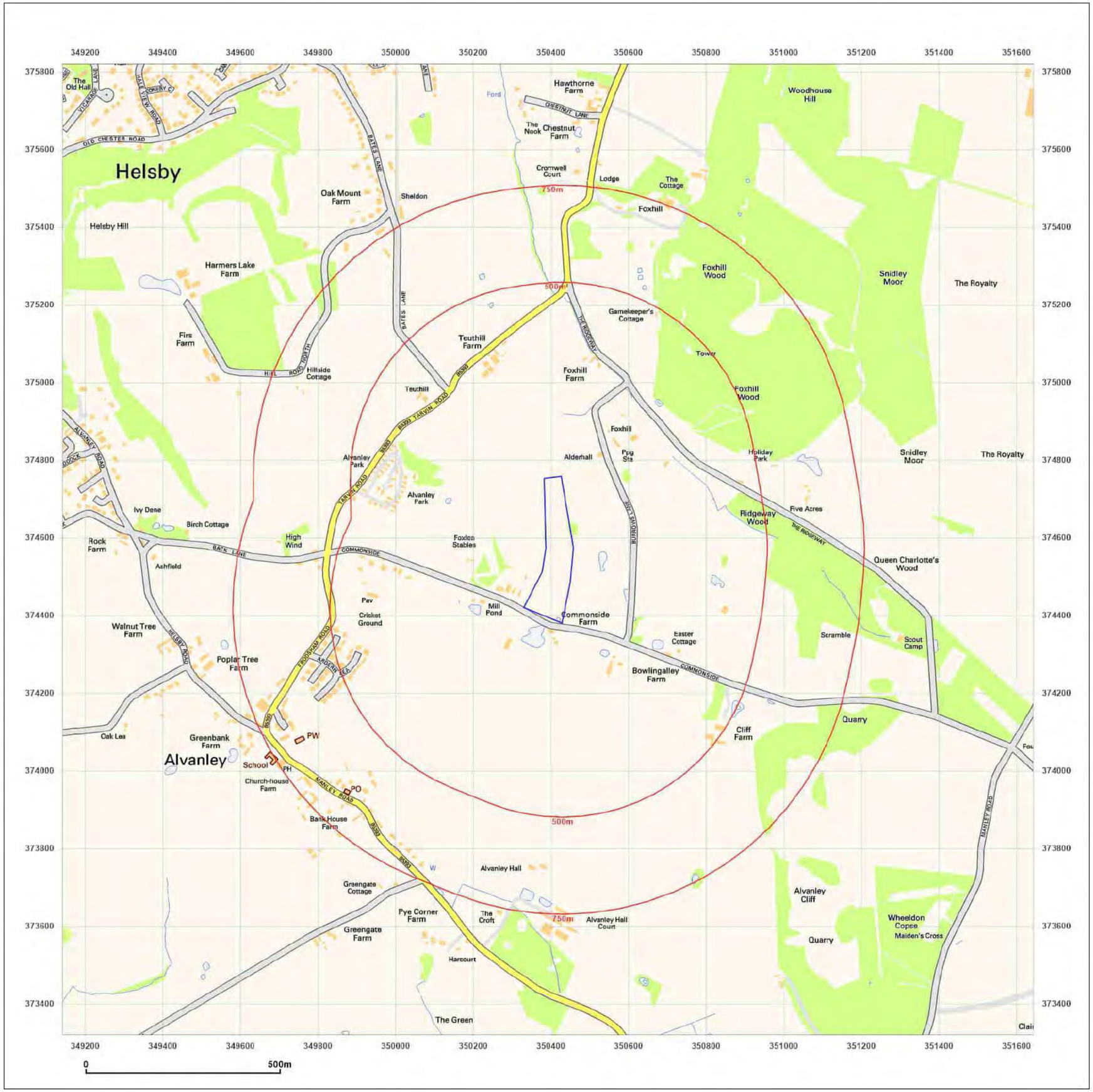

Groundsure INSIGHTS

Site Details:

COMMONSIDE TIP,
COMMONSIDE 44M FROM
COMMONSIDE, COMMONSIDE,
ALVANLEY, FRODSHAM,
CHESHIRE WEST AND
CHESTER, WA6 9HB

Client Ref: 60747912
Report Ref: GS-QIT-XM7-KWM-B77
Grid Ref: 350393, 374570

Map Name: National Grid
Map date: **2010**
Scale: 1:10,000
Printed at: 1:10,000

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2010

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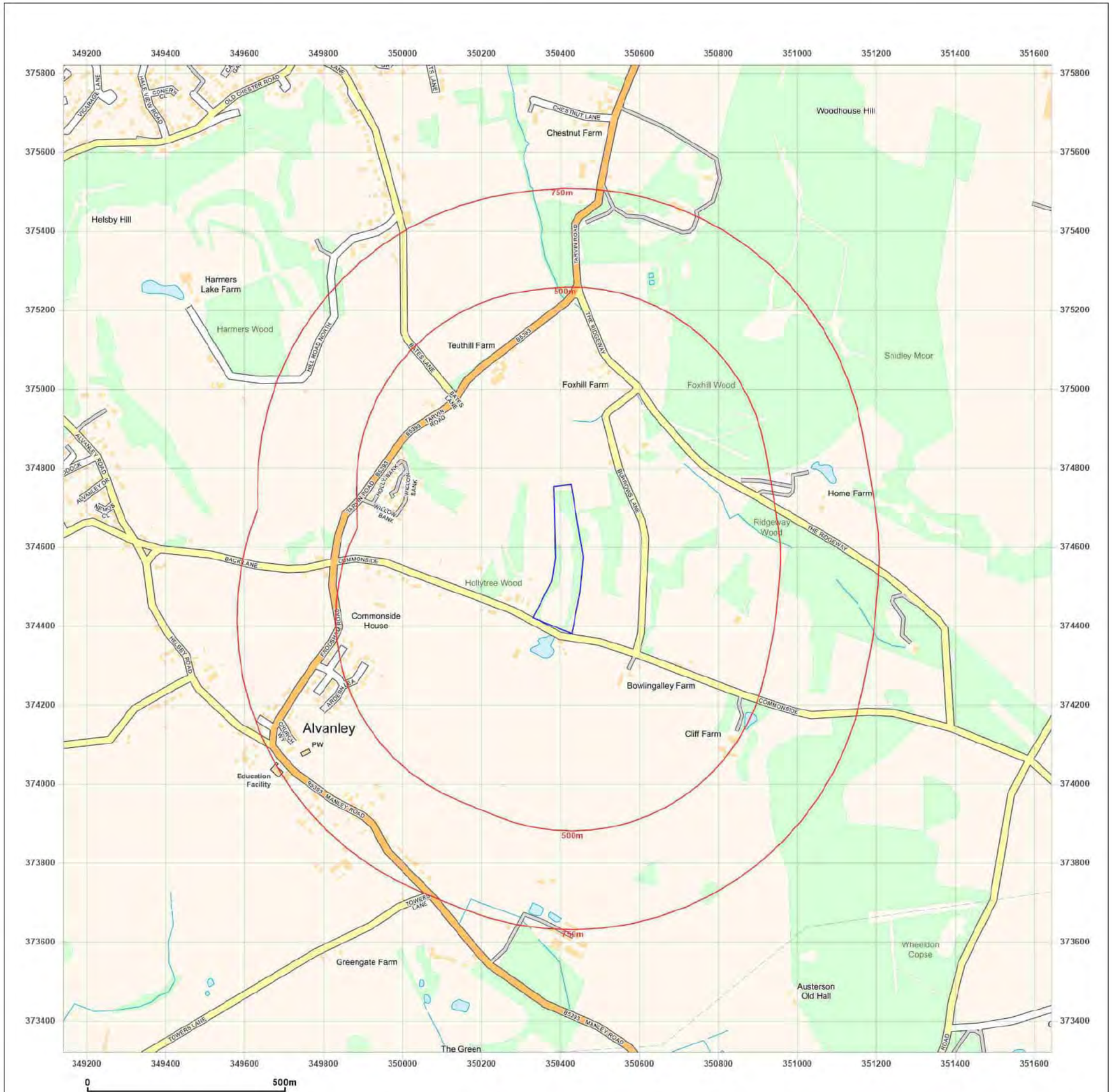

Groundsure INSIGHTS

Site Details:

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CHESHIRE WEST AND
CHESTER, WA6 9HB

Client Ref: 60747912
Report Ref: GS-QIT-XM7-KWM-B77
Grid Ref: 350393, 374570

Map Name: National Grid
Map date: **2025**
Scale: 1:10,000
Printed at: 1:10,000

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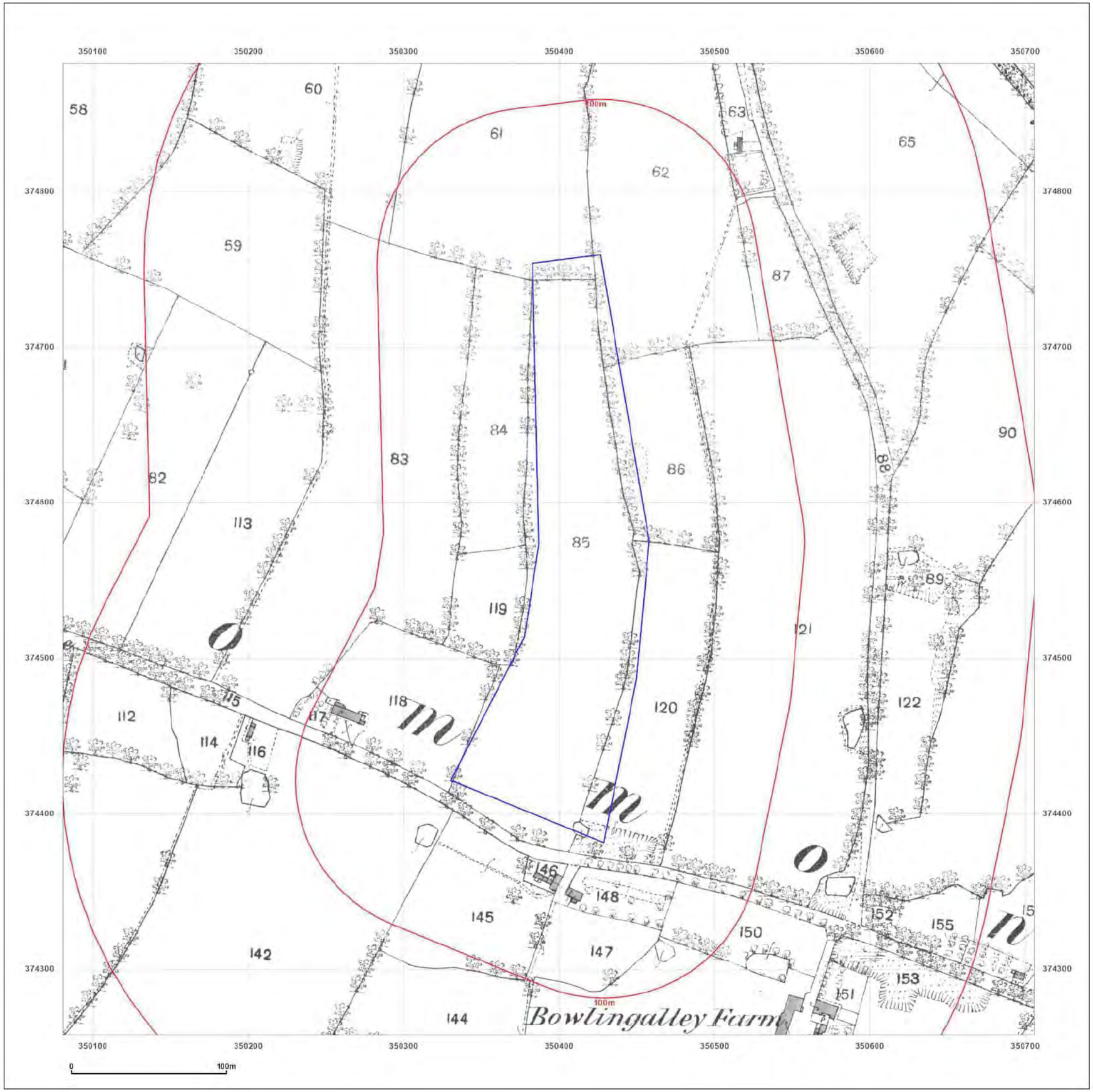

Groundsure INSIGHTS

Site Details:

COMMONSIDE TIP,
COMMONSIDE 44M FROM
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CHESHIRE WEST AND
CHESTER, WA6 9HB

Client Ref: 60747912
Report Ref: GS-QIT-XM7-KWM-B77_2500
Grid Ref: 350393, 374570

Map Name: County Series
Map date: **1873**
Scale: 1:2,500
Printed at: 1:2,500

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Surveyed 1873
Revised 1873
Edition N/A
Copyright N/A
Levelled N/A

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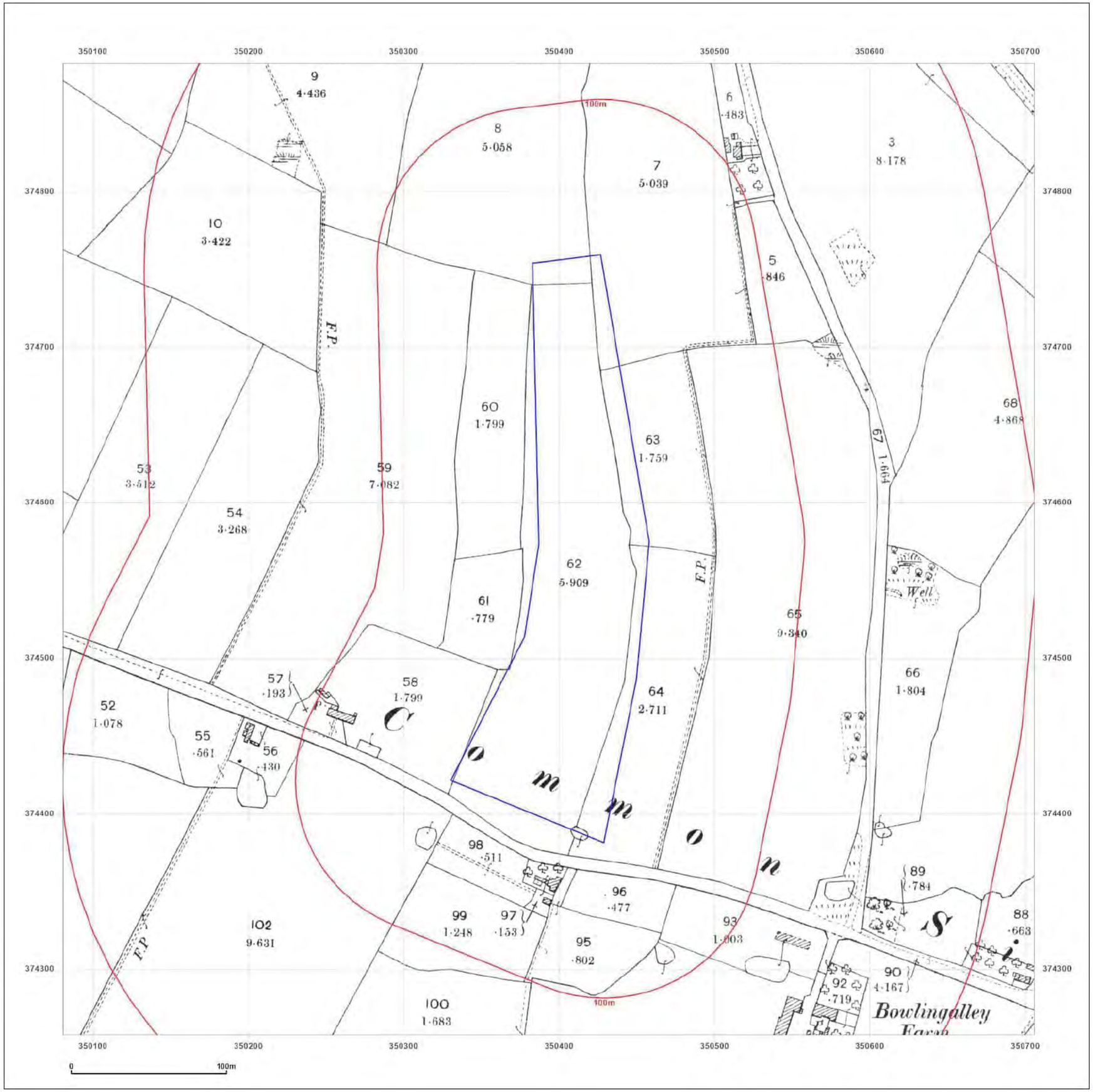

Groundsure INSIGHTS

Site Details:

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CHESHIRE WEST AND
CHESTER, WA6 9HB

Client Ref: 60747912
Report Ref: GS-QIT-XM7-KWM-B77_2500
Grid Ref: 350393, 374570

Map Name: County Series
Map date: **1898**
Scale: 1:2,500
Printed at: 1:2,500

N
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Surveyed 1898
Revised 1898
Edition N/A
Copyright N/A
Levelled N/A

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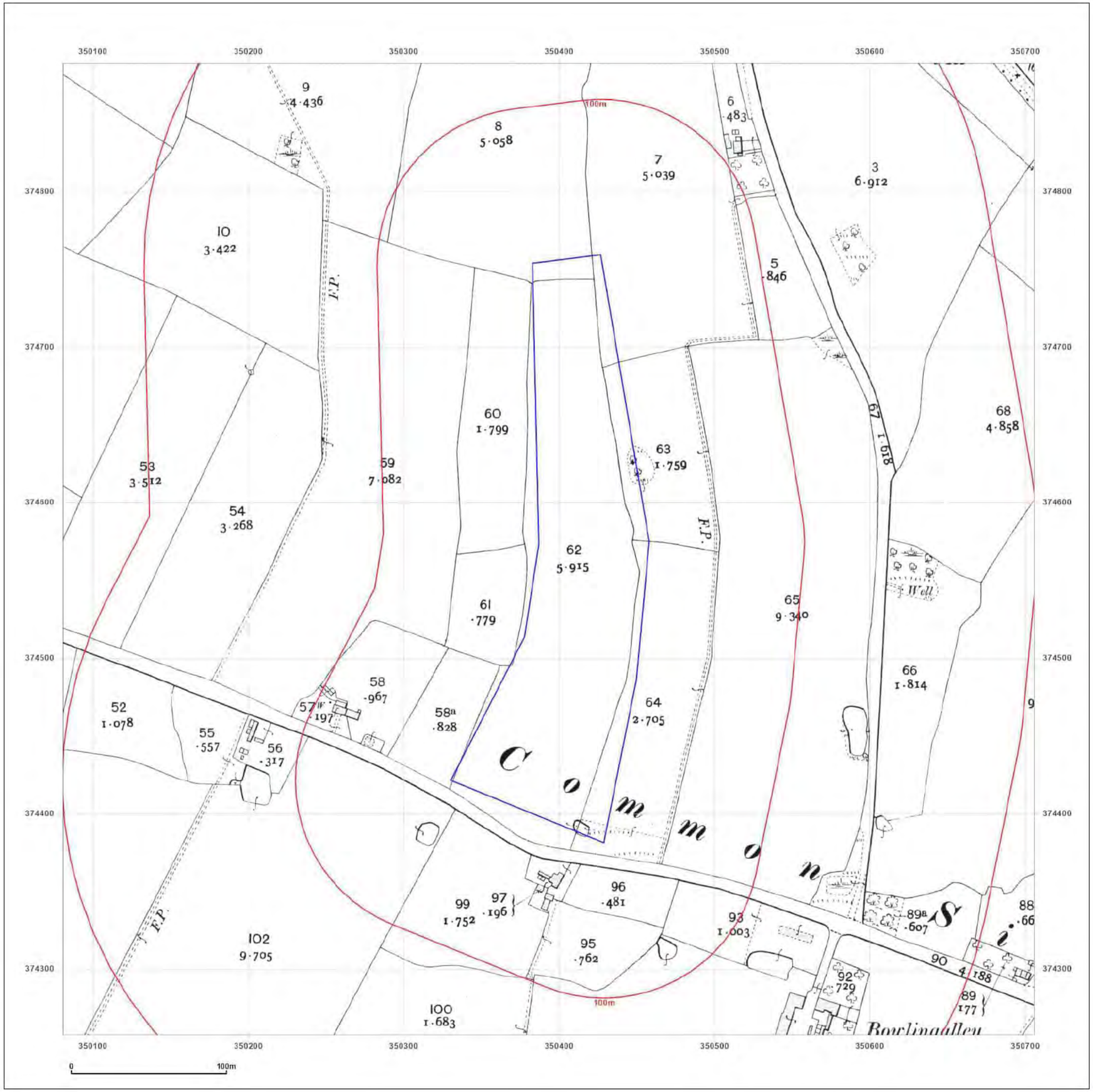

Groundsure INSIGHTS

Site Details:

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COMMONSIDE 44M FROM
COMMONSIDE, COMMONSIDE,
ALVANLEY, FRODSHAM,
CHESHIRE WEST AND
CHESTER, WA6 9HB

Client Ref: 60747912
Report Ref: GS-QIT-XM7-KWM-B77_2500
Grid Ref: 350393, 374570

Map Name: County Series
Map date: **1910**
Scale: 1:2,500
Printed at: 1:2,500

N
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Surveyed 1910
Revised 1910
Edition N/A
Copyright N/A
Levelled N/A

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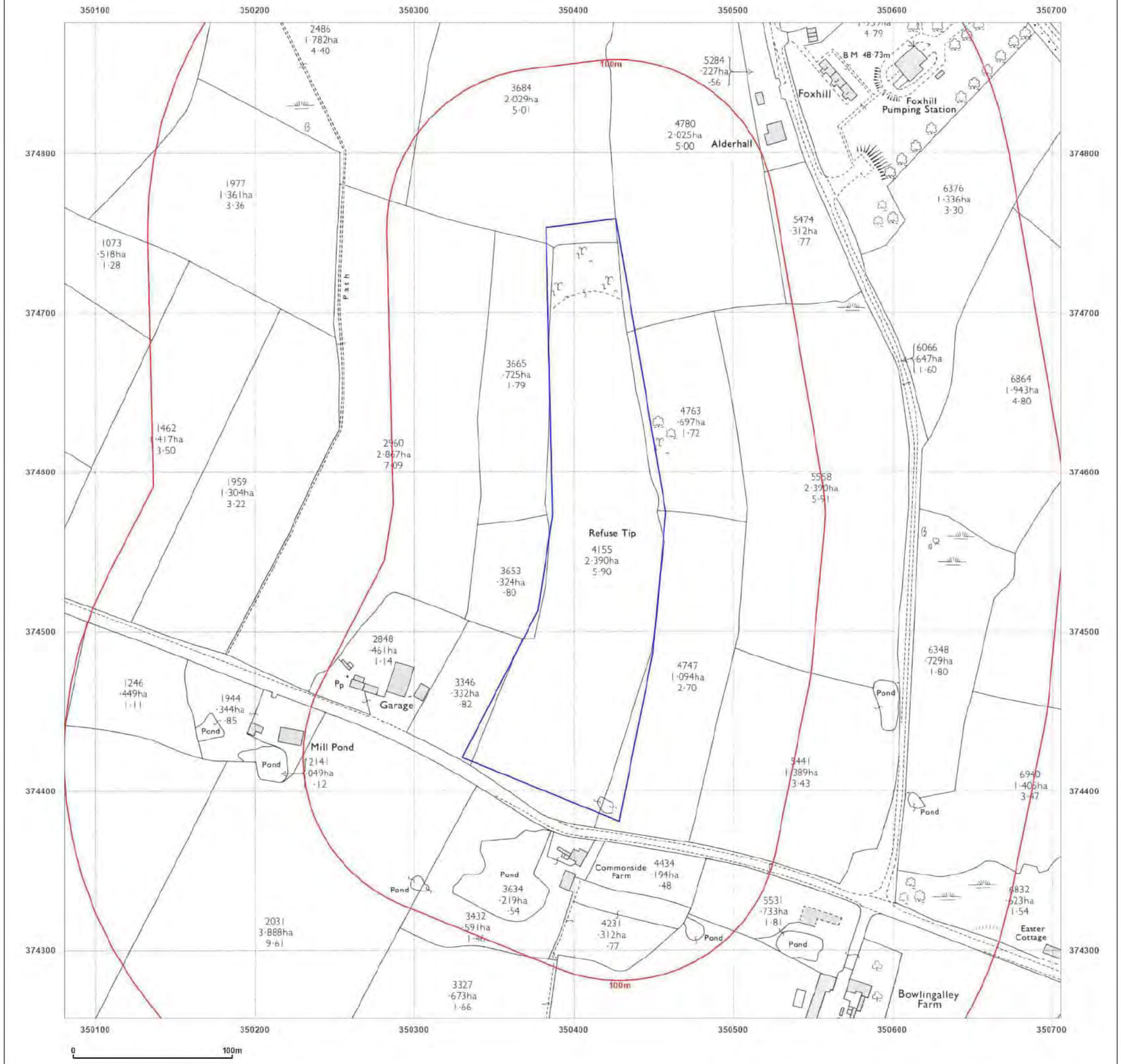

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Site Details:

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CHESHIRE WEST AND
CHESTER, WA6 9HB

Client Ref: 60747912
Report Ref: GS-QIT-XM7-KWM-B77_2500
Grid Ref: 350393, 374570

Map Name: National Grid
Map date: **1970**
Scale: 1:2,500
Printed at: 1:2,500

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

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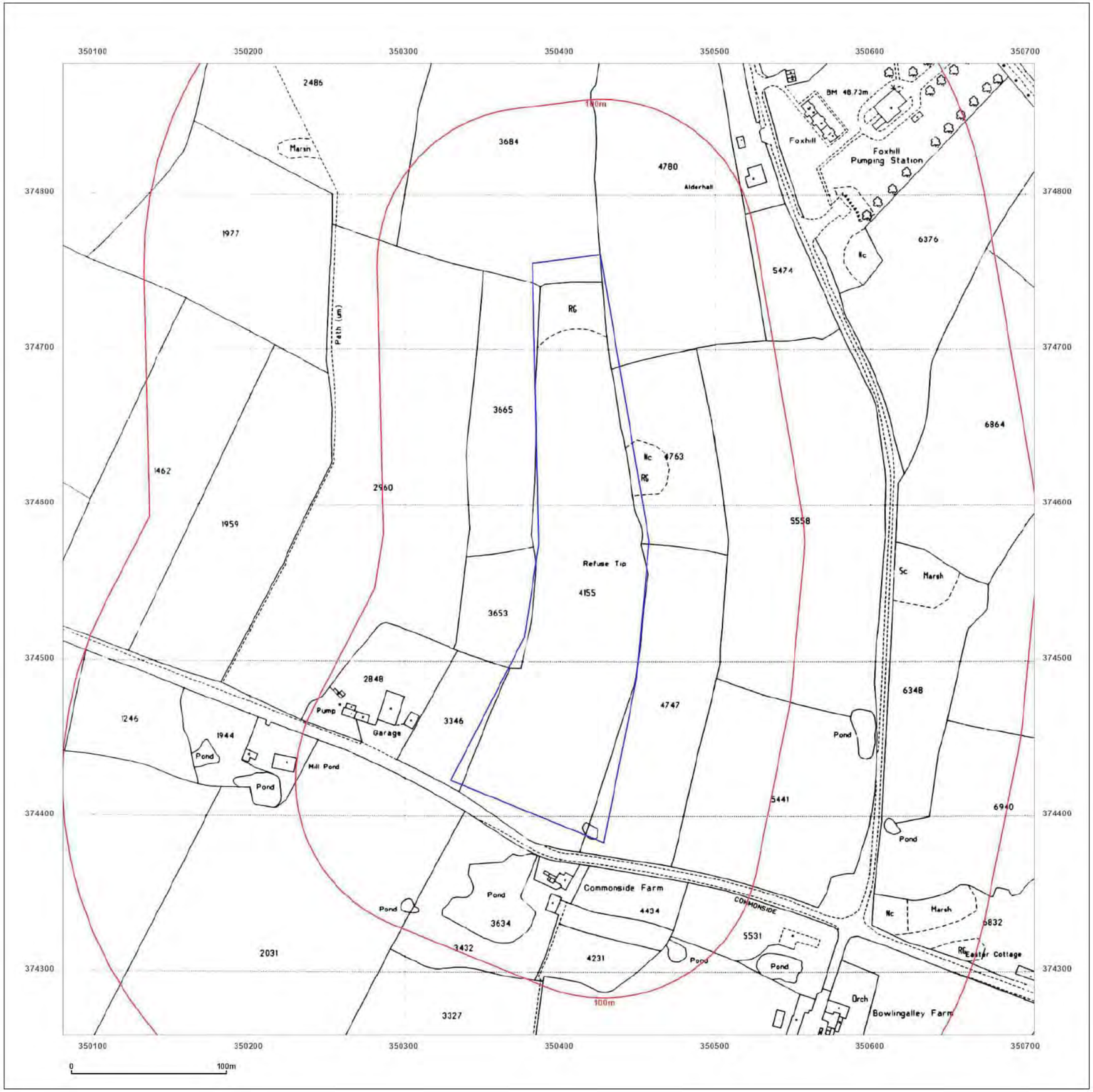

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Site Details:

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CHESHIRE WEST AND
CHESTER, WA6 9HB

Client Ref: 60747912
Report Ref: GS-QIT-XM7-KWM-B77_2500
Grid Ref: 350393, 374570

Map Name: National Grid
Map date: **1993**
Scale: 1:2,500
Printed at: 1:2,500

N
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Surveyed N/A
Revised N/A
Edition N/A
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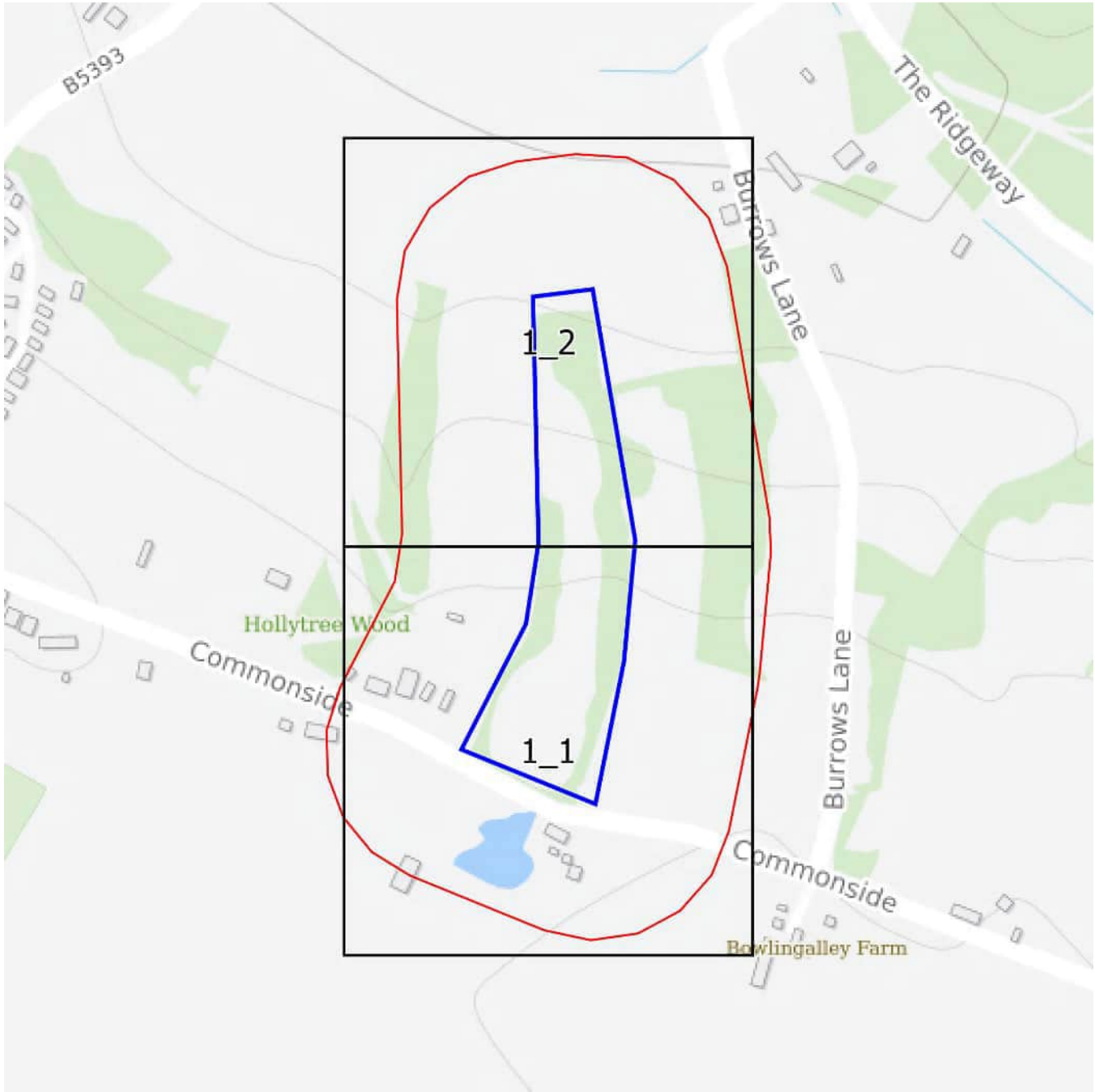
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Burrows Lane
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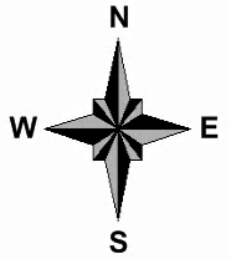
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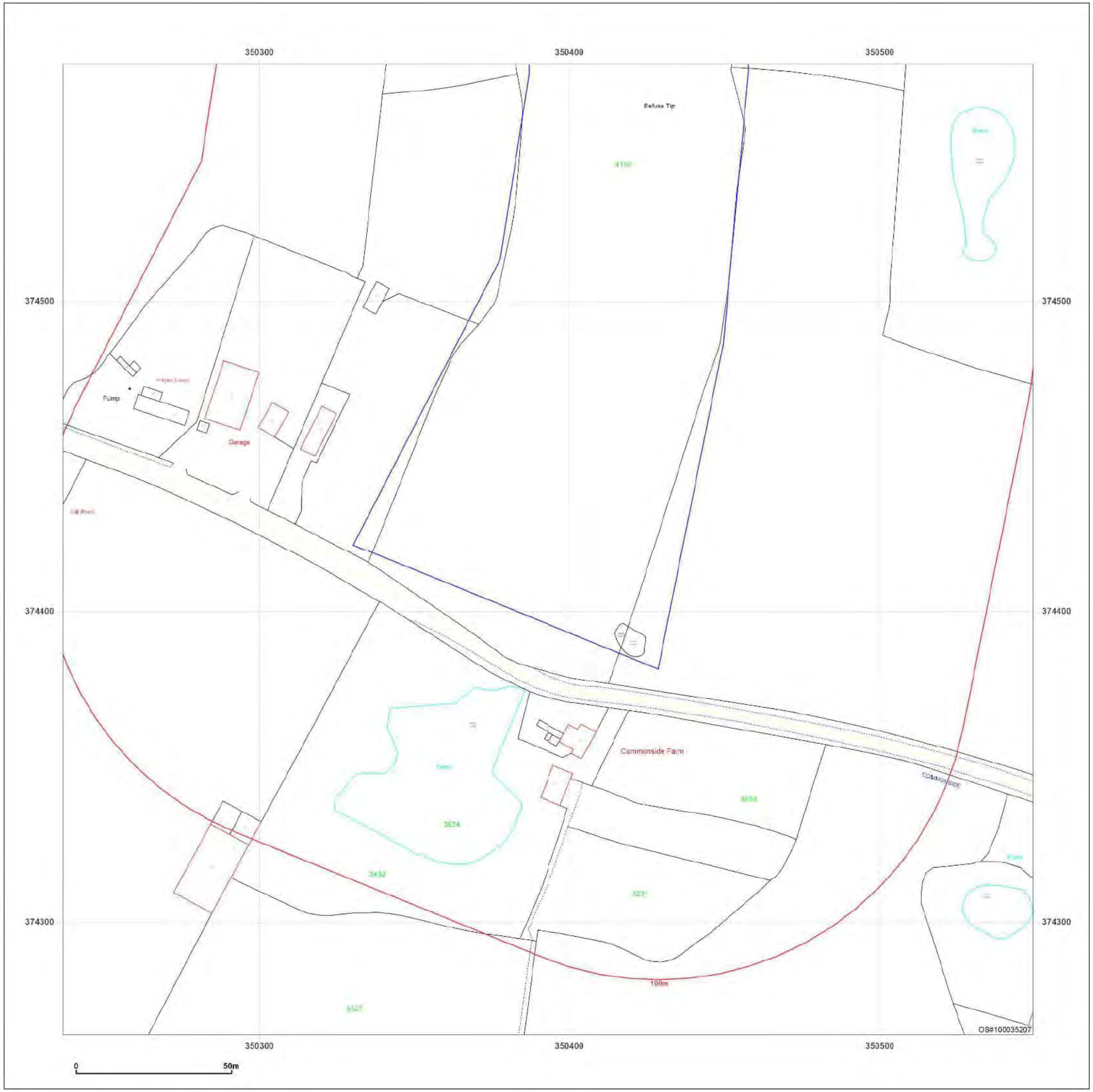

Groundsure INSIGHTS

Site Details:

COMMONSIDE TIP,
COMMONSIDE 44M FROM
COMMONSIDE, COMMONSIDE,
ALVANLEY, FRODSHAM,
CHESHIRE WEST AND
CHESTER, WA6 9HB

Client Ref: 60747912
Report Ref: GS-QIT-XM7-KWM-B77_Landline_1_1
Grid Ref: 350393, 374420

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

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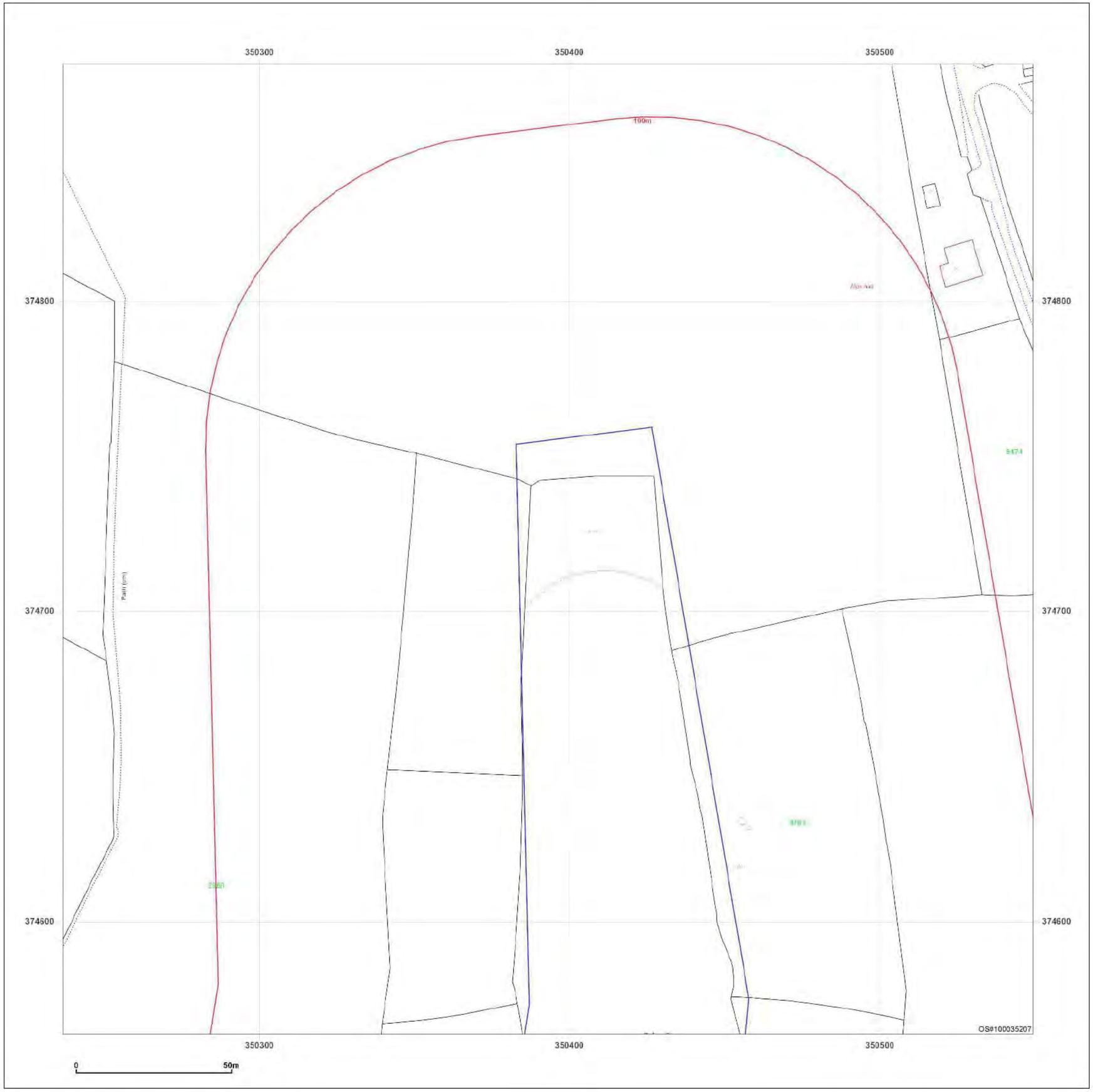

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CHESTER, WA6 9HB

Client Ref: 60747912
Report Ref: GS-QIT-XM7-KWM-B77_Landline_1_2
Grid Ref: 350393, 374720

Map Name: LandLine
Map date: 2003
Scale: 1:1,250
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Appendix D Historical Reports

D.1 NWW (1979) Investigation of a Landfill Site at Commonside, Progress Report I

The report documents an investigation initiated by North West Water's Rivers Division into the potential contamination risks posed by a disused landfill site at Commonside, near Helsby. The site, originally a steep-sided ravine, had been infilled and levelled to form low-grade agricultural land. Concerns were raised due to its proximity approximately 500 metres to the Foxhill Pumping Station, a public groundwater abstraction point supplying 1.5 million gallons of potable water per day. The landfill, operated primarily during the 1960s and early 1970s, accepted a wide range of industrial wastes under minimal regulatory oversight. Notably, polychlorinated biphenyls (PCBs), a class of persistent and toxic organic compounds, were detected in water emanating from the site and entering a nearby stream.

The investigation was structured in multiple phases. Phase I focused on characterising the site's geology and hydrogeology through borehole drilling, soil and water sampling, and groundwater monitoring. Phase II proposed trial pitting within the landfill to assess hydraulic gradients, water chemistry, and waste composition. A potential Phase III was suggested, involving the installation of a monitoring borehole between the landfill and the pumping station to serve as an early warning system.

Historical records and anecdotal accounts from past operators indicated that the site received wastes from several industrial sources, including BICC, Shell, Vauxhall Motors, and others in the Stanlow/Ellesmere Port area. Reported waste types included transformer and cable waste, paint residues, oily materials, paraffin wax (containing phenol), Epicote resin waste, and Dobatex waste with extremely high chemical oxygen demand (COD) and biological oxygen demand (BOD) values. However, the report emphasised that these accounts were largely unverified, with no supporting analytical data or documentation to confirm the exact nature or quantities of the deposited materials.

Water quality monitoring revealed elevated PCB concentrations in water samples up to 68,000 ng/L and in surface water downstream of the site (4,750 ng/L), while groundwater samples from the Foxhill Pumping Station remained below detection thresholds (<50 ng/L). The report highlighted the environmental persistence and bioaccumulative nature of PCBs, noting their potential to impact aquatic ecosystems and human health. It concluded that, given the importance of the water supply and the uncertainties surrounding the site's historical use and subsurface conditions, a detailed investigation was both necessary and urgent.

D.2 NWW (1980) Investigation of a Landfill Site at Commonside, Progress Report II [8]

The report was prepared to provide a summary of the results of an intrusive investigation. Drilling works commenced on 18th December 1979 and were completed by mid-February 1980. Six boreholes were drilled to a maximum depth of 40.5m bgl, five around the perimeter of the site (two on the western side (BH3 and BH5) and three on the eastern side (BH2, BH4 and BH6)) and one 150m to the north (BH1). Geological information from these boreholes has been incorporated into Section 4.4.

Four of the boreholes were installed as monitoring wells (the report does not identify which these were). Laboratory analysis of groundwater samples collected during drilling identified contamination in BH3 only, with a composition reported to be similar to water samples from the site, believed to have been collected from 'sampling point B' circa 85m north of the northern site boundary at the point where a pipe emerged into an open ditch. Later groundwater sampling did not identify contamination. The original laboratory data was not appended to the report.

A programme of groundwater gauging and sampling within the landfill was also undertaken at three locations to the north of the site: point A located at the water issue point on the northern boundary of the site in the vicinity of the sump, point B circa 85m north of point A at the point where a pipe emerged into an open ditch running between fields, and point C circa 120m north of point A on the same ditch. This ditch flowed into the drainage ditch 175m north of the site which in turn flows into Foxhill Brook. Water samples indicated the presence of PCBs (reportedly 68 µg/l), organochlorine compounds, phenolic compounds, including "bisphenol A" (diphenoyl propane), low concentrations of heavy metals (with the exception of iron) and high Chemical Oxygen Demand (COD) / Biological Oxygen Demand (BOD) ratios interpreted by NWW as indicative of a high proportion of non-biodegradable organic material. Of the organic components, bisphenol A was present in the greatest concentrations and used as a

'pollutant tracer'. It was reportedly manufactured at Shell Stanlow. The water quality was reportedly improved from samples collected during the 1960s and early 1970s (although the samples were not directly comparable).

A biological investigation (included as Appendix 4 of the report) noted the following:

- Non-polluted freshwaters should contain a maximum of 0.5 ng/l PCBs, moderately polluted freshwaters should contain a maximum of 50 ng/l and grossly polluted freshwaters a maximum of 500 ng/l.
- Diffusion of PCBs from landfill sites is slow due to their low volatility and solubility.
- The site was reported to be leaching PCBs at 68,000 ng/l PCB, indicating a large concentration of PCBs within the tip.
- The stream from the tip was found to be “polluted” [AECOM assumes with PCBs, although concentrations in the stream were not reported].

The report recommended that the ditch north of the site into which the water flows be piped in order to prevent livestock accessing the watercourse and to limit odour issues.

D.3 Leah, R.T. and Connor, L. (1994) An Investigation of Waters Affected by PCBs in Leached from Commonside Tip [5]

The investigation was undertaken to assess the dispersal of PCBs discharged from the site. Assessment of specific congener profiles was undertaken in an attempt to distinguish between contamination originating from the site and other contamination from a separate source originating from the industrial area to the west of the marsh (and circa 3.3km northwest of the site) that could also be a source of contamination in the marsh.

Sampling sites were positioned along Foxhill Brook upstream and downstream of the site and along the Main Marsh Drain into which it flows from Hornsmill Brook in the west to the River Weaver in the east. Sampling was undertaken at monthly intervals between February and July 1994. Sediment samples were also collected systematically across the study area on a single occasion, derived from a composite of three subsamples of surface sediment (<10cm). Additional water and sediment sampling was undertaken in October 1994 from Commonside Pond, Ridgeway Brook (above its confluence with Foxhill Brook, upstream of the site) and the River Gowy to provide data for comparison.

High concentrations of total PCBs were recorded in water leaving the base of the tip (9 µg/l to 75 µg/l). There was a rapid decline in concentration in water with distance away from the site. The concentrations downstream of the site ranged from a maximum of 7 µg/l just below the “input point” (appearing to correlate with the point where the land drain originating from the site outfalls to Foxhill Brook) to a minimum of 0.03 µg/l at the point where drainage water from the marsh is pumped into the River Weaver. The monitoring point on Foxhill Brook upstream of this input point showed PCB concentrations up to 0.15 µg/l throughout the study. In the additional samples collected in October 1994, PCBs were not detected using this method. The declining concentrations downstream were attributed to sedimentation of suspended solids with adsorbed PCBs, given that the stream volume was not observed to increase substantially downstream meaning that dilution was unlikely to have a substantial effect.

Based on guidance for polluted freshwaters (see Section D.1), the report placed the most contaminated part of the sampling area (sampling point 2A, immediately downstream of the entry of water flowing from the site into Foxhill Brook) in the highly / grossly polluted category. With the lower polluted parts of the sampling area still in the moderately polluted category.

Sediment samples showed an initial peak in total PCB concentrations at the sampling location immediately downstream of water input from the site. Concentrations declined along the brook before reaching a second peak in the Main Drain. This peak was attributed to accumulation of fine sediments around the point where Foxhill Brook enters the slower-flowing Main Drain. High PCB concentrations were also observed at the western end of the study area and was considered likely to be associated with pollution of Hornsmill Brook and was not attributed to the site.

The PCBs recorded in water were a diverse range of congeners, with a substantial proportion (44%) present in dissolved form as well as that associated with suspended particulate material. In sediments, the congener composition of PCBs showed an increase in the more toxic and hydrophobic congeners with distance from the site. Variations in congener composition were considered to be related to environmental processes.

The report concluded that the majority of PCB transport away from site was occurring on suspended solids, and that if the dispersal of suspended solids was to be controlled, the spread of future contamination would be largely stopped. The PCB concentrations in sediment were considered to pose a potential risk to wildlife and it was recommended that the areas of highest concentration in the Main Drain should be considered for removal and disposal.

D.4 GeoDelft (2000) Alvanley Tip Desk Study [2]

The Desk Study was prepared with reference to sources including previous reports relating to the site, historical aerial photographs and maps, information held by Cheshire County Council, VRBC and the EA. Relevant information relating to the site history, waste deposition and environmental setting has been incorporated into the preceding sections of this report.

Water discharging from the landfill site was reportedly sampled on various occasions between 1968 and 1994. Contaminants detected in this water included PCBs, chlorinated benzenes, ketones (such as 4-methyl-2-pentanone (MIBK)), phthalate esters, thiophenes, petroleum hydrocarbons, butadienes (such as hexachlorobutadiene) and phenolic compounds. GeoDelft noted that phenol, MIBK, m-cresol, thiophenes and ethyl phenol were the more soluble compounds and considered these most likely to enter groundwater. High BOD and COD values were also reported in water from the site in sampling undertaken between 1968 and 1982.

A review of historical water sampling included the investigations summarised in Section D.1 and D.2 as well as other sampling events for which reports have not been made available to AECOM. Other sampling undertaken in 1989 reportedly analysed samples from Foxhill Brook for PCBs from three locations: upstream at the road junction (PCB concentration = 86 µg/l), downstream at Woodhouses Ford[3] (PCB concentration = 0.9 µg/l) and the pond at Godscroft Lane (PCB concentration = 0.6 µg/l). Sampling three months later identified concentrations of 25 µg/l upstream and between 2.2 µg/l and 3.5 µg/l downstream.

The report concluded by identifying the following potential contaminant linkages:

- Contamination of Foxhill Brook by water discharging from the site.
- Leachate contamination of Foxhill Brook and impact on the downstream surface water abstraction for spray irrigation at Godscroft Hall, Frodsham.
- Contamination of groundwater by leaching from waste materials.
- Contamination of groundwater by leaching from waste materials and subsequent contamination of surface water courses.
- Contamination of groundwater by leaching from waste materials and subsequent contamination of groundwater abstractions (including wells).
- Dense Non-Aqueous Phase Liquid (DNAPL) contamination of groundwater.
- DNAPL contamination of groundwater and subsequent contamination of surface water courses.
- DNAPL contamination of groundwater and subsequent contamination of groundwater abstractions (including wells).
- Contaminated soil and/or water uptake into agricultural products.
- Methane generation and migration into enclosed spaces within buildings etc.

D.5 Leah, R.T. and Connor, L. (2001) Dispersal of Polychlorinated Biphenyls from a Closed Landfill Site [3]

The study was undertaken in order to examine the efficacy of soil capping as a measure to isolate PCBs and other contaminants from the surrounding environment.

Surface soil samples were collected on an approximately 5m grid across the whole landfill site. Samples were collected to a depth of approximately 5cm and formed as a composite of three sub-samples collected at each

[3] Precise location not identified in report, but may be in the vicinity of Woodhouses Lane where Foxhill Brook crosses modern day Chester Road.

location. Stream sediments were collected over a distance of 3km from the source. Vegetation and invertebrate sampling was also undertaken across the site.

Five soil samples were collected in the fully capped area to the south, with total EC-7 PCB concentrations between 67 µg/kg and 152 µg/kg (mean concentration 113 µg/kg). Five soil samples were collected in the central partially capped area, with total EC-7 PCB concentrations between 81 µg/kg and 215 µg/kg (mean concentration 154 µg/kg). Five soil samples were collected in the uncapped area to the north, with total EC-7 PCB concentrations between 208 µg/kg and 140,000 µg/kg (mean concentration 29,000 µg/kg). Higher concentrations of PCBs were also detected in vegetation and invertebrates across the uncapped area than in the capped or partially capped areas.

Sampling in adjacent pastures produced 28 samples with total EC-7 PCB concentrations between <0.1 µg/kg and 238 µg/kg (mean concentration 20 µg/kg). This suggested limited lateral dispersion of PCBs.

Total EC-7 PCB concentrations in stream sediments declined from 241,000 µg/kg at the landfill discharge point to circa 1000 µg/kg 3km downstream.

The lack of cap across the northern area was considered to have contributed significantly to the dispersal of PCBs downstream, comprising both leaching to groundwater and immediate surface run-off.

D.6 GeoDelft (2005) Commonside Tip Desk Study, Draft Interpretative Report [24]

The desk study was carried out as part of a Part IIA detailed inspection to establish whether the site was considered to be contaminated land in accordance with the statutory definition.

Site reconnaissance undertaken in 2004 identified that the original NWW boreholes were no longer present. A conversation with the owner of the land immediately north of the site indicated that he had installed a drain from the foot of the landfill to the brook to the south (sic – assumed to refer to the drain running between the site and Foxhill Brook to the north). Information presented in the report relating to the site setting has been superseded by more recent published data and has therefore not been repeated here.

The following pollutant linkages were considered to have a reasonable possibility of being present:

- Migration of impacted groundwater through shallow soils to Foxhill Brook and adjacent land.
- Migration of water through the site and field drainage system to Foxhill Brook.
- Migration of water in Foxhill Brook to Godscroft Hall surface water abstraction and ecological receptors.
- Leaching of contaminants through shallow soils to groundwater (major aquifer).
- Migration of contaminants in groundwater to Foxhill Brook.
- Migration of contaminants in groundwater to public water supply abstraction well.
- Migration of DNAPL (if present) through shallow soils to groundwater (major aquifer).
- Vegetation uptake of soil contamination and subsequent human consumption.
- Migration of landfill gas through shallow soils to human health receptors (asphyxiation).
- Migration of landfill gas through shallow soils to buildings (explosion).

D.7 GeoDelft (2005) Secondary Site Desk Study [25]

The desk study was carried out as part of a Part IIA detailed inspection to establish whether the site was considered to be contaminated land in accordance with the statutory definition.

Detailed information regarding the site's setting was assumed to be similar to Commonside Tip and was considered to have been addressed within the previous GeoDelft desk studies (see Sections D.3 and D.6).

The following potential pollutant linkages were listed in the report, however GeoDelft noted that the potential sources had not been defined and there was no evidence at the time of a source being present at the time of writing:

- Migration of impacted groundwater through shallow soils to Foxhill Brook and adjacent land.

- Migration of water through site and field drainage systems to Foxhill Brook.
- Migration of water in Foxhill Brook to Godscroft Hall surface water abstraction and ecological receptors.
- Leaching of contaminants through shallow soils to groundwater (major aquifer).
- Migration of contaminants in groundwater to Foxhill Brook.
- Migration of contaminants in groundwater to public water supply abstraction well.
- Migration of DNAPL through shallow soils to groundwater (major aquifer).
- Migration of DNAPL in groundwater to Foxhill Brook.
- Migration of DNAPL in groundwater to public water supply abstraction well.
- Vegetation uptake of soil contamination and subsequent human consumption.
- Direct contact of human health receptors with contaminated soils.
- Migration of landfill gas through shallow soils to human health receptors (asphyxiation).
- Migration of landfill gas through shallow soils to buildings (explosion).

D.8 GeoDelft (2005) Commonside Tip Site Investigation, Draft Interpretative Report [9]

A geo-environmental investigation was carried out around the perimeter of the site as part of ongoing investigations, in order to assess the validity of the sources, pathways and receptors that had previously been identified for this site, in the context of Part IIA of the EPA 1990.

Seven boreholes (GDBH1A-GDBH7A) were drilled to depths between 6m and 10m bgl around the boundary of the site in October 2004: two to the north (GDBH1A and GDBH2A), two on the western side (GDBH3A and GDBH4A) and three on the eastern side (GDBH5A, GDBH6A and GDBH7A). Geological information from these boreholes has been incorporated into Section 4.3. All seven boreholes were installed with groundwater / gas monitoring wells, with well screens generally spanning all or the majority of the drilled length. Samples of shallow groundwater, surface water and brook sediment were analysed for speciated PCBs, semi-volatile organic compounds (SVOCs) and volatile organic compounds (VOCs). The SVOC and VOC analysis included a screen for tentatively identified compounds (TICs).

In the groundwater and surface water samples, which included locations both upstream and downstream of the entry point for water discharging from the landfill into Foxhill Brook), no PCBs, VOCs, SVOCs or TICs were detected. Only two sediment samples showed concentrations of PCBs just above the laboratory detection limit. No floating free phase material was identified in any of the groundwater monitoring wells. Analytical data from the Foxhill abstraction boreholes provided by NWW did not identify evidence of impact from the contaminants of concern.

Landfill gas monitoring indicated a minimum oxygen concentration of 9.1% at GDBH7A and a maximum carbon dioxide concentration of 7.8% at GDBH6A. Methane was only detected in GDBH7A at a concentration of 0.3%.

The report re-evaluated a number of contaminant linkages associated with the site and concluded that the only linkages which remained valid were those relating to direct contact with contaminated soils via dispersion of contaminated dust and exposure to landfill gas based on the elevated carbon dioxide concentration. The investigation did not address the potential linkage from shallow groundwater to the bedrock aquifer or the potential linkages associated with DNAPL impact on the bedrock aquifer, Foxhill Brook or Foxhill Pumping Station, due to the depth of boreholes which would have been required and the investigation costs and distribution uncertainties associated with DNAPLs.

A Tier 1 Quantitative Risk Assessment (QRA) performed via the “DG>HydroScreen” model for the contaminants analysed did not indicate any potential risks of impact to ground and surface waters. It was noted that a limited number of the contaminants of concern required more sensitive analytical laboratory detection limits for an effective Tier 1 screen to be performed.

GeoDelft concluded that although potential sources and receptors were present, effective pathways were not present as no off-site contamination was identified. There was no evidence to suggest that there was a risk of significant harm being caused or a significant possibility of such harm being caused and / or risk of pollution of

controlled waters being or likely to be caused. GeoDelft recommended that a continued programme of gas and water monitoring would be prudent.

In addition, GeoDelft noted that *"during the fieldwork planning stage, anecdotal evidence indicated that radioactive materials may have been dumped in the landfill site"*. In response to this possibility, health physics monitoring was undertaken during the investigation. A radiological screen of soil samples that were generated during the intrusive site investigation did not indicate the presence of radioactive (beta and gamma flux) contamination.

D.9 RSK (2006) Foxhill Brook Sampling [26]

An environmental assessment was carried out in response to complaints from nearby residents regarding unpleasant "chemical" odours from Foxhill Brook and observations of a sheen/film on the water near Chestnut Lane. There was also anecdotal evidence of an incident involving the operator of a mechanical excavator who was overcome by fumes whilst working in the area of a footbridge over the brook. The assessment was undertaken to review the contaminant status of the brook at the locations where odours and contamination were observed.

Sampling was undertaken at five points along Foxhill Brook. One sediment sample was collected from the stream bed at each point and two soil samples were collected from each bank of the brook, resulting in a total of 15 samples (SS101-SS115). One stream water sample was also collected at each of the five locations (WS101-WS105). The soil and sediment samples were analysed for PCBs, VOCs and SVOCs. Strong chemical odours were observed at sampling points 2 to 5. At sampling point 4, "fatty" deposits were observed on the stream bed. Additionally, at sampling point 5, foam was observed on the water downstream of the culvert beneath Tarvin Road.

In soils/sediment, individual PCB congener concentrations ranged from below the limit of detection to 0.513 mg/kg of PCB 28. At sampling point 1 which was positioned upstream of the location where the drain from the site enters the brook, no PCBs were detected, however PCBs were detected at all other locations. The World Health Organisation (WHO) list of 12 PCBs were noted to comprise only a small proportion of the total PCBs detected. Concentration of VOCs were all below the limit of detection (1 µg/kg) except for sampling points 4 and 5 where relatively low concentrations of toluene were detected (maximum of 39 µg/kg). Toluene was not found upstream of these points and was attributed to either runoff from the road or agricultural spillage. Polycyclic aromatic hydrocarbon (PAH) concentrations ranged from below the limit of detection (100 µg/kg) to 4620 µg/kg of fluoranthene in soil sample SS107. PAH compounds were only detected downstream of the confluence between the tip and the drain. Other SVOCs were not detected.

In the water samples, PCB concentrations for individual congeners ranged between below the limit of detection (0.001 µg/l) to a maximum of 1.22 µg/l for PCB 28 in WS103 (sampling point 3). PCBs were not detected in the sample collected upstream of the confluence between the tip drain and the brook. VOCs and SVOCs were not detected, with the exception of phenol and 4-methylphenol at sampling point 4 (maximum of 136 µg/l).

A preliminary Generic Quantitative Risk Assessment (GQRA) was undertaken to assess whether the concentrations might reflect a potential risk to human health or the environment.

To assess risks to human health, the soil/sediment data were compared to the Defra Soil Guideline Values (SGVs) applicable at the time of writing, where available. Where SGVs were not available, RSK ENSR 'in-house' generic soil screening values (SSV) were adopted for specific contaminants. The criteria adopted were for a residential end use, without vegetable intake. RSK noted that use of the SGVs/SSVs was a conservative approach, as they were based on assumptions for residential properties and did not reflect likely realistic human exposure at the stream. No exceedances of the SGV were identified for PCBs or the VOCs and SVOCs detected. Concentrations of benzo(a)pyrene were above the SSV at sampling points 2 and 3.

The water data were compared to Environmental Quality Standards (EQS) values, where available. RSK considered EQS to be the most appropriate generic standard for the site. Foxhill Brook was considered very unlikely to be a potable water resource and therefore Drinking Water Standards (DWS) were not considered applicable. However, where EQS were not available, the data were compared to DWS in order to provide context to the reported concentrations. RSK also noted that calculating a risk to human health from ingestion of contaminated water might better reflect the short-term risks to human health from water in the brook, such as accidental ingestion. The reported phenol concentration was above the EQS value in one sample. RSK noted that PCBs were not detected, no screening values were available at the time and so no GQRA was undertaken for the contaminant.

RSK concluded that the most significant impact found was from PCBs in soil/sediment. These were considered to be a potential risk to human health and the environment, but these risks were deemed unquantifiable without a site-specific Detailed Quantitative Risk Assessment (DQRA) and additional statistically valid sampling. The impact of other potential contaminants on the environment and human health was considered to be low. The PCB source

was considered to most likely be the site, however this was not considered to be fully established. It was also considered possible that the 'fatty' deposits and strong odours observed could have resulted from a seasonal groundwater flow mechanism.

RSK included a number of recommendations including more closely spaced sampling along Foxhill Brook, sampling further downstream and upstream, sampling of existing groundwater wells, further assessment of groundwater and surface water flow regimes, consideration of wider soil sampling and establishment of detailed risk assessment principles and assessment if necessary.

D.10 RSK (2009) Factual Environmental Assessment, Foxhill Brook [27]

The environmental assessment was undertaken to assess the risk to identified human health receptors from the contamination reported in Foxhill Brook. It involved passive and active air monitoring, water and sediment sampling and use of a fluorescent dye tracer to assess whether water discharging from the landfill was entering Foxhill Brook.

A site walkover conducted by RSK in January 2009 observed strong chemical odours at a sump on the northern boundary of the site and at a culverted pipe running north from the landfill. A pipe that discharged into the Foxhill Brook approximately 100m downstream of Foxhill Farm was suspected by RSK as being directly connected to the sump. The discharged water was clear but had a very strong chemical odour, whilst the sediment downstream was *"ochreous in colour, fine in texture and very odorous"*. No odours were observed upstream of this pipe, whilst odours diminished downstream to the Tarvin Road Bridge, where strong odours were observed. Beyond this, slight chemical odours were observed at several locations.

Sampling locations were selected to provide improved coverage along the length of the brook than in the 2006 assessment [26], to target areas where odours had been reported and to provide information on potential sources and pathways. Eight water samples (BW1-BW8) were collected, with BW1 and BW2 being upstream of the pipe and the remainder being downstream. Two pipe water samples and one sample from the landfill sump were also collected.

In the water samples, PCB concentrations for individual congeners ranged between 0.001 µg/l and 11.450 µg/l (PCB 28). PAH concentrations ranged between 0.21 µg/l and 2.36 µg/l for total PAH. The highest individual PAH concentration was acenaphthene at 2.27 µg/l.

18 bed sediment samples (BS1-BS8) were collected at eight locations, generally from the top 5cm of sediment in the stream bed, with the following exceptions at three locations, multiple samples were collected:

- At locations BS5 and BS6, samples of bed sediment were collected from the marginal areas of the reach that were dominated by fine organic rich sediment (BS5A and BS6A), and from sandy areas predominantly associated with the thalweg (BS5B and BS6B).
- At locations BS5 and BS8, representative samples from bed sediment surface to 0.1m depth, and 0.2–0.3m depth (BS5) and bed sediment surface to 0.05m and 0.10–0.15m depth (BS8) were taken at sampling locations five and eight (BS5 and BS8) using a plastic corer.

Three pipe sediment samples (PS1, PS1 A2 and PS1 B) and one garden soil sample (GS1) were also collected.

In the sediment samples. PCB concentrations for individual congeners ranged between <0.005 mg/kg and 7.738 mg/kg (PCB 28). PAH concentrations ranged between 0.18 mg/kg and 4.25 mg/g for total PAH. The highest individual PAH concentration was benzo(a)pyrene at 1.58 mg/kg.

Active vapour monitoring was undertaken at three locations: 1-5m downstream of the pipe, adjacent to the caravan park at sampling location 4, and at sampling location 5. Passive vapour monitoring locations were also collected at three locations: 10m downstream of the pipe, Tarvin Road Bridge, and in an area of turbulence approximately 15m upstream of sampling location 5 adjacent to a residential garden and public footpath.

The vapour monitoring did not detect PCBs in any of the samples. SVOCs and VOCs were detected in each of the passive and active samples. The maximum concentration in the passive samples was nonadecane at 9.6 µg/m^3 in the sample collected upstream of sampling location 5 and the maximum concentration in the active samples was eicosane at 14.7 µg/m^3 in the sample collected at sampling location 5.

The fluorescent dye tracer test showed connectivity between the site and the pipe entering Foxhill Brook. A travel time of 30 minutes across a distance of 250m was recorded. RSK considered it likely that the pipe was directly connected to the sump, given that no dilution of the tracer dye was observed.

An assessment of risk to identified receptors was prepared as a separate interpretative report, see Section D.12.

D.11 RSK (2009) Foxhill Brook: Removal of Materials [28]

The document provides a short factual summary of sediment and organic matter removal works undertaken in March 2009. The works were undertaken to remove contaminated sediment and reduce points of aeration and resulting odours at two locations, the first immediately downstream of the outfall pipe and the second at the footbridge close to Chestnut Lane. The works removed approximately 8m^3 of sediment which were classified as non-hazardous waste. A sediment trap was installed beneath the outfall pipe to collect the most impacted sediment and allow settlement of suspended sediment prior to entering the brook. RSK noted that the impact of these works was temporary, and that sediment and organic matter would gradually build up again over time.

D.12 RSK (2009) Environmental Assessment, Foxhill Brook [10]

The report provides an interpretative assessment of the data collected in January 2009 and summarised in Section D.10 above. These results were initially compared to RSK's in-house screening values for human health and controlled waters, where available.

In the sediment samples, only one compound exceeded the RSK residential Generic Assessment Criteria (GAC) values for VOCs and SVOCs. Benzo(a)pyrene was reported at 1.58 mg/kg in the pipe sediment sample, in excess of the GAC of 1.02 mg/kg. RSK considered this did not pose a risk to human health as exposure to brook sediments was likely to be much lower than to typical residential garden soil.

RSK noted that the majority of the PCB congeners detected in sediments were the lower numbered (less chlorinated) congeners, which are generally more soluble and hence more mobile. The assessment approach for PCBs considered the toxic equivalency approach suggested by the Defra and EA in their 2003 report on collation of toxicological data and intake values for dioxins, furans and dioxin-like PCBs [29], wherein PCBs are assigned a toxic equivalency (TEQ) against the toxicity of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) , the most toxic dioxin. RSK derived a screening value for PCBs in sediment assuming a toxicity based on the most toxic PCB (PCB 126) and the standard residential scenario in the Contaminated Land Exposure Assessment (CLEA) model v1.04.

The derived screening value for PCB 126 was 1.25 x 10^{-3} mg/kg. This congener was only detected in the pipe sediment samples at 0.029 mg/kg and 0.02 mg/kg. The congener with the next highest TEQ (PCB 169) was not detected in any sediment samples. All other PCBs had TEQs of 0.0001 or lower. RSK therefore determined that the derived screening value for PCB 126 could be multiplied by 1000 following the TEQ system, resulting in a screening value of 1.25 mg/kg. Given the likely low exposure of residents to brook sediments (compared to a residential garden soil), a further factor of 10 to account for this was applied, resulting in a final screening value of 12.5 mg/kg. The maximum total PCB concentration in brook sediment was 4.9 mg/kg, below the screening value. In the pipe sediment samples, one result was slightly above the screening value (13.8 mg/kg) whilst the other was below it (9.5 mg/kg). RSK therefore concluded that there was unlikely to be a long-term human health risk to residents and footpath users.

In the water samples, no compounds exceeded the RSK residential GAC values for VOCs and SVOCs. The United States Environmental Protection Agency (US EPA) DWS Maximum Contaminant Level (MCL) of 0.5 µg/l of total PCBs was adopted as a conservative preliminary screening value for human health assessment in the absence of other published standards. Only the pipe water sample PW1 (7.8 µg/l filtered and 19.8 µg/l unfiltered) and sample BW3 directly downstream of the pipe (0.71 µg/l) exceeded this value.

In the vapour samples, no PCBs were detected above the limit of detection. The majority of VOCs detected were long chain alkanes and methyl alkanes, with other contaminants of concern including pyrene, naphthalene, methyl naphthalenes and biphenyl, which is a precursor compound in PCB manufacture and has a sweetish chemical smell. There is also literature information to suggest that PCBs can biodegrade back to biphenyl under favourable conditions. RSK considered that biphenyl could be a source of the odours observed in the vicinity of the brook. Assessment of the vapour monitoring data determined that, due to the low concentrations detected, there was not considered to be a significant human health risk from these concentrations in vapours, although the odour nuisance issue was noted to potentially require remedial treatment.

In regard to controlled waters, no VOCs or SVOCs exceeded the adopted controlled waters criteria. RSK noted that PCBs are a List 1 substance which should not be permitted to enter controlled waters. PCBs were detected at

7.36 µg/l and 19.8 µg/l in the filtered and unfiltered pipe water samples, with a concentration of 0.71 µg/l at BW3 downstream of the outfall. PCBs were also detected in all other downstream water samples (BW4-BW8). The report noted the difficulty of assessing the impact of PCBs on the aquatic ecosystem in the absence of published guidance.

Recommendations were made for an ongoing programme of sediment removal to help reduce odours, investigation of the landfill sump to assessment whether entry of PCBs into Foxhill Brook could be reduced or prevented and further investigation of potential leaching from the landfill through fields.

D.13 RSK (2024) Foxhill Brook Bed Sediment and Surface Water Sampling, Factual Report [30]

The sampling exercise was undertaken to collect sediment and water samples at the locations previously sampled by RSK in 2009, to enable comparison with the earlier data sets from 2009 and 2006.

Eight brook water samples (BW1R-BW8R) and eight sediment samples (BS1R-BS8R) were collected at the same locations as sampled in 2009. In addition, a pipe water sample (PW1R) was collected slightly downstream of the original sample. A water sample (DW01) and sediment sample (DS01) were collected from the drainage ditch in the field to the northeast previously sampled. The sump was submerged beneath ponded water at the time of sampling, therefore a sample of the ponded water (S02) was collected. The samples were analysed for PCBs (EC-7 and WHO-12), VOCs, SVOC, Total Petroleum Hydrocarbons Criteria Working Group (TPH-CWG) and heavy metals (water samples only in order to provide information to potential disposal sites).

Chemical odours, an iridescent sheen and white foam were observed at sampling location 3, downstream of Tarvin Road Bridge. A sheen was also observed at sampling location 4. The area of ponded water also exhibited chemical odours, a sheen and orange/ochre deposits.

No interpretation of the results was provided as the report was factual only. The data has been considered in Section 7.

The EA's response to this report [31] stated that they were satisfied that the range of analytes for which the samples were analysed was likely to reflect the contaminants of concern at the site. The results were considered to show a declining concentration of PCB 28 and PCB 52 along the sampled length of Foxhill Brook. Elevated concentrations of other contaminants were not considered to be present. Slightly elevated concentrations at S02 were not considered to be significant when compared to relevant EQS. The EA noted that they had been *"led to believe by the local utility provider that the groundwater is not impacted by Polychlorinated biphenyls (PCBs). This appears to support the position in the March 2005 Geodelft report"*. The EA were satisfied that there did not appear to be a significant contaminant linkage to the underlying Principal Aquifer from the site. The EA advised consideration of further assessment risks to human health arising from the potential pollution of controlled waters, investigation of the potential contaminant linkages between the site, Foxhill Brook, human health and nearby properties and further discussion as to what would constitute significant concentrations of priority hazardous substances at an appropriate risk-based compliance point. The EA did not consider the site to meet any definitions of a Special Site as set out in the Contaminated Land Regulations. It is important to note that, at this stage, no laboratory certificates or supporting documentation have been provided by the utility provider to substantiate this claim. As such, there is currently no verifiable evidence available to confirm its accuracy.

Appendix E Preliminary Data Screening Tables (Historical Reports)

Appendix E
Preliminary Data Screening Tables

Analyte	Units	HH Soil. Residential without Plant Uptake. Sandy Loam. TOC >=0.58 to <1.45%	Source	BS1R	BS2R	BS3R	BS4R	BS5R	BS6R	BS7R	BS8R	PS1R	DS01
Date Sampled				28/02/2024	28/02/2024	28/02/2024	28/02/2024	28/02/2024	28/02/2024	28/02/2024	28/02/2024	28/02/2024	28/02/2024
Depth (m)													
pH	pH units	2.5 - 10.5	UN GHS range*	6.95	7.52	8.49	8.35	7.69	7.59	8.54	7.77	7.82	7.49
Phenols	mg/kg	440	LQM/CIEH S4ULs 2015	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
TOC	% w/w	-	-	0.41	0.08	1.05	0.12	1.56	0.24	0.28	0.88	0.16	1.16
Polycyclic Aromatic Hydrocarbons													
2-Chloronaphthalene	mg/kg	3.8	EIC/AGS/CL:AIRE	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.1
2-Methylnaphthalene	mg/kg	240	USEPA RSL (May 2024)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	3000	LQM/CIEH S4ULs 2015	<0.01	<0.01	0.02	0.01	<0.01	<0.01	<0.1	<0.01	<0.01	<0.01
Acenaphthylene	mg/kg	2900	LQM/CIEH S4ULs 2015	<0.01	<0.01	0.01	<0.01	0.01	<0.01	<0.1	<0.01	<0.01	<0.01
Anthracene	mg/kg	31000	LQM/CIEH S4ULs 2015	<0.02	0.04	0.09	0.05	0.06	<0.02	<0.2	<0.02	<0.02	<0.02
Benzo(a)anthracene	mg/kg	11	LQM/CIEH S4ULs 2015	<0.04	0.18	0.45	0.19	0.52	0.1	<0.4	0.13	0.1	<0.04
Benzo(a)pyrene	mg/kg	3.2	LQM/CIEH S4ULs 2015	<0.04	0.17	0.44	0.17	0.5	0.08	<0.4	0.16	0.08	<0.04
Benzo(b)fluoranthene	mg/kg	3.9	LQM/CIEH S4ULs 2015	<0.05	0.23	0.62	0.23	0.73	0.14	<0.5	0.22	0.11	<0.05
Benzo(ghi)perylene	mg/kg	360	LQM/CIEH S4ULs 2015	<0.05	0.06	0.19	0.07	0.19	<0.05	<0.5	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	mg/kg	110	LQM/CIEH S4ULs 2015	<0.07	<0.07	0.14	<0.07	0.17	<0.07	<0.7	<0.07	<0.07	<0.07
Benzo(b&k)fluoranthene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-
Chrysene	mg/kg	30	LQM/CIEH S4ULs 2015	<0.06	0.17	0.4	0.17	0.43	0.08	<0.6	0.12	0.09	<0.06
Dibenzo(ah)anthracene	mg/kg	0.31	LQM/CIEH S4ULs 2015	<0.04	<0.04	0.04	<0.04	<0.04	<0.04	<0.4	<0.04	<0.04	<0.04
Fluoranthene	mg/kg	1500	LQM/CIEH S4ULs 2015	<0.08	0.42	1	0.48	1.06	0.18	<0.8	0.19	0.22	<0.08
Fluorene	mg/kg	2800	LQM/CIEH S4ULs 2015	<0.01	<0.01	0.01	0.01	<0.01	<0.01	<0.1	<0.01	<0.01	<0.01
Indeno(123-cd)pyrene	mg/kg	45	LQM/CIEH S4ULs 2015	<0.03	0.11	0.28	0.1	0.32	0.05	<0.3	0.12	0.04	<0.03
Naphthalene	mg/kg	2.3	LQM/CIEH S4ULs 2015	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.3	<0.03	<0.03	<0.03
Phenanthrene	mg/kg	1300	LQM/CIEH S4ULs 2015	<0.03	0.14	0.27	0.17	0.17	<0.03	<0.3	<0.03	0.06	<0.03
Pyrene	mg/kg	3700	LQM/CIEH S4ULs 2015	<0.07	0.35	0.86	0.4	0.91	0.15	<0.7	0.19	0.18	<0.07
Total PAH 16	mg/kg	-	-	<0.08	1.87	4.82	2.05	5.07	0.78	<0.8	1.13	0.88	<0.08
Polychlorinated Biphenyls													
PCB BZ 28	mg/kg	-	-	<0.003	0.081	0.053	0.052	0.091	0.039	<0.03	0.03	0.017	<0.003
PCB BZ 52	mg/kg	-	-	<0.002	0.017	0.013	0.01	0.049	0.011	<0.02	0.007	0.003	<0.002
PCB BZ 81	mg/kg	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<0.005	<0.005	<0.005
PCB BZ 101	mg/kg	-	-	<0.004	<0.004	0.004	<0.004	0.017	<0.004	<0.04	<0.004	<0.004	<0.004
PCB BZ 105	mg/kg	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<0.005	<0.005	<0.005
PCB BZ 114	mg/kg	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<0.005	<0.005	<0.005
PCB BZ 118	mg/kg	-	-	<0.007	<0.007	<0.007	<0.007	0.016	<0.007	<0.07	<0.007	<0.007	<0.007
PCB BZ 123	mg/kg	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<0.005	<0.005	<0.005
PCB BZ 123 & 118	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-
PCB BZ 126	mg/kg	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<0.005	<0.005	<0.005
PCB BZ 138	mg/kg	-	-	<0.006	<0.006	<0.006	<0.006	0.009	<0.006	<0.06	<0.006	<0.006	<0.006
PCB BZ 153	mg/kg	-	-	<0.004	<0.004	<0.004	<0.004	0.009	<0.004	<0.04	<0.004	<0.004	<0.004
PCB BZ 156	mg/kg	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<0.005	<0.005	<0.005
PCB BZ 157	mg/kg	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<0.005	<0.005	<0.005
PCB BZ 167	mg/kg	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<0.005	<0.005	<0.005
PCB BZ 169	mg/kg	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<0.005	<0.005	<0.005
PCB BZ 180	mg/kg	-	-	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.04	<0.004	<0.004	<0.004
PCB BZ 189	mg/kg	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<0.005	<0.005	<0.005
PCB BZ 77	mg/kg	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<0.005	<0.005	<0.005
Total PCB EC7	mg/kg	0.2	Dutch IV 2013 [soil type correction]	<LOD	0.098	0.07	0.062	0.191	0.05	<LOD	0.037	0.02	<LOD
Total PCB WHO12	mg/kg	0.008	EA SGV 2009	<LOD	<LOD	<LOD	<LOD	0.016	<LOD	<LOD	<LOD	<LOD	<LOD
Total PCB EC7 and WHO12	mg/kg	-	-	<0.007	0.098	0.07	0.062	0.191	0.05	<0.07	0.037	0.02	<0.007
Semi-Volatile Organic Compounds													
Perylene	ug/kg	5.4	USEPA RSL (May 2024)	<100	<100	<100	<100	193	<100	<1000	<100	<100	<100
Volatile Organic Compounds													
Carbon disulphide	ug/kg	0.14	LQM/CIEH S4ULs 2015	<1	<1	<1	<1	9	<1	<5	<1	<1	<1
Dichloromethane	ug/kg	2.1	EIC/AGS/CL:AIRE	<5	<5	<5	<5	<5	<5	<25	<5	<5	<5
Toluene	ug/kg	880	LQM/CIEH S4ULs 2015	<10	<10	<10	<10	<10	<10	<50	<10	<10	<10
Total Petroleum Hydrocarbons													
Aliphatic C5-C6	mg/kg	42	LQM/CIEH S4ULs 2015	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01
Aliphatic C6-C8	mg/kg	100	LQM/CIEH S4ULs 2015	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01
Aliphatic C8-C10	mg/kg	27	LQM/CIEH S4ULs 2015	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Aliphatic C10-C12	mg/kg	130	LQM/CIEH S4ULs 2015	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Aliphatic C12-C16	mg/kg	1100	LQM/CIEH S4ULs 2015	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Aliphatic C16-C21	mg/kg	Refer to Aliphatic C16-C35	LQM/CIEH S4ULs 2015	<1	<1	1	<1	7	<1	<10	<1	<1	<1
Aliphatic C21-C35	mg/kg	Refer to Aliphatic C16-C35	LQM/CIEH S4ULs 2015	8	68	198	48	108	22	128	27	27	6
Aliphatic C16-C35	mg/kg	65000	LQM/CIEH S4ULs 2015	8	68	199	48	115	22	128	27	27	6
Total Aliphatics	mg/kg	-	-	8	68	199	48	115	22	128	27	27	6
Aromatic C5-C7	mg/kg	370	LQM/CIEH S4ULs 2015	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01
Aromatic C7-C8	mg/kg	860	LQM/CIEH S4ULs 2015	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01
Aromatic C8-C10	mg/kg	47	LQM/CIEH S4ULs 2015	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Aromatic C10-C12	mg/kg	250	LQM/CIEH S4ULs 2015	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1
Aromatic C12-C16	mg/kg	1800	LQM/CIEH S4ULs 2015	<1	2	3	1	6	1	<10	4	1	<1
Aromatic C16-C21	mg/kg	1900	LQM/CIEH S4ULs 2015	1	7	23	5	29	4	18	13	6	<1
Aromatic C21-C35	mg/kg	1900	LQM/CIEH S4ULs 2015	4	25	112	28	127	19	87	37	28	3
Total Aromatics	mg/kg	-	-	5	35	138	34	161	24	105	55	36	3
Total Aliphatics and Aromatics C5-C35	mg/kg	-	-	13	102	336	82	276	46	234	82	62	9

Analyte	BS1	BS2	BS3	BS4	BS5	BS5A	BS5B	BS5	BS5	BS6
Date Sampled	Jan 2009	Jan 2009	Jan 2009	Jan 2009	Jan 2009	Jan 2009	Jan 2009	Jan 2009	Jan 2009	Jan 2009
Depth (m)										
pH	7.6	7.27	-	-	-	7.37	7.4	-	-	-
Phenols	-	-	-	-	-	-	-	-	-	-
TOC	0.5	0.5	-	-	-	0.7	<0.2	-	-	-
Polycyclic Aromatic Hydrocarbons										
2-Chloronaphthalene	<0.1	<0.1	-	<0.1	-	<0.1	<0.1	-	-	-
2-Methylnaphthalene	<0.1	<0.1	-	<0.1	-	<0.1	<0.1	-	-	-
Acenaphthene	0.01	0.02	-	<0.1	<0.01	<0.1	<0.1	-	-	<0.01
Acenaphthylene	<0.1	<0.1	-	<0.1	<0.01	<0.1	<0.1	-	-	<0.01
Anthracene	0.01	0.13	-	<0.1	<0.01	<0.1	<0.1	-	-	<0.01
Benzo(a)anthracene	0.22	0.25	-	0.13	<0.01	<0.1	<0.1	-	-	<0.01
Benzo(a)pyrene	0.61	0.33	-	0.14	0.01	<0.1	<0.1	-	-	0.06
Benzo(b)fluoranthene	0.25	0.14	-	<0.1	-	<0.1	<0.1	-	-	-
Benzo(ghi)perylene	0.69	0.41	-	<0.1	0.02	<0.1	<0.1	-	-	0.14
Benzo(k)fluoranthene	0.21	0.17	-	<0.1	-	<0.1	<0.1	-	-	-
Benzo(b&k)fluoranthene	0.93	0.52			0.01					0.01
Chrysene	0.64	0.37	-	0.15	<0.01	<0.1	<0.1	-	-	<0.01
Dibenzo(ah)anthracene	0.03	0.02	-	<0.1	0.06	<0.1	<0.1	-	-	0.05
Fluoranthene	0.31	0.47	-	0.17	<0.01	<0.1	<0.1	-	-	<0.01
Fluorene	<0.1	<0.1	-	<0.1	<0.01	<0.1	<0.1	-	-	<0.01
Indeno(123-cd)pyrene	0.48	0.39	-	<0.1	0.06	<0.1	<0.1	-	-	0.08
Naphthalene	0.02	0.06	-	<0.1	0.02	<0.1	<0.1	-	-	0.01
Phenanthrene	0.09	0.19	-	<0.1	<0.01	<0.1	<0.1	-	-	0.01
Pyrene	0.37	0.44	-	0.23	<0.01	<0.1	<0.1	-	-	0.02
Total PAH 16	4.25	2.93	-	-	0.18	-	-	-	-	0.38
Polychlorinated Biphenyls										
PCB BZ 28	<0.005	0.011	0.207	0.392	0.022	0.68	0.065	0.307	2.92	0.119
PCB BZ 52	<0.005	<0.005	0.036	0.077	0.005	0.135	0.012	0.059	0.518	0.025
PCB BZ 81	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.007	<0.005
PCB BZ 101	<0.005	<0.005	0.015	0.046	<0.005	0.089	0.005	0.031	0.307	0.016
PCB BZ 105	<0.005	<0.005	<0.005	0.012	<0.005	0.027	<0.005	0.009	0.094	<0.005
PCB BZ 114	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.006	<0.005
PCB BZ 118	<0.005	<0.005	0.012	0.041	<0.005	0.087	<0.005	0.03	0.315	0.015
PCB BZ 123	-	-	-	-	-	-	-	-	-	-
PCB BZ 123 & 118	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
PCB BZ 126	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
PCB BZ 138	<0.005	<0.005	0.01	0.035	<0.005	0.076	<0.005	0.025	0.258	0.013
PCB BZ 153	<0.005	<0.005	0.007	0.025	<0.005	0.052	<0.005	0.017	0.173	0.009
PCB BZ 156	<0.005	<0.005	<0.005	0.007	<0.005	0.016	<0.005	0.006	0.048	<0.005
PCB BZ 157	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.01	<0.005
PCB BZ 167	<0.005	<0.005	<0.005	0.008	<0.005	0.018	<0.005	0.006	0.062	<0.005
PCB BZ 169	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
PCB BZ 180	<0.005	<0.005	<0.005	0.012	<0.005	0.026	<0.005	0.008	0.063	<0.005
PCB BZ 189	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
PCB BZ 77	<0.005	<0.005	0.005	0.016	<0.005	0.041	<0.005	0.015	0.15	0.006
Total PCB EC7	<LOD	0.011	0.287	0.628	0.027	1.145	0.082	0.477	4.554	0.197
Total PCB WHO12	<LOD	<LOD	0.017	0.084	<LOD	0.189	<LOD	0.066	0.692	0.021
Total PCB EC7 and WHO12	<LOD	0.011	0.292	0.671	0.027	1.247	0.082	0.513	4.931	0.203
Semi-Volatile Organic Compounds										
Perylene	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds										
Carbon disulphide	<7	<7	-	<7	-	<7	<7	-	-	-
Dichloromethane	14	<10	-	<10	-	<10	<10	-	-	-
Toluene	<5	<5	-	<5	-	<5	<5	-	-	-
Total Petroleum Hydrocarbons										
Aliphatic C5-C6	-	-	-	-	-	-	-	-	-	-
Aliphatic C6-C8	-	-	-	-	-	-	-	-	-	-
Aliphatic C8-C10	-	-	-	-	-	-	-	-	-	-
Aliphatic C10-C12	-	-	-	-	-	-	-	-	-	-
Aliphatic C12-C16	-	-	-	-	-	-	-	-	-	-
Aliphatic C16-C21	-	-	-	-	-	-	-	-	-	-
Aliphatic C21-C35	-	-	-	-	-	-	-	-	-	-
Aliphatic C16-C35	-	-	-	-	-	-	-	-	-	-
Total Aliphatics	-	-	-	-	-	-	-	-	-	-
Aromatic C5-C7	-	-	-	-	-	-	-	-	-	-
Aromatic C7-C8	-	-	-	-	-	-	-	-	-	-
Aromatic C8-C10	-	-	-	-	-	-	-	-	-	-
Aromatic C10-C12	-	-	-	-	-	-	-	-	-	-
Aromatic C12-C16	-	-	-	-	-	-	-	-	-	-
Aromatic C16-C21	-	-	-	-	-	-	-	-	-	-
Aromatic C21-C35	-	-	-	-	-	-	-	-	-	-
Total Aromatics	-	-	-	-	-	-	-	-	-	-
Total Aliphatics and Aromatics C5-C35	-	-	-	-	-	-	-	-	-	-

Analyte	BS6A	BS6B	BS7	BS8	BS8	BS8	PS1	PS1 A2	PS1 B	GS1
Date Sampled	Jan 2009	Jan 2009	Jan 2009	Jan 2009	Jan 2009	Jan 2009	Jan 2009	Jan 2009	Jan 2009	Jan 2009
Depth (m)						0-0.15		0.1		
pH	7.39	7.35	-	-	-	-	7.27	-	7.67	-
Phenols	-	-	-	-	-	-	-	-	-	-
TOC	1.2	0.3	-	-	0.4	<0.2	3.8	-	<0.2	-
Polycyclic Aromatic Hydrocarbons										
2-Chloronaphthalene	<0.1	<0.1	-	<0.1	-	-	<0.1	-	<0.1	<0.1
2-Methylnaphthalene	<0.1	<0.1	-	<0.1	-	-	<0.1	-	<0.1	<0.1
Acenaphthene	<0.1	<0.1	-	<0.1	-	-	<0.1	-	<0.1	<0.1
Acenaphthylene	<0.1	<0.1	-	<0.1	-	-	<0.1	-	<0.1	<0.1
Anthracene	<0.1	<0.1	-	<0.1	-	-	<0.1	-	<0.1	<0.1
Benzo(a)anthracene	<0.1	<0.1	-	<0.1	-	-	<0.1	-	<0.1	0.26
Benzo(a)pyrene	<0.1	<0.1	-	<0.1	-	-	1.58	-	<0.1	0.17
Benzo(b)fluoranthene	<0.1	<0.1	-	<0.1	-	-	<0.1	-	<0.1	0.2
Benzo(ghi)perylene	<0.1	<0.1	-	<0.1	-	-	0.52	-	<0.1	<0.1
Benzo(k)fluoranthene	<0.1	<0.1	-	<0.1	-	-	<0.1	-	<0.1	0.16
Benzo(b&k)fluoranthene							0.17			
Chrysene	<0.1	<0.1	-	<0.1	-	-	<0.1	-	<0.1	0.33
Dibenzo(ah)anthracene	<0.1	<0.1	-	<0.1	-	-	0.84	-	<0.1	<0.1
Fluoranthene	<0.1	<0.1	-	<0.1	-	-	<0.1	-	<0.1	0.73
Fluorene	<0.1	<0.1	-	<0.1	-	-	<0.1	-	<0.1	<0.1
Indeno(123-cd)pyrene	<0.1	<0.1	-	<0.1	-	-	1.11	-	<0.1	<0.1
Naphthalene	<0.1	<0.1	-	<0.1	-	-	<0.1	-	<0.1	<0.1
Phenanthrene	<0.1	<0.1	-	<0.1	-	-	<0.1	-	<0.1	0.24
Pyrene	<0.1	<0.1	-	<0.1	-	-	<0.1	-	<0.1	0.77
Total PAH 16	-	-	-	-	-	-	4.22	-	-	-
Polychlorinated Biphenyls										
PCB BZ 28	0.69	0.149	0.059	0.044	0.104	<0.005	5.487	7.738	0.229	<0.05
PCB BZ 52	0.13	0.027	0.012	0.009	0.02	<0.005	2.372	1.441	0.046	<0.05
PCB BZ 81	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.046	0.03	<0.005	<0.05
PCB BZ 101	0.08	0.014	0.006	0.006	0.009	<0.005	1.872	0.973	0.031	<0.05
PCB BZ 105	0.023	<0.005	<0.005	<0.005	<0.005	<0.005	0.63	0.311	0.01	<0.05
PCB BZ 114	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.045	0.018	<0.005	<0.05
PCB BZ 118	0.077	0.012	0.005	<0.005	0.007	<0.005	1.924	0.923	0.029	<0.05
PCB BZ 123	-	-	-	-	-	-	-	-	-	-
PCB BZ 123 & 118	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05
PCB BZ 126	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.022	0.029	0.006	<0.05
PCB BZ 138	0.066	0.011	<0.005	<0.005	0.005	<0.005	1.587	0.741	0.025	<0.05
PCB BZ 153	0.045	0.007	<0.005	<0.005	<0.005	<0.005	1.117	0.496	0.017	<0.05
PCB BZ 156	0.013	<0.005	<0.005	<0.005	<0.005	<0.005	0.33	0.143	<0.005	<0.05
PCB BZ 157	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.068	0.029	<0.005	<0.05
PCB BZ 167	0.016	<0.005	<0.005	<0.005	<0.005	<0.005	0.402	0.18	0.006	<0.05
PCB BZ 169	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05
PCB BZ 180	0.022	<0.005	<0.005	<0.005	<0.005	<0.005	0.546	0.233	0.01	<0.05
PCB BZ 189	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.022	0.014	<0.005	<0.05
PCB BZ 77	0.037	0.006	<0.005	<0.005	<0.005	<0.005	0.966	0.472	0.012	<0.05
Total PCB EC7	1.11	0.22	0.082	0.059	0.145	<LOD	14.905	12.545	0.387	<LOD
Total PCB WHO12	0.166	0.018	0.005	<LOD	0.007	<LOD	4.455	2.149	0.063	<LOD
Total PCB EC7 and WHO12	1.199	0.226	0.082	0.059	0.145	<LOD	17.436	13.771	0.421	<LOD
Semi-Volatile Organic Compounds										
Perylene	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds										
Carbon disulphide	<7	<7	-	<7	-	-	<7	-	<7	<7
Dichloromethane	<10	<10	-	<10	-	-	<10	-	<10	<10
Toluene	<5	<5	-	<5	-	-	37	-	<5	<5
Total Petroleum Hydrocarbons										
Aliphatic C5-C6	-	-	-	-	-	-	-	-	-	-
Aliphatic C6-C8	-	-	-	-	-	-	-	-	-	-
Aliphatic C8-C10	-	-	-	-	-	-	-	-	-	-
Aliphatic C10-C12	-	-	-	-	-	-	-	-	-	-
Aliphatic C12-C16	-	-	-	-	-	-	-	-	-	-
Aliphatic C16-C21	-	-	-	-	-	-	-	-	-	-
Aliphatic C21-C35	-	-	-	-	-	-	-	-	-	-
Aliphatic C16-C35	-	-	-	-	-	-	-	-	-	-
Total Aliphatics	-	-	-	-	-	-	-	-	-	-
Aromatic C5-C7	-	-	-	-	-	-	-	-	-	-
Aromatic C7-C8	-	-	-	-	-	-	-	-	-	-
Aromatic C8-C10	-	-	-	-	-	-	-	-	-	-
Aromatic C10-C12	-	-	-	-	-	-	-	-	-	-
Aromatic C12-C16	-	-	-	-	-	-	-	-	-	-
Aromatic C16-C21	-	-	-	-	-	-	-	-	-	-
Aromatic C21-C35	-	-	-	-	-	-	-	-	-	-
Total Aromatics	-	-	-	-	-	-	-	-	-	-
Total Aliphatics and Aromatics C5-C35	-	-	-	-	-	-	-	-	-	-

Analyte	SS101	SS102	SS103	SS104	SS105	SS106	SS107	SS108	SS109	SS110	SS111	SS112	SS113	SS114	SS115
Date Sampled	23/08/2006	23/08/2006	23/08/2006	23/08/2006	23/08/2006	23/08/2006	23/08/2006	23/08/2006	23/08/2006	23/08/2006	23/08/2006	23/08/2006	23/08/2006	23/08/2006	23/08/2006
Depth (m)	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
pH															
Phenols															
TOC															
Polycyclic Aromatic Hydrocarbons															
2-Chloronaphthalene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.211	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	<0.1	<0.1	<0.1	<0.1	0.22	0.212	0.829	<0.1	<0.1	<0.1	<0.1	<0.1	0.162	<0.1	<0.1
Benzo(a)anthracene	<0.1	<0.1	<0.1	0.613	1.966	1.315	1.945	0.527	0.149	<0.1	0.43	<0.1	0.61	<0.1	0.498
Benzo(a)pyrene	<0.1	<0.1	<0.1	0.674	1.914	1.468	1.615	0.433	<0.1	0.138	0.386	<0.1	0.597	<0.1	0.507
Benzo(b)fluoranthene	<0.1	<0.1	<0.1	0.595	1.738	1.315	1.8	0.458	<0.1	0.169	0.333	<0.1	0.563	<0.1	0.633
Benzo(ghi)perylene	<0.1	<0.1	<0.1	0.481	1.224	1.018	0.881	0.298	<0.1	<0.1	0.257	<0.1	0.393	<0.1	0.326
Benzo(k)fluoranthene	<0.1	<0.1	<0.1	0.514	1.363	1.022	1.117	0.287	<0.1	<0.1	0.272	<0.1	0.448	<0.1	0.396
Benzo(b&k)fluoranthene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysene	<0.1	<0.1	<0.1	0.658	1.625	1.238	1.505	0.462	0.137	0.135	0.343	<0.1	0.579	<0.1	0.494
Dibenzo(ah)anthracene	<0.1	<0.1	<0.1	<0.1	0.286	0.235	0.223	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	<0.1	<0.1	<0.1	1.212	3.352	2.664	4.62	1.169	0.271	0.214	0.807	<0.1	1.23	0.15	1.161
Fluorene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.169	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(123-cd)pyrene	<0.1	<0.1	<0.1	0.366	1.045	0.819	0.791	0.217	<0.1	<0.1	0.201	<0.1	0.315	<0.1	0.253
Naphthalene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	<0.1	<0.1	<0.1	0.256	0.574	0.604	2.096	0.408	<0.1	<0.1	0.2	<0.1	0.449	<0.1	0.372
Pyrene	<0.1	<0.1	<0.1	1.166	3.202	2.461	3.775	1.088	0.251	0.203	0.71	<0.1	1.105	0.139	1.036
Total PAH 16	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.037	0.015	0.004	0.039	<0.1	0.003
Polychlorinated Biphenyls															
PCB BZ 28	<0.005	<0.005	<0.005	0.065	0.055	0.148	0.337	0.513	0.096	0.433	0.249	0.016	0.127	0.035	0.393
PCB BZ 52	<0.005	<0.005	<0.005	0.038	0.023	0.078	0.127	0.181	0.043	0.157	0.097	0.007	0.044	0.014	0.205
PCB BZ 81	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
PCB BZ 101	<0.005	<0.005	<0.005	0.024	0.009	0.046	0.049	0.059	0.021	0.061	0.027	<0.005	0.016	0.008	0.091
PCB BZ 105	<0.005	<0.005	<0.005	0.007	<0.005	0.011	0.009	0.009	0.005	0.012	0.005	<0.005	<0.005	<0.005	0.017
PCB BZ 114	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
PCB BZ 118	<0.005	<0.005	<0.005	0.022	0.006	0.038	0.031	0.033	0.016	0.041	0.016	<0.005	0.011	<0.005	0.063
PCB BZ 123	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
PCB BZ 123 & 118	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PCB BZ 126	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
PCB BZ 138	<0.005	<0.005	<0.005	0.02	0.005	0.035	0.025	0.027	0.016	0.034	0.013	<0.005	0.009	<0.005	0.055
PCB BZ 153	<0.005	<0.005	<0.005	0.014	<0.005	0.024	0.018	0.019	0.011	0.025	0.009	<0.005	0.006	<0.005	0.04
PCB BZ 156	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.006
PCB BZ 157	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.006
PCB BZ 167	<0.005	<0.005	<0.005	<0.005	<0.005	0.005	<0.005	<0.005	<0.005	0.005	<0.005	<0.005	<0.005	<0.005	0.008
PCB BZ 169	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
PCB BZ 180	<0.005	<0.005	<0.005	<0.005	<0.005	0.007	0.005	0.005	<0.005	0.008	<0.005	<0.005	<0.005	<0.005	0.012
PCB BZ 189	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
PCB BZ 77	<0.005	<0.005	<0.005	0.006	<0.005	0.011	0.017	<0.005	0.005	0.018	0.007	<0.005	0.012	<0.005	0.021
Total PCB EC7	<LOD	<LOD	<LOD	0.183	0.098	0.376	0.592	0.837	0.203	0.759	0.411	0.023	0.213	0.057	0.859
Total PCB WHO12	<LOD	<LOD	<LOD	0.035	0.006	0.065	0.057	0.042	0.026	0.076	0.028	<LOD	0.023	<LOD	0.121
Total PCB EC7 and WHO12	<LOD	<LOD	<LOD	0.196	0.098	0.403	0.618	0.846	0.213	0.794	0.423	0.023	0.225	0.057	0.917
Semi-Volatile Organic Compounds															
Perylene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds															
Carbon disulphide	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Dichloromethane	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	<1	<1	<1	<1	<1	<1	<1	<1	<1	37	15	4	39	<1	3
Total Petroleum Hydrocarbons															
Aliphatic C5-C6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aliphatic C6-C8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aliphatic C8-C10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aliphatic C10-C12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aliphatic C12-C16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aliphatic C16-C21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aliphatic C21-C35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aliphatic C16-C35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Aliphatics	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aromatic C5-C7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aromatic C7-C8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aromatic C8-C10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aromatic C10-C12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aromatic C12-C16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aromatic C16-C21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aromatic C21-C35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Aromatics	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Aliphatics and Aromatics C5-C35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Analyte	Number of Results	Number of Detects	Minimum Result	Maximum Result	Number of Exceedances
pH	18	18	6.95	8.54	0
Phenols	10	0	<LOD	<LOD	0
TOC	20	17	0.08	3.8	0
Polycyclic Aromatic Hydrocarbons					
2-Chloronaphthalene	36	0	<LOD	<LOD	0
2-Methylnaphthalene	36	0	<LOD	<LOD	0
Acenaphthene	38	5	0.01	0.211	0
Acenaphthylene	38	2	0.01	0.01	0
Anthracene	38	10	0.01	0.829	0
Benzo(a)anthracene	38	20	0.1	1.966	0
Benzo(a)pyrene	38	23	0.01	1.914	0
Benzo(b)fluoranthene	36	19	0.11	1.8	0
Benzo(ghi)perylene	38	17	0.02	1.224	0
Benzo(k)fluoranthene	36	13	0.14	1.363	0
Benzo(b&k)fluoranthene	5	5	0.01	0.93	0
Chrysene	38	21	0.08	1.625	0
Dibenzo(ah)anthracene	38	9	0.02	0.84	1
Fluoranthene	38	22	0.15	4.62	0
Fluorene	38	3	0.01	0.169	0
Indeno(123-cd)pyrene	38	20	0.04	1.11	0
Naphthalene	38	4	0.01	0.06	0
Phenanthrene	38	17	0.01	2.096	0
Pyrene	38	23	0.02	3.775	0
Total PAH 16	30	17	0.003	5.07	0
Polychlorinated Biphenyls					
PCB BZ 28	45	36	0.011	7.738	0
PCB BZ 52	45	35	0.003	2.372	0
PCB BZ 81	45	3	0.007	0.046	0
PCB BZ 101	45	28	0.004	1.872	0
PCB BZ 105	45	16	0.005	0.63	0
PCB BZ 114	45	3	0.006	0.045	0
PCB BZ 118	45	24	0.005	1.924	0
PCB BZ 123	25	0	<LOD	<LOD	0
PCB BZ 123 & 118	20	0	<LOD	<LOD	0
PCB BZ 126	45	3	0.006	0.029	0
PCB BZ 138	45	23	0.005	1.587	0
PCB BZ 153	45	21	0.006	1.117	0
PCB BZ 156	45	8	0.006	0.33	0
PCB BZ 157	45	4	0.006	0.068	0
PCB BZ 167	45	11	0.005	0.402	0
PCB BZ 169	45	0	<LOD	<LOD	0
PCB BZ 180	45	13	0.005	0.546	0
PCB BZ 189	45	2	0.014	0.022	0
PCB BZ 77	45	19	0.005	0.966	0
Total PCB EC7	45	36	0.011	14.905	18
Total PCB WHO12	45	24	0.005	4.455	21
Total PCB EC7 and WHO12	45	36	0.011	17.436	0
Semi-Volatile Organic Compounds					
Perylene	10	1	193	193	1
Volatile Organic Compounds					
Carbon disulphide	36	1	9	9	1
Dichloromethane	36	1	14	14	1
Toluene	36	6	3	39	0
Total Petroleum Hydrocarbons					
Aliphatic C5-C6	10	0	<LOD	<LOD	0
Aliphatic C6-C8	10	0	<LOD	<LOD	0
Aliphatic C8-C10	10	0	<LOD	<LOD	0
Aliphatic C10-C12	10	0	<LOD	<LOD	0
Aliphatic C12-C16	10	0	<LOD	<LOD	0
Aliphatic C16-C21	10	2	1	7	0
Aliphatic C21-C35	10	10	6	198	0
Aliphatic C16-C35	10	10	6	199	0
Total Aliphatics	10	10	6	199	0
Aromatic C5-C7	10	0	<LOD	<LOD	0
Aromatic C7-C8	10	0	<LOD	<LOD	0
Aromatic C8-C10	10	0	<LOD	<LOD	0
Aromatic C10-C12	10	0	<LOD	<LOD	0
Aromatic C12-C16	10	7	1	6	0
Aromatic C16-C21	10	9	1	29	0
Aromatic C21-C35	10	10	3	127	0
Total Aromatics	10	10	3	161	0
Total Aliphatics and Aromatics C5-C35	10	10	9	336	0

Sources:
LQM/CIEH Suitable 4 Use Levels (2015). Residential with Homegrown Produce. 1% SOM.
EIC/AGS/CL:AIRE GAC. Residential, Sandy Loam, 1% SOM, Plant Uptake
Dutch Soil Remediation Circular 2013 - Soil Intervention Values [soil type correction]
US Environmental Protection Agency, Regional Screening Levels, May 2024. Residential (no vapours)
* Based on UN GHS range at which skin effects may occur

Key:
Not analysed: -
Reported concentration < limit of detection
Reported concentration > GAC

Appendix E
Preliminary Data Screening Tables

Analyte	Units	LOD	HH GW. Residential. Sand.	Source	Sample ID	BW1	BW1	BW2	BW2	BW3	BW3	BW4	BW4	BW5	BW5	BW6	BW6	BW7	BW7	BW8	BW8	PW1	PW1	DW01	DW01	SO2	SO2	Sump	WS101	WS102	WS103	WS104	WS105	Number of Results	Number of Detects	Minimum Result	Maximum Result	Number of Exceedances
					Date Sampled	2009	2024	2009	2024	2009	2024	2009	2024	2009	2024	2009	2024	2009	2024	2009	2024	2009	2024	2009	2024	2009	2024	2009	23/08/2006	23/08/2006	23/08/2006	23/08/2006	23/08/2006					
pH	pH units	0.01	-	-			7.65		7.73		7.76		7.7		7.67		7.68		7.75		7.69	7.49	7.74		7.85		7.5							12	12	7.49	7.85	0
Phenols	mg/l	0.01	-	-			<0.02		<0.01		<0.01		<0.01		<0.01		<0.1		<0.01		<0.01	-	<0.01		<0.02		<0.02							11	0	<LOD	<LOD	0
4-Methylphenol	ug/l	1	-	-			<1		<1		<1		<1		<1		<1		<1		<1	-	<1		<1		<1					136	<1	23	0	<LOD	<LOD	0
Phenol	ug/l	1	-	-			<1		<1		<1		<1		<1		<1		<1		<1	-	<1		<1		<1					4	<1	23	0	<LOD	<LOD	0
Metals																																							
Arsenic	ug/l	1	-	-			1		1		1		1		1		1		1		1		1		1		1							11	11	1	1	0
Cadmium	ug/l	0.2	-	-			<0.02		<0.02		<0.02		<0.02		<0.02		<0.02		<0.02		<0.02		<0.02		<0.02		0.02							11	1	0.02	0.02	0
Copper	ug/l	4	-	-			<4		<4		<4		<4		<4		<4		<4		<4		<4		<4		7							11	1	7	7	0
Chromium	ug/l	1	-	-			<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1							11	0	<LOD	<LOD	0
Lead	ug/l	1	-	-			<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1							11	0	<LOD	<LOD	0
Mercury	ug/l	0.1	-	-			<0.1		<0.1		<0.1		<0.1		<0.1		<0.1		<0.1		<0.1		<0.1		<0.1		<0.1							11	0	<LOD	<LOD	0
Nickel	ug/l	2	-	-			<2		<2		<2		<2		<2		<2		<2		2		2		<2		12							11	3	2	12	0
Selenium	ug/l	1	-	-			<1		<1		<1		<1		<1		<1		<1															7	0	<LOD	<LOD	0
Zinc	ug/l	2	-	-			7		6		11		5		5		5		5		5		6		2		24							11	11	2	24	0
Polycyclic Aromatic Hydrocarbons																																						
Acenaphthene	ug/l	0.01	170000	SoBRA GW GAC 2024 (Resi.)			<0.01		0.01	0.19	0.01	0.15	<0.01		<0.01		<0.01		<0.01		0.01	2.27	<0.01		<0.01		0.04			<1	<1	<1	<1	<1	14	7	0.01	2.27	0
Acenaphthylene	ug/l	0.01	220000	SoBRA GW GAC 2024 (Resi.)			<0.01		<0.01	<0.01	<0.01	0.04	<0.01		<0.01		<0.01		<0.01		<0.01	0.01	<0.01		<0.01		<0.01			<1	<1	<1	<1	<1	14	2	0.01	0.04	0
Anthracene	ug/l	0.01	-	-			<0.01		<0.01	<0.01	<0.01	<0.01	<0.01		<0.01		<0.01		<0.01		<0.01	<0.01	<0.01		<0.01		<0.01			<1	<1	<1	<1	<1	14	0	<LOD	<LOD	0
Benzo[a]anthracene	ug/l	0.01	-	-			<0.01		0.01	<0.01	0.03	<0.01	0.01		<0.01		<0.01		<0.01		<0.01	<0.01	<0.01		<0.01		<0.01			<1	<1	<1	<1	<1	14	3	0.01	0.03	0
Benzo[a]pyrene	ug/l	0.01	-	-			<0.01		0.01	<0.01	0.04	<0.01	0.01		0.01		0.01		<0.01		<0.01	<0.01	<0.01		<0.01		<0.01			<1	<1	<1	<1	<1	14	5	0.01	0.04	0
Benzo[b]fluoranthene	ug/l	0.01	-	-			<0.01		0.02	<0.01	0.07	<0.01	0.02		0.02		0.02		<0.01		<0.01	<0.01	<0.01		<0.01		<0.01			<1	<1	<1	<1	<1	14	5	0.02	0.07	0
Benzo[g,h,i]perylene	ug/l	0.01	-	-			<0.01		<0.01	<0.01	0.01	<0.01	<0.01		<0.01		<0.01		<0.01		<0.01	<0.01	<0.01		<0.01		<0.01			<1	<1	<1	<1	<1	14	1	0.01	0.01	0
Benzo[k]fluoranthene	ug/l	0.01	-	-			<0.01		<0.01	<0.01	0.01	<0.01	<0.01		<0.01		<0.01		<0.01		<0.01	<0.01	<0.01		<0.01		<0.01			<1	<1	<1	<1	<1	14	1	0.01	0.01	0
Chrysene	ug/l	0.01	-	-			<0.01		<0.01	<0.01	0.04	<0.01	<0.01		<0.01		<0.01		<0.01		<0.01	<0.01	<0.01		<0.01		<0.01			<1	<1	<1	<1	<1	14	1	0.04	0.04	0
Dibenz[a,h]anthracene	ug/l	0.01	-	-			<0.01		<0.01	<0.01	<0.01	<0.01	<0.01		<0.01		<0.01		<0.01		<0.01	<0.01	<0.01		<0.01		<0.01			<1	<1	<1	<1	<1	14	0	<LOD	<LOD	0
Fluoranthene	ug/l	0.01	-	-			<0.01		0.01	<0.01	0.08	0.01	0.03		0.02		0.03		0.02		0.02	0.01	<0.01		<0.01		<0.01			<1	<1	<1	<1	<1	14	9	0.01	0.08	0
Fluorene	ug/l	0.01	210000	SoBRA GW GAC 2024 (Resi.)			<0.01		<0.01	<0.01	<0.01	<0.01	<0.01		<0.01		<0.01		<0.01		<0.01	0.04	<0.01		<0.01		0.03			<1	<1	<1	<1	<1	14	2	0.03	0.04	0
Indeno[1,2,3-cd]pyrene	ug/l	0.01	-	-			0.01		0.01	<0.01	0.03	<0.01	0.01		<0.01		<0.01		<0.01		<0.01	<0.01	<0.01		<0.01		<0.01			<1	<1	<1	<1	<1	14	4	0.01	0.03	0
Naphthalene	ug/l	0.01	1400	SoBRA GW GAC 2024 (Resi.)			<0.01		<0.01	<0.01	<0.01	<0.01	<0.01		<0.01		<0.01		<0.01		<0.01	0.03	<0.01		<0.01		0.05			<1	<1	<1	<1	<1	14	2	0.03	0.05	0
Phenanthrene	ug/l	0.01	-	-			<0.01		<0.01	<0.01	0.02	<0.01	<0.01		<0.01		<0.01		<0.01		<0.01	<0.01	<0.01		<0.01		<0.01			<1	<1	<1	<1	<1	14	1	0.02	0.02	0
Pyrene	ug/l	0.01	-	-			<0.01		0.02	<0.01	0.07	0.01	0.03		0.02		0.02		0.01		0.02	<0.01	<0.01		<0.01		<0.01			<1	<1	<1	<1	<1	14	8	0.01	0.07	0
Total PAH	ug/l	0.01	-	-			0.02		0.08	0.21	0.41	0.22	0.12		0.07		0.08		0.03		0.05	2.36	<0.01		<0.01		0.12			<1.00	<1.00	<1.00	<1.00	<1.00	14	12	0.02	2.36	0
Polychlorinated Biphenyls																																						
PCB BZ 81	ug/l	0.001	-	-		<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.003	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	23	2	0.001	0.003	0
PCB BZ 77	ug/l	0.001	-	-		<0.001	<0.001	<0.001	<0.001	0.006	<0.001	0.005	<0.001	0.002	<0.001	<0.001	<0.001	0.001	<0.001	0.001	<0.001	0.055	<0.001	<0.001	<0.001	0.022	0.003	<0.001	<0.001	<0.001	0.011	0.011	0.002	23	7	0.001	0.055	0
PCB BZ 52	ug/l	0.001	-	-		<0.001	<0.001	<0.001	0.014	0.122	0.006	0.083	0.006	0.053	0.004	0.044	0.004	0.03	0.004	0.027	0.005	1.12	0.013	<0.001	0.001	0.478	0.046	<0.001	0.005	0.289	0.169	0.036	<0.001	23	18	0.001	1.12	0
PCB BZ 28	ug/l	0.001	-	-		<0.001	0.002	0.076	0.529	0.032	0.359	0.032	0.228	0.028	0.186	0.022	0.122	0.022	0.11	0.024	5.83	0.071	<0.001	<0.001	0.007	2.715	0.153	<0.001	0.012	1.22	0.64	1.99	<0.001	23	19	0.002	5.83	0
PCB BZ 189	ug/l	0.001	-	-		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	23	0	<LOD	<LOD	0
PCB BZ 180	ug/l	0.001	-	-		<0.001	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	<0.001	0.004	<0.001	<0.001	<0.001	0.003	<0.001	<0.001	<0.001	<0.001	0.002	0.006	<0.001	23	6	0.001	0.004	0
PCB BZ 169	ug/l	0.001	-	-		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	23	0	<LOD	<LOD	0
PCB BZ 167	ug/l	0.001	-	-		<0.001	<0.001	<0.001	<0.001	0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.005	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	0.001	0.003	<0.001	23	4	0.001	0.005	0
PCB BZ 157	ug/l	0.001	-	-		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.012	<0.001	23	1	0.001	0.001	0
PCB BZ 156	ug/l	0.001	-	-		<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.003	<0.001	<0.001	<0.001	0.002	0.001	<0.001	<0.001	<0.001	0.001	0.012	<0.001	23	4	0.001	0.003	0
PCB BZ 153	ug/l	0.001	-	-		<0.001	<0.001	<0.001	<0.001	0.004	<0.001	0.003	<0.001	0.003	<0.001	0.002	<0.001	0.001	<0.001	0.001	<0.001	0.019	<0.001	<0.001	<0.001	0.017	0.004	<0.001	<0.001	0.006	0.016	0.001	<0.001	23	9	0.001	0.019	0
PCB BZ 138	ug/l	0.001	-	-		<0.001	<0.001	<0.001	<0.001	0.005	<0.001	0.004	<0.001	0.003	<0.001	0.002	<0.001	0.002	<0.001	0.002	<0.001	0.028	<0.001	<0.001	<0.001	0.013	0.007	<0.001	0.001	0.009	0.019	0.001	<0.001	23	9	0.002	0.028	0
PCB BZ 126	ug/l	0.001	-	-		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	23	0	<LOD	<LOD	0
PCB BZ 123	ug/l	0.001	-	-		<0.001	<0.001	<0.001	<0.001	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.067	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	23	2	0.01	0.067	0
PCB BZ 118	ug/l	0.002	-	-		<0.001	<0.002	<0.001	<0.002	0.009	<0.001	0.007	<0.002	0.005	<0.002	0.004	<0.001	0.003	<0.002	0.003	<0.001	0.062	<0.001	<0.001	<0.001	0.044	0.007	<0.001	0.001	0.016	0.024	0.002	<0.001	23	9	0.003	0.062	0
PCB BZ 123/118	ug/l	0.001	-	-																														0	0	<LOD	<LOD	0
PCB BZ 114	ug/l	0.001	-	-		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	23	1	0.001	0.001	0
PCB BZ 105	ug/l	0.001	-	-		<0.001	<0.001	<0.001	<0.001	0.003	<0.001	0.002	<0.001	0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	<0.001	0.018	<0.001	<0.001	<0.001	0.01	0.004	<0.001	<0.001	0.004	0.008	0.001	<0.001	23	9	0.001	0.018	0
PCB BZ 101	ug/l	0.001	-	-		<0.001	<0.001	<0.001	0.002	0.02	<0.001	0.014	<0.001	0.009	<0.001	0.008	<0.001	0.005	<0.001	0.005	0.001	0.146	<0.001	<0.001	<0.001	0.076	0.014	<0.001	0.001	0.041	0.04	0.006	<0.001	23	11	0.001	0.146	0
Total Speciated PCB EC7 & WHO12	ug/l	0.001	-	-		<LOD	<0.001	0.002	0.092	0.713	0.038	0.478	0.038	0.302	0.032	0.25	0.026	0.165	0.026	0.151	0.03	7.362	0.084		<0.001	0.008	3.38	0.24	<LOD	0.02	1.602	0.96	2.039		22	19	0.002	7.362	0
Total Petroleum Hydrocarbons																																						
Aliphatic C6-C8	ug/l	4	1500	SoBRA GW GAC 2024 (Resi.)			<5		<5		<5		<5		<5		<5		<5		<5		<5		<5		3							11	1	3	3	0
Aliphatic C8-C10	ug/l	5	57	SoBRA GW GAC 2024 (Resi.)			<5		<5		<5		<5		<5		<5		<5		<5		<5		9		8							11	2	8	9	0
Aliphatic C10-C12	ug/l	5	37	SoBRA GW GAC 2024 (Resi.)			<5		<5		<5		<5		<5		<5		<5		<5		<5		7		11							11	2	7	11	0
Total Aliphatics	ug/l	5	-	-			<5		<5		<5		<5		<5		<5		<5		<5		<5		16		2							11	2	2	16	0
Aromatic C5-C7	ug/l	1	210000	SoBRA GW GAC 2024 (Resi.)			<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		1							11	1	1	1	0
Aromatic C7-C8	ug/l	1	220000	SoBRA GW GAC 2024 (Resi.)			<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		61							11	1	61	61	0
Aromatic C8-C10	ug/l	5	1900	SoBRA GW GAC 2024 (Resi.)			<5		<5		<5		<5		<5		<5		<5		<5		<5		<5		60							11	1	60	60	0
Aromatic C10-C12	ug/l	5	6800	SoBRA GW GAC 2024 (Resi.)			<5		<5		<5		<5		<5		<5		<5		<5		<5		<5		57							11	1	57	57	0
Aromatic C12-C16	ug/l	5	39000	SoBRA GW GAC 2024 (Resi.)			<5		<5		<5		<5		<5		<5		<5		<5		<5		<5		92							11	1	92	92	0
Aromatic C16-C21	ug/l	10	-	-			<10		<10		<10		<10		<10		<10		<10		<10		<10		<10		13							11	1	13	13	0
Aromatic C21-C35	ug/l	10	-	-			<10		<10		<10		<10		<10		<10		<10		<10		<10		<10		286							11	1	286	286	0
Total Aromatics	ug/l	10	-	-			<10		<10		<10		<10		<10		<10		<10		<10		<10		16		297							11	2	16	297	0
Benzene	ug/l	1	500	SoBRA GW GAC 2024 (Resi.)			<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		2							11	1	2	2	0
Toluene	ug/l	1	230000	SoBRA GW GAC 2024 (Resi.)			<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		1							11	1	1	1	0
Ethylbenzene	ug/l	1	10000	SoBRA GW GAC 2024 (Resi.)			<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1							11	0	<LOD	<LOD	0
m/p-Xylene	ug/l	1	9500	SoBRA GW GAC 2024 (Resi.)			<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1							11	0	<LOD	<LOD	0
o-Xylene	ug/l	1	12000	SoBRA GW GAC 2024 (Resi.)			<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		9							11	1	9	9	0
Total Xylene	ug/l		9500	SoBRA GW GAC 2024 (Resi.)			<LOD		<LOD		<LOD		<LOD		<LOD		<LOD		<LOD		<LOD		<LOD		<LOD		9							11	1	9	9	0
MTBE	ug/l	1	83000	SoBRA GW GAC 2024 (Resi.)			<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1							11	0	<LOD	<LOD	0

Sources:
Society of Brownfield Risk Assessment, Development of Generic Assessment Criteria for Assessing Vapour Risks to Human Health from Volatile Contaminants in Groundwater. Version 2.0. September 2024. Residential, Sand.

Key:

Not analysed	
Reported concentration < limit of detection	<xxx
Reported concentration > EQS	xxx

Appendix E
Preliminary Data Screening Tables

Analyte	Units	LOD	CW/WE Water. DWS - England/Wales.	Source	Sample ID	BW1	BW1	BW2	BW2	BW3	BW3	BW4	BW4	BW5	BW5	BW6	BW6	BW7	BW7	BW8	BW8	PW1	PW1	DW01	DW01	SO2	SO2	Sump	WS101	WS102	WS103	WS104	WS105	Number of Results	Number of Detects	Minimum Result	Maximum Result	Number of Exceedances
					Date Sampled	2009	2024	2009	2024	2009	2024	2009	2024	2009	2024	2009	2024	2009	2024	2009	2024	2009	2024	2009	2024	2009	2024	2009	23/08/2006	23/08/2006	23/08/2006	23/08/2006	23/08/2006					
pH	pH units	0.01	-	-			7.65		7.73		7.76		7.7		7.67		7.68		7.75		7.69	7.49	7.74		7.85		7.5							12	12	7.49	7.85	0
Phenols	mg/l	0.01	5800	USEPA RSL (tapwater) [May 2024]			<0.01		<0.01		<0.01		<0.01		<0.01		<0.01		<0.01		<0.01		<0.01		<0.01		<0.02							11	0	<LOD	<LOD	0
4-Methylphenol	ug/l	1	370	USEPA RSL (tapwater) [May 2024]			<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1					136	<1	23	0	<LOD	<LOD	0
Phenol	ug/l	1	5800	USEPA RSL (tapwater) [May 2024]			<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1					4	<1	23	0	<LOD	<LOD	0
Metals																																						
Arsenic	ug/l	1	10	WS Regs 2016 (Eng/Wal)			1		1		1		1		1		1		1		1		1		1		1							11	11	1	1	0
Cadmium	ug/l	0.2	5	WS Regs 2016 (Eng/Wal)			<0.02		<0.02		<0.02		<0.02		<0.02		<0.02		<0.02		<0.02		<0.02		<0.02		0.02							11	1	0.02	0.02	0
Copper	ug/l	4	2000	WS Regs 2016 (Eng/Wal)			<4		<4		<4		<4		<4		<4		<4		<4		<4		<4		7							11	1	7	7	0
Chromium	ug/l	1	50	WS Regs 2016 (Eng/Wal)			<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1							11	0	<LOD	<LOD	0
Lead	ug/l	1	10	WS Regs 2016 (Eng/Wal)			<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1							11	0	<LOD	<LOD	0
Mercury	ug/l	0.1	1	WS Regs 2016 (Eng/Wal)			<0.1		<0.1		<0.1		<0.1		<0.1		<0.1		<0.1		<0.1		<0.1		<0.1		<0.1							11	0	<LOD	<LOD	0
Nickel	ug/l	2	20	WS Regs 2016 (Eng/Wal)			<2		<2		<2		<2		<2		<2		<2		2		2		<2		12							11	3	2	12	0
Selenium	ug/l	1	10	WS Regs 2016 (Eng/Wal)			<1		<1		<1		<1		<1		<1		<1															7	0	<LOD	<LOD	0
Zinc	ug/l	2	6000	USEPA RSL (tapwater) [May 2024]			7		6		11		5		5		5		5		5		6		2		24							11	11	2	24	0
Polycyclic Aromatic Hydrocarbons																																						
Acenaphthene	ug/l	0.01	18	AECOM DWG (WHO method)			<0.01		0.01	0.19	0.01	0.15	<0.01		<0.01		<0.01		<0.01		0.01	2.27	<0.01		<0.01		0.04							14	7	0.01	2.27	0
Acenaphthylene	ug/l	0.01	18	AECOM DWG (WHO method)			<0.01		<0.01	<0.01	<0.01	0.04	<0.01		<0.01		<0.01		<0.01		<0.01	0.01	<0.01		<0.01		<0.01							14	2	0.01	0.04	0
Anthracene	ug/l	0.01	90	AECOM DWG (WHO method)			<0.01		<0.01	<0.01	<0.01		<0.01		<0.01		<0.01		<0.01		<0.01		<0.01		<0.01		<0.01							14	0	<LOD	<LOD	0
Benzo[a]anthracene	ug/l	0.01	3.5	AECOM DWG (WHO method)			<0.01		0.01	<0.01	0.03	<0.01	0.01		<0.01		<0.01		<0.01		<0.01		<0.01		<0.01		<0.01							14	3	0.01	0.03	0
Benzo[a]pyrene	ug/l	0.01	0.01	WS Regs 2016 (Eng/Wal)			<0.01		0.01	<0.01	0.04	<0.01	0.01		0.01		0.01		<0.01		<0.01	<0.01	<0.01		<0.01		<0.01							14	5	0.01	0.04	1
Benzo[b]fluoranthene	ug/l	0.01	Refer to PAHs (sum of 4)	WS Regs 2016 (Eng/Wal)			<0.01		0.02	<0.01	0.07	<0.01	0.02		0.02		0.02		<0.01		<0.01	<0.01	<0.01		<0.01		<0.01							14	5	0.02	0.07	0
Benzo[g,h,i]perylene	ug/l	0.01	Refer to PAHs (sum of 4)	WS Regs 2016 (Eng/Wal)			<0.01		<0.01	<0.01	0.01	<0.01	<0.01		<0.01		<0.01		<0.01		<0.01	<0.01	<0.01		<0.01		<0.01							14	1	0.01	0.01	0
Benzo[k]fluoranthene	ug/l	0.01	Refer to PAHs (sum of 4)	WS Regs 2016 (Eng/Wal)			<0.01		<0.01	<0.01	0.01	<0.01	<0.01		<0.01		<0.01		<0.01		<0.01	<0.01	<0.01		<0.01		<0.01							14	1	0.01	0.01	0
Chrysene	ug/l	0.01	7	AECOM DWG (WHO method)			<0.01		<0.01	<0.01	0.04	<0.01	<0.01		<0.01		<0.01		<0.03		<0.01	<0.01	<0.01		<0.01		<0.01							14	1	0.04	0.04	0
Dibenz[a,h]anthracene	ug/l	0.01	0.07	AECOM DWG (WHO method)			<0.01		<0.01	<0.01	<0.01	<0.01	<0.01		<0.01		<0.01		<0.01		<0.01	<0.01	<0.01		<0.01		<0.01							14	0	<LOD	<LOD	0
Fluoranthene	ug/l	0.01	4	WHO DWG 2017			0.01		0.01	<0.01	0.08	0.01	0.03		0.02		0.03		0.02		0.02	0.01	<0.01		<0.01		<0.01							14	9	0.01	0.08	0
Fluorene	ug/l	0.01	12	AECOM DWG (WHO method)			<0.01		<0.01	<0.01	<0.01	<0.01	<0.01		<0.01		<0.01		<0.01		<0.01	0.04	<0.01		<0.01		0.03							14	2	0.03	0.04	0
Indeno[1,2,3-cd]pyrene	ug/l	0.01	Refer to PAHs (sum of 4)	WS Regs 2016 (Eng/Wal)			0.01		0.01	<0.01	0.03	<0.01	0.01		<0.01		<0.01		<0.01		<0.01	<0.01	<0.01		<0.01		<0.01							14	4	0.01	0.03	0
Naphthalene	ug/l	0.01	6	AECOM DWG (WHO method)			<0.01		<0.01	<0.01	<0.01	<0.01	<0.01		<0.01		<0.01		<0.01		<0.01	0.03	<0.01		<0.01		0.05							14	2	0.03	0.05	0
Phenanthrene	ug/l	0.01	4	AECOM DWG (WHO method)			<0.01		<0.01	<0.01	0.02	<0.01	<0.01		<0.01		<0.01		<0.01		<0.01	<0.01	<0.01		<0.01		<0.01							14	1	0.02	0.02	0
Pyrene	ug/l	0.01	9	AECOM DWG (WHO method)			<0.01		0.02	<0.01	0.07	0.01	0.03		0.02		0.02		0.01		0.02	<0.01	<0.01		<0.01		<0.01							14	8	0.01	0.07	0
PAH (sum of 4)	ug/l	-	0.1	WS Regs 2016 (Eng/Wal)			0.01		0.03	<LOD	0.12	<LOD	0.03		0.02		0.02		<LOD		<LOD	<LOD	<LOD		<LOD		<LOD											
Total PAH	ug/l	0.01	-	-			0.02		0.08	0.21	0.41	0.22	0.12		0.07		0.08		0.03		0.05	2.36	<0.01		<0.01		0.12							14	12	0.02	2.36	0
Polychlorinated Biphenyls																																						
PCB BZ 81	ug/l	0.001	0.0004	USEPA RSL (tapwater) [May 2024]			<0.001		<0.001	<0.001	0.001											0.003	<0.001		<0.001		<0.001					0.001	<0.001	23	2	0.001	0.003	2
PCB BZ 77	ug/l	0.001	0.006	USEPA RSL (tapwater) [May 2024]			<0.001		<0.001	<0.001	0.006	<0.001	0.005		<0.001		0.002		<0.001		0.001	0.055	<0.001		<0.001		0.022	0.003				0.011	0.011	0.002	23	7	0.001	0.055	2
PCB BZ 52	ug/l	0.001	-	-			<0.001	<0.001	0.014	0.122	0.006	0.083	0.006	0.053	0.004	0.044	0.004	0.03	0.004	0.027	0.005	1.12	0.013	<0.001	0.001	0.478	0.046	<0.001	0.005	0.289	0.169	0.036		23	18	0.001	1.12	0
PCB BZ 28	ug/l	0.001	-	-		0.002	<0.001	0.002	0.076	0.529	0.032	0.359	0.032	0.228	0.028	0.186	0.022	0.122	0.022	0.11	0.024	5.83	0.071	<0.001	0.007	2.715	0.153	<0.001	0.012	1.22	0.64	1.99		23	19	0.002	5.83	0
PCB BZ 189	ug/l	0.001	0.004	USEPA RSL (tapwater) [May 2024]			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		23	0	<LOD	<LOD	0
PCB BZ 180	ug/l	0.001	-	-			<0.001	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	0.004	<0.001	<0.001	<0.001	<0.001	0.003	<0.001	<0.001	0.002	0.006	<0.001		23	6	0.001	0.004	0
PCB BZ 169	ug/l	0.001	0.000004	USEPA RSL (tapwater) [May 2024]			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		23	0	<LOD	<LOD	0
PCB BZ 167	ug/l	0.001	0.004	USEPA RSL (tapwater) [May 2024]			<0.001	<0.001	<0.001	<0.001	0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	0.001	0.003	<0.001		23	4	0.001	0.005	1
PCB BZ 157	ug/l	0.001	0.004	USEPA RSL (tapwater) [May 2024]			<0.001	<0.001	<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.012	<0.001		23	1	0.001	0.001	0
PCB BZ 156	ug/l	0.001	0.004	USEPA RSL (tapwater) [May 2024]			<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.003	<0.001	<0.001	<0.001	<0.001	0.002	0.001	<0.001	0.001	0.012	<0.001		23	4	0.001	0.003	0
PCB BZ 153	ug/l	0.001	-	-			<0.001	<0.001	<0.001	<0.001	0.004	<0.001	0.003	<0.001	0.003	<0.001	0.002	<0.001	0.001	<0.001	0.001	0.019	<0.001	<0.001	<0.001	<0.001	0.017	0.004	<0.001	0.006	0.016	0.001		23	9	0.001	0.019	0
PCB BZ 138	ug/l	0.001	-	-			<0.001	<0.001	<0.001	<0.001	0.005	<0.001	0.004	<0.001	0.003	<0.001	0.002	<0.001	0.002	<0.001	0.002	0.028	<0.001	<0.001	<0.001	<0.001	0.013	0.007	<0.001	0.001	0.009	0.019	0.001		23	9	0.002	0.028	0
PCB BZ 126	ug/l	0.001	0.0000012	USEPA RSL (tapwater) [May 2024]			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		23	0	<LOD	<LOD	0
PCB BZ 123	ug/l	0.001	0.004	USEPA RSL (tapwater) [May 2024]			<0.001	<0.001	<0.001	<0.001	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.067	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		23	2	0.01	0.067	2
PCB BZ 118	ug/l	0.002	0.004	USEPA RSL (tapwater) [May 2024]			<0.001	<0.001	<0.001	<0.002	0.009	<0.001	0.007	<0.002	0.005	<0.002	0.004	<0.001	0.003	<0.002	0.003	0.062	<0.001	<0.001	<0.001	<0.001	0.044	0.007	<0.001	0.001	0.016	0.024	0.002		23	9	0.003	0.062	6
PCB BZ 123/118	ug/l	0.001	-	-																															0	0	<LOD	<LOD	0
PCB BZ 114	ug/l	0.001	0.004	USEPA RSL (tapwater) [May 2024]			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		23	1	0.001	0.001	0
PCB BZ 105	ug/l	0.001	0.004	USEPA RSL (tapwater) [May 2024]			<0.001	<0.001	<0.001	<0.001	0.003	<0.001	0.002	<0.001	0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	0.018	<0.001	<0.001	<0.001	<0.001	0.01	0.004	<0.001	<0.001	0.004	0.008	0.001		23	9	0.001	0.018	2
PCB BZ 101	ug/l	0.001	-	-			<0.001	<0.001	<0.001	0.002	0.02	<0.001	0.014	<0.001	0.009	<0.001	0.008	<0.001	0.005	<0.001	0.005	0.146	<0.001	<0.001	<0.001	<0.001	0.076	0.014	<0.001	0.001	0.041	0.04	0.006		23	11	0.001	0.146	0
Total Speciated PCB EC7 & WHO12	ug/l	0.001	-	-		<LOD	<0.001	0.002	0.092	0.713	0.038	0.478	0.038	0.302	0.032	0.25	0.026	0.165	0.026	0.151	0.03	7.362	0.084		0.008	3.38	0.24	<0.001	0.02	1.602	0.96	2.039		22	19	0.002	7.362	0
Total Petroleum Hydrocarbons																																						
Aliphatic C6-C8	ug/l	4	15000	WHO Petroleum DWG 2008			<5		<5		<5		<5		<5		<5		<5		<5		<5		<5		3							11	1	3	3	0
Aliphatic C8-C10	ug/l	5	300	WHO Petroleum DWG 2008			<5		<5		<5		<5		<5		<5		<5		<5		<5		9		8							11	2	8	9	0
Aliphatic C10-C12	ug/l	5	90	WHO Petroleum DWG 2008			<5		<5		<5		<5		<5		<5		<5		<5		<5		7		11							11	2	7	11	0
Total Aliphatics	ug/l	5	-	-			<1		<1		<1		<1		<1		<1		<1		<1		<1		16		2							11	2	2	16	0
Aromatic C5-C7	ug/l	1	1	WS Regs 2016 (Eng/Wal)			<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		1							11	1	1	1	0
Aromatic C7-C8	ug/l	1	700	WHO Petroleum DWG 2008			<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		61							11	1	61	61	0
Aromatic C8-C10	ug/l	5	300	WHO Petroleum DWG 2008			<5		<5		<5		<5		<5		<5		<5		<5		<5		<5		60							11	1	60	60	0
Aromatic C10-C12	ug/l	5	90	WHO Petroleum DWG 2008			<5		<5		<5		<5		<5		<5		<5		<5		<5		<5		57							11	1	57	57	0
Aromatic C12-C16	ug/l	5	90	WHO Petroleum DWG 2008			<5		<5		<5		<5		<5		<5		<5		<5		<5		<5		92							11	1	92	92	1
Aromatic C16-C21	ug/l	10	90	WHO Petroleum DWG 2008			<10		<10		<10		<10		<10		<10		<10		<10		<10		<10		13							11	1	13	13	0
Aromatic C21-C35	ug/l	10	90	WHO Petroleum DWG 2008			<10		<10		<10		<10		<10		<10		<10		<10		<10		<10		286							11	1	286	286	1
Total Aromatics	ug/l	10	-	-			<10		<10		<10		<10		<10		<10		<10		<10		<10		16		297							11	2	16	297	0
Benzene	ug/l	1	1	WS Regs 2016 (Eng/Wal)			<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		2							11	1	2	2	1
Toluene	ug/l	1	700	WHO DWG 2017			<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		1							11	1	1	1	0
Ethylbenzene	ug/l	1	300	WHO DWG 2017			<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1							11	0	<LOD	<LOD	0
m/p-Xylene	ug/l	1	190	USEPA RSL (tapwater) [May 2024]			<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1							11	0	<LOD	<LOD	0
o-Xylene	ug/l	1	190	USEPA RSL (tapwater) [May 2024]			<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		9							11	1	9	9	0
Total Xylene	ug/l		500	WHO DWG 2017			<100		<100		<100		<100		<100		<100		<100		<100		<100		<100		9							11	1	9	9	0
MTBE	ug/l	1	1800	AECOM DWG (WHO method)			<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1							11	0	<LOD	<LOD	0

Sources:
Water, England & Wales - Water Supply (Water Quality) Regulations, 2016 No. 614
Guidelines for Drinking-water Quality (4th Edition inc. the First Addendum). World Health Organisation. 2017
WHO, Petroleum Products in Drinking-water. Background document for development of WHO Guidelines for Drinking-water Quality WHO/SDE/WSH/05.08/123, 2008
Drinking Water Guidelines Calculated using WHO Methodology
US Environmental Protection Agency, Regional Screening Levels, November 2024. Tapwater

Key:
Not analysed
Reported concentration < limit of detection
Reported concentration > EQS
xxx

Appendix E
Preliminary Data Screening Tables

Analyte	Units	LOD	CW/WE Water. Aquatic Toxicity - England/Wales - Freshwater	Source	Sample ID	BW1	BW1	BW2	BW2	BW3	BW3	BW4	BW4	BW5	BW5	BW6	BW6	BW7	BW7	BW8	BW8	PW1	PW1	DW01	DW01	SO2	SO2	Sump	WS101	WS102	WS103	WS104	WS105	Number of Results	Number of Detects	Minimum Result	Maximum Result	Number of Exceedances
					Date Sampled	2009	2024	2009	2024	2009	2024	2009	2024	2009	2024	2009	2024	2009	2024	2009	2024	2009	2024	2009	2024	2009	2024	2009	23/08/2006	23/08/2006	23/08/2006	23/08/2006	23/08/2006					
pH	pH units	0.01	-	-			7.65		7.73		7.76		7.7		7.67		7.68		7.75		7.69	7.49	7.74		7.85		7.5							12	12	7.49	7.85	0
Phenols	mg/l	0.01	7.7	WFD England/Wales. 2015 - Freshwater Standards			<0.02		<0.01		<0.01		<0.01		<0.01		<0.01		<0.01		<0.01		<0.01		<0.01		<0.02							11	0	<LOD	<LOD	0
4-Methylphenol	ug/l	1	-	-			<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1					136	<1	23	0	<LOD	<LOD	0
Phenol	ug/l	1	7.7	WFD England/Wales. 2015 - Freshwater Standards			<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1					4	<1	23	0	<LOD	<LOD	0
Metals																																						
Arsenic	ug/l	1	50	WFD England/Wales. 2015 - Freshwater Standards			1		1		1		1		1		1		1		1		1		1		1							11	11	1	1	0
Cadmium	ug/l	0.2	0.08	WFD England/Wales. 2015 - AA-EQS Inland			<0.02		<0.02		<0.02		<0.02		<0.02		<0.02		<0.02		<0.02		<0.02		<0.02		0.02							11	1	0.02	0.02	0
Copper	ug/l	4	1	WFD England/Wales. 2015 - Freshwater Standards			<4		4		<4		<4		<4		<4		<4		<4		<4		<4		7							11	1	7	7	1
Chromium	ug/l	1	3.4 | 4.7	WFD England/Wales. 2015 - Freshwater Standards			<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1							11	0	<LOD	<LOD	0
Lead	ug/l	1	1.2	WFD England/Wales. 2015 - AA-EQS Inland			<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1							11	0	<LOD	<LOD	0
Mercury	ug/l	0.1	0.07	WFD England/Wales. 2015 - MAC-EQS Inland			<0.1		<0.1		<0.1		<0.1		<0.1		<0.1		<0.1		<0.1		<0.1		<0.1		<0.1							11	0	<LOD	<LOD	0
Nickel	ug/l	2	4	WFD England/Wales. 2015 - AA-EQS Inland			<1		<1		<1		<1		<1		<1		<1		2		2		<1		12							11	3	2	12	1
Selenium	ug/l	1	-	-			<1		<1		<1		<1		<1		<1		<1														7	0	<LOD	<LOD	0
Zinc	ug/l	2	10.9	WFD England/Wales. 2015 - Freshwater Standards			7		6		11		5		5		5		5		5		6		2		24							11	11	2	24	2
Polycyclic Aromatic Hydrocarbons																																						
Acenaphthene	ug/l	0.01	-	-			<0.01		0.01	0.19	0.01	0.15	<0.01		<0.01		<0.01		<0.01		0.01	2.27	<0.01		<0.01		0.04							14	7	0.01	2.27	0
Acenaphthylene	ug/l	0.01	-	-			<0.01		<0.01	<0.01	<0.01	0.04	<0.01		<0.01		<0.01		<0.01		<0.01	0.01	<0.01		<0.01		<0.01							14	2	0.01	0.04	0
Anthracene	ug/l	0.01	0.1	WFD England/Wales. 2015 - AA-EQS Inland			<0.01		<0.01	<0.01	<0.01	<0.01	<0.01		<0.01		<0.01		<0.01		<0.01	<0.01	<0.01		<0.01		<0.01							14	0	<LOD	<LOD	0
Benzo[a]anthracene	ug/l	0.01	-	-			<0.01		0.01	<0.01	0.03	<0.01	0.01		<0.01		<0.01		<0.01		<0.01	<0.01	<0.01		<0.01		<0.01							14	3	0.01	0.03	0
Benzo[a]pyrene	ug/l	0.01	0.00017	WFD England/Wales. 2015 - AA-EQS Inland			<0.01		0.01	<0.01	0.04	<0.01	0.01		0.01		0.01		<0.01		<0.01	<0.01	<0.01		<0.01		<0.01							14	5	0.01	0.04	5
Benzo[b]fluoranthene	ug/l	0.01	0.017	WFD England/Wales. 2015 - MAC-EQS Inland			<0.01		0.02	<0.01	0.07	<0.01	0.02		0.02		0.02		<0.01		<0.01	<0.01	<0.01		<0.01		<0.01							14	5	0.02	0.07	5
Benzo[g,h,i]perylene	ug/l	0.01	0.0082	WFD England/Wales. 2015 - MAC-EQS Inland			<0.01		<0.01	<0.01	0.01	<0.01	<0.01		<0.01		<0.01		<0.01		<0.01	<0.01	<0.01		<0.01		<0.01							14	1	0.01	0.01	1
Benzo[k]fluoranthene	ug/l	0.01	0.017	WFD England/Wales. 2015 - MAC-EQS Inland			<0.01		<0.01	<0.01	0.01	<0.01	<0.01		<0.01		<0.01		<0.01		<0.01	<0.01	<0.01		<0.01		<0.01							14	1	0.01	0.01	0
Chrysene	ug/l	0.01	-	-			<0.01		<0.01	<0.01	0.04	<0.01	<0.01		<0.01		<0.01		<0.01		<0.01	<0.01	<0.01		<0.01		<0.01							14	1	0.04	0.04	0
Dibenz[a,h]anthracene	ug/l	0.01	-	-			<0.01		<0.01	<0.01	<0.01	<0.01	<0.01		<0.01		<0.01		<0.01		<0.01	<0.01	<0.01		<0.01		<0.01							14	0	<LOD	<LOD	0
Fluoranthene	ug/l	0.01	0.0063	WFD England/Wales. 2015 - AA-EQS Inland			<0.01		0.01	<0.01	0.08	0.01	0.03		0.02		0.03		0.02		0.02	0.01	<0.01		<0.01		<0.01							14	9	0.01	0.08	9
Fluorene	ug/l	0.01	-	-			<0.01		<0.01	<0.01	<0.01	<0.01	<0.01		<0.01		<0.01		<0.01		<0.01	0.04	<0.01		<0.01		0.03							14	2	0.03	0.04	0
Indeno[1,2,3-cd]pyrene	ug/l	0.01	-	-			0.01		0.01	<0.01	0.03	<0.01	0.01		<0.01		<0.01		<0.01		<0.01	<0.01	<0.01		<0.01		<0.01							14	4	0.01	0.03	0
Naphthalene	ug/l	0.01	2	WFD England/Wales. 2015 - AA-EQS Inland			<0.01		<0.01	<0.01	<0.01	<0.01	<0.01		<0.01		<0.01		<0.01		<0.01	0.03	<0.01		<0.01		0.05							14	2	0.03	0.05	0
Phenanthrene	ug/l	0.01	-	-			<0.01		<0.01	<0.01	0.02	<0.01	<0.01		<0.01		<0.01		<0.01		<0.01	<0.01	<0.01		<0.01		<0.01							14	1	0.02	0.02	0
Pyrene	ug/l	0.01	-	-			<0.01		0.02	<0.01	0.07	0.01	0.03		0.02		0.02		0.01		0.02	<0.01	<0.01		<0.01		<0.01							14	8	0.01	0.07	0
Total PAH	ug/l	0.01	-	-			0.02		0.08	0.21	0.41	0.22	0.12		0.07		0.08		0.03		0.05	2.36	<0.01		<0.01		0.12							14	12	0.02	2.36	0
Polychlorinated Biphenyls																																						
PCB BZ 81	ug/l	0.001	-	-		<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.003	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	23	2	0.001	0.003	0
PCB BZ 77	ug/l	0.001	-	-		<0.001	<0.001	<0.001	<0.001	0.006	<0.001	0.005	<0.001	0.002	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	0.055	<0.001	<0.001	<0.001	<0.001	0.022	0.003	<0.001	<0.001	0.011	0.011	0.002	23	7	0.001	0.055	0
PCB BZ 52	ug/l	0.001	-	-		<0.001	<0.001	<0.001	0.014	0.122	0.006	0.083	0.006	0.053	0.004	0.044	0.004	0.03	0.004	0.027	0.005	1.12	0.013	<0.001	0.001	0.478	0.046	<0.001	0.005	0.289	0.169	0.036		23	18	0.001	1.12	0
PCB BZ 28	ug/l	0.001	-	-		<0.001	0.002	0.076	0.529	0.032	0.359	0.032	0.228	0.028	0.186	0.022	0.122	0.022	0.11	0.024	5.83	0.071	<0.001	<0.001	0.007	2.715	0.153	<0.001	0.012	1.22	0.64	1.99		23	19	0.002	5.83	0
PCB BZ 189	ug/l	0.001	-	-		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	23	0	<LOD	<LOD	0
PCB BZ 180	ug/l	0.001	-	-		<0.001	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	<0.001	0.004	<0.001	<0.001	<0.001	<0.001	0.003	<0.001	<0.001	<0.001	0.002	0.006	<0.001	23	6	0.001	0.004	0
PCB BZ 169	ug/l	0.001	-	-		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	23	0	<LOD	<LOD	0
PCB BZ 167	ug/l	0.001	-	-		<0.001	<0.001	<0.001	<0.001	0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.005	<0.001	<0.001	<0.001	<0.001	0.001	0.001	<0.001	<0.001	0.001	0.003	<0.001	23	4	0.001	0.005	0
PCB BZ 157	ug/l	0.001	-	-		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.012	<0.001	23	1	0.001	0.001	0
PCB BZ 156	ug/l	0.001	-	-		<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.003	<0.001	<0.001	<0.001	<0.001	0.002	0.001	<0.001	<0.001	0.001	0.012	<0.001	23	4	0.001	0.003	0
PCB BZ 153	ug/l	0.001	-	-		<0.001	<0.001	<0.001	<0.001	0.004	<0.001	0.003	<0.001	0.003	<0.001	0.002	<0.001	0.001	<0.001	0.001	<0.001	0.019	<0.001	<0.001	<0.001	<0.001	0.017	0.004	<0.001	<0.001	0.006	0.016	0.001	23	9	0.001	0.019	0
PCB BZ 138	ug/l	0.001	-	-		<0.001	<0.001	<0.001	<0.001	0.005	<0.001	0.004	<0.001	0.003	<0.001	0.002	<0.001	0.002	<0.001	0.002	<0.001	0.028	<0.001	<0.001	<0.001	<0.001	0.013	0.007	<0.001	0.001	0.009	0.019	0.001	23	9	0.002	0.028	0
PCB BZ 126	ug/l	0.001	-	-		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	23	0	<LOD	<LOD	0
PCB BZ 123	ug/l	0.001	-	-		<0.001	<0.001	<0.001	<0.001	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.067	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	23	2	0.01	0.067	0
PCB BZ 118	ug/l	0.002	-	-		<0.001	<0.002	<0.001	<0.002	0.009	<0.001	0.007	<0.002	0.005	<0.002	0.004	<0.001	0.003	<0.002	0.003	<0.001	0.062	<0.001	<0.001	<0.001	<0.001	0.044	0.007	<0.001	0.001	0.016	0.024	0.002	23	9	0.003	0.062	0
PCB BZ 123/118	ug/l	0.001	-	-																														0	0	<LOD	<LOD	0
PCB BZ 114	ug/l	0.001	-	-		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	23	1	0.001	0.001	0
PCB BZ 105	ug/l	0.001	-	-		<0.001	<0.001	<0.001	<0.001	0.003	<0.001	0.002	<0.001	0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	<0.001	0.018	<0.001	<0.001	<0.001	<0.001	0.01	0.004	<0.001	<0.001	0.004	0.008	0.001	23	9	0.001	0.018	0
PCB BZ 101	ug/l	0.001	-	-		<0.001	<0.001	<0.001	0.002	0.02	<0.001	0.014	<0.001	0.009	<0.001	0.008	<0.001	0.005	<0.001	0.005	0.001	0.146	<0.001	<0.001	<0.001	<0.001	0.076	0.014	<0.001	0.001	0.041	0.04	0.006	23	11	0.001	0.146	0
Total Speciated PCB EC7 & WHO12	ug/l	0.001	Refer to report text	-		<LOD	<0.001	0.002	0.092	0.713	0.038	0.478	0.038	0.302	0.032	0.25	0.026	0.165	0.026	0.151	0.03	7.362	0.084		<0.001	0.008	3.38	0.24	<LOD	0.02	1.602	0.96	2.039		22	19	0.002	7.362	0
Total Petroleum Hydrocarbons																																						
Aliphatic C6-C8	ug/l	4	-	-			<4		<4		<4		<4		<4		<4		<4		<4		<4		<4		3							11	1	3	3	0
Aliphatic C8-C10	ug/l	5	-	-			<5		<5		<5		<5		<5		<5		<5		<5		<5		9		8							11	2	8	9	0
Aliphatic C10-C12	ug/l	5	-	-			<5		<5		<5		<5		<5		<5		<5		<5		<5		7		11							11	2	7	11	0
Total Aliphatics	ug/l	5	-	-			<1		<1		<1		<1		<1		<1		<1		<1		<1		16		2							11	2	2	16	0
Aromatic C5-C7	ug/l	1	10	WFD England/Wales. 2015 - AA-EQS Inland			<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		1							11	1	1	1	0
Aromatic C7-C8	ug/l	1	74	WFD England/Wales. 2015 - Freshwater Standards			<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		61							11	1	61	61	0
Aromatic C8-C10	ug/l	5	-	-			<5		<5		<5		<5		<5		<5		<5		<5		<5		60							11	1	60	60	0
Aromatic C10-C12	ug/l	5	-	-			<5		<5		<5		<5		<5		<5		<5		<5		<5		57							11	1	57	57	0
Aromatic C12-C16	ug/l	5	-	-			<5		<5		<5		<5		<5		<5		<5		<5		<5		92							11	1	92	92	0
Aromatic C16-C21	ug/l	10	-	-			<10		<10		<10		<10		<10		<10		<10		<10		<10		13							11	1	13	13	0
Aromatic C21-C35	ug/l	10	-	-			<10		<10		<10		<10		<10		<10		<10		<10		<10		286							11	1	286	286	0
Total Aromatics	ug/l	10	-	-			<10		<10		<10		<10		<10		<10		<10		<10		<10		297							11	2	16	297	0
Benzene	ug/l	1	10	WFD England/Wales. 2015 - AA-EQS Inland			<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		2							11	1	2	2	0
Toluene	ug/l	1	74	WFD England/Wales. 2015 - Freshwater Standards			<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		1							11	1	1	1	0
Ethylbenzene	ug/l	1	20	SEPA WAT-SG-53 Fresh EQS - AA - 2015			<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1							11	0	<LOD	<LOD	0
m/p-Xylene	ug/l	1	-	-			<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1							11	0	<LOD	<LOD	0
o-Xylene	ug/l	1	-	-			<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		9							11	1	9	9	0
Total Xylene	ug/l		30	SEPA WAT-SG-53 Fresh EQS - AA - 2015			<LOD		<LOD		<LOD		<LOD		<LOD		<LOD		<LOD		<LOD		<LOD		<LOD		9							11	1	9	9	0
MTBE	ug/l	1	5100	PNEC (EU REACH) - Freshwater			<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1							11	0	<LOD	<LOD	0

Sources:
The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015 - AA-EQS Inland
The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015 - MAC-EQS Inland
The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015 - Freshwater Standards
SEPA - Supporting Guidance (WAT-SG-53) Environmental Quality Standards for Discharges to Surface Waters. v6. Dec 2015. Fresh EQS - AA
PNEC derived for EU REACH registration dossiers - Freshwater

Key:
Not analysed
Reported concentration < limit of detection
Reported concentration > EQS (xxx)

Appendix F AECOM Surface Water Sampling Results

Appendix F
AECOM Surface Water Sampling Results
May 2025

Analyte	Units	LOD	Sample ID / Date Sampled	SW02 15/05/2025	SW04B 15/05/2025	SW05 15/05/2025	Number of Results	Number of Detects	Minimum Result	Maximum Result
Polychlorinated Biphenyls										
PCB BZ 81	ug/l	0.1		<2	<2	<0.1	3	0	<LOD	<LOD
PCB BZ 77	ug/l	0.1		<2	<2	<0.1	3	0	<LOD	<LOD
PCB BZ 52	ug/l	0.1		<2	<2	<0.1	3	0	<LOD	<LOD
PCB BZ 28	ug/l	0.1		3.6	2.1	0.4	3	3	0.4	3.6
PCB BZ 189	ug/l	0.1		<2	<2	<0.1	3	0	<LOD	<LOD
PCB BZ 180	ug/l	0.1		<2	<2	<0.1	3	0	<LOD	<LOD
PCB BZ 169	ug/l	0.1		<2	<2	<0.1	3	0	<LOD	<LOD
PCB BZ 167	ug/l	0.1		<2	<2	<0.1	3	0	<LOD	<LOD
PCB BZ 157	ug/l	0.1		<2	<2	<0.1	3	0	<LOD	<LOD
PCB BZ 156	ug/l	0.1		<2	<2	<0.1	3	0	<LOD	<LOD
PCB BZ 153	ug/l	0.1		<2	<2	<0.1	3	0	<LOD	<LOD
PCB BZ 138	ug/l	0.1		<2	<2	<0.1	3	0	<LOD	<LOD
PCB BZ 126	ug/l	0.1		<2	<2	<0.1	3	0	<LOD	<LOD
PCB BZ 123	ug/l	0.1		<2	<2	<0.1	3	0	<LOD	<LOD
PCB BZ 118	ug/l	0.1		<2	<2	<0.1	3	0	<LOD	<LOD
PCB BZ 114	ug/l	0.1		<2	<2	<0.1	3	0	<LOD	<LOD
PCB BZ 105	ug/l	0.1		<2	<2	<0.1	3	0	<LOD	<LOD
PCB BZ 101	ug/l	0.1		<2	<2	<0.1	3	0	<LOD	<LOD
Total PCB 7 Congeners	ug/l	0.7		<14	<14	<0.7	3	0	<LOD	<LOD
Total PCB WHO 12	ug/l	1.2		<24	<24	<1.2	3	0	<LOD	<LOD
PCB Total (vs Aroclor 1254)	ug/l	0.2		<4	<4	<0.2	3	0	<LOD	<LOD
Alcohols and Acetates										
Acetonitrile	µg/L	100		<100	<100	<100	3	0	<LOD	<LOD
Methyl Ethyl Ketone	µg/L	2		<2	<2	<2	3	0	<LOD	<LOD
Cyclohexane	µg/L	50		<50	<50	<50	3	0	<LOD	<LOD
Methanol	µg/L	500		<500	<500	<500	3	0	<LOD	<LOD
Ethanol	µg/L	500		<500	<500	<500	3	0	<LOD	<LOD
2-Propanol	µg/L	100		<100	<100	<100	3	0	<LOD	<LOD
1-Propanol	mg/L	0.1		<0.1	<0.1	<0.1	3	0	<LOD	<LOD
1-Butanol	µg/L	100		<100	<100	<100	3	0	<LOD	<LOD
Methyl acetate	µg/L	100		<100	<100	<100	3	0	<LOD	<LOD
Ethyl acetate	µg/L	100		<100	<100	<100	3	0	<LOD	<LOD
1,2-butylacetate	µg/L	100		<100	<100	<100	3	0	<LOD	<LOD
Acetone	µg/L	50		<50	<50	<50	3	0	<LOD	<LOD
Tetrahydrofuran	µg/L	10		<10	<10	<10	3	0	<LOD	<LOD
Phenols										
4-Methylphenol	ug/l	1		<1	<1	<1	3	0	<LOD	<LOD
Phenol	ug/l	1		<1	<1	<1	3	0	<LOD	<LOD
2-methylphenol	µg/L	10		<10	<10	<10	3	0	<LOD	<LOD
Phenol	µg/L	10		<10	<10	<10	3	0	<LOD	<LOD
Cresol Total	µg/L	30		<30	<30	<30	3	0	<LOD	<LOD
Xylenols	µg/L	60		5680	190	<60	3	2	190	5680
resorcinol (m-dihydroxybenzene)	µg/L	10		<10	<10	<10	3	0	<LOD	<LOD
catechol (o-dihydroxybenzene)	µg/L	10		<10	<10	<10	3	0	<LOD	<LOD
1-Naphthol	µg/L	10		<10	<10	<10	3	0	<LOD	<LOD
2,3,5-trimethyl phenol	µg/L	10		<10	<10	<10	3	0	<LOD	<LOD
2-isopropylphenol	µg/L	10		<10	<10	<10	3	0	<LOD	<LOD
Total Speciated Phenols	µg/L	100		5700	200	<100	3	2	200	5700
3/4-Methylphenol (m/p-cresol)	µg/L	20		<20	<20	<20	3	0	<LOD	<LOD
Aldehydes										
Formaldehyde	mg/L	0.5		<0.5	<0.5	<0.5	3	0	<LOD	<LOD
acetaldehyde	µg/L	50		< 50.0	< 50.0	< 50.0	3	0	<LOD	<LOD
benzaldehyde	mg/L	0.1		0.3	0.1	< 0.1	3	2	0.1	0.3
glutaraldehyde	mg/L	10		< 10.0	< 10.0	< 10.0	3	0	<LOD	<LOD
2,4'-dichlorobiphenyl (PCB-8)	µg/L	0.005		4.52	1.41	0.339	3	3	0.339	4.52
SVOCs										
SVOC TICs	µg/L			0	0	0	3	3	<LOD	<LOD
Acenaphthene	ug/l	1		<1	<1	<1	3	0	<LOD	<LOD
Acenaphthylene	ug/l	0.5		<0.5	<0.5	<0.5	3	0	<LOD	<LOD
Anthracene	ug/l	0.5		<0.5	<0.5	<0.5	3	0	<LOD	<LOD
Benzo[a]anthracene	ug/l	0.5		<0.5	<0.5	<0.5	3	0	<LOD	<LOD
Benzo[a]pyrene	ug/l	1		<1	<1	<1	3	0	<LOD	<LOD
Benzo[b]fluoranthene	ug/l	1		<1	<1	<1	3	0	<LOD	<LOD
Benzo[g,h,i]perylene	ug/l	0.5		<0.5	<0.5	<0.5	3	0	<LOD	<LOD
Chrysene	ug/l	0.5		<0.5	<0.5	<0.5	3	0	<LOD	<LOD
Dibenz[a,h]anthracene	ug/l	0.5		<0.5	<0.5	<0.5	3	0	<LOD	<LOD
Fluoranthene	ug/l	0.5		<0.5	<0.5	<0.5	3	0	<LOD	<LOD
Fluorene	ug/l	0.5		<0.5	<0.5	<0.5	3	0	<LOD	<LOD
Indeno[1,2,3-cd]pyrene	ug/l	1		<1	<1	<1	3	0	<LOD	<LOD
Naphthalene	ug/l	1		<1	<1	<1	3	0	<LOD	<LOD
Phenanthrene	ug/l	0.5		<0.5	<0.5	<0.5	3	0	<LOD	<LOD
Pyrene	ug/l	0.5		<0.5	<0.5	<0.5	3	0	<LOD	<LOD
1,3-dichlorobenzene	µg/L	1		<1	<1	<1	3	0	<LOD	<LOD
1,4-dichlorobenzene	µg/L	1		<1	<1	<1	3	0	<LOD	<LOD
1,2-dichlorobenzene	µg/L	1		<1	<1	<1	3	0	<LOD	<LOD
1,2,4-trichlorobenzene	µg/L	1		<1	<1	<1	3	0	<LOD	<LOD
Hexachlorobutadiene	µg/L	1		<1	<1	<1	3	0	<LOD	<LOD
2-chlorophenol	µg/L	1		<1	<1	<1	3	0	<LOD	<LOD
2-methylphenol	µg/L	0.5		<0.5	<0.5	<0.5	3	0	<LOD	<LOD
2-nitrophenol	µg/L	0.5		<0.5	<0.5	<0.5	3	0	<LOD	<LOD
2,4-dichlorophenol	µg/L	0.5		<0.5	<0.5	<0.5	3	0	<LOD	<LOD
2,4-dimethylphenol	µg/L	1		2	<1	<1	3	1	2	2
2,4,5-trichlorophenol	µg/L	0.5		<0.5	<0.5	<0.5	3	0	<LOD	<LOD
2,4,6-trichlorophenol	µg/L	1		<1	<1	<1	3	0	<LOD	<LOD
4-chloro-3-methylphenol	µg/L	0.5		<0.5	<0.5	<0.5	3	0	<LOD	<LOD
4-nitrophenol	µg/L	10		<10	<10	<10	3	0	<LOD	<LOD
Pentachlorophenol	µg/L	1		<1	<1	<1	3	0	<LOD	<LOD
2-chloronaphthalene	µg/L	1		<1	<1	<1	3	0	<LOD	<LOD
2-methylnaphthalene	µg/L	1		<1	<1	<1	3	0	<LOD	<LOD
Bis(2-ethylhexyl) phthalate	µg/L	5		<5	<5	<5	3	0	<LOD	<LOD
Butyl benzyl phthalate	µg/L	1		<1	<1	<1	3	0	<LOD	<LOD
Di-n-butyl phthalate	µg/L	1.5		<1.5	<1.5	<1.5	3	0	<LOD	<LOD
Di-n-octyl phthalate	µg/L	1		<1	<1	<1	3	0	<LOD	<LOD
Diethylphthalate	µg/L	1		<1	<1	<1	3	0	<LOD	<LOD
Dimethyl phthalate	µg/L	1		<1	<1	<1	3	0	<LOD	<LOD
2-nitroaniline	µg/L	1		<1	<1	<1	3	0	<LOD	<LOD
2,4-Dinitrotoluene	µg/L	0.5		<0.5	<0.5	<0.5	3	0	<LOD	<LOD
2,6-dinitrotoluene	µg/L	1		<1	<1	<1	3	0	<LOD	<LOD
3-nitroaniline	µg/L	1		<1	<1	<1	3	0	<LOD	<LOD
4-bromophenyl phenyl ether	µg/L	1		<1	<1	<1	3	0	<LOD	<LOD
4-chloroaniline	µg/L	1		<1	<1	<1	3	0	<LOD	<LOD
4-chlorophenyl phenyl ether	µg/L	1		<1	<1	<1	3	0	<LOD	<LOD
4-nitroaniline	µg/L	0.5		<0.5	<0.5	<0.5	3	0	<LOD	<LOD
Azobenzene	µg/L	0.5		<0.5	<0.5	<0.5	3	0	<LOD	<LOD
Bis(2-chloroethoxy) methane	µg/L	0.5		<0.5	<0.5	<0.5	3	0	<LOD	<LOD
Bis(2-chloroethyl)ether	µg/L	1		<1	<1	<1	3	0	<LOD	<LOD
Carbazole	µg/L	0.5		<0.5	<0.5	<0.5	3	0	<LOD	<LOD
Dibenzofuran	µg/L	0.5		<0.5	<0.5	<0.5	3	0	<LOD	<LOD
Hexachlorobenzene	µg/L	1		<1	<1	<1	3	0	<LOD	<LOD
Hexachlorocyclopentadiene	µg/L	1		<1	<1	<1	3	0	<LOD	<LOD
Hexachloroethane	µg/L	1		<1	<1	<1	3	0	<LOD	<LOD
Isophorone	µg/L	0.5		<0.5	<0.5	<0.5	3	0	<LOD	<LOD
N-nitrosodi-n-propylamine	µg/L	0.5		<0.5	<0.5	<0.5	3	0	<LOD	<LOD
Nitrobenzene	µg/L	1		<1	<1	<1	3	0	<LOD	<LOD
VOCs										
Naphthalene	µg/L	2		<2	<2	<2	3	0	<LOD	<LOD
Dichlorodifluoromethane	µg/L	2		<2	<2	<2	3	0	<LOD	<LOD
MTBE	µg/L	0.1		<0.1	<0.1	<0.1	3	0	<LOD	<LOD
Chloromethane	µg/L	3		<3	<3	<3	3	0	<LOD	<LOD
Vinyl chloride	µg/L	0.1		<0.1	<0.1	<0.1	3	0	<LOD	<LOD
Bromomethane	µg/L	1		<1	<1	<1	3	0	<LOD	<LOD
Chloroethane	µg/L	3		<3	<3	<3	3	0	<LOD	<LOD
Trichlorofluoromethane	µg/L	3		<3	<3	<3	3	0	<LOD	<LOD
1,1-dichloroethene	µg/L	3		<3	<3	<3	3	0	<LOD	<LOD
Dichloromethane	µg/L	3		<3	<3	<3	3	0	<LOD	<LOD
trans-1,2-dichloroethene	µg/L	3		<3	<3	<3	3	0	<LOD	<LOD
1,1-dichloroethane	µg/L	3		<3	<3	<3	3	0	<LOD	<LOD
cis-1,2-dichloroethene	µg/L	3		<3	<3	<3	3	0	<LOD	<LOD
2,2-dichloropropane	µg/L	1		<1	<1	<1	3	0	<LOD	<LOD
Bromochloromethane	µg/L	2		<2	<2	<2	3	0	<LOD	<LOD
Chloroform	µg/L	2		<2	<2	<2	3	0	<LOD	<LOD
1,1,1-trichloroethane	µg/L	2		<2	<2	<2	3	0	<LOD	<LOD
1,1-dichloropropene	µg/L	3		<3	<3	<3	3	0	<LOD	<LOD
Carbon tetrachloride	µg/L	2		<2	<2	<2	3	0	<LOD	<LOD
1,2-dichloroethane	µg/L	2		<2	<2	<2	3	0	<LOD	<LOD
Benzene	µg/L	0.5		9.6	1.7	<0.5	3	2	1.7	9.6
Trichloroethene	µg/L	3		<3	<3	<3	3	0	<LOD	<LOD
1,2-dichloropropane	µg/L	2		<2	<2	<2	3	0	<LOD	<LOD
Dibromomethane	µg/L	3		<3	<3	<3	3	0	<LOD	<LOD
Bromodichloromethane	µg/L	2		<2	<2	<2	3	0	<LOD	<LOD
cis-1,3-dichloropropene	µg/L	2		<2	<2	<2	3	0	<LOD	<LOD
Toluene	µg/L	5		<5	<5	<5	3	0	<LOD	<LOD
trans-1,3-dichloropropene	µg/L	2		<2	<2	<2	3	0	<LOD	<LOD
1,1,2-trichloroethane	µg/L	2		<2	<2	<2	3	0	<LOD	<LOD
Tetrachloroethene	µg/L	3		<3	<3	<3	3	0	<LOD	<LOD
1,3-dichloropropane	µg/L	2		<2	<2	<2	3	0	<LOD	<LOD
Chlorodibromomethane	µg/L	2		<2	<2	<2	3	0	<LOD	<LOD
1,2-dibromoethane	µg/L	2		<2	<2	<2	3	0	<LOD	<LOD
Chlorobenzene	µg/L	2		<2	<2	<2	3	0	<LOD	<LOD
1,1,1,2-tetrachloroethane	µg/L	2		<2	<2	<2	3	0	<LOD	<LOD
Ethylbenzene	µg/L	1		<1	<1	<1	3	0	<LOD	<LOD
Xylene (m & p)	µg/L	2		3	<2	<2	3	1	3	3
Xylene (o)	µg/L	1		47	3	<1	3	2	3	47
Styrene	µg/L	2		<2	<2	<2	3	0	<LOD	<LOD
Bromoform	µg/L	2		<2	<2	<2	3	0	<LOD	<LOD
Isopropylbenzene	µg/L	3		<3	<3	<3	3	0	<LOD	<LOD
1,1,2,2-tetrachloroethane	µg/L	4		<4	<4	<4	3	0	<LOD	<LOD
Bromobenzene	µg/L	2		<2	<2	<2	3	0	<LOD	<LOD
1,2,3-trichloropropane	µg/L	3		<3	<3	<3	3	0	<LOD	<LOD
n-propylbenzene	µg/L	3		<3	<3	<3	3	0	<LOD	<LOD
2-chlorotoluene	µg/L	3		<3	<3	<3	3	0	<LOD	<LOD
1,3,5-trimethylbenzene	µg/L	3		3	<3	<3	3	1	3	3
4-chlorotoluene	µg/L	3		<3	<3	<3	3	0	<LOD	<LOD
tert-butylbenzene	µg/L	3		<3	<3	<3	3	0	<LOD	<LOD
1,2,4-trimethylbenzene	µg/L	3		<3	<3	<3	3	0	<LOD	<LOD
sec-butylbenzene	µg/L	3		<3	<3	<3	3	0	<LOD	<LOD
p-isopropyltoluene	µg/L	3		<3	<3	<3	3	0	<LOD	<LOD
1,3-dichlorobenzene	µg/L	3		<3	<3	<3	3	0	<LOD	<LOD
1,4-dichlorobenzene	µg/L	3		<3	<3	<3	3	0	<LOD	<LOD
n-butylbenzene	µg/L	3		<3	<3	<3	3	0	<LOD	<LOD
1,2-dichlorobenzene	µg/L	3		<3	<3	<3	3	0	<LOD	<LOD
1,2-dibromo-3-chloropropane	µg/L	2		<2	<2	<2	3	0	<LOD	<LOD
1,2,4-trichlorobenzene	µg/L	3		<3	<3	<3	3	0	<LOD	<LOD
Hexachlorobutadiene	µg/L	3		<3	<3	<3	3	0	<LOD	<LOD
1,2,3-trichlorobenzene	µg/L	3		<3	<3	<3	3	0	<LOD	<LOD
VOC TICs	µg/L			ND	ND	ND	0	0	<LOD	<LOD

Key:

Not analysed	-
Reported concentration < limit of detection	<xxx

Appendix G Laboratory Certificates

Element Materials Technology
Unit 3 Deeside Point
Zone 3
Deeside Industrial Park
Deeside
CH5 2UA

P: +44 (0) 1244 833780
F: +44 (0) 1244 833781
W: www.element.com

AECOM
100 Embankment
Cathedral Approach
Manchester
United Kingdom
M3 7FB

Attention :	Tom Levick
Date :	8th August, 2025
Your reference :	60747912
Our reference :	Test Report 25/7949 Batch 1
Location :	Commonside Tip P2A
Date samples received :	17th May, 2025
Status :	Final Report
Issue :	202508080857

Three samples were received for analysis on 17th May, 2025 of which three were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

The greenhouse gas emissions generated (in Carbon – Co2e) to obtain the results in this report are estimated as:

Scope 1&2 emissions - 3.62 kg of CO2

Scope 1&2&3 emissions - 8.555 kg of CO2

Authorised By:

Simon Gomery BSc
Senior Technical Account Manager

Client Name: AECOM
Reference: 60747912
Location: Commonside Tip P2A
Contact: Tom Levick
EMT Job No: 25/7949

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
$H=H_2SO_4$, Z=ZnAc, N=NaOH, $HN=HN0_3$

EMT Sample No.	1-11	12-22	23-33									
Sample ID	SW2	SW4b	SW5									
Depth												
COC No / misc												
Containers	V P G	V P G	V P G									
Sample Date	15/05/2025 16:00	15/05/2025 16:30	15/05/2025 17:00									
Sample Type	Surface Water	Surface Water	Surface Water									
Batch Number	1	1	1									
Date of Receipt	17/05/2025	17/05/2025	17/05/2025									

Please see attached notes for all abbreviations and acronyms

											LOD/LOR	Units	Method No.
VOC TICs	ND	ND	ND									None	TM15/PM10
SVOC TICs	ND	ND	ND									None	TM16/PM30
PCBs (Total vs Aroclor 1254)	<4.0 AB	<4.0 AB	<0.2								<0.2	ug/l	TM17/PM30
PCB 77 #	<2.0 AB	<2.0 AB	<0.1 SV								<0.1	ug/l	TM17/PM30
PCB 81 #	<2.0 AB	<2.0 AB	<0.1 SV								<0.1	ug/l	TM17/PM30
PCB 105 #	<2.0 AB	<2.0 AB	<0.1 SV								<0.1	ug/l	TM17/PM30
PCB 114 #	<2.0 AB	<2.0 AB	<0.1 SV								<0.1	ug/l	TM17/PM30
PCB 118 #	<2.0 AB	<2.0 AB	<0.1 SV								<0.1	ug/l	TM17/PM30
PCB 123 #	<2.0 AB	<2.0 AB	<0.1 SV								<0.1	ug/l	TM17/PM30
PCB 126 #	<2.0 AB	<2.0 AB	<0.1 SV								<0.1	ug/l	TM17/PM30
PCB 156 #	<2.0 AB	<2.0 AB	<0.1 SV								<0.1	ug/l	TM17/PM30
PCB 157 #	<2.0 AB	<2.0 AB	<0.1 SV								<0.1	ug/l	TM17/PM30
PCB 167 #	<2.0 AB	<2.0 AB	<0.1 SV								<0.1	ug/l	TM17/PM30
PCB 169 #	<2.0 AB	<2.0 AB	<0.1 SV								<0.1	ug/l	TM17/PM30
PCB 189 #	<2.0 AB	<2.0 AB	<0.1 SV								<0.1	ug/l	TM17/PM30
Total 12 PCBs	<24.0 AB	<24.0 AB	<1.2 SV								<1.2	ug/l	TM17/PM30
PCB 28 #	3.6 AB	2.1 AB	0.4 SV								<0.1	ug/l	TM17/PM30
PCB 52 #	<2.0 AB	<2.0 AB	<0.1 SV								<0.1	ug/l	TM17/PM30
PCB 101 #	<2.0 AB	<2.0 AB	<0.1 SV								<0.1	ug/l	TM17/PM30
PCB 118 #	<2.0 AB	<2.0 AB	<0.1 SV								<0.1	ug/l	TM17/PM30
PCB 138 #	<2.0 AB	<2.0 AB	<0.1 SV								<0.1	ug/l	TM17/PM30
PCB 153 #	<2.0 AB	<2.0 AB	<0.1 SV								<0.1	ug/l	TM17/PM30
PCB 180 #	<2.0 AB	<2.0 AB	<0.1 SV								<0.1	ug/l	TM17/PM30
Total 7 PCBs	<14.0 AB	<14.0 AB	<0.7 SV								<0.7	ug/l	TM17/PM30
Resorcinol	<0.01	<0.01	<0.01								<0.01	mg/l	TM26/PM0
Catechol	<0.01	<0.01	<0.01								<0.01	mg/l	TM26/PM0
Phenol #	<0.01	<0.01	<0.01								<0.01	mg/l	TM26/PM0
m/p-cresol	<0.02	<0.02	<0.02								<0.02	mg/l	TM26/PM0
o-cresol	<0.01	<0.01	<0.01								<0.01	mg/l	TM26/PM0
Total cresols #	<0.03	<0.03	<0.03								<0.03	mg/l	TM26/PM0
Xylenols #	5.68 AA	0.19	<0.06								<0.06	mg/l	TM26/PM0
1-naphthol	<0.01	<0.01	<0.01								<0.01	mg/l	TM26/PM0
2,3,5-trimethyl phenol	<0.01	<0.01	<0.01								<0.01	mg/l	TM26/PM0
2-isopropylphenol	<0.01	<0.01	<0.01								<0.01	mg/l	TM26/PM0
Total Speciated Phenols HPLC	5.7	0.2	<0.1								<0.1	mg/l	TM26/PM0

Client Name: AECOM
Reference: 60747912
Location: Commonside Tip P2A
Contact: Tom Levick
EMT Job No: 25/7949

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
H=H_2SO_4, Z=ZnAc, N=NaOH, HN=$HN0_3$

EMT Sample No.	1-11	12-22	23-33							LOD/LOR	Units	Method No.
Sample ID	SW2	SW4b	SW5									
Depth												
COC No / misc												
Containers	V P G	V P G	V P G									
Sample Date	15/05/2025 16:00	15/05/2025 16:30	15/05/2025 17:00									
Sample Type	Surface Water	Surface Water	Surface Water									
Batch Number	1	1	1									
Date of Receipt	17/05/2025	17/05/2025	17/05/2025									
Alcohols/Acetates												
Methyl Alcohol (Methanol)	<500	<500	<500							<500	ug/l	TM83/PM10
Ethyl Alcohol (Ethanol)	<500	<500	<500							<500	ug/l	TM83/PM10
i-Propyl Alcohol (Isopropanol)	<100	<100	<100							<100	ug/l	TM83/PM10
n-Propyl Alcohol	<100	<100	<100							<100	ug/l	TM83/PM10
n-Butyl Alcohol	<100	<100	<100							<100	ug/l	TM83/PM10
n-Pentyl Alcohol	<100	<100	<100							<100	ug/l	TM83/PM10
n-Hexyl Alcohol	<100	<100	<100							<100	ug/l	TM83/PM10
n-Heptyl Alcohol	<100	<100	<100							<100	ug/l	TM83/PM10
Methyl Acetate	<100	<100	<100							<100	ug/l	TM83/PM10
Ethyl Acetate	<100	<100	<100							<100	ug/l	TM83/PM10
i-Propyl Acetate	<100	<100	<100							<100	ug/l	TM83/PM10
n-Propyl Acetate	<100	<100	<100							<100	ug/l	TM83/PM10
n-Butyl Acetate	<100	<100	<100							<100	ug/l	TM83/PM10
Acetone	<50	<50	<50							<50	ug/l	TM83/PM10
Cyclohexane	<50	<50	<50							<50	ug/l	TM83/PM10
Methyl Ethyl Ketone (MEK)	<2	<2	<2							<2	ug/l	TM83/PM10
Tetrahydrofuran	<10	<10	<10							<10	ug/l	TM83/PM10
Acetonitrile	<100	<100	<100							<100	ug/l	TM83/PM10
Formaldehyde	<0.5	<0.5	<0.5							<0.5	mg/l	TM51/PM0

Please see attached notes for all abbreviations and acronyms

Please include all sections of this report if it is reproduced
All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: AECOM
Reference: 60747912
Location: Commonside Tip P2A
Contact: Tom Levick
EMT Job No: 25/7949

SVOC Report : Liquid

EMT Sample No.	1-11	12-22	23-33									
Sample ID	SW2	SW4b	SW5									
Depth										Please see attached notes for all abbreviations and acronyms		
COC No / misc												
Containers	V P G	V P G	V P G									
Sample Date	15/05/2025 16:00	15/05/2025 16:30	15/05/2025 17:00									
Sample Type	Surface Water	Surface Water	Surface Water									
Batch Number	1	1	1									
Date of Receipt	17/05/2025	17/05/2025	17/05/2025									
SVOC MS										LOD/LOR	Units	Method No.
Phenols												
2-Chlorophenol #	<1	<1	<1							<1	ug/l	TM16/PM30
2-Methylphenol #	<0.5	<0.5	<0.5							<0.5	ug/l	TM16/PM30
2-Nitrophenol	<0.5	<0.5	<0.5							<0.5	ug/l	TM16/PM30
2,4-Dichlorophenol #	<0.5	<0.5	<0.5							<0.5	ug/l	TM16/PM30
2,4-Dimethylphenol	2	<1	<1							<1	ug/l	TM16/PM30
2,4,5-Trichlorophenol #	<0.5	<0.5	<0.5							<0.5	ug/l	TM16/PM30
2,4,6-Trichlorophenol	<1	<1	<1							<1	ug/l	TM16/PM30
4-Chloro-3-methylphenol #	<0.5	<0.5	<0.5							<0.5	ug/l	TM16/PM30
4-Methylphenol	<1	<1	<1							<1	ug/l	TM16/PM30
4-Nitrophenol	<10	<10	<10							<10	ug/l	TM16/PM30
Pentachlorophenol	<1	<1	<1							<1	ug/l	TM16/PM30
Phenol	<1	<1	<1							<1	ug/l	TM16/PM30
PAHs												
2-Chloronaphthalene #	<1	<1	<1							<1	ug/l	TM16/PM30
2-Methylnaphthalene #	<1	<1	<1							<1	ug/l	TM16/PM30
Naphthalene #	<1	<1	<1							<1	ug/l	TM16/PM30
Acenaphthylene #	<0.5	<0.5	<0.5							<0.5	ug/l	TM16/PM30
Acenaphthene #	<1	<1	<1							<1	ug/l	TM16/PM30
Fluorene #	<0.5	<0.5	<0.5							<0.5	ug/l	TM16/PM30
Phenanthrene #	<0.5	<0.5	<0.5							<0.5	ug/l	TM16/PM30
Anthracene #	<0.5	<0.5	<0.5							<0.5	ug/l	TM16/PM30
Fluoranthene #	<0.5	<0.5	<0.5							<0.5	ug/l	TM16/PM30
Pyrene #	<0.5	<0.5	<0.5							<0.5	ug/l	TM16/PM30
Benzo(a)anthracene #	<0.5	<0.5	<0.5							<0.5	ug/l	TM16/PM30
Chrysene #	<0.5	<0.5	<0.5							<0.5	ug/l	TM16/PM30
Benzo(bk)fluoranthene #	<1	<1	<1							<1	ug/l	TM16/PM30
Benzo(a)pyrene	<1	<1	<1							<1	ug/l	TM16/PM30
Indeno(123cd)pyrene	<1	<1	<1							<1	ug/l	TM16/PM30
Dibenzo(ah)anthracene #	<0.5	<0.5	<0.5							<0.5	ug/l	TM16/PM30
Benzo(ghi)perylene #	<0.5	<0.5	<0.5							<0.5	ug/l	TM16/PM30
Phthalates												
Bis(2-ethylhexyl) phthalate	<5	<5	<5							<5	ug/l	TM16/PM30
Butylbenzyl phthalate	<1	<1	<1							<1	ug/l	TM16/PM30
Di-n-butyl phthalate #	<1.5	<1.5	<1.5							<1.5	ug/l	TM16/PM30
Di-n-Octyl phthalate	<1	<1	<1							<1	ug/l	TM16/PM30
Diethyl phthalate #	<1	<1	<1							<1	ug/l	TM16/PM30
Dimethyl phthalate	<1	<1	<1							<1	ug/l	TM16/PM30

All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: AECOM
Reference: 60747912
Location: Commonside Tip P2A
Contact: Tom Levick
EMT Job No: 25/7949

SVOC Report : Liquid

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-11	12-22	23-33									
Sample ID	SW2	SW4b	SW5									
Depth												
COC No / misc												
Containers	V P G	V P G	V P G									
Sample Date	15/05/2025 16:00	15/05/2025 16:30	15/05/2025 17:00									
Sample Type	Surface Water	Surface Water	Surface Water									
Batch Number	1	1	1									
Date of Receipt	17/05/2025	17/05/2025	17/05/2025									
SVOC MS												
Other SVOCs												
1,2-Dichlorobenzene #	<1	<1	<1								<1	ug/l	TM16/PM30
1,2,4-Trichlorobenzene #	<1	<1	<1								<1	ug/l	TM16/PM30
1,3-Dichlorobenzene #	<1	<1	<1								<1	ug/l	TM16/PM30
1,4-Dichlorobenzene #	<1	<1	<1								<1	ug/l	TM16/PM30
2-Nitroaniline	<1	<1	<1								<1	ug/l	TM16/PM30
2,4-Dinitrotoluene #	<0.5	<0.5	<0.5								<0.5	ug/l	TM16/PM30
2,6-Dinitrotoluene	<1	<1	<1								<1	ug/l	TM16/PM30
3-Nitroaniline	<1	<1	<1								<1	ug/l	TM16/PM30
4-Bromophenylphenylether #	<1	<1	<1								<1	ug/l	TM16/PM30
4-Chloroaniline	<1	<1	<1								<1	ug/l	TM16/PM30
4-Chlorophenylphenylether #	<1	<1	<1								<1	ug/l	TM16/PM30
4-Nitroaniline	<0.5	<0.5	<0.5								<0.5	ug/l	TM16/PM30
Azobenzene #	<0.5	<0.5	<0.5								<0.5	ug/l	TM16/PM30
Bis(2-chloroethoxy)methane #	<0.5	<0.5	<0.5								<0.5	ug/l	TM16/PM30
Bis(2-chloroethyl)ether #	<1	<1	<1								<1	ug/l	TM16/PM30
Carbazole #	<0.5	<0.5	<0.5								<0.5	ug/l	TM16/PM30
Dibenzofuran #	<0.5	<0.5	<0.5								<0.5	ug/l	TM16/PM30
Hexachlorobenzene #	<1	<1	<1								<1	ug/l	TM16/PM30
Hexachlorobutadiene #	<1	<1	<1								<1	ug/l	TM16/PM30
Hexachlorocyclopentadiene	<1	<1	<1								<1	ug/l	TM16/PM30
Hexachloroethane #	<1	<1	<1								<1	ug/l	TM16/PM30
Isophorone #	<0.5	<0.5	<0.5								<0.5	ug/l	TM16/PM30
N-nitrosodi-n-propylamine #	<0.5	<0.5	<0.5								<0.5	ug/l	TM16/PM30
Nitrobenzene #	<1	<1 SV	<1								<1	ug/l	TM16/PM30
Surrogate Recovery 2-Fluorobiphenyl	91	73	89								<0	%	TM16/PM30
Surrogate Recovery p-Terphenyl-d14	117	95	119								<0	%	TM16/PM30

All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: AECOM
Reference: 60747912
Location: Commonside Tip P2A
Contact: Tom Levick
EMT Job No: 25/7949

VOC Report : Liquid

EMT Sample No.	1-11	12-22	23-33									
Sample ID	SW2	SW4b	SW5									
Depth												
COC No / misc												
Containers	V P G	V P G	V P G									
Sample Date	15/05/2025 16:00	15/05/2025 16:30	15/05/2025 17:00									
Sample Type	Surface Water	Surface Water	Surface Water									
Batch Number	1	1	1									
Date of Receipt	17/05/2025	17/05/2025	17/05/2025									

Please see attached notes for all abbreviations and acronyms

				LOD/LOR	Units	Method No.
VOC MS						
Dichlorodifluoromethane	<2	<2	<2	<2	ug/l	TM15/PM10
Methyl Tertiary Butyl Ether #	<0.1	<0.1	<0.1	<0.1	ug/l	TM15/PM10
Chloromethane #	<3	<3	<3	<3	ug/l	TM15/PM10
Vinyl Chloride #	<0.1	<0.1	<0.1	<0.1	ug/l	TM15/PM10
Bromomethane	<1	<1	<1	<1	ug/l	TM15/PM10
Chloroethane #	<3	<3	<3	<3	ug/l	TM15/PM10
Trichlorofluoromethane #	<3	<3	<3	<3	ug/l	TM15/PM10
1,1-Dichloroethene (1,1 DCE) #	<3	<3	<3	<3	ug/l	TM15/PM10
Dichloromethane (DCM) #	<3	<3	<3	<3	ug/l	TM15/PM10
trans-1-2-Dichloroethene #	<3	<3	<3	<3	ug/l	TM15/PM10
1,1-Dichloroethane #	<3	<3	<3	<3	ug/l	TM15/PM10
cis-1-2-Dichloroethene #	<3	<3	<3	<3	ug/l	TM15/PM10
2,2-Dichloropropane	<1	<1	<1	<1	ug/l	TM15/PM10
Bromochloromethane #	<2	<2	<2	<2	ug/l	TM15/PM10
Chloroform #	<2	<2	<2	<2	ug/l	TM15/PM10
1,1,1-Trichloroethane #	<2	<2	<2	<2	ug/l	TM15/PM10
1,1-Dichloropropene #	<3	<3	<3	<3	ug/l	TM15/PM10
Carbon tetrachloride #	<2	<2	<2	<2	ug/l	TM15/PM10
1,2-Dichloroethane #	<2	<2	<2	<2	ug/l	TM15/PM10
Benzene #	9.6	1.7	<0.5	<0.5	ug/l	TM15/PM10
Trichloroethene (TCE) #	<3	<3	<3	<3	ug/l	TM15/PM10
1,2-Dichloropropane #	<2	<2	<2	<2	ug/l	TM15/PM10
Dibromomethane #	<3	<3	<3	<3	ug/l	TM15/PM10
Bromodichloromethane #	<2	<2	<2	<2	ug/l	TM15/PM10
cis-1-3-Dichloropropene	<2	<2	<2	<2	ug/l	TM15/PM10
Toluene #	<5	<5	<5	<5	ug/l	TM15/PM10
trans-1-3-Dichloropropene	<2	<2	<2	<2	ug/l	TM15/PM10
1,1,2-Trichloroethane #	<2	<2	<2	<2	ug/l	TM15/PM10
Tetrachloroethene (PCE) #	<3	<3	<3	<3	ug/l	TM15/PM10
1,3-Dichloropropane #	<2	<2	<2	<2	ug/l	TM15/PM10
Dibromochloromethane #	<2	<2	<2	<2	ug/l	TM15/PM10
1,2-Dibromoethane #	<2	<2	<2	<2	ug/l	TM15/PM10
Chlorobenzene #	<2	<2	<2	<2	ug/l	TM15/PM10
1,1,1,2-Tetrachloroethane #	<2	<2	<2	<2	ug/l	TM15/PM10
Ethylbenzene #	<1	<1	<1	<1	ug/l	TM15/PM10
m/p-Xylene #	3	<2	<2	<2	ug/l	TM15/PM10
o-Xylene #	47	3	<1	<1	ug/l	TM15/PM10
Styrene	<2	<2	<2	<2	ug/l	TM15/PM10
Bromoform #	<2	<2	<2	<2	ug/l	TM15/PM10
Isopropylbenzene #	<3	<3	<3	<3	ug/l	TM15/PM10
1,1,2,2-Tetrachloroethane	<4	<4	<4	<4	ug/l	TM15/PM10
Bromobenzene #	<2	<2	<2	<2	ug/l	TM15/PM10
1,2,3-Trichloropropane #	<3	<3	<3	<3	ug/l	TM15/PM10
Propylbenzene #	<3	<3	<3	<3	ug/l	TM15/PM10
2-Chlorotoluene #	<3	<3	<3	<3	ug/l	TM15/PM10
1,3,5-Trimethylbenzene #	3	<3	<3	<3	ug/l	TM15/PM10
4-Chlorotoluene #	<3	<3	<3	<3	ug/l	TM15/PM10
tert-Butylbenzene #	<3	<3	<3	<3	ug/l	TM15/PM10
1,2,4-Trimethylbenzene #	<3	<3	<3	<3	ug/l	TM15/PM10
sec-Butylbenzene #	<3	<3	<3	<3	ug/l	TM15/PM10
4-Isopropyltoluene #	<3	<3	<3	<3	ug/l	TM15/PM10
1,3-Dichlorobenzene #	<3	<3	<3	<3	ug/l	TM15/PM10
1,4-Dichlorobenzene #	<3	<3	<3	<3	ug/l	TM15/PM10
n-Butylbenzene #	<3	<3	<3	<3	ug/l	TM15/PM10
1,2-Dichlorobenzene #	<3	<3	<3	<3	ug/l	TM15/PM10
1,2-Dibromo-3-chloropropane	<2	<2	<2	<2	ug/l	TM15/PM10
1,2,4-Trichlorobenzene	<3	<3	<3	<3	ug/l	TM15/PM10
Hexachlorobutadiene	<3	<3	<3	<3	ug/l	TM15/PM10
Naphthalene	<2	<2	<2	<2	ug/l	TM15/PM10
1,2,3-Trichlorobenzene	<3	<3	<3	<3	ug/l	TM15/PM10
Surrogate Recovery Toluene D8	101	106	106	<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	99	101	101	<0	%	TM15/PM10

Client Name: AECOM
Reference: 60747912
Location: Commonside Tip P2A
Contact: Tom Levick

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 25/7949						

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating. Only analyses which are accredited are recorded as deviating if set criteria are not met.
It is a requirement under ISO 17025 that we inform clients if samples are deviating i.e. outside what is expected. A deviating sample indicates that the sample 'may' be compromised but not necessarily will be compromised. The result is still accredited and our analytical reports will still show accreditation on the relevant analytes.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 25/7949

SOILS and ASH

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. Asbestos samples are retained for 6 months.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C. Ash samples are dried at 35°C ±5°C.

Where Mineral Oil is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil is quoted, this refers to Total Aliphatics C10-C40.

STACK EMISSIONS

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a requirement of our Accreditation Body for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.
Laboratory records are kept for a period of no less than 6 years.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

Customer Provided Information

Sample ID and depth is information provided by the customer.

Age of Diesel

The age of release estimation is based on the nC17/pristane ratio only as prescribed by Christensen and Larsen (1993) and Kaplan, Galperin, Alimi et al., (1996).
Age estimation should be treated with caution as it can be influenced by site specific factors of which the laboratory are not aware.

Tentatively Identified Compounds (TICs)

Where Tentatively Identified Compounds (TICs) are reported, up to 10 Tentatively Identified Compounds will be listed where there is found to be a greater than 80% match with the NIST library. The reported concentration is determined semi-quantitively, with a matrix specific limit of detection. Note, other compounds may be present but are not reported.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above quantitative calibration range. The result should be considered the minimum value and is indicative only. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range
AA	x10 Dilution
AB	x20 Dilution

HWOL ACRONYMS AND OPERATORS USED

HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics mathematically subtracted
#2	EU_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

EMT Job No: 25/7949

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM15	Modified USEPA 8260B v2:1996. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.				
TM15	Modified USEPA 8260B v2:1996. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes			
TM16	Modified USEPA 8270D v5:2014. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM16	Modified USEPA 8270D v5:2014. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM17	Modified US EPA method 8270D v5:2014. Determination of specific Polychlorinated Biphenyl congeners by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM17	Modified US EPA method 8270D v5:2014. Determination of specific Polychlorinated Biphenyl congeners by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.				
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.	Yes			
TM51	Formaldehyde determination by reaction with Ammonium Ions and acetylacetone which is analysed spectrophotometrically. This is a colourimetric determination based on ISO 15373:2001 method A.	PM0	No preparation is required.				
TM83	Modified USEPA method 8260B v2:1996. Determination of Alcohols, Acetates, Acetone, Fuel Oxygenates, THF and Cyclohexane by Headspace GC-MS	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.				

Certificate of Analysis

Report No.: **25-04543-1**

Issue No.: **1**
Date of Issue **07/08/2025**

Customer Details:	Element Materials Technology Environmental UK Ltd, Unit 3, Deeside Point, Deeside Indust. Estate Zone 3, Chester, Cheshire, CH5 2UA, United Kingdom
Customer Contact:	Bethan Perry
Customer Order No.:	GB05110055PO
Customer Reference:	Not Supplied
Quotation Reference:	Q25-03490 (Issue: 12)
Description:	12 water samples
Date Received:	20/05/2025
Date Started:	22/05/2025
Date Completed:	29/07/2025
Test Methods:	Details available on request (refer to SOP code against relevant result/s)
Notes:	None

Approved By: **Marco Lattughi, Operational Director**

RPS Environmental Management Limited trading as RPS Mountainheath. Registered in England No. 01756175.
13 St Martins Way, Bedford, Bedfordshire, MK42 0LF. T +44 1462 480 400
A member of the RPS Group plc. Terms and conditions apply - copy on request

Results Summary

Report No.: 25-04543-1

Customer Reference: Not Supplied

Customer Order No: GB05110055PO

	Customer Sample No	SW2 - 5	SW2 - 6	SW2 - 10	SW2 - 11	SW4b - 16	SW4b - 17	SW4b - 21	SW4b - 22	SW5 - 27	SW5 - 28
	RPS Sample No	96299	96300	96301	96302	96303	96304	96305	96306	96307	96308
	Sample Type	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
	Sample Matrix	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW
	Sampling Date	15/05/2025	15/05/2025	15/05/2025	15/05/2025	15/05/2025	15/05/2025	15/05/2025	15/05/2025	15/05/2025	15/05/2025
Determinand	**CAS No**	**Codes**	**SOP**	**RL**	**Units**						
acetaldehyde	75-07-0	N	G038	50	µg/L	< 50.0				< 50.0				< 50.0	
benzaldehyde	100-52-7	N	G181	0.1	mg/L		0.3				0.1				< 0.1
glutaraldehyde	111-30-8	N	G063	10	mg/L			< 10.0				< 10.0			
2,4'-dichlorobiphenyl (PCB-8)	34883-43-7	N	G275	0.005	µg/L				4.52				1.41		

Results Summary

Report No.: 25-04543-1

Customer Reference: Not Supplied

Customer Order No: GB05110055PO

					Customer Sample No	**SW5 - 32**	**SW5 - 33**
					RPS Sample No	96309	96310
					Sample Type	**WATER**	**WATER**
					Sample Matrix	SW	SW
					Sampling Date	15/05/2025	15/05/2025
Determinand	**CAS No**	**Codes**	**SOP**	**RL**	**Units**		
acetaldehyde	75-07-0	N	G038	50	µg/L		
benzaldehyde	100-52-7	N	G181	0.1	mg/L		
glutaraldehyde	111-30-8	N	G063	10	mg/L	< 10.0	
2,4'-dichlorobiphenyl (PCB-8)	34883-43-7	N	G275	0.005	µg/L		0.339

Deviating Samples

Report No.: 25-04543-1

Customer Reference: Not Supplied

Customer Order No: GB05110055PO

Our policy on Deviating Samples has been implemented in accordance with UKAS Policy on Deviating Samples (TPS63).
RPS is not responsible for the integrity of samples as received, unless RPS personnel performed the sampling. Samples submitted may be declared to be deviating.
Where applicable the analysis method remains UKAS accredited, however results reported for a deviating sample may be compromised.
Where no sampling date was supplied, samples have been declared to be deviating. If the date can be supplied, results may be reissued if assessed not deviating.
Where the sample container used was unsuitable or broken, the sample is flagged as deviating and re-sampling/re-submisson may be required.

RPS No.	Customer No.	Customer ID	Date Sampled	Containers Received	Deviating	Reason for Deviation
96299	SW2 - 5		15/05/2025	GCV40 40 mL clear glass vial	No	
96300	SW2 - 6		15/05/2025	GCV40 40 mL clear glass vial	No	
96301	SW2 - 10		15/05/2025	GCV40 40 mL clear glass vial	No	
96302	SW2 - 11		15/05/2025	GCV40 40 mL clear glass vial	No	
96303	SW4b - 16		15/05/2025	GCV40 40 mL clear glass vial	No	
96304	SW4b - 17		15/05/2025	GCV40 40 mL clear glass vial	No	
96305	SW4b - 21		15/05/2025	GCV40 40 mL clear glass vial	No	
96306	SW4b - 22		15/05/2025	GCV40 40 mL clear glass vial	No	
96307	SW5 - 27		15/05/2025	GCV40 40 mL clear glass vial	No	
96308	SW5 - 28		15/05/2025	GCV40 40 mL clear glass vial	No	
96309	SW5 - 32		15/05/2025	GCV40 40 mL clear glass vial	No	
96310	SW5 - 33		15/05/2025	GCV40 40 mL clear glass vial	No	

Report No.: 25-04543-1

Type	Matrix Code	Description
Food	CEREALPROD	Cereals, grains & products
Food	DRIEDFRUIT	Dried fruits
Food	FRIEDBAKED	Fried or baked food
Food	LEGUME	Legumes
Food	MEAT	Meat
Food	POWDERED	Powdered food
Food	PULSE	Pulses (dried legumes)
Food	VEGETABLES	Vegetables
Gas	TDTUBE	TD Tube
Gas	TENAX	Tenax Tube
Gas	TUBE	Tube
Gas	VAPOUR	Gas
Geological	SED_MAR	Marine Sediment
Geological	SED_RIV	River Sediment
Geological	SLUDG_SOL	Sludge (solid only)
Geological	SOIL	Soil
Liquid	BEVERAGE	Beverage
Liquid	BLOOD	Blood
Liquid	CONDENSATE	Condensate
Liquid	FOAM_LIQ	Liquid foam
Liquid	FORMULATN	Formula
Liquid	LEACHATE	Leachate
Liquid	OIL/GREASE	Oil or grease
Liquid	SLUDG_LIQ	Sludge (liquid only)
Liquid	SOLVENT	Solvent
Liquid	URINE	Urine
Sludge	SLUDG_WHL	Sludge for bulk route
Solid	BADGE	Badge
Solid	BEDDING	Bedding
Solid	BIOTA	Biota (general)
Solid	BIOTA_F	Biota (fish)
Solid	BIOTA_SF	Biota (shellfish)
Solid	CONSTRCTN	Construction materials
Solid	FABRIC	Fabrics & furnishing materials
Solid	FEED	Animal feed
Solid	FERTILISER	Fertiliser
Solid	FILTER	Filter
Solid	FOAM	Solid foam material
Solid	LATEX	Latex/Rubber
Solid	PACKAGING	Packaging material
Solid	PAPER	Paper
Solid	PLANT	Plant (vegetation)
Solid	POWDER	Powder
Solid	SWAB	Swab
Water	BAL	Ballast Water
Water	BIL	Bilge Water
Water	DW	Drinking Water
Water	EFFLUENT	Effluent
Water	GW	Ground Water
Water	INFLUENT	Influent
Water	MINEW	Mine Water
Water	MW	Mineral Water
Water	SALTW	Salt Water
Water	SW	Surface Water
Water	TW	Tap Water
Water	W	Unknown Water

Report No.: 25-04543-1

Key Code	Description
N	Not Accredited Test
U	UKAS Accredited Test - UKAS accreditation is only implied if the report carries the UKAS logo
UF	UKAS Flexible Scope Test
M	MCERTS Accredited Test - MCERTS accreditation is only implied if the report carries the MCERTS logo
O	Marine Management Organisation (MMO) Validated
SN	Subcontracted to approved laboratory not accredited for the test
SU	Subcontracted to approved laboratory UKAS Accredited for the test
SM	Subcontracted to approved laboratory MCERTS/UKAS Accredited for the test
SIN	Subcontracted to internal RPS Group laboratory not accredited for the test
SIU	Subcontracted to internal RPS Group laboratory UKAS Accredited for the test
SIM	Subcontracted to internal RPS Group laboratory MCERTS/UKAS Accredited for the test
*	Modified standard method
I/S (in results)	Insufficient Sample
U/S (in results)	Unsuitable Sample
S/C (in results)	See Comments
ND (in results)	Not Detected
DW (in units)	Results are expressed on a dry weight basis
L (in results)	Result is outside normal limits

Sample Type	Sample Retention and Disposal Period
Foodstuff	1 month (if frozen) from the issue date of this report
Waters	2 weeks from the issue date of this report
Other Liquids	1 month from the issue date of this report
Solids / Soils	1 month from the issue date of this report
Sediments	1 month from the issue date of this report

Note: Sample retention may be subject to agreement with the customer for particular projects

Dev code	Description
D	No sampling date provided.
T	No sampling time provided.
Z	Temperature of samples exceeded in transit/storage.
V	Excessive headspace for volatile determinands.
P	Sample submitted without required preservative(s).
C	Incorrect container.
H	Holding time exceeded (sampling to extraction).
X	Holding time exceeded (sampling to receipt).

Note: Where the following information is included in this certificate, it has usually been supplied by the customer: Customer Sample ID, Sample Location, Sample Depth, Sampling Date and Sampling Time. The laboratory shall not be responsible for any information that is supplied by the customer that may affect the validity of results.