Report prepared at
Ladds Garden Village
Bath Road
Hare Hatch
RG10 9SB

On behalf of
Westbourne Homes Limited

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24-304.01

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Prepared by
Aviron Associates Limited

Report Quality Management			
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Client	Westbourne Homes Limited		
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Prepared by	Vanessa Bell BSc (Hons), MSc	Geo-Environmental Consultant	05/06/2025
Prepared by	Orlando Blackwell BEng (Hons) MSc (Eng)	Principal Engineer	06/06/2025
Prepared and Approved by	James Burkitt BEng (Hons) CEnv MRICS	Managing Director	12/09/2025

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Aviron Associates Limited
Badgemore House
Badgemore Park
Gravel Hill
Henley on Thames
Oxfordshire
RG9 4NR

Telephone numbers 01491 413 722
07787 771 686

james@aviron.co.uk
www.aviron.co.uk

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1.0 PROJECT AND SITE INFORMATION

1.1 APPOINTMENT

Aviron Associates Limited (Aviron) was retained by Westbourne Homes Limited (the "Client") to prepare a tier 1 Preliminary Risk Assessment (PRA) and complete a Site Investigation (SI) leading towards a tier 2 Generic Quantitative Risk Assessment (GQRA) of the following premises:

Ladds Garden Village, Bath Road, Hare Hatch, RG10 9SB (hereafter referred to as the "site").

The PRA forms a tier 1 assessment by completing an environmental desktop study report with site walkover to identify potential areas of contaminative concern associated with the proposed development of the site. The PRA will then form a preliminary Conceptual Site Model (CSM) with recommendations for any further investigation or risk assessment.

The SI (or contaminated land investigation) will investigate the pollutant linkages established within the PRA in order to produce suitable data for the preparation of a tier 2 GQRA to refine the CSM and as necessary provide recommendations for any further investigation or tier 3 Detailed Quantitative Risk Assessment (DQRA). Alternatively, it may be possible to make remediation recommendations immediately following the GQRA.

In addition, geotechnical issues shall be investigated to provide recommendations for new foundations, drainage and pavement design.

Aviron has relied upon information received from the Client and their agents as accurate, unless contradicted by written documentation or site observations.

1.2 THE SITE

Table 1.2 provides a summary of site details and surrounding area.

Table 1.2: Site Details	
Site Location	The site is located on Bath Road (A4), in Hare Hatch, approximately 10 kilometres (km) to the north-east of Reading. **Figure 1** is presented as the Site Location Plan.
National Grid Ref.	Centred at approximately 480680, 177930.
Current Land Use	The site comprises the commercial premises of Ladds Garden Village. River Sand and Gravel Limited operates at the site, supplying sand, gravel and other aggregates along with Turf Supplies, supplied rolls of turf. **Figure 2** is presented as the Existing Site Layout Plan.

Table 1.2: Site Details	
	Figure 3 is presented as the Site Photographs.
Surrounding Land Use	The site is located on the north-eastern outskirts of Hare Hatch, with Bath Road forming the northern site boundary. Landuse in the immediate surrounding area comprises the grounds of Hare Hatch House to the north-west, open fields to the east, The Hollies and Scarletts Lane to the south-east, and a residential development site under construction to the south-west and west.
Proposed Land Use	The proposed development comprises the demolition of the existing buildings and the construction of nineteen detached and semi-detached dwellings with private gardens, garages and parking as well as associated access drive and communal amenity space. **Figure 4** is presented as the Proposed Development Plan.

1.3 SITE WALKOVER SURVEY

A site walkover survey was undertaken and included an inspection of the site and surrounding area, where safe and accessible. The purpose of the survey is to identify any potential on-site or nearby contaminative activities or potential sources of land contamination.

Additionally, as part of the survey any features which may affect site re-development in terms of physical site and ground conditions were noted.

Table 1.3 provides a description of site features observed during the walkover survey and also current Ordnance Survey maps made available at the time of report writing.

Table 1.3: Summary of Site Walkover Survey	
Physical Site Characteristics	
Existing Structures	Predominantly block, steel frame and wooden structures, as well as temporary containers, associated with Ladds Garden Village, and the production, storage and sale of all types of plants, gardening supplies and landscaping materials.
Basements	None observed.
Visual Topography and Site Surfacing	Reference to a Site Survey drawing by Chiltern Surveys Ltd (HARE2401 Rev. A 30:04:2024), supplied by the Client, indicates that the site slopes gently downwards in a north-westerly direction from approximately 58.7m above Ordnance Datum (AOD) in the south-east, to 54.0m AOD in the north-west. The site is covered in a variety of surfaces from tarmac in the car park in the north-west to brick blocks and concrete paving slabs, to unmade gravel surfaces and grass.
Retaining Structures and Slopes	None observed. The site slopes gently downwards in a north-westerly direction
Drainage Issues	None observed.

Table 1.3: Summary of Site Walkover Survey	
Surface Waters	Drainage ditch some 1m deep along the northern boundary of the site. Small pond located in the north-west of the site.
Trees and Hedges	Significant mature trees line the western site boundary, a hedge line is located along the eastern boundary, with other frequent trees and screens around the site and internally. The Site Survey drawing references high water demand species such as willow, cypress and poplar, as well as a pollarded tree and unnamed species.
Made and Infilled Ground	Made ground should be anticipated beneath the buildings, hardstanding and unmade surfacing.
Contaminative Characteristics	
Above or Underground Storage Tanks (ASTs/USTs) and Drums	Above ground dilapidated water tank located in the south-east of the site. The tank may have been fed by a 'borehole' marked in the area on the Site Survey drawing.
Fuel Interceptors	None observed.
Waste Storage and Disposal	None observed.
Hazardous Material Storage and Use	None observed.
Asbestos Containing Materials (ACMs)	Asbestos may be expected within the building fabric locally, and in the Made Ground and beneath the buildings. An asbestos survey is recommended prior to demolition/redevelopment works.
Boiler Houses	None observed.
Sub-stations	None observed.
Surface Staining	None observed.
Potentially Contaminative Activities	No potentially contaminative activities observed; however, the site was in use until recently as a garden centre.

1.3.1 Summary of Physical Site Characteristics

Consideration should be made towards the make-up and competency of the underlying strata and the influence of trees on the proposed development buildings.

1.3.2 Summary of Contaminative Site Characteristics

No potentially contaminative activities observed; however, the site was in use until recently as a garden centre.

2.0 DESK STUDY REVIEW

Historical Ordnance Survey (OS) maps were obtained as part of the Envirocheck database search within report package reference 376682315 dated 14 May 2025, included within **Appendix I**. Database information within the Envirocheck report also includes reference to the hydrogeology, hydrology, subsidence and mining risk and ground gas hazards in the site area and is summarised in the following sections. A summary of the ground hazards for construction purposes is also included.

2.1 HISTORICAL REVIEW

Historical Ordnance Survey (OS) maps were reviewed, and the historical development of the site and the surrounding land is summarised in the following table.

Table 2.1: History of the Site and Surrounding Land

Date (scale)	Site History	Surrounding Land History
1876 (1:2,500) 1882 (1:10,560)	The site is shown to have comprised undeveloped land, crossed by a tree-lined field boundary in the east.	The site is located in a predominately rural area in Hare Hatch. The nearest development is the Bath Road adjacent to the northern boundary and Hare Hatch House, The Hawthorns and Hill Farm to the north-west, north-east and south-west respectively. A drainage ditch is shown along the northern boundary of the site. The site boundaries are noted to have been tree-lined locally.
1899 (1:2,500) 1901 (1:10,560) 1912 (1:2,500) 1913 (1:10,560) 1932 (1:10,560) 1934 (1:10,560) 1947 (aerial photograph	Field boundary extending into the north-western corner of the site, extended further by 1912 to cover the northern boundary.	Residential infill development noted in the wider Hare Hatch area.
1948 (aerial photograph 1960 (1:10,560) 1972 (1:2,500) 1976 (1:10,000)	The field in the north of the site is shown to have been woodland at this time.	No notable changes identified.
1992 (1:2,500) 1993 (1:2,500)	The site is marked as a nursery, with a centrally located detached building.	The Hollies is marked to the south-east, with further residential development noted in the area.

Table 2.1: History of the Site and Surrounding Land		
Date (scale)	**Site History**	**Surrounding Land History**
	A smaller detached building is marked in the south-east of the site with a track connecting the site to Scarletts lane to the south-east.	
1996 (1:2,500) 1999 (1:10,000)	The smaller detached building is shown to have been replaced in the south-east, with an additional building also marked int eh south-west. The outline of the existing pond in the north-west and the car park in the north is evident at this time.	Numerous terraced structures located to the west.
1999 (aerial photograph) 2003-2016 (1:10,000)	Numerous poly tunnels and buildings, some of which as existing. Storage of gardening and landscaping materials locally. Vehicles parked int eh north of the site. The eastern section of the site was undeveloped at this time.	The nursery is shown to have extended beyond the site to the south. Former Bird Gardens marked to the south-west of the site.
2024-2025 (1:10,000)	Existing polytunnels marked in the previously undeveloped eastern section of the site.	No notable changes identified.
2025 current edition 2025 (aerial photograph)	The site is now no longer in use.	Construction site noted to the west.
Note: All distances are approximate.		

2.1.1 Anecdotal Evidence

No anecdotal evidence was available at the time of reporting.

2.1.2 Summary of Historical Landuses

A review of the historical Ordnance Survey maps show that the site comprised undeveloped land until sometime between 1976 and 1992, when the site was identified as a nursery. Considerable expansion of the site is evident over the following period, until its recent disuse.

There are no significant commercial industrial landuses noted in the immediate surrounding area.

2.1.2 Planning History

Planning history associated with the development on site, as noted on Wokingham Borough Council planning portal includes reference to the site as Ladds Garden Village, including applications in connection with the following: 'Proposed erection of plant protection area' 'Proposed Erection of Polytunnel Canopy', 'Proposed retention of front porch/pergola (retrospective), proposed use of existing buildings as a birds of prey centre and erection of 177sq.m of display canopies', 'replacement of the roof and new cladding plus changes to fenestration on the main building', 'Condition 5 landscaping. 6 Ecological enhancements', and 'Proposed Erection of Non-Illuminated Sign Boards'.

2.2 GEOLOGY, HYDROGEOLOGY AND HYDROLOGY

2.2.1 Anticipated Geology

Relevant geological information has been determined using the British Geological Survey (BGS) extract sheets 268 (Reading) and 269 (Windsor), which have been summarised in table 2.1.1 below.

Table 2.2.1: Anticipated Geology

Stratum	Age	Possible Thickness (m)	Typical Description	Aquifer Status
Artificial/Made Ground None indicated on site	N/A	N/A	N/A	N/A
Superficial None indicated on site	N/A	-	N/A	N/A
Solid Lambeth Group - *across the majority of the site*	Thanetian to Ypresian	Up to 39m	Clay, some silty or sandy, with some sands and gravels, minor limestones and lignites and occasional sandstone and conglomerate	Secondary (A) aquifer
Solid Seaford Chalk Formation and Newhaven Chalk Formation - *sub-cropping the Lambeth Group and outcropping in the north of the site*	Coniacian to Campanian	95-155m	Undifferentiated Chalk	Principal aquifer

The Envirocheck report indicates that there are no superficial strata within 100m of the site.

There are no records of artificial ground in the Envirocheck report for premises within 500m of the site. There are also no records of made ground, mass movement or fault lines in the Envirocheck report for premises within 500m of the site.

2.2.2 Ground Conditions – Aviron Borehole Records

Aviron recorded borehole logs for historical drilling works in 2024 at the adjacent premises (The Bird Gardens) immediately south-west of the site are summarised in Table 2.2.2 below.

Table 2.2.2: Aviron Borehole Records

BGS Reference	Distance from Site (Direction)	Geology (Depth to base, metres (m) below ground level (bgl))	Groundwater depth
Aviron 23-271.02 The Bird Gardens May 2024	0m SW	MADE GROUND to 2.0m bgl. Soft to firm becoming firm, medium strength and stiff slightly sandy CLAY (Lambeth Group) to 7.5m bgl. Structureless CHALK (Seaford and Newhaven Chalk Formations) of weathering Grade Dc to 10.5m bgl. CHALK of weathering Grade C, B and A to the termination depth of drilling at 25.0m bgl.	No groundwater was encountered in these deep boreholes; however, water was noted in SAND within window sample boreholes at 2.0-2.5m bgl in late 2023.

2.2.3 Summary of Anticipated Ground Conditions

- Lambeth Group – soft, firm and stiff slightly sandy CLAY with sand horizons to some 7.5m bgl
- Seaford and Newhaven Chalk Formations – CHALK, weathered at sub-crop surface

2.2.4 Hydrogeology

The hydrogeology of the site has been determined by the solid geology of the Lambeth Group and the Chalk Formations, which are classified by the Environment Agency as a secondary (A) aquifer and a principal aquifer respectively.

According to the Environment Agency, Secondary (A) aquifers comprise 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. Principal aquifers are layers of rock or drift deposits that have high intergranular and/or fracture permeability which may support water supply and/or river base flow on a strategic scale.

Both the Envirocheck report and the Environment Agency website (May 2025) indicate that the site is located within an Environment Agency Total Catchment Zone III source protection zone (SPZ3).

The groundwater vulnerability for the site is noted as 'Secondary and Principal Bedrock Aquifers – High Vulnerability'.

The Envirocheck report indicates that there are numerous references to groundwater abstraction licences for premises within the 500-2000m search band of the site, however there none reference 'Public Water Supply'.

The northern area of the site is located in a BGS Groundwater Flooding Susceptibility area where there is noted to be 'Limited Potential for Groundwater Flooding to Occur'.

2.2.5 Hydrology

The nearest surface water feature comprises the drainage ditch located along the northern boundary of the site, forming an inland river, an OS water network line and part of the Thames catchment.

The Envirocheck report indicates that there are no references to surface water abstraction licences for premises within 2000m of the site.

The Envirocheck report indicates that there is one reference to a discharge consent within 250m of the site. The discharge is positioned 210m to the north at Beechbrook and is for 'Sewage Discharges - Final/Treated Effluent - Not Water Company' that are discharged onto land.

The Envirocheck report indicates that there are no references to Local Authority Pollution Prevention and Controls and no references to Pollution Incidents to Controlled Waters within 500m of the site.

The site is not located in an area that is at risk of 'extreme flooding' or 'flooding' from rivers or sea without defences. The site is not located I flood water storage area, nor does it benefit from flood defences.

The Envirocheck report indicates that the northern third of the site is located in a 1 in 1000, a 1 in 100 and a 1 in 30 year surface water flood extent. The flood extent corresponds approximately to the location of the inland river along the northern boundary of the site. A small area in the south-west of the site is also located in a 1 in 1000 year surface water flood extent.

2.3 LANDFILLS AND BIO-GROUND GAS

2.3.1 Landfills, Waste Management Facilities and Infilled Ground

The Envirocheck report indicates that there are no BGS recorded landfills and no historical landfill sites located within 500m of the site.

The Envirocheck report indicates that there are two references to potentially infilled land (water) within 250m

of the site. The locations correspond to 'Unknown Filled Ground (Pond, marsh, river, stream, dock etc)', 171m and 218m to the north-west.

2.3.2 Preliminary Risk Assessment (PRA) – Bio-Ground Gas

Table 2.3.2 summarises the gas risk for the site, based on the above information gained through the desk-based research. In accordance with current guidance (CIRIA C665), the gas generation potential for each source has been individually assessed, with references to potential gassing risk made according to the following definitions: Negligible, Very Low, Low, Moderate, High and Very High. The definitions are explained in Section 10.0 of the guidance.

The objective of this exercise is to determine if potentially unacceptable bio-ground gas risks exist, and whether further investigation and assessment is necessary.

Table 2.3.2: Preliminary Risk Assessment (PRA) – Bio-Ground Gas

Potential Source	Risk	Risk Rating	Rationale
Made Ground (CO_2 + CH_4)	Human health Explosion	Very Low	Made Ground should be anticipated associated with the use of the site as a nursery. Organic degradable material may be expected as growth media, however the risk of ground gas generation from Made Ground is considered to be low.
Alluvial Strata (CO_2 + CH_4)	Human health Explosion	Negligible	No alluvial deposits within 250m of the site.
Landfills (CO_2 + CH_4)	Human health Explosion	Negligible	No historical landfills located within 500m of the site.
Infilled Ground + Burial Sites (CO_2 + CH_4)	Human health Explosion	Very Low	Potentially infilled ground recorded within 250m of the site at two locations. However, potential gassing source (volume) is considered insignificant and migratory pathway through Lambeth Group is limited.
Coal and Mining (CO_2 + CH_4)	Human health Explosion	Very Low	Not located in a coal mining area. Non-coal mining area of Great Britain noted to be 'highly unlikely to unlikely'.
Soil Vapours	Human health Explosion	Negligible	No soil vapour risks identified in the immediate surroundings.
COMBINED RISK RATING = VERY LOW			

A very low combined risk from ground gas ingress and explosion is considered. No viable sources of risk have been identified which may present a risk to the occupancy of the new homes. However, it is recommended precautionary gas monitoring is completed to quantify the qualitative assessment.

2.4 RADON GAS

Information from the Envirocheck report (using data supplied by the BGS) indicates that 'The property is in a Lower probability radon area (less than 1% of homes are estimated to be at or above the Action Level)', and that 'The property is included in a 'lower probability radon area' (less than 1% of homes are estimated to be at or above the Action Level)'. ***No protective measures are considered necessary in the construction of new dwellings or extensions, according to the British Geological Survey.***

The information can be verified through checking on the interactive radon map for Great Britain provided by the UK Health Security Agency (UKHSA) and the British Geological Survey (BGS).

The HSA website (ukradon.org) can be used to purchase radon reports, where an address-specific radon report may be obtained. It should however be noted that for redevelopment sites, a GeoReport provided by the British Geological Survey may be more appropriate.

2.5 GROUND STABILITY, NATURAL CAVITIES AND MINING HAZARDS

Table 2.5 indicates potential ground stability, natural cavities and mining hazards identified within the Envirocheck report for the site.

These will be considered in terms of the proposed development and detailed in the following section 2.5, Preliminary Ground Hazards Summary.

Table 2.5: Ground Stability, Natural Cavities and Mining

Hazard	Ground Stability and Natural Cavities Hazard Potential
Potential for Collapsible Ground Stability	Very Low.
Potential for Compressible Ground Stability	No Hazard.
Potential for Ground Dissolution	Moderate: for the northern area of the site. Low: for the majority of the site.
Landslides	Very Low: for the majority of the site.
Running Sands	Very Low: for the majority of the site.
Shrink-Swell Clay	Moderate: for the majority of the site.

Table 2.5: Ground Stability, Natural Cavities and Mining	
Natural Cavities	240m SW: Swallow Hole – Chalk Group, Lambeth Group 568m N: Swallow Hole x 3 – Chalk Group, Lambeth Group 850m N: Swallow Hole – Chalk Group, Lambeth Group
Hazard	**Mining Hazard Potential**
BGS recorded mineral sites	None within 500m.
Coal mining affected areas	No Hazard.
Mining instability	No Hazard.
Man-made mining cavities	None within 500m.
Non coal mining areas of Great Britain	Highly Unlikely to Unlikely.
Potential mining areas	No Hazard.
Infilled Land	No potentially infilled land (water or non-water) recorded within the site extents.
Other mining/quarrying	None recorded within the site extents.

2.6 PRELIMINARY GROUND HAZARDS SUMMARY

The following Table 2.6 provides a summary of the preliminary ground hazards identified with the ground and groundwater conditions and historical site use as determined from the desk-based information accumulated within the PRA. The following key plan should be considered in regard of plausible risk:

❍ - Further action required. Potentially plausible hazard.

❍ - Unlikely to represent a hazard, no further consideration required.

Table 2.6: Preliminary Ground Hazards Summary		
Ground Hazard	**Plausible**	**Description**
Topographic		
Site constraints	❍	Restricted site access including buildings and hardstanding.
Slopes, embankments, cuttings	❍	Foundation type and construction difficulties. Remedial measures to stabilise slopes, embankments and cuttings, and mitigate risks of landslides.
Man-made		
Filled ground/ made	❍	Foundation type and construction difficulties associated with the development of the

Table 2.6: Preliminary Ground Hazards Summary		
Ground Hazard	**Plausible**	**Description**
ground/ infilled basements		site.
Existing foundations and below ground structures	◔	Foundation type and construction difficulties. Obstructions to new construction. Influence of existing and adjacent foundations to new construction. Vibration associated with the construction technique.
Mining instability	◔	Foundation type and construction difficulties. Appropriate mining investigation.
Ground chemistry	◔	Made Ground is heterogenous and subject to composition may present a risk of sulphate and sulphide attack on buried concrete.
Unexploded Ordnance	◔	Detailed unexploded ordnance (UXO) risk assessment did not form part of our project instruction.
Geological		
Frost action	◔	Susceptibility of soils affected at pavement and foundation formation. Provision of non-frost susceptible materials.
Lateral soil instability	◔	Foundation type and construction difficulties. Provision of temporary works – shoring.
Soft clays, silts and compressible soils	◔	Foundation type and construction difficulties. Sufficient bearing resistance to support the proposed construction.
Shrinkable soils	◔	Foundation type and construction difficulties. Influence of trees on foundation depths. Potential for desiccation to have occurred and heave protection. NHBC Standards Chapter 4.2, Building Near Trees.
Ground dissolution of soluble rocks	◔	Risk of ground dissolution of soluble rocks in the area of the site noted to be 'moderate to low'. Foundation type and construction difficulties. Dynamic probing, torque readings. A quantitative risk of ground dissolution of soluble rocks did not form part of our project instruction.
Ground chemistry	◔	Natural soils in the area present a risk of sulphate and sulphide attack on buried concrete.
Hydrogeological/Hydrological		
Elevated or rising groundwater	◔	Foundation type and construction difficulties. Provision of temporary works – dewatering (possibly well-points) in shallow

Table 2.6: Preliminary Ground Hazards Summary		
Ground Hazard	**Plausible**	**Description**
		excavations due to surface water flooding. Provision of temporary works – shoring. Reduced bearing resistance. Effectiveness of soakaway drainage or deep borehole soakaways.
Fluvial or coastal scour/erosion	❍	Foundation type and construction difficulties. Remedial or preventative measures.
❍ - Further action required. Potentially plausible hazard. ❍ - Unlikely to represent a hazard, no further consideration required.		

Any proposed new construction will need to consider obstructions and the increased thicknesses of made ground locally, the required bearing resistance of the proposed buildings, existing foundations, the influence of trees and ground dissolution of soluble rocks.

A suitable ground investigation would confirm an appropriate foundation solution.

Shallow soakaway drainage may be successful in the Lambeth Group anticipated subject to soil infiltration testing, and compliance with CIRIA C574, Engineering in Chalk, 2002.

3.0 REGULATORY INFORMATION, CONSULTATIONS AND OTHER

Unless otherwise stated regulatory database information has been obtained from the Envirocheck report included as **Appendix I.**

3.1 STATUTORY REGISTERS AND AUTHORISATIONS

Table 3.1 includes the statutory registers and authorisations that relate to the site and surrounding area. Pertinent registers and authorisations will be used in conjunction with the desk-based review to determine the preliminary environmental risk.

Table 3.1: Statutory Registers and Authorisations

Item	0 – 250m	251 – 500m
Contaminated Land Register Entries and Notices	0	0
Records of Licensed Discharge Consents	210m N - 'Sewage Discharges - Final/Treated Effluent - Not Water Company' discharging on to land,	5
Prosecutions Relating to Controlled Waters	0	0
Enforcements and Prohibition Notices	0	0
Integrated Pollution Controls	0	0
Integrated Pollution Prevention and Control	0	0
Local Authority Integrated Pollution Prevention and Control	0	0
Local Authority Pollution Prevention and Controls	0	0
Local Authority Pollution Prevention and Control Enforcements	0	0
Pollution Incidents to Controlled Waters	0	0
Substantiated Pollution Incident	0	0
Prosecutions Relating to Authorised Processes	0	0
Registered Radioactive Substances	0	0
Records of Water Industry Act Referrals	0	0

Table 3.1: Statutory Registers and Authorisations		
Item	**0 – 250m**	**251 – 500m**
Explosive Sites	0	0
Planning Hazardous Substance Consents/Planning Hazardous Substance Enforcements	0	0
Notification of Installations Handling Hazardous Substances (NIHHS) Facilities and Control of Major Accident Hazards Facilities (COMAH)	0	0
Fuel Stations	0	0
Contemporary Trade Directory Entries	Pertinent Contemporary Trade Directory Entries within the site or within 100m of the site: On-site: Sonning Mowers (within Ladds Garden Village) - Lawnmowers & Garden Machinery - Sales & Service – Inactive On-site: Gareth James Swimming Pools - Swimming Pool Contractors, Repairers & Service - Inactive On-site: Rivar Sand & Gravel Ltd - Sand, Gravel & Other Aggregates - Active	
Underground Electrical Cables	0	0
Item	**Immediate Vicinity**	
Sensitive Land Uses	Site in area of adopted green belt, adopted in February 2014. Ancient woodland 166m to the east (Scarletts Wood).	

3.2 CONSULTEES

3.2.1 Local Authority - Contaminated Land Officer

The Local Environmental Health Department has not been contacted as part of our project instruction.

3.2.2 Local Authority - Building Control Officer

The Local Authority Building Control Officer has not been contacted as part of our project instruction.

3.2.3 Local Authority - Archaeological Officer

Reference to 'Romano-British Pottery found' noted on the historical mapping to the south-east of the site. Discussions should be held with the Local Authority Archaeological Officer to confirm implications for the development of the site.

3.2.4 Local Authority - Petroleum Officer

The Local Authority Petroleum Officer has not been contacted as part of our project instruction.

3.2.5 Environment Agency - Contaminated Land and Groundwater

The Contaminated Land and Groundwater Team of Environment Agency has not been contacted as part of our project instruction.

3.2.6 Coal Authority and Mining Searches UK

The Coal Authority and Mining Searches UK have not been contacted as part of our project instruction.

4.0 PRELIMINARY RISK ASSESSMENT

4.1 METHODOLOGY

A tier 1 PRA and CSM have been prepared in accordance with the technical approach on Land Contamination Risk Management (LCRM), which replaced 'CLR11'. Possible hazards identified by a potential source of contamination and sensitive receptors have been assessed via a source-pathway-receptor (SPR) model in accordance with current UK protocols. A risk may only exist where a plausible SPR linkage is viable and where the quantity or concentration of a contaminant (source) is sufficient to cause harm. Under the statutory definition "Contamination" may only exist where contaminants pose a risk of harm to a receptor. Risk may be defined as a function of the likelihood and severity of any adverse effects resulting from a contamination event in accordance with CIRIA C552. A summary of how risk is derived and the associated definition is presented in tables 4.1.1 and 4.1.2.

Table 4.1.1: Risk Ratings Matrix

	Consequence			
Probability	**Severe**	**Medium**	**Mild**	**Minor**
High Likelihood	Very high risk	High risk	Moderate Risk	Moderate/low risk
Likely	High risk	Moderate Risk	Moderate/low risk	Low risk
Low Likelihood	Moderate Risk	Moderate/low risk	Low risk	Very low risk
Unlikely	Moderate/low risk	Low risk	Very low risk	Very low risk

Table 4.1.2: Risk Ratings Definition

Risk Rationale	Definition
Very high risk	A high probability that severe harm could occur to determined receptor from identified contaminant - OR - evidence exists that severe harm to receptor is currently occurring. Urgent investigation and remediation should be considered. If demonstrated this risk is likely to result in substantial liability.
High risk	Harm is likely to occur to determined receptor from identified contaminant. Urgent investigation and short-term risk minimisation remediation followed by longer term fit for purpose remediation should be considered. If demonstrated this risk is likely to result in substantial liability.
Moderate Risk	It is possible that harm could occur to a determined receptor from identified contaminant. It is relatively unlikely that any harm would be severe or should harm occur it is likely to be relatively mild.
Moderate/low risk	It is possible that harm could occur to a determined receptor from identified contaminant. It is unlikely that any harm would be severe or should harm occur it is probable to be relatively mild.
Low risk	It is possible that harm could occur to a determined receptor from identified contaminant. It is unlikely that such harm, if indeed present, would at worst be mild.
Very low risk	There is a low possibility that harm could occur to a receptor. In such event the harm would not be severe.

4.2 POTENTIAL SOURCES OF CONTAMINATION

Based on the desk-study and walkover survey completed, table 4.2 presents a summary of the potential sources identified.

Table 4.2: Potential Sources		
Source	**Description**	**Key Contaminants of Concern**
1. Site-wide soil contamination	Risk of soil contamination within the site associated with historical use of the site as a nursery and the presence of Made Ground across the site.	Metals, hydrocarbons (TPH/PAH), asbestos.
2. Asbestos	Risk of Asbestos Containing Soils (ACS) and Asbestos Containing Materials (ACMs) from the existing and any previous buildings.	Asbestos.
3. Ground gases/vapours	Low risk of hazardous ground gases is anticipated. Potential risk from Made Ground and infilled ground.	Hazardous ground gas. Complete gas monitoring.
TPH – Total Petroleum Hydrocarbons. PAH – Polycyclic Aromatic Hydrocarbons.		

4.3 PATHWAYS

A pathway is one or more routes or means that a receptor can be exposed to, or affected by, a contaminant.

Table 4.3: Plausible Pathways
On-Site and Locally
Direct contact; to humans and infrastructure
Underlying geology/*hydrogeology; shallow solid geology noted as secondary (A) and principal aquifers*
Inhalation and ingestion
Surface run-off/drainage

4.4 RECEPTORS

A receptor is either a living organism, a group of organisms, an ecological system, controlled waters or property that could be harmed or polluted by a contaminant. Table 4.4 examines the potential receptors.

Table 4.4: Potential Receptors			
Receptor	**Description**	**Comments**	**Plausible**
Construction workers	Groundworkers and general construction works	Construction works proposed within the site	Yes

Table 4.4: Potential Receptors			
Receptor	**Description**	**Comments**	**Plausible**
End users	Occupants of the proposed development	Gardens proposed across the site.	Yes
Adjacent land users	Occupants of surrounding residencies	Adjacent residential dwellings which could be affected by run-off or migration.	Yes
Soft landscaping	Areas of new planting including lawns	Gardens proposed across the site.	Yes
Water supply pipes	Plastic pipework for potable water supply to housing may be affected if laid in contaminated soils	New supply required for redevelopment.	Yes
Buildings & infrastructure	Buried concrete for new foundations may be in contact with aggressive ground (sulphur attack)	New building works proposed.	Yes
Groundwater	Controlled waters (aquifers) beneath the site	Site underlain by secondary and principal aquifers. Site located in a SPZ3. No potable water abstraction within 2000m.	Yes
Surface waters	Controlled water such as lakes, streams, rivers or coastal waters	Inland river along the northern boundary of the site.	Yes
Ecological receptors	Sensitive areas of ecological significance defined under Part 2A of EPA 1990	Site is located in a green belt.	Yes

4.5 SUMMARY OF POLLUTANT LINKAGES FOR PROPOSED LAND USE - INITIAL CSM

The initial CSM is based upon the proposed site end use and the information currently consulted relating to various risk sources and plausible pollutant linkages and is presented within table 4.5.

Table 4.5: Initial Conceptual Site Model (for plausible pollutant linkage pathways)						
Source	**Receptor**	**Pathway**	**Probability**	**Consequence**	**Risk & Justification**	**Linkage No.**
Source 1 Site-wide soil contamination	Construction workers	Direct contact	Unlikely	Mild	Very Low *Note 1.* Site occupied with building in previous use as a nursery. Potential for made ground and contaminants associated with the buildings locally. Potential asbestos arising from building materials.	1
	End users	Direct contact	Low Likelihood	Mild	Low *See Note 1.*	2
	Adjacent land users	Direct contact via run-off	Unlikely	Mild	Low *Note 2*. Site is underlain by secondary and principal aquifers. Site occupied with existing buildings, and in previous use as a nursery. Site predominantly soft surfaced.	3
	Soft landscaping	Root uptake	Low Likelihood	Mild	Low *Note 3.* Potential for made ground has been identified locally which may impact soft landscaping and root development. However, no evidence of existing vegetation die-back.	4
	Water supply pipes	Direct contact	Low Likelihood	Mild	Low *Note 1.*	5
	Buildings & infrastructure	Direct contact	Low Likelihood	Mild	Low *Note 1.*	6
	Groundwater	Vertical migration through hydrogeology	Low Likelihood	Mild	Low *Note 4.* Site underlain by secondary/principal aquifers. The site is located in an SPZ3. Site predominantly soft surfaced, creating a pathway to controlled water receptors.	7

Table 4.5: Initial Conceptual Site Model (for plausible pollutant linkage pathways)						
Source	**Receptor**	**Pathway**	**Probability**	**Consequence**	**Risk & Justification**	**Linkage No.**
	Surface water	Run-off	Low Likelihood	Mild	Low *Note 5.* Inland river along the northern site boundary	8
	Ecology	Direct contact via run-off	Low Likelihood	Mild	Low *See Note 2*.	9
Source 2 Asbestos	Construction workers	Inhalation	Low likelihood	Medium	Moderate/Low *Note 7.* Potential for ACMs in former/existing buildings.	19
	End users	Inhalation	Low likelihood	Medium	Moderate/Low *See Note 7.*	20
	Adjacent land users	Inhalation	Unlikely	Mild	Very Low *Note 8.* Potential for ACMs from buildings. Distance and dispersion in outdoor air limits risk.	21
Source 3 Ground gases and Soil vapours (on/off site source)	Construction workers	Inhalation of vapours/gas	Unlikely	Mild	Very Low *Note 9.* Significant notable sources of ground gas not identified either at the site or in the vicinity.	22
	End users	Inhalation of vapours/gas	Unlikely	Mild	Very Low *See Note 9.*	23

The overall environmental risk classification for the site is considered to be generally **LOW** for the site.

4.5 CONSIDERATIONS FOR SITE INVESTIGATION

Further site investigation should comprise the following:

1. **Investigation of soil contamination.** This should be completed on both a spatial and targeted basis. Spatial coverage should be achieved in order to targeted areas of the site where potential sources of contamination may exist and ideally where these sources overlay a pathway for risk to exist (i.e. within proposed garden areas).

   Local sources of contamination, such as potential asbestos in structures should be targeted.

2. **Investigation of hazardous bio-ground gases and soil vapours.** Monitoring wells should be installed to enable bio-ground gas and vapour monitoring.

The listed suite of analysis is considered suitable and will provide a screening for the majority of commonly found soil contaminants, which shall be followed through into the site investigation.

- Aviron's "**ES-1**" of laboratory analysis shall be applied to future site investigations which includes; arsenic, barium, cadmium, total chromium, copper, nickel, zinc, lead, mercury, selenium, water soluble boron, total cyanide, total sulphate, water soluble sulphide, speciated Polycyclic Aromatic Hydrocarbons (PAH), speciated Total Petroleum Hydrocarbons (TPH), Benzene, Toluene, Ethylbenzene, Xylenes (BTEX) and Methyl Tert-Butyl Ether (MTBE), organic matter, total phenols, pH and asbestos. **Provides broad analysis of common soil contaminants.**

The listed suite of analysis is considered suitable and will provide a screening for the majority of commonly found soil contaminants, which shall be followed through into the site investigation.

5.0 SITE INVESTIGATION WORK

5.1 METHOD STATEMENT AND SITE INVESTIGATION APPROACH

A method statement detailing how the site investigation was to be conducted was produced in accordance with current statuary guidance, best practices and the Client's instructions.

A health and safety plan was completed before site work commenced. Site investigation staff were briefed on the potential contaminants likely to be encountered, and the appropriate personal protective equipment (PPE) to be adopted for this type of investigation.

The site investigation was conducted in accordance with British Standards; BS5930:2015+A1 'Code of Practice for Ground Investigation', BS1377-1:2016 'Methods of test for soils for Civil Engineering Purposes', BS EN ISO 17892 Parts 1-12, 'Geotechnical investigation and testing. Laboratory testing of soil', and BS10175:2011+A2:2017 'Investigation of Potentially Contaminated sites'.

5.2 SITE INVESTIGATION METHODS

Section 4.5 prepared an initial CSM where pollutant linkages with a greater risk than low would require suitable investigation.

Table 5.2 presents what it considered to be a suitable method and rationale of investigation which was completed on 9 May 2025.

Table 4.2: Rationale of the Site Investigation Positions		
Locations	**Rationale**	**Monitoring Wells**
Window Sample (WS) Boreholes		
WS1 to WS9 were positioned around the development area of the site to provide spatial coverage targeting the proposed development buildings, and shallow soils for sampling and testing. Borehole were positions between agreement with the land owner and the Client. The boreholes were also located adjacent and remote from trees to determine corresponding material properties profiles.		Monitoring wells were installed into WS1, WS4 and WS9 to 4.0- 5.0m bgl to enable gas and groundwater monitoring.
Hand Trial Pits (HP)		
HP1 was positioned in the east of the site, at the location originally intended for WS10, however, access to this area was restricted and a hand pit was completed instead. The hand pit provides spatial coverage targeting shallow soils for sampling and testing.		Not installed.

Exploratory Hole Location Plans are enclosed as **Figures 5** and **6.**

All intrusive locations were pre-cleared prior to the ground investigation works using a Cable Avoidance Tool (CAT) and tracing of manhole covers, which was completed to endeavour service avoidance during this exercise.

5.2.1 Window Sample Drilling

Window sample boreholes WS1 to WS9 were drilled to depths of up to 5.0m bgl using an Archway Dart drilling rig.

The purpose of the window sampling was to evaluate ground conditions at shallow depths, collect soil samples for geochemical and geotechnical laboratory analysis and to determine soil strength by means of SPTs.

The action of window sampling also enables the installation of monitoring wells to determine standing groundwater levels and ground gas testing.

Standard Penetration Tests were undertaken at 1m intervals to depths of up to 5.0m bgl within the boreholes in accordance with BS EN SO 22476-3 "Standard Penetration Test 2005". Drilling refusal (SPT N>50) occurred locally at 4.0m bgl where the drilling was terminated to prevent damage to the drilling rig and jamming the tooling.

Disturbed soil samples were also collected from bored arisings for geochemical sampling and laboratory testing for screening for human health risk assessment and geotechnical laboratory tests which are further discussed within section 6.0.

5.2.2 Hand Trial Pitting

One hand trial pit (HP1) was excavated by hand to a depth of 0.4m bgl, to determine the shallow ground conditions at the position originally intended for WS10, to enable geochemical sampling and laboratory testing for screening for human health risk assessment.

The trial pit complements the window sample boreholes targeting specific areas of the site and to assess the overlying ground conditions.

5.3 GROUND CONDITIONS

The exploratory hole logs and photographs are presented within **Appendix II**.

Detailed strata descriptions are shown on the aforementioned exploratory hole logs though in general ground conditions were encountered as follows:

Table 3.3: Summary of Ground Conditions			
Unit	**Description**	**From (m bgl)**	**To (m bgl)**
Topsoil	Sandy clayey topsoil with roots.	GL	0.2 – 0.5
Made Ground	Clayey gravelly SAND, silty sandy GRAVEL, silty sandy gravelly CLAY.	GL – 0.2	0.4 – 1.1
Lambeth Group	Soft, firm and stiff silty sandy gravelly CLAY.	0.2 – 1.1	5.0+
Seaford Chalk Formation and Newhaven Chalk Formation	Predominantly structureless CHALK of weathering Grade Dc, above CHALK of weathering Grade C and B noted locally	2.2 – 3.3	5.0+

5.3.1 Field Observations

No unusual odours, stains or evidence of soil contamination was noted during the ground investigation works.

Roots were recorded locally across the site during the site investigation work to depths of 0.2m bgl.

5.4 GROUNDWATER LEVELS

5.4.1 Groundwater Levels: During Site Investigation Works

Groundwater was encountered during the site investigation works as detailed in table 5.4.1 below.

Table 5.4.1: Groundwater During Investigation		
Location	**Depth – bgl (during GI)**	**Comments**
WS1-WS9	Dry to depths of up to 5.0m bgl	No groundwater encountered during the ground investigation works
HP1	Dry to a depth of 0.4m bgl	

5.4.2 Groundwater and Gas Monitoring Wells

Selected boreholes were converted to monitoring wells to enable standing groundwater level monitoring and ground gas monitoring. Wells were installed into 101mm diameter window sample boreholes using 63mm

external diameter and 50mm internal diameter HDPE standpipe.

Table 5.4.2 describes the construction of the wells.

Table 5.4.2: Monitoring Well Construction			
Location	**Depth of plain pipe and bentonite seal (m)**	**Response zone; depth of slotted pipe with gravel screen (m)**	**Depth of install (m)**
WS1	Ground level (GL)-1.0	1.0-5.0	5.0
WS4	GL-1.0	1.0-4.0	4.0
WS9	GL-1.0	1.0-5.0	5.0

5.4.3 Groundwater and Gas Post-Investigation Monitoring

In all instances and prior to completing groundwater monitoring and field measurements bulk ground gases and soil vapours were monitored using a GFM 435 Gas Analyser and miniRAE Photon-Ionisation Detector (PID) on the dates shown in table 5.4.3, which provides standing level groundwater 'dips' during post-investigation monitoring.

Table 5.4.3: Groundwater Monitoring Depths			
Location / Date	**Depth – bgl WS1**	**Depth – bgl WS4**	**Depth – bgl WS9**
2 June 2025	Dry to 5.04m	Dry to 4.11m	4.75m
9 June 2025	Dry to 5.04m	Dry to 4.11m	4.79m

The groundwater encountered within WS9 may possibly be 'perched' within the surrounding clay bound soils into which the monitoring well was installed.

Gas monitoring is discussed in section 9.0 of this report.

Field monitoring sheets are enclosed in **Appendix III**.

6.0 LABORATORY ANALYSIS

6.1 SOIL GEOCHEMICAL TESTING

Table 6.1 details the soil samples which were collected and submitted for geochemical analysis.

Table 5.1: Soil Geochemical Testing			
Location	**Strata Sampled**	**Objective**	**Analysis**
HP1 (0.1m)	Made Ground	Spatially positioned within the south-east of the site within the yard area.	ES-1
WS1 (0.3m)	Topsoil	Spatially positioned within the north-east of the site.	ES-1
WS2 (0.3m)	Topsoil	Spatially positioned within the north-east of the site.	ES-1
WS4 (0.6m)	Natural Clay	Spatially positioned within the west of the site to obtain a sample of natural Clay	ES-1
WS5 (0.5m)	Made Ground	Spatially positioned within the centre of the site.	ES-1
WS6 (0.4m)	Made Ground	Spatially positioned within the south-west of the site.	ES-1
WS8 (0.3m)	Made Ground	Spatially positioned within the south of the site within the yard area.	ES-1
WS9 (0.6m)	Natural Clay	Spatially positioned within the south-east of the site to obtain a sample of natural Clay	ES-1
COMP1	Made Ground	Representative sample of Made Ground to enable waste soil classification.	Waste Acceptance Criteria (WAC)

Chemical sampling and testing targeted the overlying units of Reworked Topsoil whereby virtue of surface deposition historical contaminants are most likely to be recorded. The purpose of sampling slightly deeper natural strata is to generate a baseline understanding of natural soil chemistry and to understand phytotoxic elements at depths of root growth.

The analytical suites were chosen to provide a suitable screening in accordance with the potential contaminants identified within the site conceptualisation presented within section 4.5.

Soil samples for environmental quality analysis were sent to i2 Analytical Limited.

6.2 SOIL GEOTECHNICAL TESTING

A programme of geotechnical laboratory testing was undertaken at Geotechnical Site and Testing Laboratories Limited and Eurofins Chemtest Limited. Testing was completed on the fine soils encountered beneath the site. The test procedures used were generally in accordance with the methods described in BS1377-1:2016 and/or BS EN ISO 17892. Details of testing used are provided in table 6.2.

Table 6.2: Soil Geotechnical Testing

Test	Standard	Number of Samples
Atterberg Limits (and Moisture Content) *The objective of Atterberg limits and moisture content testing is to determine plasticity and volume change potential of fine (clay and silt) soils and the potential for desiccation to have occurred*	BS EN ISO 17892 Part 1: 2014+A1:2022 Water content Part 12: 2018 +A2:2022 Liquid & plastic limit	12 (12)
Saturation of Moisture Content *The objective of saturation of moisture content analysis is to determine Chalk density*	BS1377 : Part 2 : 1990 : clause 3.3	4
Aviron LC Suite - pH, water soluble sulphate, total sulphate & total sulphur *To enable concrete classification to be specified*	UKAS accredited	10 (including 8 within the ES-1 analysis)

6.3 SOIL SAMPLING PROTOCOL

All soil samples were collected from bored or excavated arisings using a trowel and following Aviron's standard protocols for soil sampling. To avoid cross contamination, the sampling equipment was cleaned using de-ionised water after each sample was retrieved.

Clean latex gloves were used each time a soil sample was collected, and all samples were placed into clean sterilised jars for submission to the UKAS/MCERTS accredited laboratory.

All sample containers were labelled on-site immediately prior to filling. These samples were identified by a label placed on the body of each container and the following information was recorded; site name, date collected, unique sample number, soil sample depth.

Samples for geochemical analysis were then placed into a cool box containing ice packs to maintain refrigerated conditions following collection and transport to the laboratory. Ice packs were changed every twenty-four hours where necessary to maintain cool conditions and suppress volatiles.

7.0 ENVIRONMENTAL INTERPRETATIVE GUIDANCE

7.1 GENERIC QUANTITATIVE RISK ASSESSMENT

The purpose of a tier 2 GQRA is to determine the suitability of the site for proposed development and end use.

The site investigation shall collect soil samples whereby determinant chemical measured in the soil through laboratory analysis have been compared with guidance values which are appropriate to the receptor under consideration. The guidance values or screening criteria applied shall be industry adopted generic values which following a screening of the laboratory analysis shall determine whether or not a site is contaminated, as defined under Part IIA of the EPA 1990 and specification in regard of the proposed development and identified receptors.

Where exceedances of guidance values or recorded a GQRA is can be used to appraise risk and make recommendations in regard of further investigation, remediation and/or tier 3 Detailed Quantitative Risk Assessment (DQRA).

7.2 GUIDANCE USED FOR ASSESSING SOIL CONTAMINATION

Aviron has followed the technical approach on Land Contamination Risk Management (LCRM), accessed on gov.uk website and other available guidance to assess contaminant concentrations.

Details of the methodology and Aviron's position on the adoption of guidance values is outlined below.

The available chemical data, from soil samples tested, is sorted into appropriate datasets depending on sampling regime and ground conditions. An initial GQRA is completed using the relevant and industry available screening criteria and where appropriate, statistical modelling. Risks to human health shall be initially assessed by comparing soil chemical data against various published screening criteria. These have been sourced from the following and in order of preference:

- Category 4 Screening Levels (C4SLs) prepared by the Department of Environmental Food and Rural Affairs (DEFRA) and published March 2014.
- Phase 2 C4SLs prepared by CL:AIRE and published May 2021.
- Suitable 4 Use Levels (S4ULs) prepared by Land Quality Management/Chartered Institute of Environmental Health (LQM/CEIH) and published December 2014. LQM acknowledgement for use of S4ULs. *"Copyright Land Quality Management Limited reproduced with permission; Publication Number S4UL3275. All rights reserved".*

- Soil Guidance Values (SGVs) prepared by the Environment Agency (EA)/DEFRA and published 2009.
- Soil Generic Assessment Criteria (GAC) prepared by Environment Industries Commission (EIC)/Association of Geotechnical and Geoenvironmental Specialists (AGS)/Contaminated Land: Application In Real Environments (CL:AIRE) and published 2010.

Aviron have adopted the above hierarchy in response to LCRM recommendations.

7.3 GUIDANCE USED FOR THE ASSESSMENT OF HAZARDOUS GROUND GAS

The principal influence for causing the migration of landgas in the ground is changes to barometric pressure. The most onerous landgas emission conditions on a site are usually observed following days of low or rapidly falling barometric pressure below 1000 millibars (mb).

Monitoring is usually performed over a period of several weeks or months in order to increase the chances of visiting the site on days when the conditions for monitoring worst-case results are correct. Gas monitoring results collected solely during high pressure conditions (>1000mb) may not provide a true value for worst case emission rates from the site.

Methane is produced by a number of processes, which can be biological or chemical in nature. The principal process is from the biogenic decay of organic material and is commonly found associated with landfill and organic marsh deposits or river silts. Methane can also be found associated with coal workings. It is explosive at concentrations of between 5 and 15%, with 5% being termed the lower explosive limit (LEL).

In assessing the risks from hazardous ground gas, reference has been made to the guidance from BS 8485:2015 'Code of Practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings' and CIRIA Report C665 'Assessing risks posed by hazardous ground gases to buildings' 2007 which adopts a risk characterisation strategy based on the maximum flow (L/hour) and maximum steady stated concentration (% v/v) of methane and carbon dioxide from a site to derive gas screening values (GSV) in litres/hour which are comparable with the Modified Wilson and Card classification (shown in Table 8.5 of C665) for any site which isn't intended to be developed as low-rise housing with vented underfloor void.

It is noted monitoring shall be precautionary.

8.0 ASSESSMENT OF GEOCHEMICAL SOIL RESULTS

Development proposed include private gardens and therefore the residential with homegrown produce from the guidance listed in section 6.2 shall be selected.

In order to select the appropriate Soil Organic Matter (SOM) value for appraisal of PAH and TPH the mean average SOM value was determined from the laboratory dataset and accordingly the 2.5% SOM value was selected on the basis of the average SOM values.

Laboratory certificates of chemical analysis are presented in **Appendix IV** along with the chemical assessment criteria.

8.1 ASSESSMENT OF SOIL GEOCHEMICAL RESULTS

Table 7.1 provides a summary of the results for each sample analysed when compared to the relevant assessment criteria.

Table 7.1: Summary of Geochemical Results

Location	Strata	Determinant	Measured Conc. (mg/kg)	Guidance Conc. (mg/kg)
HP1 (0.1m)	Made Ground	Benzo(b)fluoranthene	12	3.3
		Benzo(a)pyrene	12	2.7
		Dibenz(ah)anthracene	1.6	0.28
WS1 (0.3m)	Topsoil	All determinants recorded at acceptable concentrations	n/a	n/a
WS2 (0.3m)	Topsoil	All determinants recorded at acceptable concentrations	n/a	n/a
WS4 (0.6m)	Natural Clay	All determinants recorded at acceptable concentrations	n/a	n/a
WS5 (0.5m)	Made Ground	All determinants recorded at acceptable concentrations	n/a	n/a
WS6 (0.4m)	Made Ground	All determinants recorded at acceptable concentrations	n/a	n/a
WS8 (0.3m)	Made Ground	Benzo(b)fluoranthene	27	3.3
		Benzo(a)pyrene	34	2.7
		Dibenz(ah)anthracene	2.5	0.28
WS9 (0.6m)	Natural Clay	All determinants recorded at acceptable concentrations	n/a	n/a

COMP1	Made Ground	WAC test suggests inert waste soil	n/a	n/a

Notes:

Barium EIC Generic Acceptance Criteria (EIC GAC) is 1300mg /kg (Residential)

Chromium is assumed to be chromium II (not chromium IV).

8.2 DISCUSSION OF SOIL GEOCHEMICAL EXCEEDANCES

Seven samples were collected for chemical analysis from the overlying Made Ground (4no.), Topsoil (2no.) and underlying natural Clay (2no.).

Both samples obtained from the Topsoil and natural Clay recorded acceptable concentrations below the corresponding GAC.

Of the four samples collected from Made Ground, two of the samples collected recorded elevated concentrations of PAH when compared to the corresponding GAC.

Figure 7 presents a Soil Contamination Plan, which has been overlain on a proposed development plan and highlights only the positions (shown in Table 8.1) where samples were collected and tested from the overlying Made Ground.

8.2.1 PAH

Benzo(b)fluoranthene, Benzo(a)pyrene and Dibenzo(ah)anthracene has been recorded above their respective GACs in the Made Ground of positions HP1 and WS8 in the south-east corner of the site where a yard is currently located and broadly surfaced with road plainings. PAH is typically found within ash or ashy products and the discovery of shallow PAH contamination within the yard area is most likely attributed to bituminous road plainings in the south-east corner of the site.

The Made Ground sampled within the south-west of the site (WS6 and WS7) from non-bituminous sources has recorded acceptable chemical/PAH concentrations.

8.2.2 TPH, BTEX, MTBE, PCB, Metals, Metalloids, Inorganics and Asbestos

All remaining determinands analysed within the overlying Topsoil, Made Ground and natural Clay were recorded at acceptable conditions, which is considered to reflect a land use which have been given the open land following by a garden centre.

8.2.3 Conclusions

Active remediation shall be necessary to address the exposure risk presented by the PAH containing bituminous Made Ground sampled and tested at HP1 and WS8 within the existing road plainings yard are in the south-east of the site.

To remove potential exposure risk to site end users the overlying 'road plainings' (bituminous) surfacing should be removed from site prior to the construction of new gardens and areas of soft landscaping.

8.2.4 Waste Management and Disposal

Whilst the majority chemical concentrations are below the GACs which determine the potential for exposure risk to exist to end users, this does not guarantee the chemical composition of the in-situ soils will meet an 'inert' waste classification. Sample COMP1 suggests inert waste, however PAH recorded within the Made Ground (road plainings) of HP1 and WS8 is likely to results in non-hazardous waste disposal.

Waste classification can be confirmed by the waste management contractor, who upon presentation of the laboratory results (and possibly further WAC testing) shall be able to classify waste soil.

9.0 HAZARDOUS GROUND GAS MONITORING

9.1 STRATEGY

As previously presented within table 5.4.2 monitoring well installations were constructed in order to provide ground gas monitoring following the outcome of the preliminary ground gas assessment within section 2.3.

A very low combined risk from ground gas ingress and explosion is considered. No viable sources of risk have been identified which may present a risk to the occupancy of the new homes. It was recommended precautionary gas monitoring is completed to quantify the qualitative assessment.

The installation of the monitoring wells have suitable response zones to enable the capture of ground gases which may possibly migrate through granular and fractured units beneath proposed homes. Each monitoring well was completed with a 1m thick bentonite seal from ground level to prevent atmospheric influence.

9.2 MONITORING

The presence of soil vapours was determined prior to bulk ground gas monitoring using a MiniRAE Photon Ionisation Detector (PID) from RAEs Systems. The presence of hazardous bio-gases including methane (CH4), carbon dioxide (CO2) and oxygen (O2) was determined using a GFM Infra-Red Gas Analyser from Ribble Enviro Limited. The flow rate and atmospheric pressure, in millibars (mb), was also measured during the monitoring process. Depth to groundwater was measured using an electronic dip meter.

Monitoring work was completed on the dates specified within table 9.2 which also summarises weather conditions and atmosphere pressure. To determine rising or falling pressures local 'online' weather trends from the Met Office and/or the monitoring apparatus were consulted.

Table 9.2: Background Gas Monitoring Data

Date	Atmospheric Pressure	Rising/Falling Pressure?	Worst Case Conditions?	Groundwater above response zone?
2 June 2025	1008mB	Steady	No	No
9 June 2025	1021mB	Steady	No	No

Note 2 of C665 indicates 'worst case' conditions occur during falling and sub-1000mB atmospheric pressures. Section 5.5.1 of C665 indicates 'worst case' conditions are likely to occur during weather conditions such as rainfall, frost or dry weather.

9.3 MONITORING

Table 9.3 summaries the results obtained which are enclosed in **Appendix III**.

Table 9.3: Summary of Monitoring Results			
Gas	**Measured Conc. Range (% v/v)**		**Comments**
	Low	**High**	
CH_4	0.0 (<0.1)	0.0 (<0.1)	Methane was not detected (<0.1%) and thus is below the guidance value of 1% at which point the characteristic situation is advised to increase to CS2.
CO_2	0.9	2.2	Carbon dioxide has been detected at concentrations below the guidance value of 5% at which point the characteristic situation is advised to increase to CS2.
O_2	18.0	18.2	Oxygen has been recorded at ambient concentrations, above 16% the point where it is considered there is potential for asphyxiation.
Vapour*	0.1	2.7	Very low (PID) concentrations have been recorded. This concurs with the ground conditions and geochemical laboratory results suggesting the absence of soil vapour risk to new homes.

*vapour concentration in parts per million (ppm)

Monitoring positions remained constant and intact. No replacement monitoring positions were installed during the period of this project. No damage was observed to the monitoring wells during works.

It is considered the integrity of the monitoring wells has not been compromised as there is no evidence of surface damage which may affect the underlying installations. There is a bentonite seal within the bored annulus preventing escape of ground gases and entry of atmospheric gases. The gas valve remained closed prior to all monitoring occasions so passive venting of ground gas is unlikely to have occurred as site visits were unannounced.

9.4 INTERPRETATION OF DATA

Under normal use of the site (i.e. above ground), the risk presented by methane and carbon dioxide is dependent on both the concentrations and the rate of flow. In accordance with Wilson and Card methodology specified in the CIRIA C655 document, Gas Screening Values (GSV) were determined using the formula below.

GSV =	(Maximum steady concentration / 100) x Flow rate
GSV measured in litres per hour (l/hr)	Maximum steady concentration measured in percent (%) Flow rate measured in l/hr.

Based on the maximum concentrations and flows recorded, the **GSV** for **methane** was **0.0 L/hr** and the **GSV** for **carbon dioxide** was **0.0l/hr**.

Based on the GSV for carbon dioxide which is between below 0.07l/h the site is considered to conform the Characteristic Situation 1 (CS1). The monitoring results concur with the outcome of the PRA and it is not considered a ground gas ingress risk exists to new homes.

Ground gas protection is not considered necessary.

10.0 REVISED RISK ASSESSMENT

10.1 REVISED SOURCES OF CONTAMINATION

Following completion of the site investigation and interpretation of test results the following sources of contamination are considered to exist.

Table 10.1: Revised Sources

Source	Description	Comments	On/off-site
1r. PAH Made Ground contamination in existing yard area within SE of site.	PAH contamination is present within the existing road plainings yard area in the south-east of the site, considered to be sourced from bituminous products.	PAH. Remove road plainings during early stages of groundworks to remove source of risk. Complete via verification sampling and testing post site clearance/removal to confirm absence of exposure risk.	On
2r. Undiscovered contamination	Potential for undiscovered soil contamination following floor slab removal of barn/stable.	Enact discovery strategy	Off

10.2 REVISED CONCEPTUAL SITE MODEL

Following interpretation of the laboratory results, site dynamics and the revision of potential soil contaminants within table 10.1 a revised conceptual model has been prepared and is presented in table 10.2.

Table 10.2: Refined Conceptual Site Model (for plausible pollutant linkage pathways)

Source	Receptor	Pathway	Probability	Consequence	Risk & Justification	Linkage No.
Source 1r PAH Made Ground contamination in existing yard area within SE of site.	Construction workers	Direct contact	Low likelihood	Mild	Low *Note 10.* Made Ground, mainly in the south-east of the site, is impacted with PAH within the road plainings yard area. Construction workers should wear suitable Personal Protection Equipment (PPE) and undertake site clearance diligently.	24
	End users	Direct contact	Likely	Medium	Moderate *See Note 11.* Remediation shall be necessary to new gardens and soft landscaping which over lay the existing yard area in the south-east of	25

Table 10.2: Refined Conceptual Site Model (for plausible pollutant linkage pathways)						
Source	**Receptor**	**Pathway**	**Probability**	**Consequence**	**Risk & Justification**	**Linkage No.**
					the site. This is likely to be in the form of source removal (of the road plainings) and construction of a suitable clean cover system to areas of gardens and soft landscaping. A Discovery Strategy, Remediation Action Plan and Verification Plan should be prepared.	
	Adjacent land users	Direct contact via run-off	Low likelihood	Mild	Low *Note 12*. Exceedances of PAH recorded within the Made Ground. Pathway to cause harm unviable given careful site clearance.	26
	Soft landscaping	Root uptake	Likely	Medium	Moderate *Note 13*. Exceedances of PAH recorded within the Made Ground. Made Ground also physically unsuitable for sustain plant growth. **Action: Import suitable thickness of Topsoil (BS3882) to sustain planting**	27
	Water supply pipes	Direct contact	Low likelihood	Mild	Low *Note 14*. Exceedances of PAH recorded within the Made Ground. **Action: Consult local water authority to confirm water main design.**	28
	Buildings & infrastructure	Direct contact	Low likelihood	Mild	Low *Note 15*. Generally non-aggressive ground conditions have been encountered. **Action: Follow advice in section 11.7.**	29
	Groundwater	Vertical migration through hydrogeology	Unlikely	Mild	Very Low *Note 16.* The site is underlain by a secondary (a) and in turn principal aquifer. Contamination is shallow and	30

Table 10.2: Refined Conceptual Site Model (for plausible pollutant linkage pathways)						
Source	**Receptor**	**Pathway**	**Probability**	**Consequence**	**Risk & Justification**	**Linkage No.**
					locally confirm to the road plainings yard, being underlain by a unit of Clay, potentially acting as an aquitard. The Clay has acceptable soil chemistry. Groundwater is >5m and below the overlying unit of PAH impacted Made Ground, which shall largely be removed during the construction process.	
	Surface water	Run-off	Unlikely	Mild	Very Low *See Note 16.*	31
	Ecology	Direct contact via run-off	Unlikely	Mild	Very Low *See Note 16.*	31
Source 2r Undiscovered contamination	Construction workers	Direct contact	Unlikely	Mild	Very Low *Note 17.* Other than the road plainings, there is no evidence of soil contamination following investigation. However, there remains potential for discovery following site clearance and floor slab removal. **Action. Enact Discovery Strategy and any subsequent (and as necessary) remediation and verification.**	33
	End users	Direct contact	Unlikely	Mild	Very Low *See Note 17.*	34
	Adjacent land users	Direct contact via run-off	Unlikely	Mild	Very Low *See Note 17.*	35
	Soft landscaping	Root uptake	Unlikely	Mild	Very Low *See Note 17.*	36
	Water supply pipes	Direct contact	Unlikely	Mild	Very Low *See Note 17.*	37

Table 10.2: Refined Conceptual Site Model (for plausible pollutant linkage pathways)						
Source	**Receptor**	**Pathway**	**Probability**	**Consequence**	**Risk & Justification**	**Linkage No.**
	Buildings & infrastructure	Direct contact	Unlikely	Mild	Low *See Note 17.*	38
	Groundwater	Vertical migration through hydrogeology	Unlikely	Mild	Very Low *See Note 17.*	39
	Surface waters	Vertical and lateral migration through hydrogeology	Unlikely	Mild	Very Low *See Note 17.*	40
	Ecology	Direct contact via run-off	Unlikely	Mild	Very Low *See Note 17.*	41

10.3 RISK COMMENTARY

10.3.1 Contamination Risk from Soil to Human Health – Construction Workers

Concentrations of soil determinants are unlikely to present a short-term exposure risk to adult construction workers, specifically from the dermal contact, ingestion and inhalation pathways. Nonetheless construction workers should ensure suitable PPE is worn which would include:

- Gloves to prevent dermal contact with contaminated soils. It is advised that disposable latex gloves are worn beneath the outer 'work' gloves. This shall prevent skin contact with any contaminated soils which may come into contact with the outer 'work' gloves.
- To prevent ingestion of contaminated soils construction workers should avoid putting hands or objects in their mouth whilst on-site.
- To prevent ingestion of contaminated soils prior to eating or drinking construction workers should ensure their hands are properly washed, rinsed and dried. The use of latex gloves shall restrict any contamination from soils from coming into contact with the skin.
- To prevent inhalation of contamination soils construction workers should wear dust masks on dry and windy days. On damp or wet still days the risk of dust inhalation is low.

Notwithstanding there always remains risk for undiscovered contamination and thus a Discovery Strategy

should be enacted.

10.3.2 Contamination Risk from Soil to Human Health – End Users

Concentrations of soil determinants (PAH) present a long-term exposure risk to site end users; specifically from inhalation, dermal contact and ingestion pathways.

As previously discussed, PAH has been recorded within the Made Ground or the bituminous road plainings yard area in the south-east of the site.

Remediation works are considered to be necessary to areas of proposed soft landscaping, where if left in-situ chemically contaminated soils would present an exposure risk.

Table 10.3.2 outlines a typical remedial cover system, which is likely to require the removal of PAH impacted Made Ground prior to placement of clean imported soils.

Table 10.3.2: Cover Systems

Garden Type	Depth (bgl)	Description
Private Garden (areas where produce can be grown)	Ground Level - 300mm	BS3882:2015 'clean' Topsoil
	300mm – 600mm	'Clean' and ideally granular sub-soil to assist landscaped drainage.
	600mm	Terram Hi-Vis or similar product
Communal Garden/amenity Space (areas where produce cannot be grown)	Ground Level - 300mm	BS3882:2015 'clean' Topsoil
	300mm	Terram Hi-Vis or similar product
Should the road plainings be entirely removed this thickness of the cover system (imported sub-soil/topsoil) may be reduced provided the sub-cropping strata is chemical 'clean' natural Clay.		

A Discovery Strategy, Remediation Action Plan and Verification Plan should be prepared.

10.3.3 Contamination Risk from Soil to Human Health – Domestic Water Supply

Special design for domestic water supply are unlikely. However, to be certain, it is advised that the report should be provided to the local water authority to ensure the correct materials are chosen for water supply pipes. Following the formal withdrawal of WRAS Guidance Note No. 9-04-03 (October 2002), it is recommended that the following reference should be consulted:

Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites" (Ref 10/WM/03/21 by the UK

Water Industry Research Ltd (UKWIR); ISBN: 1 84057 5697

Generally, all services should be placed within dedicated runs, and then backfilled with clean imported material.

10.3.4 Contamination Risk from Soils to Controlled Waters

It is not considered that soils present a risk to groundwater/controlled waters given the absence of contaminative site history and the limited source of shallow PAH Made Ground contamination above a unit of Clay.

10.3.5 Contamination Risk from Groundwater

It is not considered contaminated groundwater exists beneath the site

10.3.6 Risk from Bio-Ground Gas

Following completion of the PRA a very low combined risk from ground gas ingress and explosion is considered.

To further evaluate bio-ground gas risk two precautionary rounds of monitoring have been completed to quantify the qualitative PRA.

The monitoring has recorded acceptable gaseous concentrations which recorded GSVs to indicate a Characteristic Situation 1 (CS1).

It is not considered ground gas protection is necessary.

11.0 GEOTECHNICAL ASSESSMENT

This section provides a geotechnical assessment in connection with the proposed development as described above and considers the GEO Limit State: failure or excessive deformation of the ground, in accordance with EN 1997 Eurocode 7: Geotechnical Design (and the UK National Annex to Eurocode 7) where applicable.

It is assumed for the purposes of this assessment that the finished ground floor levels of the proposed development buildings are the same as the ground level at each of the exploratory hole locations.

The assessment of the stability of any slopes or retaining structures across or adjacent the site, the requirement for additional retaining structures and the requirements for cut and fill that may be required to facilitate construction is outside the scope of this report.

Although a moderate and low qualitative risk of ground dissolution of soluble rocks has been determined in the Envirocheck report for the northern area of the site and the majority of the site respectively, a quantitative risk of ground dissolution of soluble rocks is outside the scope of this report. Any solution features encountered during the groundworks phase should be addressed appropriately.

Where applicable the following assessment includes bearing resistance assuming conventional construction only and no allowances have been made for interaction between existing adjacent foundations and proposed foundations or loads.

Eurocode 7 Section 2.1 Basis for Geotechnical Design indicates that for each geotechnical design situation it shall be verified that no limit state is exceeded. Geotechnical design requirements have been established by three Geotechnical Categories, 1, 2 and 3. For the purpose of this assessment the development is Geotechnical Category 2: which include conventional types of structure and foundation with no exceptional risk or difficult or loading conditions. Designs for structures in Geotechnical Category 2 should normally include quantitative geotechnical data and analysis to ensure that the fundamental requirements are satisfied. Routine procedures for field and laboratory testing and for design and execution may be used for Geotechnical Category 2 designs.

11.1 GROUND MODEL

The following table 11.1 provides the ground model for the site as determined from ground conditions encountered during the site investigation works.

Table 11.1: Ground Model				
Stratum	**Description**	**Top of Stratum (m bgl)**	**Bottom of Stratum (m bgl)**	**Average Thickness (m)**
TOPSOIL	Sandy clayey topsoil with roots.	GL	0.3 – 0.5	0.37
MADE GROUND	Clayey gravelly SAND, silty sandy GRAVEL, silty sandy gravelly CLAY.	GL – 0.2	0.4 – 1.1	0.58
CLAY	Soft, firm and stiff silty sandy gravelly CLAY.	0.2 – 1.1	5.0+	-
CHALK	Structureless CHALK of weathering Grade Dc, above CHALK of weathering Grade C and B noted locally.	2.2 – 3.3	5.0+	-
Notes				
Softened soils noted locally to some 1.5m bgl. Desiccated soils noted locally to depths of up to 4m bgl.				
Groundwater				
Possibly perched water noted locally in WS9 at 4.75m bgl during return monitoring in June 2025.				

11.2 FOUNDATION DESIGN CONCEPT

The ground model and the following considerations will need to be taken in account in determining the foundation solution for the proposed development buildings:

- Medium and high volume change potential CLAY soils and the influence of trees and desiccation.
- Soft CLAY soils to depths of some 1.5m bgl.
- Adequate bearing resistance to support the proposed development buildings.
- Temporary works in MADE GROUND and soft soils.

The clay soils present at shallow depth beneath the site are of predominantly intermediate and high plasticity and medium and high volume change potential.

Assumed maximum ‘characteristic action’ (or line load) of 115kN/m run on conventional shallow foundations 1.0m wide on firm CLAY, at the anticipated foundation formation level of between 1.5m and 2.5m bgl may be acceptable for the majority of the proposed buildings subject to the above considerations. It is assumed that the ‘characteristic actions’ comprises a vertical permanent action.

Due to the influence of trees and a cypresses screen, a piled foundation solution is expected to be required locally beneath the buildings in Plots 1, 2, 7, 8, 10, 11 and 17, subject to an assessment in accordance with NHBC Chapter 4.2, Building Near Trees, and due to potential desiccation.

Further information regarding the permanent actions and variable actions (making up the 'characteristic actions') applied to the foundations may be required along with confirmation of the foundation type and foundation dimensions.

11.2 EXCAVATION CONDITIONS

Excavation of the materials encountered during the ground investigation should be achieved using conventional hydraulic excavation techniques.

11.2.1 Temporary Works

From the ground investigation undertaken, excavations in the natural fine soils may remain stable in the short term. However, due to the Made Ground and soft soils noted locally, potential for spalling and the requirements for excavations to facilitate the construction, care should be taken to ensure that instability of excavations does not affect existing structures and services (e.g. foundations, roads, boundary walls or buildings) both on and off-site, and temporary support is expected to be required in order to achieve this.

Further advice should therefore be sought from the appointed structural engineer and specialist contractor regarding temporary works. General guidance can be found within CIRIA Report 97: Trenching Practice, dated 2001.

Care should be taken to ensure that falls from excavation faces do not adversely affect the integrity of foundation concrete.

All excavations on site should be in accordance with HSE guidelines and stability should be practically maintained at all times.

11.2.2 Dewatering

Groundwater was encountered locally during the return monitoring in June 2025 in WS9 at 4.74m bgl, which is expected to represent perched water in the clay bound soils at this location.

On the basis of the data obtained; dewatering is not expected to be required in shallow excavations beneath the site (as of June 2025).

11.3 EXISTING SERVICES/SUBSTRUCTURES

Due to the historical development of the site and site environs, existing services or sub-structures should be anticipated.

Where foundations or obstructions are encountered during excavations for the proposed foundations, all new foundations should be extended downwards to fully penetrate all redundant former construction.

11.4 BEARING STRATA

Bearing resistance for the firm CLAY at the anticipated foundation formation level of 1.5m to 2.5m bgl is provided below pending confirmation of the required foundation actions, foundation widths, foundation depths and tolerable settlement.

Locally due to the influence of trees, a cypresses screen and desiccation, a piled foundation solution is expected to be required beneath the buildings in Plots 1, 2, 7, 8, 10, 11 and 17.

11.4.1 Atterberg Limits and Material Properties

Atterberg limits tests conducted on samples at depths of between 1.0m and 4.0m bgl indicate that the fine soils locally across the site comprise inorganic CLAY of predominantly intermediate and high plasticity (CI/CH) and locally very high plasticity (CV). The modified plasticity index was determined to be between 19% and 52% indicating soils of low, medium and high volume change potential (VCP).

For the purposes of this assessment and in accordance with NHBC Standards Chapter 4.2, Building Near Trees, the CLAY soils across the site are classified as being of high volume change potential above CHALK of negligible volume change potential.

The results of saturation moisture content (SMC) testing indicate that in accordance with CIRIA C574, Engineering in Chalk, 2002, the chalk tested at depths of between 3.0m and 4.0m bgl are classified as being of predominantly low density and locally medium density.

11.4.2 Desiccation

Using the ratio of the moisture content (MC) to the liquid limit (LL) (an empirical indicator of desiccation, after Driscoll, 1983), the test results indicate that the CLAY strata beneath the site are potentially desiccated (MC:LL ratio 0.29-0.49).

Although the fine soils of the Lambeth Group are known to be overconsolidated, where a MC:LL ratio of <0.5 is considered typical, an assessment in accordance with BRE Digest 412 Desiccation in Clay Soils, 1996, including a number of material properties and shear strength profiles indicates that desiccation is expected to have occurred locally to depths of between 2.0m (WS1, WS2, WS7, WS9) and 4.0m (WS3) bgl.

Desiccated fine soils (silt and clay) result from moisture being withdrawn from the soil, typically by root action. Heave forces occur following the re-hydration of these soils, by swelling on account of increased moisture content.

Moisture content within fine soils can increase due to seasonal weather variations (rain) and also the removal of trees, whereby moisture is no longer being drawn from the soil by root action. The effect of heave is increased when trees are removed. The upward heave force can lift foundations causing structural damage (cracking of masonry, movement of door/window frames). Conversely during periods of dry weather, the moisture content reduces causing fine soils to shrink and the upward heave force to reduce; in such an event the foundation (re)settles. To remove the risk of continued and abnormal movement beneath the base of new foundations due to swelling and shrinking of fine soils the foundations should be placed beneath the desiccated zone.

Foundations should therefore be extended below the desiccated CLAY soils, up to 4.0m bgl, locally on piled foundations, and mitigation measures to prevent heave in the fine soils encountered across the site should be incorporated into the below ground construction.

The soil sampling and testing undertaken provides for a preliminary assessment only based on limited sampling and testing locations. To enable a comprehensive desiccation assessment, consideration should be given to additional soil sampling, in-situ testing and profiling and laboratory analysis including soil suction tests.

11.4.3 Design Parameters

Characteristic values for design parameters for the strata encountered beneath the site are included in Table 11.4.3 below.

Estimated critical state angles of shearing resistance (ϕ'_{crit}) of 23°, 30° and 35° are assumed for the CLAY, CHALK of weathering Grade Dc and Grade C/B, using Tables 2 and 4 of BS8002:1994 September 2001. Typical values of the angle of shearing resistance (ϕ') for various weathering grades of CHALK have also been determined using CIRIA C574.

Table 11.4.3: Design Parameters					
Strata	**Volume Change Potential**	**Unit Weight (kN/m³)**	**Critical State Angle of Shearing Resistance (ϕ'_{crit})**	**Typical Angle of Shearing Resistance (ϕ')**	**Worst Credible Angle of Shearing Resistance (ϕ')**
CLAY	High	17-19	23		
CHALK – Dc	Negligible	18-19	30	31	29
CHALK – C, B	Negligible	18-19	35	39	34

A characteristic value of undrained shear strength ($C_{U,K}$) of 60kN/m^2 has been assumed for the firm CLAY at the anticipated foundation level of 1.5m to 2.5m bgl. The characteristic value of undrained shear strength was derived using the results of the empirical relationships between C_U and the SPT N_{60} value (E_r=69%, N_{60}=11.5), plasticity index after Stroud M.A and the results of laboratory testing. (The Standard Penetration Test in Insensitive Clays and Soft Rocks, Proceedings of the European Symposium on Penetration Testing, 2, 367-376 (1975).

Please note that when using this data for design purposes, the effects of eccentric loading are taken into account, and that the bearing pressure is limited to account for maximum tolerable settlement beneath the structures and adjacent properties.

Geotechnical laboratory material property test results are presented within **Appendix V.**

11.5 TREE INFLUENCE ON FOUNDATIONS

When considering the influence of trees on foundations, the material properties of the strata beneath the site and the distance and species of the trees to the foundations are the determining factors.

For the purposes of this assessment the CLAY soils across the site are classified as being of high-volume change potential, and an adjustment to foundation depths in accordance with NHBC Standards Chapter 4.2, Building Near Trees, 2024 is therefore required.

A number of medium and high water demand trees and a cypresses screen were identified on the Site Survey drawing by Chiltern Surveys Ltd, supplied by the Client, that indicate that foundations beneath a number of the plots would be required to depths in excess of 2.5m bgl.

The depths should be confirmed, however in the interim and on the basis of the preliminary information, a piled foundations is expected to be required beneath the buildings in Plots 1, 2, 7, 8, 10, 11 and 17 in accordance NHBC Chapter 4.2.

Should the proposed development buildings be supported on piled foundations or extended into CHALK soils locally, no further adjustment to foundation depths is required.

Should roots or desiccated soils be encountered during the groundworks, and/or previously unidentified trees or tree stumps encountered during the site preparation works, foundations should be extended beneath the roots/desiccated soils and/or the depth adjusted to accommodate the species of tree/tree stump encountered. A record of the findings associated with roots, desiccated soils and trees/tree stumps should be kept during the groundworks phase.

Mitigation measures to prevent heave in the overlying CLAY soils encountered across the site should be incorporated into the below ground construction within the influence of trees. Mitigation measures to protect existing tree species during the construction process will also need to be considered.

Mitigation measures to prevent heave should extend to all aspects of in-ground construction, which may include services such as drainage and manholes.

11.6 FOUNDATION TYPE, DEPTH AND ALLOWABLE BEARING PRESSURE

11.6.1 Trench Fill/Strip Foundations

Should the depths of foundations, the adjustments in accordance with NHBC Standards and the requirements of temporary works be overcome, conventional shallow foundations in firm CLAY at the anticipated foundation formation depths of 1.5-2.5m bgl may be suitable for the majority of the proposed buildings. Due to the potential for desiccation and the influence of trees and a cypresses screen, foundations beneath the buildings in Plots 1, 2, 7, 8, 10, 11 and 17 are expected to require a piled foundation solution.

Using assumed maximum vertical characteristic actions of 115kN/m run (1.5-2.5m bgl) and Design Approach 1 of Eurocode 7 (checking for a limit state of rupture or excessive deformation), Combination 1 and Combination 2 are both satisfied where the vertical design actions (V_d) are less than the design value of the vertical bearing resistances (Rd) in each case. The GEO limit state requirement is therefore satisfied.

It is assumed that the action is vertical, and it is also assumed that the base of the foundations and the ground surface are horizontal. The vertical design actions include the trench fill foundations, assumed to be a maximum thickness of 2.5m, and also accounts for overburden.

The vertical characteristic action of **115kN/m run** corresponds to the bearing resistance in Table 11.6.1 of **115kN/m²** when applied to trench fill foundations 1.0m wide constructed on firm **CLAY** at depths of 1.5m to 2.5m bgl, for the majority of the proposed development buildings. The serviceability state is satisfied with the total settlement being restricted to **25mm**.

Table 11.6.1: Bearing Resistance				
Plot Location /Strata Type	**Depth BGL (m)**	**Footing Width (m)**	**Bearing Resistance (kN/m²)**	**Comment**
Plots 3, 4 Firm CLAY	2.0	1.0	115	Extend foundations beneath desiccated soils to 2.0m bgl.
Plots 5, 6, 12 to 16 Firm CLAY	1.5			Extend foundations beneath softened soils to 2.0m bgl.
Plot 9 Firm CLAY	2.1			Foundations extended to approximately 2.1m bgl due to adjacent trees in accordance with NHBC Chapter 4.2.
Plots 1, 2, 7, 8, 10, 11, 17	Expected to require a piled foundation solution, since foundation adjustment to depths of between 2.4m and 4.0m bgl due to adjacent trees and a cypresses screen in accordance with NHBC Chapter 4.2, and potential for desiccation to have occurred.			
Consider high volume change potential soils and adjustments to foundation depths in accordance with NHBC Chapter 4.2. No further adjustment required should foundations be extended into CHALK soils locally.				
An assessment should be made regarding the likely height of any pollarded or maintained species of trees and hedges/screens should the respective species have been allowed to grow to their full potential, and any tree stumps identified.				
Consider temporary works due to potentially spalling soils. The total settlement beneath trench fill foundations 1.0m wide is anticipated to be less than 25mm for the soils encountered. Please note that increasing foundation widths to accommodate increased line loads will result in an increase in the total settlement anticipated. Include mitigation measures to accommodate differential movement between foundations spanning firm CLAY and CHALK soils.				

Notwithstanding the above it is recommended that the formation beneath each section of the proposed re-development works is inspected to assess the competency of the bearing strata prior to pouring of foundation concrete. The formation should not be allowed to soften due to surface water, rainwater or groundwater ingress prior to pouring of foundation concrete.

It should be noted that the design actions and design layout/dimensions of the proposed works have not been supplied and the above bearing resistance accounts for conventional construction only.

The moments resulting in eccentricity of loadings, and the settlement, sliding and overturning and the requirements for propping would need to be considered in the design of any retaining structures.

It should also be noted that the above recommendations have been made using data in window sample boreholes completed.

11.6.2 Piled Foundations

Should the issues of the required bearing resistance, temporary works or foundation depths due to trees, the cypresses screen or desiccation be deemed uneconomical for conventional construction, a piled foundation solution may be required.

The advice of a piling specialist should be sought to determine the working loads of their proprietary piling technique when considering the ground and groundwater conditions encountered beneath the site, and the health and safety implications of working within the confines of the site and adjacent neighbouring properties.

Consideration should be given to undertaking additional ground investigation work such as cable and percussion drilling to a depth suitable to enable piled foundation design.

11.6.3 Floor Slabs and Heave

Due to the potential for desiccation to have occurred, it is recommended that the ground floor slabs beneath the proposed development buildings are suspended on ground beams.

Mitigation measures to prevent heave in the overlying fine soils encountered should also be incorporated into the below ground construction within the influence of trees.

Mitigation measures to prevent heave should extend to all aspects of in-ground construction, which may include services such as drainage and manholes.

11.7 CONCRETE CLASSIFICATION

In accordance with Building Research Establishment (BRE) Special Digest 1: 2005 - Concrete in Aggressive Ground, the following laboratory test data has been used to derive classifications for shallow buried concrete (Table C1, natural ground locations) beneath the site:

- Soluble Sulphate (2:1 extract) – 0.0061 to 0.828g/l
- pH – 7.5 to 10.3
- Total Sulphate SO_4 – 0.014 – 0.6%
- Total Sulphur – 0.0051 – 0.28%
- Total Potential Sulphate – 0.0153 – 0.84%
- Oxidisable Sulphide < 0.3% to 0.451%

"*BRE guidance suggests that 'if significant number of determination of oxidisable sulphides is above 0.3%, then use the results of total potential sulphate to determine the concrete class*".

Oxidisable sulphide has been calculated above 0.3% SO_4 in the Made Ground sample tested from HP1 at 0.2m bgl in the east of the site and exceeds the threshold where the concrete classification is based on oxidisable sulphide and total potential sulphate.

Based on the results obtained for soluble sulphate and oxidisable sulphide and total potential sulphate, the Design Sulphate (DS) Class for buried concrete beneath the site is DS-2. Assuming Foundations are constructed above the groundwater, the Aggressive Chemical Environment for Concrete (ACEC) Class is AC-1s.

It should be noted that additional considerations for the determination of concrete class and appropriate aggregate use are set out in BRE Special Digest 1. These are considerations specific to the soil type, the proposed development and the type of concrete foundations to be used at the site.

Laboratory results for the pH, sulphate and sulphur testing are included within **Appendix IV**.

11.8 PAVEMENT DESIGN

The results of DCP/TRL testing indicate that CBR values 'bottom out' at around 1.2% to 6.1%, once the probe had penetrated the overlying soils.

Due to the potential for desiccation to have artificially increased the CBR values, consideration should be given to adopting an estimated CBR value of 3% and 4% may be appropriate for thin and thick construction respectively for 'silty clay' (PI 30%) in accordance with Design Guidance for Road Pavement Foundations IAN 73 06 HD25[rev1] 2009.

Any soft spots should be removed and replaced with suitably compacted materials to grade, and elsewhere the road pavement formation should be scarified and proof rolled.

11.9 SOAKAWAY DRAINAGE

The overlying Clay soils are unlikely to be suitable for soakaway drainage and an alternative method of surface water disposal should be sought.

12.0 CONCLUSIONS AND RECOMMENDATIONS

This tier 1 PRA desk study and Site Investigation including tier 2 GQRA has provided an assessment of the site's history, geo-environmental setting and an evaluation of ground conditions.

12.1 ENVIRONMENTAL

Table 12.1 summarises the pertinent environmental risks providing advice on further works and assessment.

Table 12.1: Environment Risk Summary

Medium	Item	Risk Description	Comments/Recommendations
Soils	1	PAH soil contamination within the Made Ground of the existing road plainings yard area which is considered to present a risk to human health if left in-situ within proposed garden areas/soft landscaping.	Remediation via the removal of road plainings (PAH source) and installation of a clean cover system to private gardens and soft landscaping. Prepare Discovery Strategy, Remediation Action Plan and Verification Plan.
	2	Potential for undiscovered soil contamination beneath hardstanding following removal of floor slabs and during groundworks excavations.	Prepared a Discovery Strategy enable management of any events of contamination discovery.
	3	Any imported Topsoil should be chemically suitable for use in private gardens.	Import suitable Topsoil (BS3882) to sustain planting.
	4	Ensure material encountered is suitable for desired water main.	Consult local water authority prior to water main installation.
Ground Gas	n/a	Preliminary risk assessment and gas monitoring has determined very low risk from ground gas. Two rounds of monitoring have been completed which has determined acceptable gaseous concentrations and GSVs. A CS1 has been determined and ground gas protection is not considered necessary.	
Radon	n/a	Information from the Envirocheck report (using data supplied by the BGS) indicates that 'The property is in a Lower probability radon area (less than 1% of homes are estimated to be at or above the Action Level)', and that 'The property is included in a 'lower probability radon area' (less than 1% of homes are estimated to be at or above the Action Level)'. No protective measures are considered necessary in the construction of new dwellings or extensions, according to the British Geological Survey. The information can be verified through checking on the interactive radon map for Great Britain provided by the UK Health Security Agency (UKHSA) and the British Geological Survey (BGS). The HSA website (ukradon.org) can be used to purchase radon reports, where an address-specific radon report may be obtained. It should however be noted that for redevelopment sites, a GeoReport provided by the British Geological Survey may be more appropriate.	
Groundwater	n/a	Ground conditions are not considered to present a notable risk to groundwater or controlled waters.	

Once the above risks have been evaluated/implemented the environmental risk assessment can be

considered complete and the development suitable for occupancy.

12.2 GROUND HAZARDS SUMMARY

This report and the Clients preferred foundation solution should be presented to the Local Authority or appropriate build warranty provider for approval prior to construction.

Table 12.2 summarises the pertinent Ground Hazards Summary.

Table 12.2: Ground Hazards Summary

Construction Issue	Ground Hazard	Recommendation
Below Ground Obstructions	Foundations and made ground should be anticipated at shallow depth from the historical development of the site.	Shallow obstructions likely to be removed with conventional excavation plant and hydraulic breaking equipment.
Foundations	Potentially desiccated soils noted to depths of between 2.0m and 4.0m bgl (WS1, WS2, WS3, WS7, WS9). Conventional shallow foundations at anticipated formation level of circa 1.5-2.5m bgl in firm CLAY are subject to adequate bearing resistance, further increased adjustments to foundation depths due to the influence of trees in accordance with NHBC Chapter 4.2, and the requirements of temporary works. Shallow excavations in fine soils during dry conditions may be stable in the short term, however instability may be expected to occur due to spalling. Perched water noted locally at 4.74m bgl during monitoring in June 2025.	Piled foundations solution expected to be required beneath the buildings in Plots 1, 2, 7, 8, 10, 11, 17 due to the influence of trees, cypresses screen and potential desiccation. Bearing resistance of 115kN/m^2 may be acceptable for trench fill foundations at depths of 1.5m to 2.5m bgl elsewhere, in firm CLAY, subject to design requirements. Dewatering not expected to be required. Excavations stability in CLAY soils subject to spalling. CLAY soils determined as high volume change potential (NHBC Chapter 4.2, Building Near Trees).
Floor Slabs and Heave	Suspended	Heave protection required in clay soils within the influence of trees. Mitigation measures to prevent heave should extend to all aspects of in-ground construction, which may include services such as drainage and manholes.
Buried Concrete	Slightly aggressive ground conditions encountered.	Concrete classification determined as DS-2, AC-1s.
Pavements	DCP/TRL CBR testing complete.	Consider CBR value of 3% and 4% for thin and thick construction respectively for 'silty clay' (PI 30%) (IAN 73 06 HD25[rev1] 2009).
Drainage	Shallow soakaways unlikely to be effective given predominantly Clay bound strata.	Consider alternative to soakaway drainage.

Table 12.2: Ground Hazards Summary		
Construction Issue	**Ground Hazard**	**Recommendation**
Abnormals	A piled foundation solution is expected to be required locally.	Consider additional ground investigation such as cable and percussion drilling to enable piled foundation design.

13.0 PROJECT INSTRUCTION AND LIMITATIONS

13.1 SCOPE OF WORKS

The following scope of work was undertaken to an agreed brief set out in Aviron's proposal and involves the following:

- Undertake one day of window sample boreholes to depths of up to 5.0m bgl, including SPTs at 1m intervals.
- Install three of the boreholes with monitoring pipe to enable return gas and groundwater readings.
- Hand trial pitting to enable a visual assessment of soils at relatively shallow depth and to enable soil targeted soil sampling to enhance the human health risk assessment.
- Log the strata within each exploratory hole noting any water strikes.
- Collect disturbed soil samples from exploratory holes and submit for geochemical laboratory tests to determine the presence or absence of soil contaminants, and geotechnical material property tests to enable foundation recommendations and allow roadway and drainage design.
- All soil samples shall be collected in accordance with the instruction and ground conditions and submitted to UKAS/MCERTS accredited laboratories for testing.
- Prepare an interpretative GERA report to interpret ground conditions with respect to potential environmental risks and provide recommendations for foundation design and engineering parameters.

Aviron has relied upon information received from the Client and their agents as accurate, unless contradicted by written documentation or site observations.

13.2 PUBLISHED GUIDANCE

This report follows the technical approach presented on Land contamination risk management (LCRM), accessed on gov.uk website. The guidance replaced the Contaminated Land Report 11 (CLR11) "Model Procedures for the Management of Land Contamination" prepared by the Environment Agency in 2004. CLR11, which was withdrawn in 2020, provided guidance on the application of management processes when assessing potentially contaminated land.

This project and report have been designed to fulfil the information requirements set out in LCRM.

This report is additionally prepared in accordance with current guidance notes, standards and practices as set out by the Environment Agency and statutory organisations in order to establish potential and significant contaminant linkages as defined in Part IIA of the Environmental Protection Act 1990.

13.3 LIMITATIONS

Aviron's scope of work has been designed to meet the timeframe and as such it may follow that further work would be prudent upon evaluation of the ground conditions. The scope of work provided shall provide a view of site conditions and understanding of potential geo-environmental risks and possible mitigation procedures.

The information used in this report has been derived from the site investigation, which in turn were based on known current and historical land uses identified at the site and surrounding area, available to Aviron at the time of the investigation.

Intrusive points chosen relate to the data collected and the risk assessment and recommendations will rely on these points only. It therefore follows that some areas of the site will not be examined. It is always possible that some areas not investigated may contain conditions which would be impossible to determine due to lack of evidence or time and budget restrictions.

This report provides recommendations for foundation design based upon the ground conditions encountered and where possible makes predictions for possible variations in ground conditions. However, it is always possible that not all variations in ground conditions can be accounted for and shall also be dependent upon design loadings and foundation construction techniques used. It should be acknowledged that ground conditions may vary from intrusive point to intrusive point and without undertaking continuous investigation it is impossible to entirely understand variations in ground conditions. Our recommendations should therefore not supersede the project's Consulting Structural and Civil Engineers design.

This report comprises a Ground Investigation Report in accordance with BS EN 1997-2, unless otherwise stated. This report does not constitute a Geotechnical Design Report (BS EN 1997-2) and geotechnical recommendations in this report are for guidance only.

In accordance with the BS EN 1998-1:2004+A1:2013 'Eurocode 8: Design of Structures for Earthquake Resistance – Part 1', the UK is located in an area of very low seismicity, and seismic loading need not be considered.

Unless otherwise stated, a preliminary or detailed risk assessment of unexploded ordnance (UXO) is outside the scope of this report.

Also, unless otherwise stated, an assessment of invasive species such as Japanese Knotweed and Himalayan Balsam is outside the scope of this report.

Should changes in legislation, statutory requirements or industry practices occurred following issue of this report, this report should be viewed in light of these changes.

Should a notable time period elapse between the date issue of this report and the date of application of this report changes to site dynamics may occur and in particular the site inspection notes may no longer be applicable should any change of use occur to the site in the interim.

14.0 REFERENCES AND OTHER SOURCES OF INFORMATION

Landmark Envirocheck database search report package reference 376682315 dated 14 May 2025

British Geological Survey Website. www.bgs.ac.uk

BRE Special Digest 1:2005. Concrete in Aggressive Ground

BRE D412. Desiccation in Clay Soils. 1996

BS1377-1:2016 Methods of test for soils for civil engineering purposes - General requirements and sample preparation

BS5930:2015+A1:2020. British Standards Institute. Code of Practice for Ground Investigations

BS8004:2015+A1:2020. British Standards Institute. Code of Practice for Foundations

BS10175:2011+A2:2017. British Standards Institute. Investigation of Potentially Contaminated Land - Code of Practice

BS EN ISO 14688-1:2018 Geotechnical investigation and testing – Identification and Classification of Soil – Identification and Description

BS EN ISO 14688-2:2018 Geotechnical investigation and testing – Identification and Classification of Soil – Principles for a Classification

BS EN ISO 17892 – Parts 1-12 Geotechnical investigation and testing. Laboratory testing of soil

BS EN ISO 22475-1:2021 Geotechnical investigation and testing - Sampling Methods and Groundwater Measurements

BS EN ISO 22476-3:2005+A1:2011 Standard Penetration Test

BS EN 1997-1.2004+A1:2013 Eurocode 7 Geotechnical Design Part 1 General Rules

BS EN 1997-2.2007 Eurocode 7 Geotechnical Design Part 2 Ground Investigation and Testing

NA+A2 to BS NA+A1:2014 to EN 1997-1.2004+A1:2013 UK National Annex to Eurocode 7 Geotechnical Design - General Rules

NA to BS EN 1997-2.2007 UK National Annex to Eurocode 7 Geotechnical Design - Ground Investigation and Testing

BS 8485:2015 Code of Practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings

CIRIA C574 'Engineering in Chalk' 2002

CIRIA Report C665 'Assessing risks posed by hazardous ground gases to buildings' 2007

DEFRA and Environment Agency, 2004. Model Procedures for the Management of Land Contamination, Contaminated Land Report 11

Environment Agency Website: www.environment-agency.gov.uk

Jardine, Maswose, Burland. 1985. Field and Laboratory Measurements of Soil Stiffness. Proceedings of the 11th International Conference on Soil Mechanics and Foundation Engineering, San Francisco

London District Surveyors Association, 2017, Guidance Notes for the Design of Straight Shafted Bored Piles in London Clay

LQM/CIEH: Paul Nathanail, Caroline McCaffrey, Andy Gillett, Richard Ogden and Judith Nathanail. 2014. The LQM/CIEH S4ULs for Human Health Risk Assessment. Land Quality Press, Nottingham. ISBN 978-0-9931084-0-2. "Copyright Land Quality Management Limited reproduced with permission; Publication number S4UL3275. All rights reserved"

NHBC (2017). National House Building Council Standards. Chapter 4

NHBC Guidance on Methane and Carbon Dioxide 2007 (Boyle and Witherington, 2007)

Peck, Hanson and Thornburn. Foundation Engineering. 1967

Somerville, S. H., Control of groundwater for temporary works, CIRIA Report 113 (1986).

SP1010 - Development of Category 4 Screening Levels for Land Affected by Contamination. Final Project Report (Revision 2). Contaminated Land: Applications In Real Environmental (CL:AIRE). September 2014

SR2: Human health toxicological assessment of contaminants in soil, Science Report SC050021/SR2, Environment Agency, August 2008

SR7: Compilation of Data for Priority Organic Pollutants for Derivation of Soil Guideline Values, Science Report SC050021/SR7, Environment Agency, November 2008

Stroud M A 1974. The Standard Penetration Test in Insensitive Clays and soft Rocks – Proc. ESOPTI 2(2) : 367-375

Stroud M 1988. The Standard Penetration Test - Its Application and Interpretation, ICE Geotechnical Conference on Penetration Testing in the UK

Vesic. 1973. Analysis of Ultimate Loads of Shallow Foundations

Figures

Legend

Approximate Site Boundary

Notes

Figure 1

Drawing Title

Site Location Plan

Project Number	24-304.01
Project Title	Ladds Garden Village, Bath Road, Hare Hatch, RG10 9SB
Drawn by	OB
Checked by	JB
Scale	NTS

Aviron Associates Limited - Badgemore House - Gravel Hill - Henley on Thames - RG9 4NR - T: 01491 413 722 - M: 07787 771 686 - E: james@aviron.co.uk

Legend

Approximate Site Boundary

Photo Direction

Notes

Figure 2

Drawing Title

Existing Site Layout Plan

Project Number	24-304.01
Project Title	Ladds Garden Village, Bath Road, Hare Hatch, RG10 9SB
Drawn by	OB
Checked by	JB
Scale	NTS

Aviron Associates Limited - Badgemore House - Gravel Hill - Henley on Thames - RG9 4NR - T: 01491 413 722 - M: 07787 771 686 - E: james@aviron.co.uk

Photo 1

Photo 2

Photo 3

Photo 4

Photo 5

Photo 6

Photo 7

Photo 8

Photo 9

Legend

Notes

Figure 3

Drawing Title

Site Photographs

Project Number	24-304.01
Project Title	Ladds Garden Centre, Bath Road, Hare Hatch, RG10 9SB
Drawn by	OB
Checked by	JB
Scale	NTS

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Legend

Approximate Site Boundary

Notes

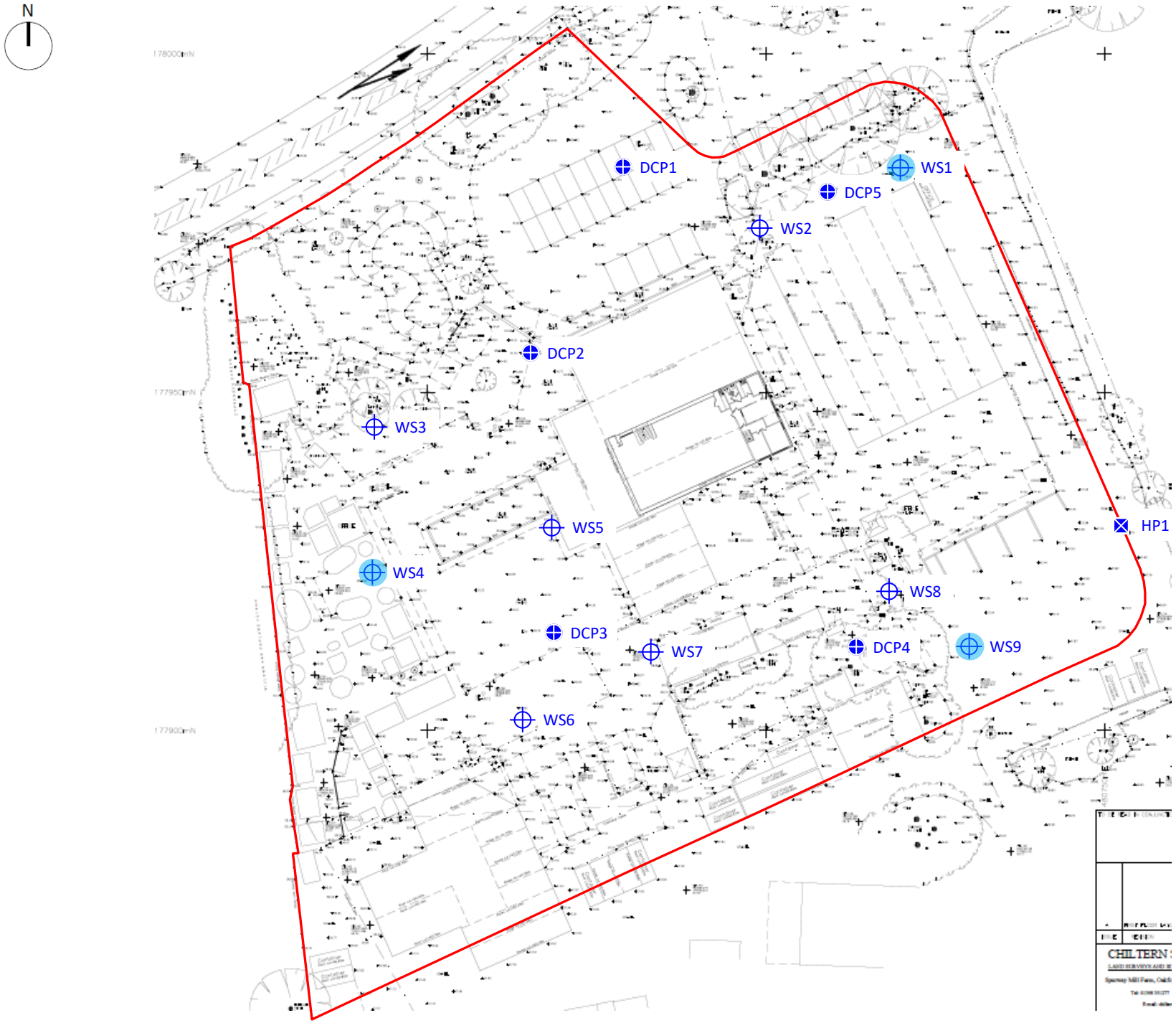
Figure 4

Drawing Title

Proposed Development Plan

Project Number	24-304.01
Project Title	Ladds Garden Centre, Bath Road, Hare Hatch, RG10 9SB
Drawn by	OB
Checked by	JB
Scale	NTS

Aviron Associates Limited - Badgemore House - Gravel Hill - Henley on Thames - RG9 4NR - T: 01491 413 722 - M: 07787 771 686 - E: james@aviron.co.uk



Legend

- Window Sample Location
- Monitoring Well
- Hand Trial Hole
- CBR by DCP

Notes

Figure 5

Drawing Title

Exploratory Hole Location Plan - Existing Layout

Project Number	24-304.01
Project Title	Ladds Garden Village, Bath Road, Hare Hatch, RG10 9SB
Drawn by	OB
Checked by	JB
Scale	NTS

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Legend

- Window Sample Location
- Monitoring Well
- Hand Trial Hole
- CBR by DCP

Notes

Figure 6

Drawing Title

Exploratory Hole Location Plan - Proposed Development

Project Number	24-304.01
Project Title	Ladds Garden Village, Bath Road, Hare Hatch, RG10 9SB
Drawn by	OB
Checked by	JB
Scale	NTS

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Legend

- Window Sample Location
- Hand Trial Hole
- CBR by DCP
- 'Contaminated' Location
- 'Uncontaminated' Location

Notes

TS = Topsoil. **MG** = Made Ground.
Where positions are not highlighted red or green, these have not been tested.

Figure 7

Drawing Title

Made Ground/Topsoil Contamination Plan
Proposed Development

Project Number	24-304.01
Project Title	Ladds Garden Village, Bath Road, Hare Hatch, RG10 9SB
Drawn by	OB
Checked by	JB
Scale	NTS

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Appendices

I Envirocheck Database Reports

II Exploratory Hole Logs and Photographs

III Field Monitoring Results

IV Soil Contamination Results and Assessment Criteria

V Soil Geotechnical Results

Appendix

I Envirocheck Database Reports

Appendix

II Exploratory Hole Logs and Photographs

WINDOW SAMPLE LOG

Site:		Project No.	Borehole:
Ladds Garden Village, Bath Road, Hare Hatch, RG10 9SB		24-304.01	WS1
Client:	**Start:**	**End:**	**Sheet:**
Westbourne Homes Limited	22/05/2025	22/05/2025	1 of 1
Method/Plant Used:	**Co-ordinates:**	**Ground Level:**	
Archway Dart (DO)	NT	NT	

Description of Strata	Legend	Depth (m bgl) (thickness)	Well Cnstr.	Samples/Tests Depth	No	Type	SPT Results 75mm	75mm	75mm	75mm	75mm	75mm	N' Value	Notes
Dark brown, sandy, clayey TOPSOIL. Roots to 0.2m.		(0.5) 0.5		0.3	1	ES								
Firm becoming stiff, dark brown, occasionally white, silty, sandy, gravelly CLAY. Gravel is fine to medium, subrounded to subangular of flint. Contains occasional coarse gravel sized flints. (LAMBETH GROUP)		(2.0) 2.5		1.0		SPT	2	2	2	3	2	2	9	
				2.0	2	D/SPT	5	4	5	4	4	5	18	
Structureless CHALK composed of sandy silty sub-angular to rounded GRAVEL. Clasts are very weak and weak, low density, white, off-white and cream with occasional black specks. Matrix is light brown, brown. Occasional medium and coarse gravel sized flints. Grade Dc. (SEAFORD CHALK FORMATION AND NEWHAVEN CHALK FORMATION)		(2.5) 5.0		3.0	3	D/SPT	2	2	2	2	3	3	10	
				4.0	4	D/SPT	2	2	2	3	2	2	9	
				5.0	5	D/SPT	3	4	4	5	5	6	20	

Casing record			Chiselling records			Water level observations (depths in metres below gl)					
Date	Diameter (mm)	Depth (m)	Time	From (m)	To (m)	Date	Water strike	Water level (after 20mins)	Flow	Standing level	Remarks
22/05/2025	100	1.00				22/05/2025	Dry	-	-	-	

Remarks	By	
Roots to 0.2m. No groundwater encountered in borehole. No visual or olfactory evidence of contamination. Borehole backfilled with arisings. SPT: Standard Penetration Test, HP: Hand Penetrometer, B: Bulk Sample, D: Disturbed Sample	Logged	OC
	Checked	OB
	Scale	01:25

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WINDOW SAMPLE LOG

Site:		Project No.	Borehole:
Ladds Garden Village, Bath Road, Hare Hatch, RG10 9SB		24-304.01	WS2
Client:	**Start:**	**End:**	**Sheet:**
Westbourne Homes Limited	22/05/2025	22/05/2025	1 of 1
Method/Plant Used:	**Co-ordinates:**	**Ground Level:**	
Archway Dart (DO)	NT	NT	

Description of Strata	Legend	Depth (m bgl) *(thickness)*	Well Cnstr.	Samples/Tests			SPT Results						N' Value	Notes
				Depth	No	Type	75mm	75mm	75mm	75mm	75mm	75mm		
Dark brown, sandy, clayey TOPSOIL. Roots to 0.2m.		*(0.4)* **0.4**		0.3	1	ES								
Stiff, dark brown, silty, sandy, gravelly CLAY. Gravel is fine to medium, subrounded to subangular of flint. Contains occasional coarse gravel sized flints. (LAMBETH GROUP)		*(0.5)* **0.9**												
Firm, light brown, silty, sandy, gravelly CLAY. Gravel is fine to coarse, subrounded to subangular of flint. Contains occasional coarse gravel sized flints. (LAMBETH GROUP)		*(1.1)* **2.0**		1.0	2	D/SPT	1	2	1	3	4	3	11	
				2.0	3	D/SPT	4	3	4	4	2	3	13	
Firm, brown, silty, sandy, gravelly CLAY. Gravel is fine to coarse, subangular to angular of flint. Contains occasional coarse gravel sized flints. (LAMBETH GROUP)		*(0.2)* **2.2**												
Structureless CHALK composed of sandy silty sub-angular to rounded GRAVEL. Clasts are very weak and weak, low density, white, off-white and cream with occasional black specks. Matrix is brown. Occasional pockets of firm off-white and cream SILT. Occasional coarse gravel sized flints. Grade Dc, locally Dm. (SEAFORD CHALK FORMATION AND NEWHAVEN CHALK FORMATION)		*(2.8)*		3.0			1	1	1	2	1	3	7	
				4.0	4	D/SPT	2	2	2	3	3	3	11	
		5.0		5.0	5	D/SPT	3	4	4	4	5	6	19	

Casing record			Chiselling records			Water level observations (depths in metres below gl)					
Date	Diameter (mm)	Depth (m)	Time	From (m)	To (m)	Date	Water strike	Water level (after 20mins)	Flow	Standing level	Remarks
22/05/2025	100	1.00				22/05/2025	Dry	-	-	-	

Remarks	By	
Roots to 0.2m. No groundwater encountered in borehole. No visual or olfactory evidence of contamination. Borehole backfilled with arisings. SPT: Standard Penetration Test, HP: Hand Penetrometer, B: Bulk Sample, D: Disturbed Sample	Logged	OC
	Checked	OB
		Scale 01:25

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WINDOW SAMPLE LOG

Site:		Project No.	Borehole:
Ladds Garden Village, Bath Road, Hare Hatch, RG10 9SB		24-304.01	WS3
Client:	Start:	End:	Sheet:
Westbourne Homes Limited	22/05/2025	22/05/2025	1 of 1
Method/Plant Used:	Co-ordinates:	Ground Level:	
Archway Dart (DO)	NT	NT	

Description of Strata	Legend	Depth (m bgl) (thickness)	Well Cnstr.	Samples/Tests Depth	No	Type	SPT Results 75mm	75mm	75mm	75mm	75mm	75mm	N' Value	Notes
Grass covered, dark brown, sandy, clayey reworked TOPSOIL. Roots to 0.2m.		(0.2) 0.2												
Dark brown, white, grey, clayey, very gravelly, SAND. Gravel is fine to medium, subrounded to subangular of flint. (MADE GROUND)		(0.3) 0.5												
Firm, brown, silty, sandy, gravelly CLAY. Gravel is fine to medium, subrounded of flint. (LAMBETH GROUP)		(0.5) 1.0		0.6	1	ES								
				1.0	2	D/SPT	1	2	1	2	2	3	8	
Firm, brown, black, silty, sandy, gravelly CLAY. Gravel is fine to medium, subrounded of flint. (LAMBETH GROUP)		(0.5) 1.5												
Firm, dark brown, silty, sandy, gravelly CLAY. Gravel is fine to medium, subrounded of flint. (LAMBETH GROUP)		(0.5) 2.0		2.0	3	D/SPT	2	2	2	3	3	3	11	
Firm, light brown, silty, sandy, gravelly CLAY. Gravel is fine to medium, subrounded of flint. (LAMBETH GROUP)		(1.0) 3.0		3.0	4	D/SPT	4	5	4	5	5	6	20	
Stiff, light brown, silty, sandy, gravelly CLAY. Gravel is fine to coarse, subrounded to subangular of flint. (LAMBETH GROUP)		(1.0) 4.0		4.0	5.0	D/SPT	4	6	6	6	7	8	27	

Casing record			Chiselling records			Water level observations (depths in metres below gl)					
Date	Diameter (mm)	Depth (m)	Time	From (m)	To (m)	Date	Water strike	Water level (after 20mins)	Flow	Standing level	Remarks
22/05/2025	100	1.00				22/05/2025	Dry	-	-	-	

Remarks		By
Roots to 0.2m. No groundwater encountered in borehole. No visual or olfactory evidence of contamination. Borehole backfilled with arisings. SPT: Standard Penetration Test, HP: Hand Penetrometer, B: Bulk Sample, D: Disturbed Sample	Logged	OC
	Checked	OB
		Scale 01:25

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WINDOW SAMPLE LOG

Site:		Project No.	Borehole:
Ladds Garden Village, Bath Road, Hare Hatch, RG10 9SB		24-304.01	WS4
Client:	Start:	End:	Sheet:
Westbourne Homes Limited	22/05/2025	22/05/2025	1 of 1
Method/Plant Used:	Co-ordinates:	Ground Level:	
Archway Dart (DO)	NT	NT	

Description of Strata	Legend	Depth (m bgl) (thickness)	Well Cnstr.	Samples/Tests			SPT Results						N' Value	Notes
				Depth	No	Type	75mm	75mm	75mm	75mm	75mm	75mm		
Grass covered, firm, dark brown, grey, silty, sandy, very gravelly CLAY. Gravel is fine to coarse, rounded to angular of flint. Contains brick and concrete fragments. Roots to 0.2m. (MADE GROUND)		(1.1)		0.6	1	ES								
				1.0		SPT	1	1	1	2	2	2	7	
		1.1												
Soft to firm, brown, grey, silty, sandy, gravelly CLAY. Gravel is fine, subroundded to rounded of flint. (LAMBETH GROUP)		(0.4)												
		1.5												
Firm, light brown, lamminated, silty, sandy, gravelly CLAY. Gravel is fine, subrounded of flint. (LAMBETH GROUP)		(0.5)												
		2.0		2.0	2	D/SPT	2	3	5	4	5	6	20	
Stiff, dark brown, silty, very sandy, occasionally gravelly CLAY. Gravel is fine rounded of flint. (LAMBETH GROUP)		(0.4)												
		2.4												
Firm to stiff, dark brown, silty, very sandy, very gravelly CLAY. Gravel is fine to coarse, rounded to angular of flint. (LAMBETH GROUP)		(0.3)		3.5	3	D								
		2.7												
Very weak and weak, low density, white with frequent black specks CHALK. Fractures very closely spaced (10/30/50), infilled (2/10/20) with orange brown comminuted chalk. Grade C. (SEAFORD CHALK FORMATION AND NEWHAVEN CHALK FORMATION)		(0.5)		3.0	4	D/SPT	7	7	7	7	7	8	29	
		3.2												
Weak, white, unstained CHALK. Fractures closely spaced (50/90/150), clean or infilled (0/1/3) with white comminuted chalk, with slight orange brown staining. Grade B. (SEAFORD CHALK FORMATION AND NEWHAVEN CHALK FORMATION)		(0.8)												
		4.0		4.0	5	D/SPT	4	4	5	6	6	7	24	

Casing record

Date	Diameter (mm)	Depth (m)
22/05/2025	100	1.00

Chiselling records

Time	From (m)	To (m)

Water level observations (depths in metres below gl)

Date	Water strike	Water level (after 20mins)	Flow	Standing level	Remarks
22/05/2025	Dry	-	-	-	

Remarks

Roots to 0.2m.
No groundwater encountered in borehole.
No visual or olfactory evidence of contamination.
Borehole backfilled with arisings.

SPT: Standard Penetration Test, HP: Hand Penetrometer, B: Bulk Sample, D: Disturbed Sample

	By	
Logged	OC	
Checked	OB	Scale 01:25

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WINDOW SAMPLE LOG

Site:		Project No.	Borehole:
Ladds Garden Village, Bath Road, Hare Hatch, RG10 9SB		24-304.01	WS5
Client:	**Start:**	**End:**	**Sheet:**
Westbourne Homes Limited	22/05/2025	22/05/2025	1 of 1
Method/Plant Used:	**Co-ordinates:**	**Ground Level:**	
Archway Dart (DO)	NT	NT	

Description of Strata	Legend	Depth (m bgl) *(thickness)*	Well Cnstr.	Samples/Tests			SPT Results						N' Value	Notes
				Depth	No	Type	75mm	75mm	75mm	75mm	75mm	75mm		
Dark brown, white, grey, clayey, very gravelly, SAND. Gravel is fine to coarse, rounded to angular of flint and brick. (MADE GROUND)		*(0.5)* **0.5**		0.5	1	ES								
Firm, dark brown, slightly grey, locally black, silty, sandy, very gravelly CLAY. Gravel is fine to medium, subrounded to rounded of flint. (LAMBETH GROUP)		*(0.5)* **1.0**		1.0	1	D/SPT	1	1	2	1	2	2	7	
Soft becoming firm, brown, greenish grey, silty, sandy, occasionally gravelly CLAY. Gravel is fine, rounded of flint. (LAMBETH GROUP)		*(1.1)* **2.1**		2.0	2	D/SPT	2	3	2	3	3	4	12	
Firm to stiff, orange, brown, grey, silty, sandy, occasionally gravelly CLAY. Gravel is fine, rounded of flint. (LAMBETH GROUP)		*(0.7)* **2.8**												
Brown, locally orange brown silty, gravelly, very clayey SAND. Gravel is fine, rounded of flint. (LAMBETH GROUP)		*(0.2)* **3.0**		3.0		SPT	13	12	9	8	7	6	30	
Stiff, dark brown, silty, very sandy, very gravelly CLAY. Gravel is fine to coarse, subrounded to angular of flint. (LAMBETH GROUP)		*(0.3)* **3.3**		3.2	3	D								
Weak, white with frequent black specks CHALK. Fractures very closely spaced (10/20/30), infilled (2/5/10) with light orange brown comminuted chalk. Grade C. (SEAFORD CHALK FORMATION AND NEWHAVEN CHALK FORMATION)		*(0.5)* **3.8**												
Weak, medium density, white, unstained CHALK. Fractures closely spaced (40/80/120), clean or infilled (0/2/5) with white comminuted chalk, with orange brown staining. Occasional coarse gravel sized flints. Grade B. (SEAFORD CHALK FORMATION AND NEWHAVEN CHALK FORMATION)		*(0.2)* **4.0**		4.0	4	D/SPT	6	5	5	8	7	10	30	

Casing record

Date	Diameter (mm)	Depth (m)
22/05/2025	100	1.00

Chiselling records

Time	From (m)	To (m)

Water level observations (depths in metres below gl)

Date	Water strike	Water level (after 20mins)	Flow	Standing level	Remarks
22/05/2025	Dry	-	-	-	

Remarks

No roots found in borehole.
No groundwater encountered in borehole.
No visual or olfactory evidence of contamination.
Borehole backfilled with arisings.

SPT: Standard Penetration Test, HP: Hand Penetrometer, B: Bulk Sample, D: Disturbed Sample

	By
Logged	OC
Checked	OB

Scale 01:25

Aviron Associates Limited - Badgemore House || Badgemore Park || Gravel Hill || Henley on Thames || RG9 4NR - T:01491 413 722 - M: 07787771686 -E:james@aviron.co.uk

WINDOW SAMPLE LOG

Site:		Project No.	Borehole:
Ladds Garden Village, Bath Road, Hare Hatch, RG10 9SB		24-304.01	WS6
Client:	**Start:**	**End:**	**Sheet:**
Westbourne Homes Limited	22/05/2025	22/05/2025	1 of 1
Method/Plant Used:	**Co-ordinates:**	**Ground Level:**	
Archway Dart (DO)	NT	NT	

Description of Strata	Legend	Depth (m bgl) *(thickness)*	Well Cnstr.	Samples/Tests			SPT Results						N' Value	Notes
				Depth	No	Type	75mm	75mm	75mm	75mm	75mm	75mm		
Firm, dark brown, black, silty, very sandy, very clayey reworked TOPSOIL with occasional brick and concrete fragments. (MADE GROUND)		*(0.5)* **0.5**		0.4	1	ES								
Firm, brown, silty, sandy, gravelly CLAY. Gravel is fine, subrounded of flint. (LAMBETH GROUP)		*(0.5)* **1.0**		1.0	2	ES/SPT	1	1	1	2	3	2	8	
Soft to firm, grey, brown, silty, gravelly, very clayey SAND. Gravel is fine, rounded of flint. (LAMBETH GROUP)		*(0.5)* **1.5**		1.5	3	D								
Firm, brown, silty, sandy, gravelly CLAY. Gravel is fine, subrounded of flint. (LAMBETH GROUP)		*(0.5)* **2.0**		2.0		SPT	1	2	2	3	2	3	10	
Firm, grey, brown, silty, gravelly, very clayey SAND. Gravel is fine, rounded of flint. (LAMBETH GROUP)		*(0.4)* **2.4**												
Firm, grey, silty, sandy, gravelly CLAY. Gravel is fine, subrounded of flint. (LAMBETH GROUP)		*(0.6)* **3.0**		3.0	4	D/SPT	2	1	2	2	2	3	9	
Firm becoming stiff, grey, orange, silty, sandy, gravelly CLAY. Gravel is fine, subrounded of flint. (LAMBETH GROUP)		*(1.0)* **4.0**		4.0	5	D/SPT	9	9	11	13	13	13	50	For 295mm

Casing record			Chiselling records			Water level observations (depths in metres below gl)					
Date	Diameter (mm)	Depth (m)	Time	From (m)	To (m)	Date	Water strike	Water level (after 20mins)	Flow	Standing level	Remarks
22/05/2025	100	1.00				22/05/2025	Dry	-	-	-	

Remarks		By
No roots found in borehole. No groundwater encountered in borehole. No visual or olfactory evidence of contamination. Borehole backfilled with arisings.	Logged	OC
SPT: Standard Penetration Test, HP: Hand Penetrometer, B: Bulk Sample, D: Disturbed Sample	Checked	OB
		Scale 01:25

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WINDOW SAMPLE LOG

Site:		Project No.	Borehole:
Ladds Garden Village, Bath Road, Hare Hatch, RG10 9SB		24-304.01	WS7
Client:	**Start:**	**End:**	**Sheet:**
Westbourne Homes Limited	22/05/2025	22/05/2025	1 of 1
Method/Plant Used:	**Co-ordinates:**	**Ground Level:**	
Archway Dart (DO)	NT	NT	

Description of Strata	Legend	Depth (m bgl) (thickness)	Well Cnstr.	Samples/Tests			SPT Results						N' Value	Notes
				Depth	No	Type	75mm	75mm	75mm	75mm	75mm	75mm		
Tarmac. (MADE GROUND)		0.1												
Grey, sandy fine to coarse sub-angualr to angular GRAVEL of concrete and brick fragments. (MADE GROUND)		(0.3) 0.4												
Firm, dark brown, black, silty, very sandy, very gravelly CLAY with cement and brick fragments. (MADE GROUND)		(0.6) 1.0		1.0			1	1	1	2	2	2	7	
Soft to firm, brown, silty, sandy, occasionally gravelly CLAY. Gravel is fine, subrouned of flint. (LAMBETH GROUP)		(1.0) 2.0		2.0	1	ES/D/SPT	2	2	3	4	4	4	15	
Firm to stiff, grey, brown, lamminated, silty, sandy, occcasionally gravelly CLAY. Gravel is fine, subrounded of flint. (LAMBETH GROUP)		(1.0) 3.0		3.0	2	D/SPT	3	2	3	3	4	4	14	
Firm to stiff becoming stiff, orange, light brown, locally green, laminated, silty, sandy, occasionally gravelly CLAY. Gravel is fine, rounded of flint. (LAMBETH GROUP)		(1.0) 4.0		4.0	3	D/SPT	12	12	13	13	15	9	50	For 295

Casing record			Chiselling records			Water level observations (depths in metres below gl)					
Date	Diameter (mm)	Depth (m)	Time	From (m)	To (m)	Date	Water strike	Water level (after 20mins)	Flow	Standing level	Remarks
22/05/2025	100	1.00				22/05/2025	Dry	-	-	-	

Remarks	By	
No roots found in borehole. No groundwater encountered in borehole. No visual or olfactory evidence of contamination. Borehole backfilled with arisings. SPT: Standard Penetration Test, HP: Hand Penetrometer, B: Bulk Sample, D: Disturbed Sample	Logged	OC
	Checked	OB
		Scale 01:25

Aviron Associates Limited - Badgemore House || Badgemore Park || Gravel Hill || Henley on Thames || RG9 4NR - T:01491 413 722 - M: 07787771686 -E:james@aviron.co.uk

WINDOW SAMPLE LOG

Site:	Project No.	Borehole:
Ladds Garden Village, Bath Road, Hare Hatch, RG10 9SB	24-304.01	WS8
Client:	**Start:**	**End:**	**Sheet:**
Westbourne Homes Limited	22/05/2025	22/05/2025	1 of 1
Method/Plant Used:	**Co-ordinates:**	**Ground Level:**
Archway Dart (DO)	NT	NT

Description of Strata	Legend	Depth (m bgl) (thickness)	Well Cnstr.	Samples/Tests			SPT Results						N' Value	Notes
				Depth	No	Type	75mm	75mm	75mm	75mm	75mm	75mm		
Weeds above stiff, grey, black, silty, sandy, gravelly reworked TOPSOIL with brick and concrete fragments. (MADE GROUND)		(0.4) 0.4		0.3	1	ES								
Firm, orange, silty, sandy, very gravelly CLAY. Gravel is fine, rounded of flint. (LAMBETH GROUP).		(0.6) 1.0		1.0	2	D/SPT	1	1	1	2	2	3	8	
Soft to firm becoming firm, grey, brown, occasionally orange brown, silty, sandy, gravelly CLAY. Gravel is fine to medium, subangular of flint. (LAMBETH GROUP)		(2.4) 3.4		2.0	3	D/SPT	2	3	3	3	3	4	13	
				3.0		SPT	3	3	3	3	3	3	12	
Stiff, bright orange, dark grey, silty, sandy, occasionally gravelly CLAY. Gravel is fine, subrounded of flint. (LAMBETH GROUP)		(0.6) 4.0		4.0	4	D/SPT	10	11	13	16	17	4	50	For 230mm

Casing record			Chiselling records			Water level observations (depths in metres below gl)					
Date	Diameter (mm)	Depth (m)	Time	From (m)	To (m)	Date	Water strike	Water level (after 20mins)	Flow	Standing level	Remarks
22/05/2025	100	1.00				22/05/2025	Dry	-	-	-	

Remarks	By	
No roots found in borehole. No groundwater encountered in borehole. No visual or olfactory evidence of contamination. Borehole backfilled with arisings.	Logged	OC
SPT: Standard Penetration Test, HP: Hand Penetrometer, B: Bulk Sample, D: Disturbed Sample	Checked	OB
	Scale	01:25

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WINDOW SAMPLE LOG

Site:		Project No.	Borehole:
Ladds Garden Village, Bath Road, Hare Hatch, RG10 9SB		24-304.01	WS9
Client:	**Start:**	**End:**	**Sheet:**
Westbourne Homes Limited	22/05/2025	22/05/2025	1 of 1
Method/Plant Used:	**Co-ordinates:**	**Ground Level:**	
Archway Dart (DO)	NT	NT	

Description of Strata	Legend	Depth (m bgl) (thickness)	Well Cnstr.	Samples/Tests			SPT Results						N' Value	Notes
				Depth	No	Type	75mm	75mm	75mm	75mm	75mm	75mm		
Grey and brown silty, sandy fine to coarse subangular GRAVEL of concrete and brick fragments. (MADE GROUND)		(0.4) 0.4												
Soft becoming firm, orange, brown, silty, sandy, occasionally gravelly CLAY. Gravel is fine to medium, subronded to rounded of flint. (LAMBETH GROUP)		(0.6) 1.0		0.6	1	ES								
				1.0	2	D/SPT	1	1	1	2	2	2	7	
Soft to firm, dark brown, silty, sandy, occasionally gravelly clay. Gravel is fine, rounded of flint. (LAMBETH GROUP)		(0.2) 1.2												
Firm becoming stiff, dark grey, silty, sandy, occasionally gravelly CLAY. Gravel is fine, subrounded of flint. (LAMBETH GROUP)		(1.4) 2.6		2.0	3	D/SPT	2	3	3	3	4	4	14	
Stiff, brown, dark grey, silty, sandy, occasionally gravelly CLAY. Gravel is fine, subrounded of flint. (LAMBETH GROUP)		(2.2) 4.8		3.0	4	D/SPT	3	3	4	4	4	4	16	
				4.0		SPT	3	3	4	4	4	5	17	
Stiff, orange brown mottled dark grey, silty, sandy, occasionally gravelly CLAY. Gravel is fine, subrounded of flint. (LAMBETH GROUP)		(0.2) 5.0		5.0	5	D/SPT	3	4	4	5	5	5	19	

Casing record			Chiselling records			Water level observations (depths in metres below gl)					
Date	Diameter (mm)	Depth (m)	Time	From (m)	To (m)	Date	Water strike	Water level (after 20mins)	Flow	Standing level	Remarks
22/05/2025	100	1.00				22/05/2025	Dry	-	-	-	

Remarks		By
No roots found in borehole. No groundwater encountered in borehole. No visual or olfactory evidence of contamination. Borehole backfilled with arisings.	Logged	OC
SPT: Standard Penetration Test, HP: Hand Penetrometer, B: Bulk Sample, D: Disturbed Sample	Checked	OB
		Scale 01:25

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TRIAL PIT LOG

Project:		Project No.	Trial Pit:
Ladds Garden Village, Bath Road, Hare Hatch, RG10 9SB		24-304.01	HP1
Client:	Start:	End:	Sheet:
Westbourne Homes Limited	22/05/2025	22/05/2025	1 of 1
Method/Plant Used:	Co-ordinates:	Ground Level:	
Hand Tools	NT	NT	

Description of Strata	Legend	Depth (m bgl) *(thickness)*	Well Cnstr.	Samples/Tests Depth	No	Type	Laboratory Test Details
Grey, silty, sandy angular coarse GRAVEL of concrete and bricks (MADE GROUND)		**0.1**					
Brown and grey brown, very sandy gravelly, reworked TOPSOIL with concrete and brick fragments (MADE GROUND)		*(0.2)* **0.3**		0.2	1	ES	
Firm, brown, grey, silty, sandy, gravelly CLAY with cement and brick fragments. Gravel is fine to coarse subrounded to subangular of flint. (MADE GROUND)		**0.4**					

Dimensions (m)			Water level observations (depths in metres below gl)					
Length	Width	Depth	Date	Water strike	Water level (after 20mins)	Flow	Standing level	Remarks
0.20	0.20	0.40	22/05/2025	Dry	-	-	-	

Remarks		By
No roots found in trial pit. No groundwater encountered. No visual or olfactory evidence of contamination. Trial pit backfilled with arisings.	Logged	OC
	Checked	OB
		Scale 01:25

Aviron Associates Limited - Badgemore House - Greys Road - Henley on Thames - RG9 4NR - T:01491 413 722 - M: 07787771686 - E:james@aviron.co.uk

Exploratory Hole Photos

Project Number 24-304.01 **Project Title** Ladds Garden Centre, Bath Road, Hare Hatch, RG10 9SB **Taken by** OC **Date** 22/05/2025

WS1 Arisings

WS2 Arisings

WS3 Arisings

WS4 Arisings

WS5 Arisings

WS6 Arisings

Exploratory Hole Photos

Project Number 24-304.01 **Project Title** Ladds Garden Centre, Bath Road, Hare Hatch, RG10 9SB **Taken by** OC **Date** 22/05/2025

WS7 Arisings

WS8 Arisings

WS9 Arisings

Appendix

III Field Monitoring Results

MONITORING DATA SHEET

SITE Ladds Garden Centre, Bath Road, Hare Hatch, RG10 9SB
PROJECT 24-304.01

VISIT NUMBER 1
DATE 02/06/2025

EQUIPMENT GFM435 + MiniRAE
TAKEN BY OC

Record of Stable Concentrations										Interpretation		
Location	Time	Flow (l/h)	CH4 (% v/v)	CO2 (% v/v)	O2 (% v/v)	Baro. Prs. (mB)	PID (ppm)	Water (m bgl)	Base Well (m bgl)	CH4 GSV (l/h)	CO2 GSV (l/h)	CS
Site	08:27		0.0	0.0	20.4	1008	0.0	n/a	n/a	n/a	n/a	n/a
WS1	08:30	0.0	0.0	2.2	18.0	1008	0.0	Dry	5.04	0	0	CS-1
WS4	08:36	0.0	0.0	1.4	18.2	1008	2.7	Dry	4.11	0	0	CS-1
WS9	08:55	0.0	0.0	0.9	18.0	1008	1.7	4.74	5.01	0	0	CS-1

Weather Observations					
State of Ground	Cloud Cover	Wind	Rain	Air Temperature °C	
Dry	Clear	Calm	None	Before	13
Moist	Sunny	Light	Slight		
Wet	Slight	Moderate	Moderate	After	13
Snow	Cloudy	Strong	Heavy		
Frozen	Overcast				
	Fog/Mist				

Pressure Observations			
Source	Pressure Records		Trend
Metoffice	Location	**Wargrave**	Falling
GFM435	Time	**08:25**	Steady
	Pressure	**1008mB**	Rising

Notes	
Worst case conditions? (<1000mB and Falling)	No

Aviron Associates Limited
Badgemore House - Badgemore Park - Gravel Hill - Henley on Thames - RG9 4NR
T: 01491 413 722 - E: james@aviron.co.uk

MONITORING DATA SHEET

SITE Ladds Garden Centre, Bath Road, Hare Hatch, RG10 9SB
PROJECT 24-304.01

VISIT NUMBER 1
DATE 02/06/2025

EQUIPMENT GFM435 + MiniRAE
TAKEN BY OC

Record of Stable Concentrations										Interpretation		
Location	Time	Flow (l/h)	CH4 (% v/v)	CO2 (% v/v)	O2 (% v/v)	Baro. Prs. (mB)	PID (ppm)	Water (m bgl)	Base Well (m bgl)	CH4 GSV (l/h)	CO2 GSV (l/h)	CS
Site	11:10		0.0	0.0	20.4	1021	0.0	n/a	n/a	n/a	n/a	n/a
WS1	11:20	0.0	0.0	1.9	18.1	1021	0.1	Dry	5.04	0	0	CS-1
WS4	11:31	0.0	0.0	1.4	18.1	1021	1.7	Dry	4.11	0	0	CS-1
WS9	11:41	0.0	0.0	1.1	18.4	1021	1.1	4.74	5.01	0	0	CS-1

Weather Observations					
State of Ground	Cloud Cover	Wind	Rain	Air Temperature °C	
Dry	Clear	Calm	None	Before	16
Moist	Sunny	Light	Slight		
Wet	Slight	Moderate	Moderate	After	16
Snow	Cloudy	Strong	Heavy		
Frozen	Overcast				
	Fog/Mist				

Pressure Observations			
Source	Pressure Records		Trend
Metoffice	Location	**Henley**	Falling
GFM435	Time	**10:00**	Steady
	Pressure	**1021mB**	Rising

Notes	
Worst case conditions? (<1000mB and Falling)	No

Aviron Associates Limited
Badgemore House - Badgemore Park - Gravel Hill - Henley on Thames - RG9 4NR
T: 01491 413 722 - E: james@aviron.co.uk

Appendix

IV Soil Contamination Results and Assessment Criteria

Aviron Associates Ltd
Badgemore House
Henley
Oxfordshire
RG9 4NR

e: james@aviron.co.uk
orlando@aviron.co.uk
david@aviron.co.uk

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

Analytical Report Number : 25-025913

Project / Site name:	Ladds Garden Centre, Bath Road, Hare Hatch, RG10 9S	**Samples received on:**	15/05/2025
Your job number:	24 304 01	**Samples instructed on/ Analysis started on:**	20/05/2025
Your order number:	24 304 01	**Analysis completed by:**	29/05/2025
Report Issue Number:	1	**Report issued on:**	29/05/2025
Samples Analysed:	10 soil samples		

[redacted]

Signed:

Joanna Wawrzeczko
Senior Reporting Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting
air	- once the analysis is complete

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Retention period for records and reports is minimum 6 years from the date of issue of the final report.
Some records may be kept for longer according to other legal/best practice requirements.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 25-025913
Project / Site name: Ladds Garden Centre, Bath Road, Hare Hatch, RG10 9S
Your Order No: 24 304 01

Lab Sample Number				551294	551295	551296	551297	551298
Sample Reference				HP1	WS1	WS2	WS4	WS5
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Water Matrix				N/A	N/A	N/A	N/A	N/A
Depth (m)				0,20-depth-	0,30-depth-	0,30-depth-	0,60-depth-	0,50-depth-
Date Sampled				15/05/2025	15/05/2025	15/05/2025	15/05/2025	15/05/2025
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
Stone Content	%	0.1	NONE	40	< 0.1	< 0.1	23.7	< 0.1
Moisture Content	%	0.01	NONE	1.7	7.4	7.3	8.9	15
Total mass of sample received	kg	0.1	NONE	1.2	0.3	0.8	0.7	0.7
Asbestos								
Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	WEM	WEM	WEM	WEM	WEM
Analysis completed	N/A	N/A	N/A	29/05/2025	27/05/2025	29/05/2025	29/05/2025	29/05/2025
General Inorganics								
pH (L099)	pH Units	N/A	MCERTS	10.1	7.5	7.7	10.3	9.4
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Sulphate as SO_4	mg/kg	50	MCERTS	590	510	490	6000	4000
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	270	37	56	1300	1700
Water Soluble SO_4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	-	-	-	-
Water Soluble SO_4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	-	-	-	-
Water Soluble SO_4 16hr extraction (2:1)	mg/l	1.25	MCERTS	137	18.4	28.1	658	828
Total Sulphur	mg/kg	50	MCERTS	1700	330	380	2800	2100
Organic Matter (automated)	%	0.1	MCERTS	8.1	3.6	3.8	2.2	2.5
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	0.2	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	0.33	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	1.9	< 0.05	< 0.05	0.1	0.05
Fluorene	mg/kg	0.05	MCERTS	1.6	< 0.05	< 0.05	0.07	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	16	0.06	< 0.05	0.66	0.38
Anthracene	mg/kg	0.05	MCERTS	4.1	< 0.05	< 0.05	0.25	0.15
Fluoranthene	mg/kg	0.05	MCERTS	21	0.25	0.18	1.8	1.6
Pyrene	mg/kg	0.05	MCERTS	17	0.23	0.16	1.7	1.8
Benzo(a)anthracene	mg/kg	0.05	MCERTS	9	0.13	0.08	0.92	1.2
Chrysene	mg/kg	0.05	MCERTS	9.3	0.14	0.12	0.96	1.3
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	12	0.23	0.15	1.5	1.6
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	5.5	0.07	< 0.05	0.49	0.6
Benzo(a)pyrene	mg/kg	0.05	MCERTS	12	0.22	0.12	1.3	1.3
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	6.5	0.12	0.08	0.71	0.68
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	1.6	< 0.05	< 0.05	0.17	0.16
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	7.1	0.14	< 0.05	0.83	0.74
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	125	1.58	0.88	11.5	11.5

Analytical Report Number: 25-025913
Project / Site name: Ladds Garden Centre, Bath Road, Hare Hatch, RG10 9S
Your Order No: 24 304 01

Lab Sample Number				551294	551295	551296	551297	551298
Sample Reference				HP1	WS1	WS2	WS4	WS5
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Water Matrix				N/A	N/A	N/A	N/A	N/A
Depth (m)				0,20-depth-	0,30-depth-	0,30-depth-	0,60-depth-	0,50-depth-
Date Sampled				15/05/2025	15/05/2025	15/05/2025	15/05/2025	15/05/2025
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	6	9	11	37	20
Boron (water soluble)	mg/kg	0.2	MCERTS	3.4	0.8	1.6	3.7	2.2
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.2	< 0.2	< 0.2	3.5	0.7
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	23	23	24	31	36
Copper (aqua regia extractable)	mg/kg	1	MCERTS	12	15	17	140	52
Lead (aqua regia extractable)	mg/kg	1	MCERTS	13	54	40	140	56
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	8.9	12	14	21	23
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	2	1.4	1.4	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	44	53	72	1000	140
Petroleum Hydrocarbons								
TPHCWG - Aliphatic >EC5 - EC6 $_{HS\_1D\_AL}$	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aliphatic >EC6 - EC8 $_{HS\_1D\_AL}$	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aliphatic >EC8 - EC10 $_{HS\_1D\_AL}$	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aliphatic >EC10 - EC12 $_{EH\_CU\_1D\_AL}$	mg/kg	1	MCERTS	3.1	< 1.0	< 1.0	< 1.0	< 1.0
TPHCWG - Aliphatic >EC12 - EC16 $_{EH\_CU\_1D\_AL}$	mg/kg	2	MCERTS	8.4	< 2.0	< 2.0	< 2.0	< 2.0
TPHCWG - Aliphatic >EC16 - EC21 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	19	< 8.0	< 8.0	9.4	< 8.0
TPHCWG - Aliphatic >EC21 - EC35 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	310	< 8.0	< 8.0	72	45
TPHCWG - Aliphatic >EC5 - EC35 $_{EH\_CU+HS\_1D\_AL}$	mg/kg	10	NONE	340	< 10	< 10	82	45
TPHCWG - Aromatic >EC5 - EC7 $_{HS\_1D\_AR}$	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aromatic >EC7 - EC8 $_{HS\_1D\_AR}$	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aromatic >EC8 - EC10 $_{HS\_1D\_AR}$	mg/kg	0.02	MCERTS	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
TPHCWG - Aromatic >EC10 - EC12 $_{EH\_CU\_1D\_AR}$	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPHCWG - Aromatic >EC12 - EC16 $_{EH\_CU\_1D\_AR}$	mg/kg	2	MCERTS	13	< 2.0	< 2.0	9.3	3.7
TPHCWG - Aromatic >EC16 - EC21 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	88	< 10	< 10	29	12
TPHCWG - Aromatic >EC21 - EC35 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	690	11	< 10	190	64
TPHCWG - Aromatic >EC5 - EC35 $_{EH\_CU+HS\_1D\_AR}$	mg/kg	10	NONE	790	11	< 10	220	80
VOCs								
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
p & m-Xylene	µg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
o-Xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number: 25-025913
Project / Site name: Ladds Garden Centre, Bath Road, Hare Hatch, RG10 9S
Your Order No: 24 304 01

Lab Sample Number				551299	551300	551301	551302	551303
Sample Reference				WS6	WS6	WS7	WS8	WS9
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Water Matrix				N/A	N/A	N/A	N/A	N/A
Depth (m)				0,40-depth-	1,00-depth-	2,00-depth-	0,30-depth-	0,60-depth-
Date Sampled				15/05/2025	15/05/2025	15/05/2025	15/05/2025	15/05/2025
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	14	20	17	6.3	19
Total mass of sample received	kg	0.1	NONE	0.7	0.5	0.9	0.8	0.5
Asbestos								
Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected	-	-	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	WEM	-	-	WEM	WEM
Analysis completed	N/A	N/A	N/A	29/05/2025	-	-	29/05/2025	29/05/2025
General Inorganics								
pH (L099)	pH Units	N/A	MCERTS	8	8.3	8.4	8.6	7.9
Total Cyanide	mg/kg	1	MCERTS	< 1.0	-	-	< 1.0	< 1.0
Total Sulphate as SO_4	mg/kg	50	MCERTS	430	160	140	750	590
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	73	12	32	210	510
Water Soluble SO_4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	0.00611	0.016	-	-
Water Soluble SO_4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	6.11	16	-	-
Water Soluble SO_4 16hr extraction (2:1)	mg/l	1.25	MCERTS	36.6	-	-	107	257
Total Sulphur	mg/kg	50	MCERTS	340	52	51	890	230
Organic Matter (automated)	%	0.1	MCERTS	2.6	-	-	5.6	0.3
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	-	-	< 1.0	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	-	-	0.35	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	-	-	1	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	0.17	-	-	2.1	< 0.05
Fluorene	mg/kg	0.05	MCERTS	0.12	-	-	2.1	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	1.5	-	-	19	0.22
Anthracene	mg/kg	0.05	MCERTS	0.32	-	-	7.3	0.07
Fluoranthene	mg/kg	0.05	MCERTS	3.4	-	-	46	0.73
Pyrene	mg/kg	0.05	MCERTS	2.9	-	-	44	0.76
Benzo(a)anthracene	mg/kg	0.05	MCERTS	1.6	-	-	27	0.42
Chrysene	mg/kg	0.05	MCERTS	1.6	-	-	23	0.47
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	2.6	-	-	34	0.68
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.93	-	-	16	0.29
Benzo(a)pyrene	mg/kg	0.05	MCERTS	2.1	-	-	34	0.62
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	1.1	-	-	18	0.36
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.24	-	-	2.5	0.08
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	1.3	-	-	20	0.37
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	19.7	-	-	296	5.06

Analytical Report Number: 25-025913
Project / Site name: Ladds Garden Centre, Bath Road, Hare Hatch, RG10 9S
Your Order No: 24 304 01

Lab Sample Number				551299	551300	551301	551302	551303
Sample Reference				WS6	WS6	WS7	WS8	WS9
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Water Matrix				N/A	N/A	N/A	N/A	N/A
Depth (m)				0,40-depth-	1,00-depth-	2,00-depth-	0,30-depth-	0,60-depth-
Date Sampled				15/05/2025	15/05/2025	15/05/2025	15/05/2025	15/05/2025
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	6.7	-	-	12	7.7
Boron (water soluble)	mg/kg	0.2	MCERTS	1.9	-	-	0.5	0.4
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.2	-	-	0.8	< 0.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	20	-	-	32	39
Copper (aqua regia extractable)	mg/kg	1	MCERTS	13	-	-	19	21
Lead (aqua regia extractable)	mg/kg	1	MCERTS	27	-	-	38	12
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	-	-	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	11	-	-	17	22
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	-	-	1.5	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	41	-	-	71	40
Petroleum Hydrocarbons								
TPHCWG - Aliphatic >EC5 - EC6 $_{HS\_1D\_AL}$	mg/kg	0.01	MCERTS	< 0.010	-	-	< 0.010	< 0.010
TPHCWG - Aliphatic >EC6 - EC8 $_{HS\_1D\_AL}$	mg/kg	0.01	MCERTS	< 0.010	-	-	< 0.010	< 0.010
TPHCWG - Aliphatic >EC8 - EC10 $_{HS\_1D\_AL}$	mg/kg	0.01	MCERTS	< 0.010	-	-	< 0.010	< 0.010
TPHCWG - Aliphatic >EC10 - EC12 $_{EH\_CU\_1D\_AL}$	mg/kg	1	MCERTS	< 1.0	-	-	2	< 1.0
TPHCWG - Aliphatic >EC12 - EC16 $_{EH\_CU\_1D\_AL}$	mg/kg	2	MCERTS	< 2.0	-	-	44	< 2.0
TPHCWG - Aliphatic >EC16 - EC21 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	< 8.0	-	-	95	< 8.0
TPHCWG - Aliphatic >EC21 - EC35 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	< 8.0	-	-	140	< 8.0
TPHCWG - Aliphatic >EC5 - EC35 $_{EH\_CU+HS\_1D\_AL}$	mg/kg	10	NONE	< 10	-	-	280	< 10
TPHCWG - Aromatic >EC5 - EC7 $_{HS\_1D\_AR}$	mg/kg	0.01	MCERTS	< 0.010	-	-	< 0.010	< 0.010
TPHCWG - Aromatic >EC7 - EC8 $_{HS\_1D\_AR}$	mg/kg	0.01	MCERTS	< 0.010	-	-	< 0.010	< 0.010
TPHCWG - Aromatic >EC8 - EC10 $_{HS\_1D\_AR}$	mg/kg	0.02	MCERTS	< 0.020	-	-	< 0.020	< 0.020
TPHCWG - Aromatic >EC10 - EC12 $_{EH\_CU\_1D\_AR}$	mg/kg	1	MCERTS	< 1.0	-	-	< 1.0	< 1.0
TPHCWG - Aromatic >EC12 - EC16 $_{EH\_CU\_1D\_AR}$	mg/kg	2	MCERTS	< 2.0	-	-	39	< 2.0
TPHCWG - Aromatic >EC16 - EC21 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	< 10	-	-	270	< 10
TPHCWG - Aromatic >EC21 - EC35 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	< 10	-	-	550	< 10
TPHCWG - Aromatic >EC5 - EC35 $_{EH\_CU+HS\_1D\_AR}$	mg/kg	10	NONE	< 10	-	-	860	< 10
VOCs								
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	MCERTS	< 5.0	-	-	< 5.0	< 5.0
Benzene	µg/kg	5	MCERTS	< 5.0	-	-	< 5.0	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0	-	-	< 5.0	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	-	-	< 5.0	< 5.0
p & m-Xylene	µg/kg	8	MCERTS	< 8.0	-	-	< 8.0	< 8.0
o-Xylene	µg/kg	5	MCERTS	< 5.0	-	-	< 5.0	< 5.0

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number : 25-025913
Project / Site name: Ladds Garden Centre, Bath Road, Hare Hatch, RG10 9S

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
551294	HP1	None Supplied	0,20-depth-	Brown sand with stones
551295	WS1	None Supplied	0,30-depth-	Brown loam with gravel and vegetation
551296	WS2	None Supplied	0,30-depth-	Brown loam and sand with vegetation
551297	WS4	None Supplied	0,60-depth-	Brown sand with stones
551298	WS5	None Supplied	0,50-depth-	Brown clay and sand
551299	WS6	None Supplied	0,40-depth-	Brown clay with vegetation
551300	WS6	None Supplied	1,00-depth-	Brown clay
551301	WS7	None Supplied	2,00-depth-	Brown clay
551302	WS8	None Supplied	0,30-depth-	Brown loam and sand with gravel and vegetation
551303	WS9	None Supplied	0,60-depth-	Brown clay

Analytical Report Number : 25-025913
Project / Site name: Ladds Garden Centre, Bath Road, Hare Hatch, RG10 9S

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters Heating/Cooling (PrW) DI Process Water (DI PrW)
Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in Soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques	In-house method based on HSG 248, 2021	A001B	D	ISO 17025
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L038B	D	MCERTS
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES	In-house method based on Second Site Properties version 3	L038B	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES	In-house method	L038B	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Sulphate, water soluble, in soil (16hr extraction)	In-house method	L038B	D	MCERTS
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES	In-house method	L038B	D	MCERTS
Speciated PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	MCERTS
BTEX and/or Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS	In-house method based on USEPA 8260	L073B	W	MCERTS
Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS with carbon banding aliphatic and aromatic	In-house method	L076B/L088-PL	D/W	MCERTS
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement	In-house method	L099-PL	D	MCERTS

Analytical Report Number : 25-025913
Project / Site name: Ladds Garden Centre, Bath Road, Hare Hatch, RG10 9S

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters Heating/Cooling (PrW) DI Process Water (DI PrW)
Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Soil Descriptions	Textural classification	In-house method	L019B	W	NONE

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL' or 'B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Quality control parameter failure associated with individual result applies to calculated sum of individuals.
The result for sum should be interpreted with caution

Aviron Associates Ltd
Badgemore House
Henley
Oxfordshire
RG9 4NR

e: james@aviron.co.uk
orlando@aviron.co.uk
david@aviron.co.uk

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

Analytical Report Number : 25-025917

Project / Site name:	Ladds Garden Centre, Bath Road, Hare Hatch, RG10 9S	**Samples received on:**	15/05/2025
Your job number:	24 304 01	**Samples instructed on/ Analysis started on:**	20/05/2025
Your order number:	24 304 01	**Analysis completed by:**	29/05/2025
Report Issue Number:	1	**Report issued on:**	29/05/2025
Samples Analysed:	10:1 WAC sample		

[redacted]

Signed:

Anna Goc
PL Head of Reporting Team
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting
air	- once the analysis is complete

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Retention period for records and reports is minimum 6 years from the date of issue of the final report.
Some records may be kept for longer according to other legal/best practice requirements.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 25-025917
Project / Site name: Ladds Garden Centre, Bath Road, Hare Hatch, RG10 9S
Your Order No: 24 304 01

Lab Sample Number				551304
Sample Reference				COMP1
Sample Number				None Supplied
Water Matrix				N/A
Depth (m)				None Supplied
Date Sampled				15/05/2025
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**	
Stone Content	%	0.1	NONE	< 0.1
Moisture Content	%	0.01	NONE	17
Total mass of sample received	kg	0.1	NONE	1.7
General Inorganics				
pH (L005B)	pH Units	N/A	MCERTS	7.4
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	0.6
Loss on Ignition @ 450°C	%	0.2	MCERTS	2.2
Acid Neutralisation Capacity	+/- mmol/kg	-9999	NONE	1.6
Speciated PAHs				
Naphthalene	mg/kg	0.05	MCERTS	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	0.14
Pyrene	mg/kg	0.05	MCERTS	0.15
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.08
Chrysene	mg/kg	0.05	MCERTS	0.1
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	0.14
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.06
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.13
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.08
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.06
Coronene	mg/kg	0.05	NONE	< 0.05
Total PAH				
Total WAC-17 PAHs	mg/kg	0.85	NONE	0.93
Petroleum Hydrocarbons				
Mineral Oil (EC10 - EC40) EH_CU_1D_AL	mg/kg	10	NONE	< 10
VOCs				
Benzene	µg/kg	5	MCERTS	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0
p & m-Xylene	µg/kg	8	MCERTS	< 8.0
o-Xylene	µg/kg	5	MCERTS	< 5.0
Total BTEX	µg/kg	10	MCERTS	< 10

Analytical Report Number: 25-025917
Project / Site name: Ladds Garden Centre, Bath Road, Hare Hatch, RG10 9S
Your Order No: 24 304 01

Lab Sample Number				551304
Sample Reference				COMP1
Sample Number				None Supplied
Water Matrix				N/A
Depth (m)				None Supplied
Date Sampled				15/05/2025
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**	
PCBs by GC-MS				
PCB Congener 28	mg/kg	0.001	MCERTS	< 0.001
PCB Congener 52	mg/kg	0.001	MCERTS	< 0.001
PCB Congener 101	mg/kg	0.001	MCERTS	< 0.001
PCB Congener 118	mg/kg	0.001	MCERTS	< 0.001
PCB Congener 138	mg/kg	0.001	MCERTS	< 0.001
PCB Congener 153	mg/kg	0.001	MCERTS	< 0.001
PCB Congener 180	mg/kg	0.001	MCERTS	< 0.001
Total PCBs	mg/kg	0.007	MCERTS	< 0.007

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

i2 Analytical
7 Woodshots Meadow
Croxley Green Business Park
Watford, WD18 8YS

Telephone: 01923 225404
Fax: 01923 237404
email:reception@i2analytical.com

Waste Acceptance Criteria Analytical Results

Report No:	**25-025917**						
					Client:	**Aviron Associates Ltd**	
Location	**Ladds Garden Centre, Bath Road, Hare Hatch, RG10 9S**						
Lab Reference (Sample Number)	551304				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	15/05/2025				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	COMP1						
Depth (m)	None Supplied						
Solid Waste Analysis							
TOC (%)**	0.6				3%	5%	6%
Loss on Ignition (%) **	2.2				--	--	10%
BTEX (µg/kg) **	< 10				6000	--	--
Sum of PCBs (mg/kg) **	< 0.007				1	--	--
Mineral Oil (mg/kg) EH_1D_CU_AL	< 10				500	--	--
Total PAH (WAC-17) (mg/kg)	0.93				100	--	--
pH (units)**	7.4				--	>6	--
Acid Neutralisation Capacity (mmol / kg)	1.6				--	To be evaluated	To be evaluated
Eluate Analysis (BS EN 12457 - 2 preparation utilising end over end leaching procedure)	10:1 mg/l			10:1 mg/kg	Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
Arsenic *	0.00436			0.0436	0.5	2	25
Barium *	0.00949			0.0949	20	100	300
Cadmium *	< 0.000100			< 0.00100	0.04	1	5
Chromium *	0.003			0.03	0.5	10	70
Copper *	0.0026			0.026	2	50	100
Mercury *	< 0.000500			< 0.00500	0.01	0.2	2
Molybdenum *	0.000718			0.00718	0.5	10	30
Nickel *	0.0022			0.022	0.4	10	40
Lead *	< 0.0010			< 0.010	0.5	10	50
Antimony *	< 0.0017			< 0.017	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.0028			0.028	4	50	200
Chloride *	1.7			17	800	15000	25000
Fluoride*	0.32			3.2	10	150	500
Sulphate *	2.5			25	1000	20000	50000
TDS*	41			410	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	7.94			79.4	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	1.7						
Dry Matter (%)	83						
Moisture (%)	17						

Results are expressed on a dry weight basis, after correction for moisture content where applicable.

*= UKAS accredited (liquid eluate analysis only)

Stated limits are for guidance only and i2 cannot be held responsible for any discrepancies with current legislation

** = MCERTS accredited

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.
This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Analytical Report Number : 25-025917
Project / Site name: Ladds Garden Centre, Bath Road, Hare Hatch, RG10 9S

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
551304	COMP1	None Supplied	None Supplied	Brown clay

Analytical Report Number : 25-025917
Project / Site name: Ladds Garden Centre, Bath Road, Hare Hatch, RG10 9S

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters Heating/Cooling (PrW) DI Process Water (DI PrW)
Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
pH at 20°C in soil	Determination of pH in soil by addition of water followed by electrometric measurement	In-house method	L005B	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
PCB's By GC-MS in soil	Determination of PCB by extraction with hexane followed by GC-MS	In-house method based on USEPA 8082	L027B	D	MCERTS
Total dissolved solids 10:1 WAC	Determination of total dissolved solids in water by electrometric measurement	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L031B	W	ISO 17025
Fluoride 10:1 WAC	Determination of fluoride in leachate by 1:1ratio with a buffer solution followed by Ion Selective Electrode	In-house method based on Use of Total Ionic Strength Adjustment Buffer for Electrode Determination	L033B	W	ISO 17025
Dissolved organic carbon 10:1 WAC	Determination of dissolved organic carbon in leachate by TOC/DOC NDIR Analyser	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037B	W	NONE
Metals in leachate by ICP-OES	Determination of metals in leachate by acidification followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L039B	W	ISO 17025
One stage WAC 10:1 leachate preparation	One stage batch test at a liquid to solid ratio of 10 L/kg	BS EN 12457-2-2002	L043B	W	NONE
Acid neutralisation capacity of soil	Determination of acid neutralisation capacity by addition of acid or alkali followed by electronic probe	In-house method based on Guidance an Sampling and Testing of Wastes to Meet Landfill Waste Acceptance	L046B	W	NONE
Loss on ignition of soil @ 450°C	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	In-house method	L047-PL	D	MCERTS
Speciated PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	MCERTS
BTEX and/or Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS	In-house method based on USEPA 8260	L073B	W	MCERTS
Total petroleum hydrocarbons by GC-FID/GC-MS HS in soil	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS	In-house method	L076B/L088-PL	D/W	NONE

Analytical Report Number : 25-025917
Project / Site name: Ladds Garden Centre, Bath Road, Hare Hatch, RG10 9S

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters Heating/Cooling (PrW) DI Process Water (DI PrW)
Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Monohydric phenols 10:1 WAC	Determination of phenols in leachate by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	ISO 17025
Chloride 10:1 WAC	Determination of Chloride colorimetrically by discrete analyser	In-house based on MEWAM Method ISBN 0117516260	L082B	W	ISO 17025
Soil Descriptions	Textural classification	In-house method	L019B	W	NONE

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL' or 'B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Quality control parameter failure associated with individual result applies to calculated sum of individuals.
The result for sum should be interpreted with caution

Residential with Homegrown Produce
Soil Screening Values
Private Gardens

Determinant	1% SOM (mg/kg)	2.5% SOM (mg/kg)	6% SOM (mg/kg)	Criteria
METALS, SEMI-METALS, INROGANICS + PAH				
Arsenic	37	37	37	C4SL/LQM S4UL
Boron	290	290	290	LQM S4UL
Cadmium	11	11	11	LQM S4UL
Chromium III	910	910	910	LQM S4UL
Chromium IV	6	6	6	LQM S4UL
Copper	2,400	2,400	2,400	LQM S4UL
Mercury	1.2	1.2	1.2	LQM S4UL
Nickel	180	180	180	LQM S4UL
Lead	200	200	200	LQM S4UL
Selenium	250	250	250	LQM S4UL
Zinc	3,700	3,700	3,700	LQM S4UL
Free Cyanide	34	34	34	ATRISK
Acenaphthene	210	510	1100	LQM S4UL
Acenaphthylene	170	420	920	LQM S4UL
Anthracene	2,400	5,400	11,000	LQM S4UL
Benzo(a)anthracene	7.2	11	13	LQM S4UL
Benzo(a)pyrene	2.2	2.7	3	LQM S4UL
Benzo(b)fluoranthene	2.6	3.3	3.7	LQM S4UL
Benzo(ghi)perylene	320	340	350	LQM S4UL
Benzo(k)fluoranthene	77	93	100	LQM S4UL
Chrysene	15	22	27	LQM S4UL
Dibenz(ah)anthracene	0.24	0.28	0.3	LQM S4UL
Fluoranthene	280	560	890	LQM S4UL
Fluorene	170	400	860	LQM S4UL
Indeno(123-cd)pyrene	27	36	41	LQM S4UL
Naphthalene	2.3	5.6	13	LQM S4UL
Phenanthrene	95	220	440	LQM S4UL
Pyrene	620	1,200	2,000	LQM S4UL
Phenols	280	550	1,100	LQM S4UL
TOTAL PETROLEUM HYDOCARBONS				
Benzene	0.087	0.17	0.37	LQM S4UL
Toluene	130	290	660	LQM S4UL
Ethlybenzene	47	110	260	LQM S4UL
o-xylene	60	140	330	LQM S4UL
m-xylene	59	140	320	LQM S4UL
p-xylene	56	130	310	LQM S4UL
Aliphatic EC 5-6	42	78	160	LQM S4UL
Aliphatic EC >6-8	100	230	530	LQM S4UL
Aliphatic EC >8-10	27	65	150	LQM S4UL
Aliphatic EC >10-12	130	330	760	LQM S4UL
Aliphatic EC >12-16	1,100	2,400	4,300	LQM S4UL
Aliphatic EC >16-35	65,000	92,000	110,000	LQM S4UL
Aliphatic EC >35-44	65,000	92,000	110,000	LQM S4UL
Aromatic EC 5-7 (benzene)	70	140	300	LQM S4UL
Aromatic EC >7-8 (toluene)	130	290	660	LQM S4UL
Aromatic EC >8-10	34	83	190	LQM S4UL
Aromatic EC >10-12	74	180	380	LQM S4UL
Aromatic EC >12-16	140	330	660	LQM S4UL
Aromatic EC >16-21	260	540	930	LQM S4UL
Aromatic EC >21-35	1,100	1,500	1,700	LQM S4UL
Aromatic EC >35-44	1,100	1,500	1,700	LQM S4UL
Aromatic EC >44-70	1,600	1,800	1,900	LQM S4UL
ASBESTOS				
None Detectable			Aviron Adopted Value	

Appendix

V Soil Geotechnical Results

Laboratory Report

UKAS TESTING 2788

GSTL GEOTECHNICAL SITE & TESTING LABORATORIES A PHENNA GROUP COMPANY

Contract Number: 78849

Client Ref: **24-304.01**
Client PO: **24-304.01**

Date Received: **21-05-2025**
Date Completed: **05-06-2025**
Report Date: **05-06-2025**

Client: **Aviron Associates LTD**

This report has been checked and approved by:

Contract Title: **Ladds Garden Centre, Bath Road, Hare Hatch, RG10 9SB**
For the attention of: **Orlando**

[redacted]

Brendan Evans
Senior Office Administrator

Description	Qty
Determination of water content BS EN ISO 17892-1:2014 - @ Non Accredited Test	12
4 Point Liquid & Plastic Limit.. BS EN ISO 17892-12 - * UKAS	12
Saturated Moisture Content of chalk (SMC) BS 1377:1990 - Part 2 : 3.3 - * UKAS	4

Notes: **Observations and Interpretations are outside the UKAS Accreditation**
*** - denotes test included in laboratory scope of accreditation**
 # - denotes test carried out by approved contractor
@ - denotes non accredited tests

Approved Signatories:
Brendan Evans (Senior Office Administrator) - Darren Bourne (Quality Senior Technician) - Paul Evans (Director)
Richard John (Quality/Technical Manager) - Shaun Jones (Laboratory manager) - Shaun Thomas (Site Manager)
Wayne Honey (HR & HSE Manager)

GEO Site & Testing Services Ltd
Unit 3-4 Heol Aur, Dafen Ind Est, Llanelli, Carmarthenshire SA14 8QN
Tel: 01554 784 040 Fax: 01554 784 040 info@gstl.co.uk https://gstl.co.uk

GSTL GEOTECHNICAL SITE & TESTING LABORATORIES	**WATER CONTENT, LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX** **BS EN ISO 17892-12:2018+A2:2022 4 Point Liquid Limit** **BS EN ISO 17892-1:2014+A1:2022 Determination of Water Content**	
Contract Number	78849	
Project Name	Ladds Garden Centre, Bath Road, Hare Hatch, RG10 9SB	
Date Tested	03/06/2025	
	DESCRIPTIONS	

Sample/Hole Reference	Sample Number	Sample Type	Depth (m)			Descriptions
WS1		D	2.00	-		Off white brown claky clayey SILT
WS3		D	1.00	-		Brown fine to medium gravelly silty CLAY
WS3		D	2.00	-		Brown fine to medium gravelly silty CLAY
WS3		D	3.00	-		Brown fine to medium gravelly silty CLAY
WS3		D	4.00	-		Brown/ grey fine to medium gravelly silty CLAY
WS5		D	1.00	-		Brown/ grey fine to medium gravelly silty CLAY
WS5		D	2.00	-		Brown silty CLAY
WS5		D	3.20	-		Brown fine to medium gravelly silty sandy CLAY
WS8		D	1.00	-		Brown silty CLAY
WS9		D	1.00	-		Brown silty CLAY
WS9		D	2.00	-		Grey silty CLAY
WS9		D	3.00	-		Brown silty CLAY
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		

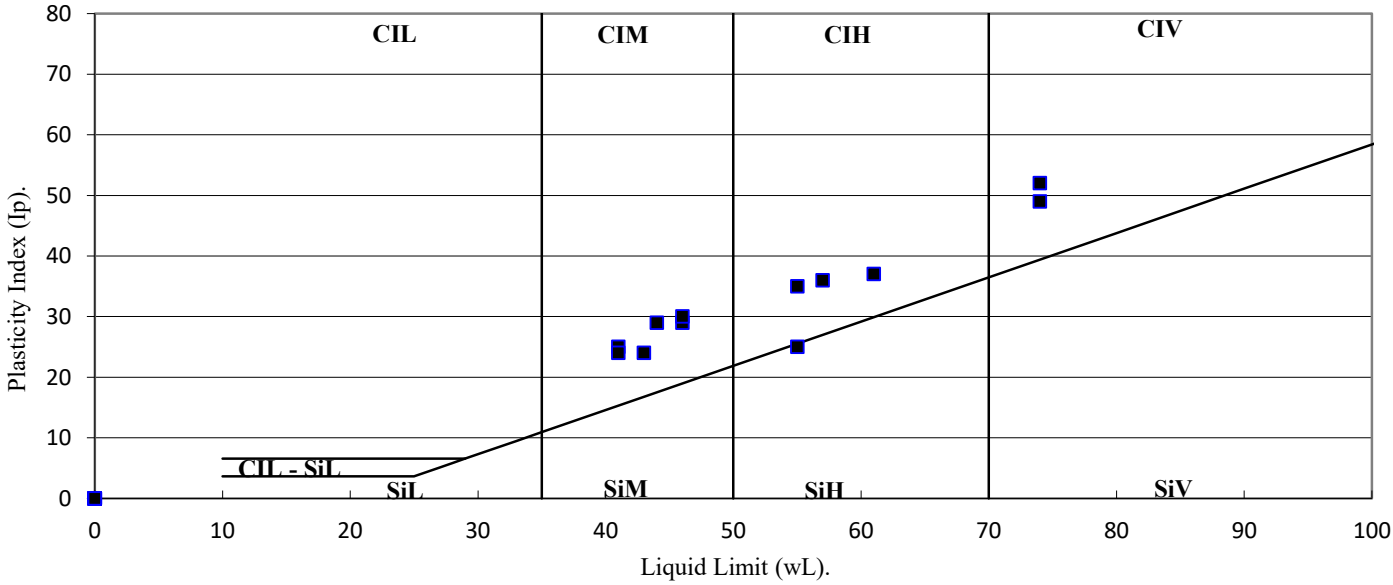
Operator
Clayton. J

GSTL GEOTECHNICAL SITE & TESTING LABORATORIES	WATER CONTENT, LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX BS EN ISO 17892-12:2018+A2:2022 4 Point Liquid Limit BS EN ISO 17892-1:2014+A1:2022 Determination of Water Content	
Contract Number	78849	
Project Name	Ladds Garden Centre, Bath Road, Hare Hatch, RG10 9SB	
Date Tested	03/06/2025	
Test Comments	80g/30° Fall cone used with increasing water content	

Sample/Hole Reference	Sample Number	Sample Type	Depth (m)			Water Content %	Liquid Limit %	Plastic Limit %	Plasticity index %	Passing 0.425mm %	Remarks
WS1		D	2.00	-		36.1	55	30	25	100	MH High Plasticity
WS3		D	1.00	-		16.7	44	15	29	85	CI Intermediate Plasticity
WS3		D	2.00	-		17.3	41	16	25	83	CI Intermediate Plasticity
WS3		D	3.00	-		14.9	41	17	24	82	CI Intermediate Plasticity
WS3		D	4.00	-		16.7	43	19	24	80	CI Intermediate Plasticity
WS5		D	1.00	-		13.7	46	17	29	86	CI Intermediate Plasticity
WS5		D	2.00	-		30.1	74	22	52	100	CV Very High Plasticity
WS5		D	3.20	-		14.6	46	16	30	79	CI Intermediate Plasticity
WS8		D	1.00	-		29.1	61	24	37	100	CH High Plasticity
WS9		D	1.00	-		32.6	74	25	49	100	CV Very High Plasticity
WS9		D	2.00	-		22.6	55	20	35	100	CH High Plasticity
WS9		D	3.00	-		28.1	57	21	36	100	CH High Plasticity
				-							
				-							
				-							
				-							
				-							
				-							
				-							
				-							
				-							
				-							
				-							

SYMBOLS : NP = Non Plastic **NB: All liquid limits are 4 point and wet sieved**

PLASTICITY CHART
BS EN ISO 14688-2:2018 Clause 4.4



***For sample descriptions please see sample descriptions sheet**

Operator
Clayton. J

GSTL GEOTECHNICAL SITE & TESTING LABORATORIES

Saturation Moisture Content of Chalk

BS 1377 : Part 2 : 1990 Section 3.3

Contract Number	78849
Project Name	Ladds Garden Centre, Bath Road, Hare Hatch, RG10 9SB
Date Tested	21/05/2025

Hole Reference	Sample Number	Sample Type	Depth (m)			Moisture Content	Bulk Density	Dry Density	Saturated Moisture Content	Remarks
WS1		D	3.00	-		32	1.85	1.40	34	NON-STANDARD
WS2		D	4.00	-		31	1.88	1.44	33	NON-STANDARD
WS4		D	3.00	-		23	1.90	1.54	28	NON-STANDARD
WS5		D	4.00	-		25	1.95	1.56	27	NON-STANDARD

Key	Reported As	Clause
Moisture Content	%	3.2
Bulk Density	Mg/m^3	7.2
Dry Density	Mg/m^3	7.2
SMC	%	3.3.6

If there is a NON-STANDARD in the remarks next to the reported SMC result this means there was no lump of chalk of sufficient volume (300mL-500mL) present in the samples received to meet the testing requirements of the stated standard.

Operator
Julian Jones

Dynamic Cone Penetrometer

Project:	**Ladds Garden Centre, Bath Road, Hare Hatch, RG10 9SB**	Project No: **24-304.01**	DCP Location: **DCP1**
Client:	**Westbourne Homes Limited**	Operator: **OC**	Date: **22/05/2025**
Surface Conditions & Observations: **Dry**		Zero Error (mm): **30**	Approx AOD (m):

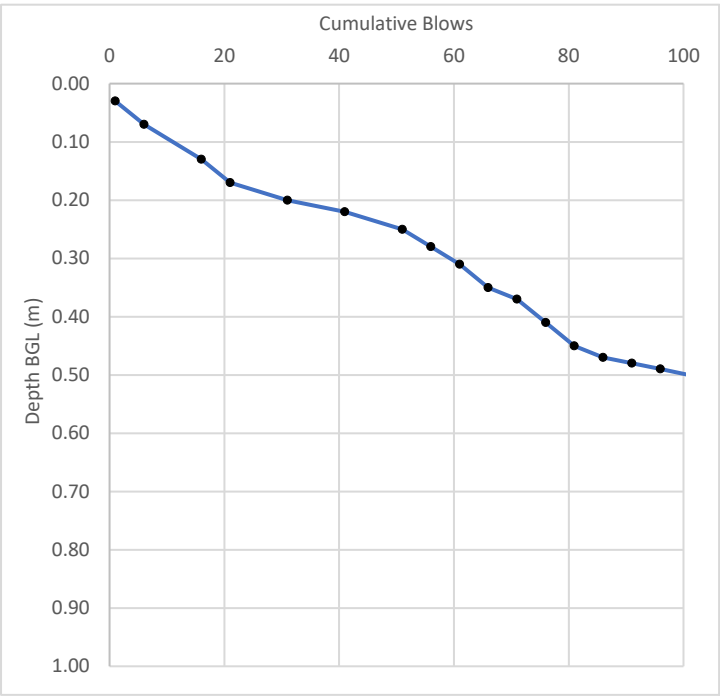
Blows	Cumulative Blows	Cumulative Penetration Depth (mm)	Depth Bgl (m)	AOD (m)	Penetration Rate (mm/blow)	CBR Value (%)
0		40	0.010	-0.010		
1	1	60	0.030	-0.030	20.0	12.7
5	6	100	0.070	-0.070	8.0	33.5
10	16	160	0.130	-0.130	6.0	45.4
5	21	200	0.170	-0.170	8.0	33.5
10	31	230	0.200	-0.200	3.0	94.6
10	41	250	0.220	-0.220	2.0	145.1
10	51	280	0.250	-0.250	3.0	94.6
5	56	310	0.280	-0.280	6.0	45.4
5	61	340	0.310	-0.310	6.0	45.4
5	66	380	0.350	-0.350	8.0	33.5
5	71	400	0.370	-0.370	4.0	69.8
5	76	440	0.410	-0.410	8.0	33.5
5	81	480	0.450	-0.450	8.0	33.5
5	86	500	0.470	-0.470	4.0	69.8
5	91	510	0.480	-0.480	2.0	145.1
5	96	520	0.490	-0.490	2.0	145.1
5	101	530	0.500	-0.500	2.0	145.1
5	106	570	0.540	-0.540	8.0	33.5
5	111	600	0.570	-0.570	6.0	45.4
5	116	640	0.610	-0.610	8.0	33.5
5	121	665	0.635	-0.635	5.0	55.1
3	124	690	0.660	-0.660	8.3	32.1
3	127	710	0.680	-0.680	6.7	40.7
3	130	750	0.720	-0.720	13.3	19.5
3	133	790	0.760	-0.760	13.3	19.5
3	136	820	0.790	-0.790	10.0	26.5
3	139	860	0.830	-0.830	13.3	19.5
1	140	900	0.870	-0.870	40.0	6.1
1	141	910	0.880	-0.880	10.0	26.5
1	142	920	0.890	-0.890	10.0	26.5
1	143	930	0.900	-0.900	10.0	26.5

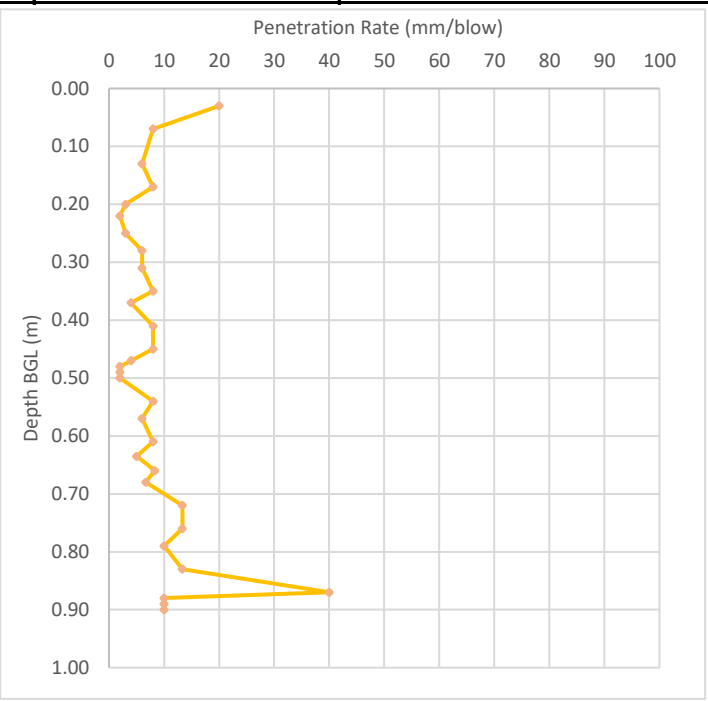
TRRL Road Note 8 Equation: Log_{10} (CBR) = 2.48 - 1.057 Log_{10} (mm/blow)

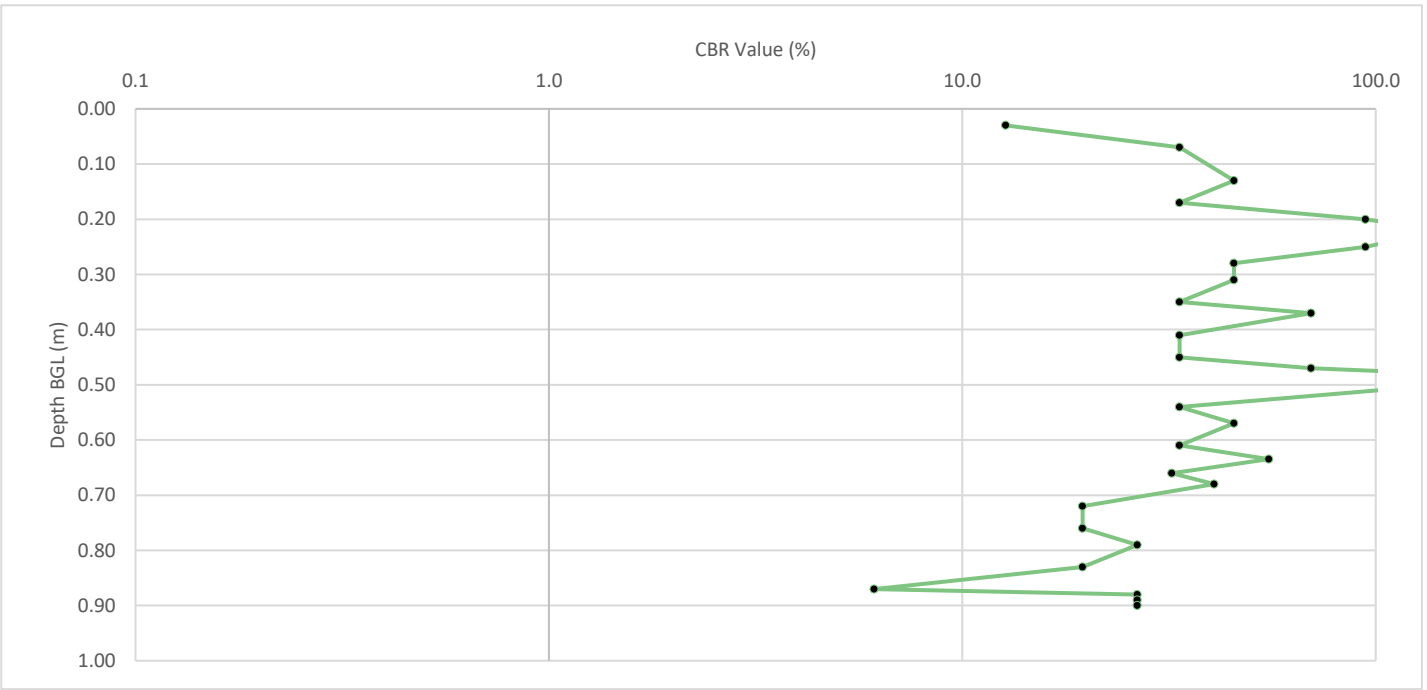
Cone Angle 60°

Dynamic Cone Penetrometer

Project:	**Ladds Garden Centre, Bath Road, Hare Hatch, RG10 9SB**	Project No: **24-304.01**	DCP Location: **DCP1**
Client:	**Westbourne Homes Limited**	Operator: **OC**	Date: **22/05/2025**
Surface Conditions & Observations: **Dry**		Zero Error (mm): **30**	Approx AOD (m):







Dynamic Cone Penetrometer

Project:	**Ladds Garden Centre, Bath Road, Hare Hatch, RG10 9SB**	Project No: **24-304.01**	DCP Location: **DCP2**
Client:	**Westbourne Homes Limited**	Operator: **OC**	Date: **22/05/2025**
Surface Conditions & Observations: **Dry**		Zero Error (mm): **30**	Approx AOD (m):

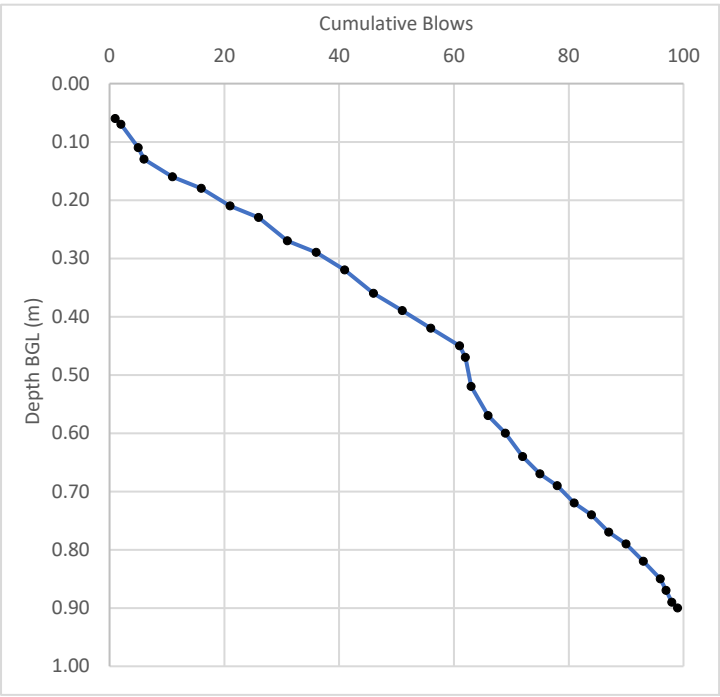
Blows	Cumulative Blows	Cumulative Penetration Depth (mm)	Depth Bgl (m)	AOD (m)	Penetration Rate (mm/blow)	CBR Value (%)
0		60	0.030	-0.030		
1	1	90	0.060	-0.060	30.0	8.3
1	2	100	0.070	-0.070	10.0	26.5
3	5	140	0.110	-0.110	13.3	19.5
1	6	160	0.130	-0.130	20.0	12.7
5	11	190	0.160	-0.160	6.0	45.4
5	16	210	0.180	-0.180	4.0	69.8
5	21	240	0.210	-0.210	6.0	45.4
5	26	260	0.230	-0.230	4.0	69.8
5	31	300	0.270	-0.270	8.0	33.5
5	36	320	0.290	-0.290	4.0	69.8
5	41	350	0.320	-0.320	6.0	45.4
5	46	390	0.360	-0.360	8.0	33.5
5	51	420	0.390	-0.390	6.0	45.4
5	56	450	0.420	-0.420	6.0	45.4
5	61	480	0.450	-0.450	6.0	45.4
1	62	500	0.470	-0.470	20.0	12.7
1	63	550	0.520	-0.520	50.0	4.8
3	66	600	0.570	-0.570	16.7	15.4
3	69	630	0.600	-0.600	10.0	26.5
3	72	670	0.640	-0.640	13.3	19.5
3	75	700	0.670	-0.670	10.0	26.5
3	78	720	0.690	-0.690	6.7	40.7
3	81	750	0.720	-0.720	10.0	26.5
3	84	770	0.740	-0.740	6.7	40.7
3	87	800	0.770	-0.770	10.0	26.5
3	90	820	0.790	-0.790	6.7	40.7
3	93	850	0.820	-0.820	10.0	26.5
3	96	880	0.850	-0.850	10.0	26.5
1	97	900	0.870	-0.870	20.0	12.7
1	98	920	0.890	-0.890	20.0	12.7
1	99	930	0.900	-0.900	10.0	26.5

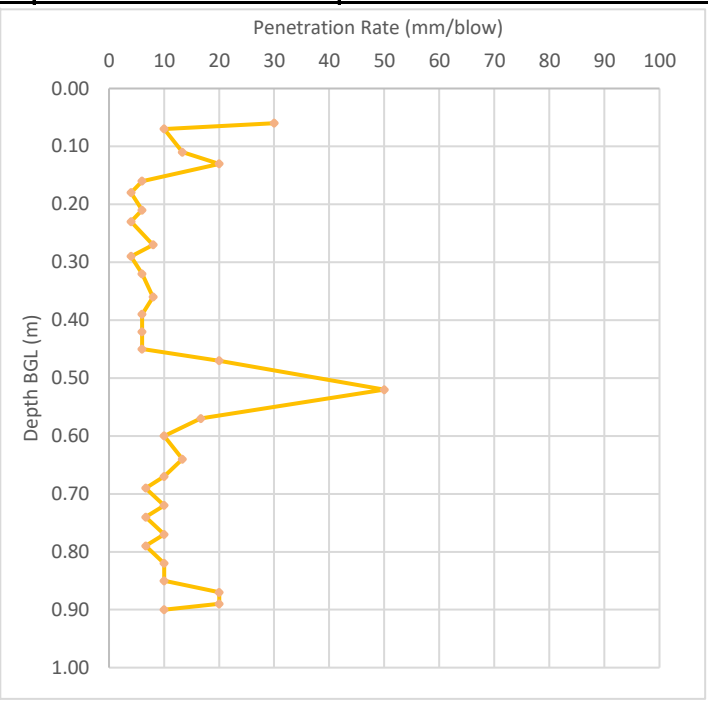
TRRL Road Note 8 Equation: Log_{10} (CBR) = 2.48 - 1.057 Log_{10} (mm/blow)

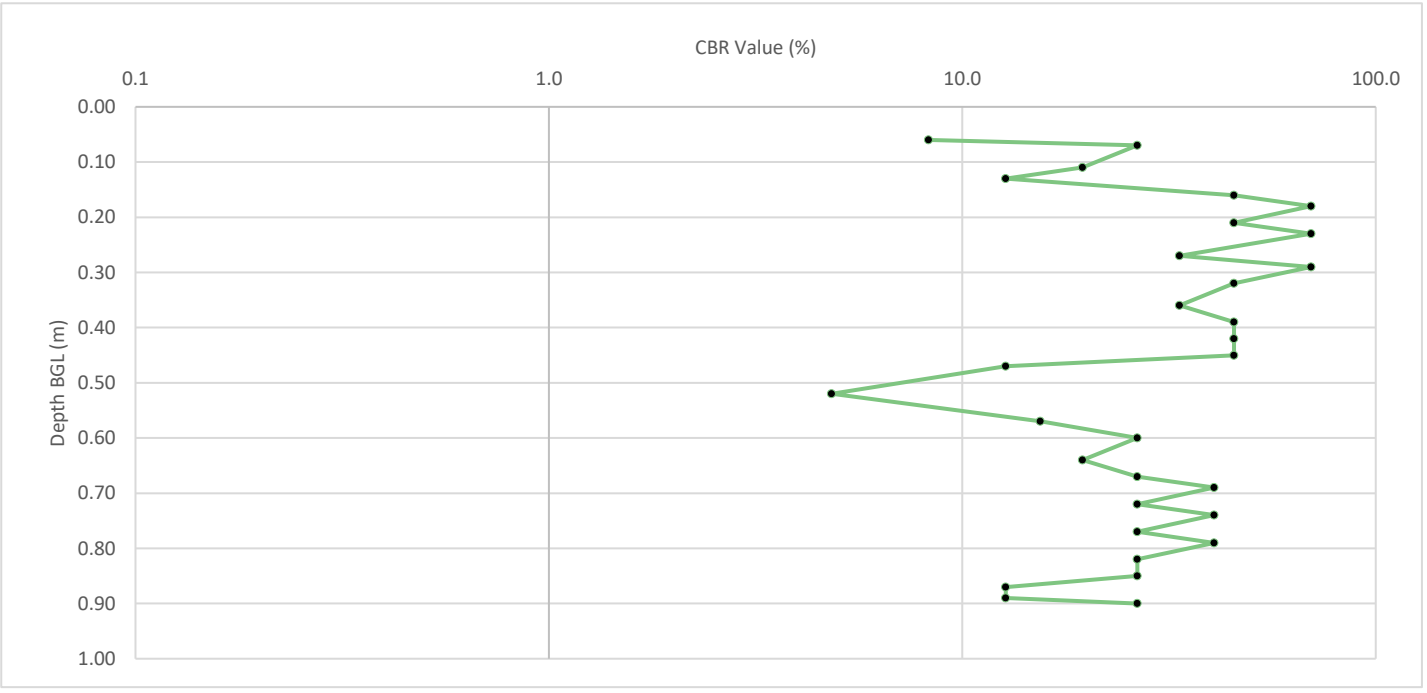
Cone Angle 60°

Dynamic Cone Penetrometer

Project:	**Ladds Garden Centre, Bath Road, Hare Hatch, RG10 9SB**	Project No: **24-304.01**	DCP Location: **DCP2**
Client:	**Westbourne Homes Limited**	Operator: **OC**	Date: **22/05/2025**
Surface Conditions & Observations: **Dry**		Zero Error (mm): **30**	Approx AOD (m):







Dynamic Cone Penetrometer

Project:	**Ladds Garden Centre, Bath Road, Hare Hatch, RG10 9SB**	Project No: **24-304.01**	DCP Location: **DCP3**
Client:	**Westbourne Homes Limited**	Operator: **OC**	Date: **22/05/2025**
Surface Conditions & Observations: **Dry**		Zero Error (mm): **30**	Approx AOD (m):

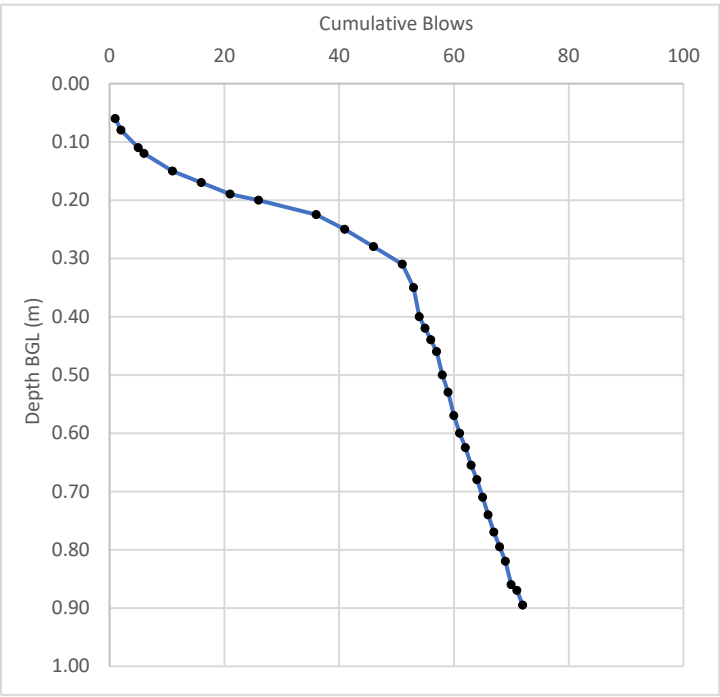
Blows	Cumulative Blows	Cumulative Penetration Depth (mm)	Depth Bgl (m)	AOD (m)	Penetration Rate (mm/blow)	CBR Value (%)
0		70	0.040	-0.040		
1	1	90	0.060	-0.060	20.0	12.7
1	2	110	0.080	-0.080	20.0	12.7
3	5	140	0.110	-0.110	10.0	26.5
1	6	150	0.120	-0.120	10.0	26.5
5	11	180	0.150	-0.150	6.0	45.4
5	16	200	0.170	-0.170	4.0	69.8
5	21	220	0.190	-0.190	4.0	69.8
5	26	230	0.200	-0.200	2.0	145.1
10	36	255	0.225	-0.225	2.5	114.7
5	41	280	0.250	-0.250	5.0	55.1
5	46	310	0.280	-0.280	6.0	45.4
5	51	340	0.310	-0.310	6.0	45.4
2	53	380	0.350	-0.350	20.0	12.7
1	54	430	0.400	-0.400	50.0	4.8
1	55	450	0.420	-0.420	20.0	12.7
1	56	470	0.440	-0.440	20.0	12.7
1	57	490	0.460	-0.460	20.0	12.7
1	58	530	0.500	-0.500	40.0	6.1
1	59	560	0.530	-0.530	30.0	8.3
1	60	600	0.570	-0.570	40.0	6.1
1	61	630	0.600	-0.600	30.0	8.3
1	62	655	0.625	-0.625	25.0	10.1
1	63	685	0.655	-0.655	30.0	8.3
1	64	710	0.680	-0.680	25.0	10.1
1	65	740	0.710	-0.710	30.0	8.3
1	66	770	0.740	-0.740	30.0	8.3
1	67	800	0.770	-0.770	30.0	8.3
1	68	825	0.795	-0.795	25.0	10.1
1	69	850	0.820	-0.820	25.0	10.1
1	70	890	0.860	-0.860	40.0	6.1
1	71	900	0.870	-0.870	10.0	26.5
1	72	925	0.895	-0.895	25.0	10.1

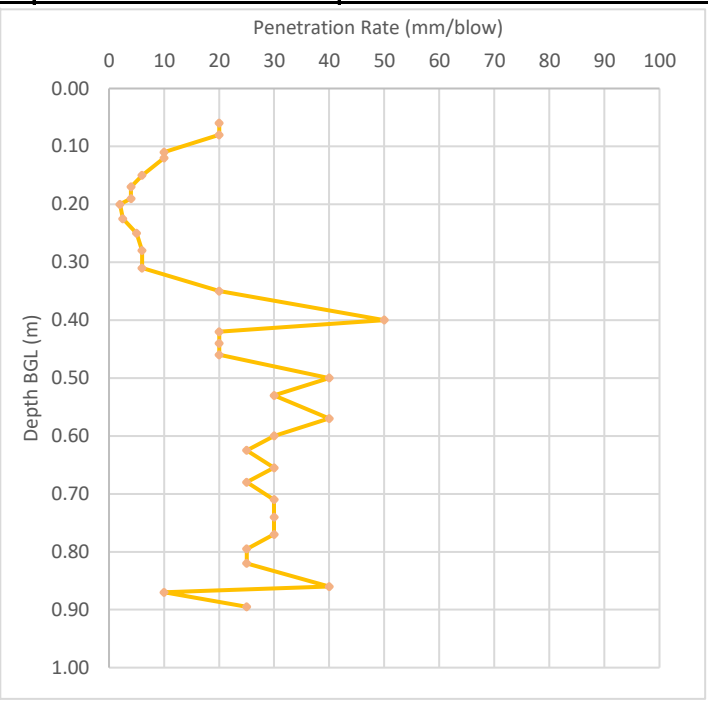
TRRL Road Note 8 Equation: Log_{10} (CBR) = 2.48 - 1.057 Log_{10} (mm/blow)

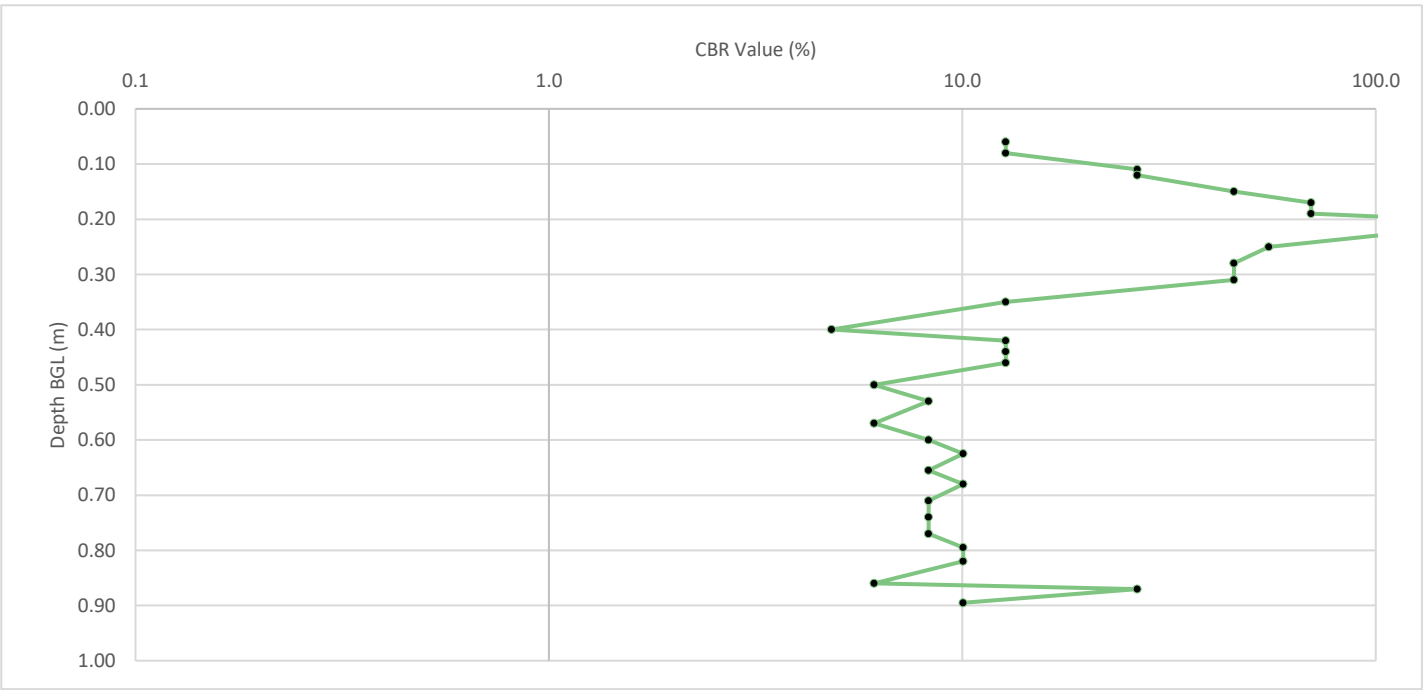
Cone Angle 60°

Dynamic Cone Penetrometer

Project:	**Ladds Garden Centre, Bath Road, Hare Hatch, RG10 9SB**	Project No: **24-304.01**	DCP Location: **DCP3**
Client:	**Westbourne Homes Limited**	Operator: **OC**	Date: **22/05/2025**
Surface Conditions & Observations: **Dry**		Zero Error (mm): **30**	Approx AOD (m):







Dynamic Cone Penetrometer

Project:	**Ladds Garden Centre, Bath Road, Hare Hatch, RG10 9SB**	Project No: **24-304.01**	DCP Location: **DCP4**
Client:	**Westbourne Homes Limited**	Operator: **OC**	Date: **22/05/2025**
Surface Conditions & Observations: **Dry**		Zero Error (mm): **30**	Approx AOD (m):

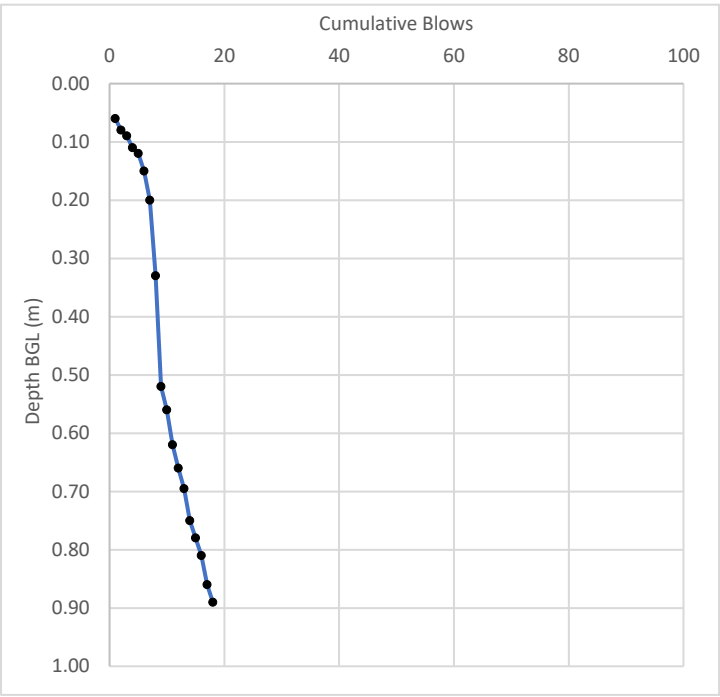
Blows	Cumulative Blows	Cumulative Penetration Depth (mm)	Depth Bgl (m)	AOD (m)	Penetration Rate (mm/blow)	CBR Value (%)
0		60	0.030	-0.030		
1	1	90	0.060	-0.060	30.0	8.3
1	2	110	0.080	-0.080	20.0	12.7
1	3	120	0.090	-0.090	10.0	26.5
1	4	140	0.110	-0.110	20.0	12.7
1	5	150	0.120	-0.120	10.0	26.5
1	6	180	0.150	-0.150	30.0	8.3
1	7	230	0.200	-0.200	50.0	4.8
1	8	360	0.330	-0.330	130.0	1.8
1	9	550	0.520	-0.520	190.0	1.2
1	10	590	0.560	-0.560	40.0	6.1
1	11	650	0.620	-0.620	60.0	4.0
1	12	690	0.660	-0.660	40.0	6.1
1	13	725	0.695	-0.695	35.0	7.0
1	14	780	0.750	-0.750	55.0	4.4
1	15	810	0.780	-0.780	30.0	8.3
1	16	840	0.810	-0.810	30.0	8.3
1	17	890	0.860	-0.860	50.0	4.8
1	18	920	0.890	-0.890	30.0	8.3

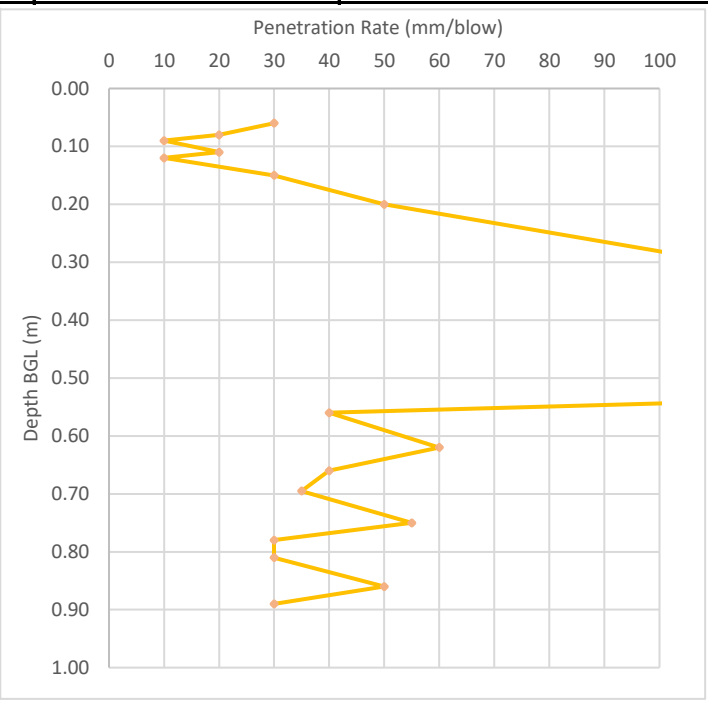
TRRL Road Note 8 Equation: Log_{10} (CBR) = 2.48 - 1.057 Log_{10} (mm/blow)

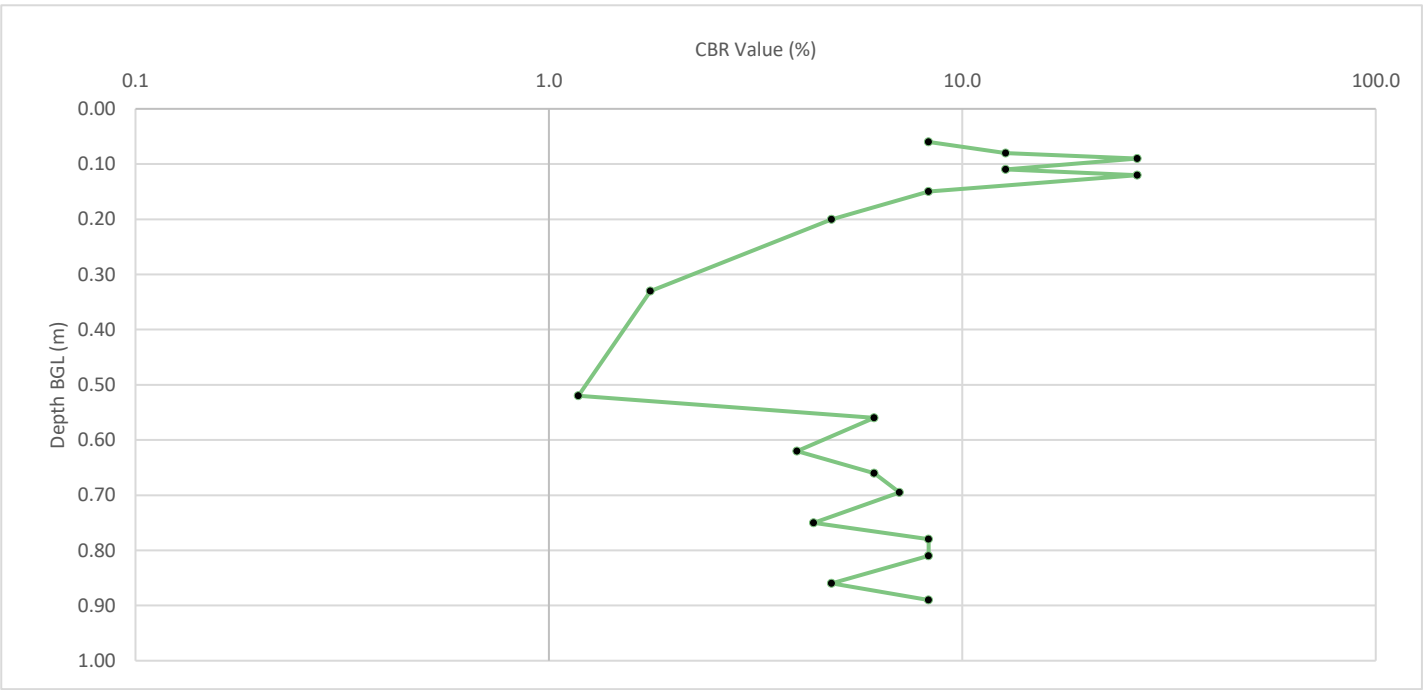
Cone Angle 60°

Dynamic Cone Penetrometer

Project:	**Ladds Garden Centre, Bath Road, Hare Hatch, RG10 9SB**	Project No: **24-304.01**	DCP Location: **DCP4**
Client:	**Westbourne Homes Limited**	Operator: **OC**	Date: **22/05/2025**
Surface Conditions & Observations: **Dry**		Zero Error (mm): **30**	Approx AOD (m):







Dynamic Cone Penetrometer

Project:	**Ladds Garden Centre, Bath Road, Hare Hatch, RG10 9SB**	Project No: **24-304.01**	DCP Location: **DCP5**
Client:	**Westbourne Homes Limited**	Operator: **OC**	Date: **22/05/2025**
Surface Conditions & Observations: **Dry**		Zero Error (mm): **30**	Approx AOD (m):

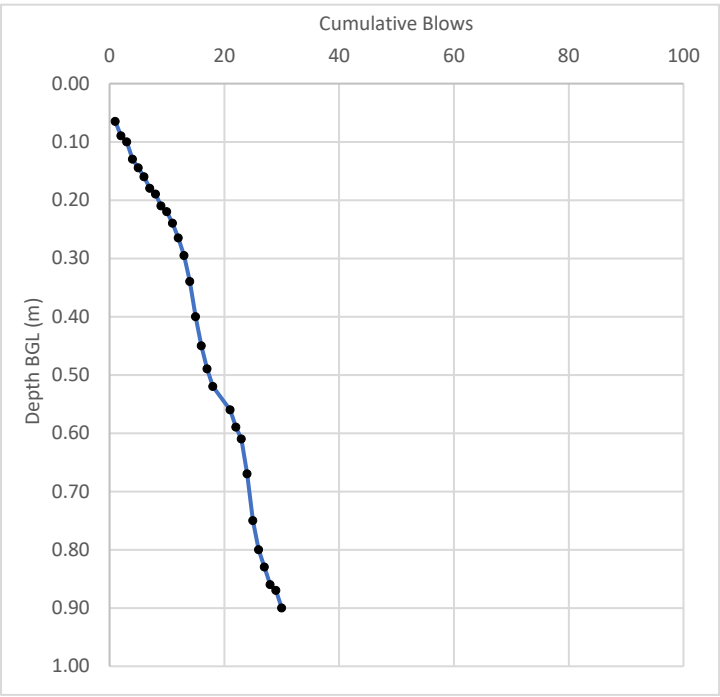
Blows	Cumulative Blows	Cumulative Penetration Depth (mm)	Depth Bgl (m)	AOD (m)	Penetration Rate (mm/blow)	CBR Value (%)
0		50	0.020	-0.020		
1	1	95	0.065	-0.065	45.0	5.4
1	2	120	0.090	-0.090	25.0	10.1
1	3	130	0.100	-0.100	10.0	26.5
1	4	160	0.130	-0.130	30.0	8.3
1	5	175	0.145	-0.145	15.0	17.3
1	6	190	0.160	-0.160	15.0	17.3
1	7	210	0.180	-0.180	20.0	12.7
1	8	220	0.190	-0.190	10.0	26.5
1	9	240	0.210	-0.210	20.0	12.7
1	10	250	0.220	-0.220	10.0	26.5
1	11	270	0.240	-0.240	20.0	12.7
1	12	295	0.265	-0.265	25.0	10.1
1	13	325	0.295	-0.295	30.0	8.3
1	14	370	0.340	-0.340	45.0	5.4
1	15	430	0.400	-0.400	60.0	4.0
1	16	480	0.450	-0.450	50.0	4.8
1	17	520	0.490	-0.490	40.0	6.1
1	18	550	0.520	-0.520	30.0	8.3
3	21	590	0.560	-0.560	13.3	19.5
1	22	620	0.590	-0.590	30.0	8.3
1	23	640	0.610	-0.610	20.0	12.7
1	24	700	0.670	-0.670	60.0	4.0
1	25	780	0.750	-0.750	80.0	2.9
1	26	830	0.800	-0.800	50.0	4.8
1	27	860	0.830	-0.830	30.0	8.3
1	28	890	0.860	-0.860	30.0	8.3
1	29	900	0.870	-0.870	10.0	26.5
1	30	930	0.900	-0.900	30.0	8.3

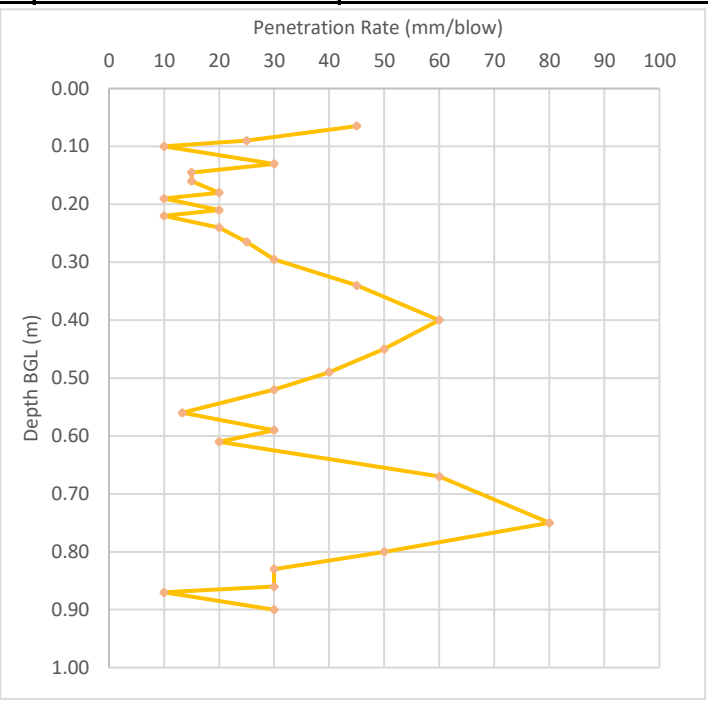
TRRL Road Note 8 Equation: Log_{10} (CBR) = 2.48 - 1.057 Log_{10} (mm/blow)

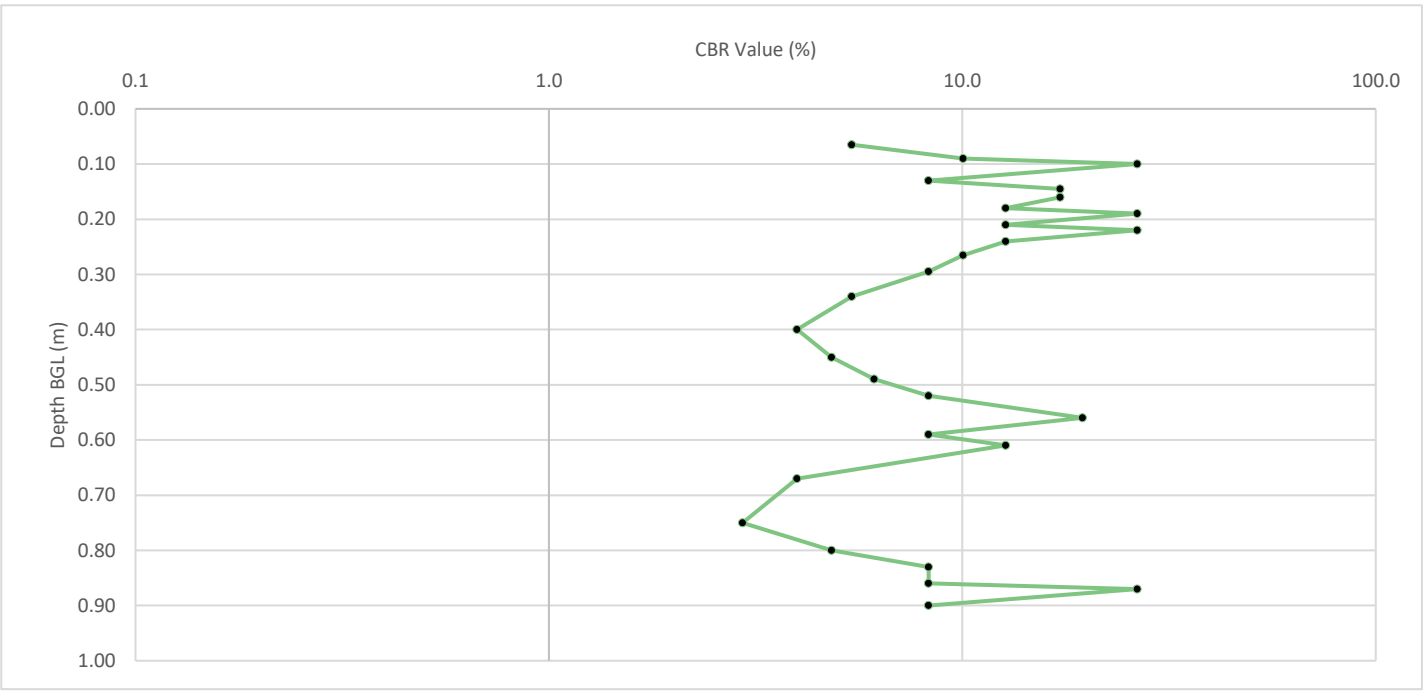
Cone Angle 60°

Dynamic Cone Penetrometer

Project:	**Ladds Garden Centre, Bath Road, Hare Hatch, RG10 9SB**	Project No: **24-304.01**	DCP Location: **DCP5**
Client:	**Westbourne Homes Limited**	Operator: **OC**	Date: **22/05/2025**
Surface Conditions & Observations: **Dry**		Zero Error (mm): **30**	Approx AOD (m):







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AVIRON ASSOCIATES LIMITED
Badgemore House
Badgemore Park
Gravel Hill
Henley on Thames
Oxfordshire
RG9 4NR
TELEPHONE: 07787 771 686 / 01491 413 722
FAX : 01491 413 722
ENQUIRIES: james@aviron.co.uk
WEB: www.aviron.co.uk