



HALFORDS PARK, HALFORDS LANE, SMETHWICK B66 1EL PHASE I AND PHASE II GEOTECHNICAL ASSESSMENT ENVIRONMENT AGENCY 19<sup>TH</sup> FEBRUARY 2024 LS7367 Г



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Site:	HALFORDS PARK, HALFORDS LANE, SMETHWICK B66 1EL				
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#### **1.0 EXECUTIVE SUMMARY**

This summary is a brief precis of the main findings and conclusions of the investigation. For detailed information, the reader is referred to the main report.

The area under investigation comprised the northern border of the car park for the Environment Agency Halfords Park Depot. The proposed development was understood to comprise new automatic gates to Halfords Park depot. The intrusive investigation included 2no. Dynamic sampler boreholes with associated probing.

Strata	Base Depth range	Summary
Hardstanding	0.15-0.20mbgl	Reinforced concrete (DS01) and asphalt (DS02).
Made Ground	0.70-0.80mbgl	A dark brown/brown/reddish, sandy, GRAVEL and CLAY
		with red brick, sandstone, clinker and carbonaceous
		material.
Glaciofluvial	2.70-3.00mbgl+	Orange-brown to reddish brown, slightly gravelly, clayey
Deposits		SAND with occasional bands of gravels and cobbles.
Enville Member	3.00mbgl+	Reddish brown slightly sandy, slightly gravelly CLAY.

Groundwater was recorded in DS02 standing at a level of 0.80mbgl after 40 minutes.

A single continuous reinforced concrete strip foundation spanning the width of the new gate is recommended, designed to 40kN/m2 at a minimum depth of 0.75mbgl on the natural strata. The formation will be non-frost susceptible and a low volume change potential.

Excavations are generally likely to be unstable. Excavations below the water table may become highly unstable.

Pavements may be formed on either the Made Ground or the Glaciofluvial Deposits. CBR value of 3% recommended for the natural strata, which is classified as being frost susceptible.

Buried structural concrete may be designed to DS-1 and AC-1 in accordance with BS8500.

Chemical results on Made Ground corresponded to Non-hazardous Waste classification. Natural soils are anticipated to generally be Inert Waste.



#### 2.0 INTRODUCTION

#### 2.1 General

Land Science was instructed to undertake a combined Phase I and Phase II Geotechnical Assessment in relation to construction of new automatic gates at Halfords Park, Halfords Lane, Smethwick B66 1EL. The location is shown on Figure 1, which is centred at grid reference SP 02294 89586.

#### 2.2 Client

The Client for this appointment was the Environment Agency. This report may only be used by this named client and their project team for the purposes set out and subject to the report conditions. It was understood that the Client already owned the property, and that this investigation was not a pre-purchase appraisal.

#### 2.3 Area Under Investigation

The area under investigation comprised the northern border of the car park for the Environment Agency Halfords Park Depot. The layout is indicated on Figure 2, and a walkover survey is presented in section 3.0. The area was approximately 0.16 hectares.

#### 2.4 Proposed Development

The proposed development was understood to comprise new automatic gates to Halfords Park depot. Figure 3 illustrates the layout of the proposed redevelopment. The findings of this report may be not valid if the proposed development is altered.

#### 2.5 Previous Investigations

Land Science was not aware of any previous desk studies or ground investigation(s) for this project.

#### 2.6 Scope of Work

The work carried out is described in detail in following sections but in summary included:

- A site setting desk study.
- An intrusive investigation comprising dynamic sampler boreholes with associated dynamic probing.
- Preliminary geotechnical testing of selected soil in the field and laboratory
- Preliminary chemical testing of selected soil in the laboratory.

The fieldwork was conducted on 5<sup>th</sup> January 2024, under the supervision of Land Science.

#### 2.7 Geotechnical Objectives

An interpretive Ground Investigation Report (GIR) was required in order to provide an assessment of ground conditions with respect to possible foundation options, design parameters for shallow



foundations, soil shrinkability, frost susceptibility, concrete specification, pavement design, and excavation stability.

#### 2.8 Standards

Where practicable, the investigation was undertaken in accordance with the following primary standards and guidance:

- BS 5930:2015 Code of Practice for Site Investigations
- BS 1377:2018 Soils for Civil Engineering Purposes
- BS 8004:2015 Code of Practice for Foundations
- BS EN 1997-2:2007. Eurocode 7: Geotechnical Design Part 2: Ground Investigation and testing.

Other technical sources have been cited in respect of specific aspects of the investigation, as referenced throughout the text.



#### 3.0 WALKOVER SURVEY

#### 3.1 General

A walkover survey was carried out to order to provide an assessment of the existing site conditions and to identify potential areas of concern, with photographs in Appendix B.

#### 3.2 Site Description

In summary, the area under investigation comprised asphalt and concrete car parking/yard areas associated with the adjacent Environment Agency depot. The site was bounded by metal palisade security fencing with lighting, and a double leaf hinged gate giving access to the depot. No cracking or instability were noted around the gate area.

#### 3.3 Neighbouring Land

Neighbouring land comprised primarily warehouses and yard/parking areas to the north and west. A business centre with habitable apartments were noted to the south, and residential properties to the east beyond *Halfords Lane*.

#### **3.4** Geo-Environmental Conditions

The walkover survey did not identify any areas of particular concern regarding the geo-environmental condition of the site. No significant evidence of tanks, chemical storage, staining or sheens, bult up ground, contaminative land uses etc, were noted.

#### 3.5 Geotechnical Conditions

The walkover survey did not identify any areas of particular concern regarding the geotechnical condition of the site. No trees or significant evidence of underground structures, ground instability, subsidence, wet areas, significant earthworks, etc, were noted.



#### 4.0 DESK STUDY

#### 4.1 General

A desk study was carried out to inform the preliminary conceptual understanding of the site and its setting, and to identify potential aspects of concern, in the context of the stated report objectives.

#### 4.2 Historical Mapping

Various historical records were reviewed to assess potential historical land uses and activities that may impact on ground conditions at the site.

Free historic maps were reviewed online and the following key features were noted:

- The earliest map dated 1840-1880s showed the site to comprise an open, undeveloped field in the district of *Sandwell Place*.
- The 1892-1914 mapping showed the field to be repurposed as a recreational sporting area (football ground).
- The 1952 map showed the site to be redeveloped as an unspecified industrial facility.

Off site, the following key features were identified:

- Residential dwellings to the east remained in a broadly similar layout since the 1890 map in addition to the railway lines to the north running from west-northwest to east-southeast. Area to the immediate north, west and south were redeveloped as an industrial area between 1890 and 1952.
- The historical map set included aerial photograph dated 1948. The imagery showed the site location comprised industrial facilities. A colliery was noted within 500m to the northwest.

#### 4.3 Aerial Imagery

Recent aerial photography covering the site was examined using Google Earth Pro. By 1999 the area is considered to be redeveloped with some of the industrial buildings being partially demolished with concrete remaining. By 2001 the depot and parking area on site was constructed and remained in the same layout until the present day. The surrounding area was noted to be redeveloped between 2001 and 2009.



#### 4.4 Ground Conditions

A preliminary ground model was derived for the site by based on a combination of various sources including published maps, borehole records, previous investigations, and the site history. In summary, the following potential ground model was identified:

Strata	Approximate Depth (mbgl)	Summary Description
Made Ground	1.00	The site has been subject to previous development and there is a potential for construction and demolition wastes, imported fill materials, and zones of disturbed ground, etc.
Glaciofluvial Deposits	3.00	Includes mostly coarse-grained sediments (i.e. sand and gravel) with some finer-grained layers (i.e. clay and silt). Sand and gravel, locally with lenses of silt, clay or organic material.
Enville Member	To depth	Red mudstone and red-brown, fine- to coarse-grained sandstone, locally pebbly, and lenticular beds of conglomerate. Sandstone mostly sublitharenite; conglomerate clasts mostly Carboniferous limestone and chert.

In addition, groundwater was anticipated, as follows:

• Perched water – in granular soils upon cohesive soil of the Glaciofluival Deposits.

#### 4.5 Geological Hazards

The desk study included searches of geological hazards. None of the hazards were rated as moderate or above, considered the screening threshold for further investigation.

A search of various databases for coal mining, mining, brine compensation, and natural cavities was carried-out. No relevant features were identified, except the following:

• Coal Mining Affected Areas - In an area which may be affected by coal mining activity. Mining of coal and lignite within 250m between 1890 and 1947.

#### 4.6 Environmental Setting

- Superficial aquifer: The Glaciofluvial Deposits strata was classified as a Secondary A Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.
- Bedrock aquifer: The Enville Member strata was classified as a Secondary A Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.
- Source protection zone: None no groundwater Source Protection Zones were identified on site or in the vicinity. A SPZ 'III' defined as the total area needed to support the abstraction within 250m) was located 200m to the south east.
- Flooding from Rivers and Sea: Zone 1 Low Probability Land having a less than 1 in 1,000 annual probability of river or sea flooding.



- Surface water flooding on site: Very low risk each year this area has a chance of flooding of less than 0.1%. Flooding from surface water is difficult to predict as rainfall location and volume are difficult to forecast. In addition, local features can greatly affect the chance and severity of flooding.
- Groundwater flooding on site: Unlikely to occur on site.

#### 4.7 Radon Gas

The requirement for Radon Protection Measures (RPM) has been assessed in accordance with BRE 211:2015. Public Health England and the BGS estimate the potential for radon and the requirement for Radon Protection Measures on site as follows:

- Radon probability: Not at risk less than 1% of homes are estimated by PHE to exceed the threshold for Radon gas in residential dwellings.
- Radon Protection Measures (RPM): No Radon protection is required for new dwellings or extensions constructed at this location.
- Commercial premises: On the basis that exposure limits for residential properties are more stringent than work spaces, it is concluded that no protection measures would be required for a commercial development at this site.

#### 4.8 UXO Risk Assessment

Free online maps suggest the risk from UXO might be moderate. It is recommended that a stage I UXO risk assessment is obtained from a specialist consultant. It may be necessary to consider UXO safety briefing for groundworkers on site.



#### 5.0 INTRUSIVE INVESTIGATION

#### 5.1 Investigation Rationale

Based on the geotechnical objectives, the intrusive investigation was based on the following strategy:

- Dynamic sampler boreholes were used to minimise disruption to the site.
- Dynamic probing was used to build a ground profile with depth.
- The positions were located near the footprint of the proposed development.

Position	Provisional Depth / strata	Existing Location	Proposed Location	Testing, installations etc
DS01	3.00mbgl	Car park (Yard area)	Car park (Yard area)	DP, HP
DS02	3.00mbgl			DP, HP

#### 5.2 Geotechnical Strategy

Geotechnical aspects were investigated based on the following strategy:

Area of Concern	Investigation	Position(s)		
Shallow soil	Shallow exploratory holes located in and around the proposed	All		
conditions	development footprint			
Shrinkable soils	Plasticity index and particle size testing was scheduled to	All		
	determine the shrinkability and percentage passing 425µm sieve.			
Sulphate	Representative samples from relevant depths were scheduled for	All		
	analysis of pH value and water soluble Sulphate.			
Frost	Samples were submitted for plasticity index (cohesive) or particle	All		
susceptibility	size distribution (granular) to determine frost susceptibility.			
Groundwater	Observations on the occurrence of water and standing levels were			
	to be made during the fieldwork.			
Waste	For preliminary waste classification, representative samples were	DS01		
classification	to be screened for contaminants and full hazardous waste			
	leachate testing performed.			

#### 5.3 Enabling Works

Hardstanding (asphalt and reinforced concrete) were broken out in both positions using a hand-held JCB hydraulic breaker.

#### 5.4 Dynamic (Windowless) Sampling (DS)

Dynamic Sampling entails 1m long hollow tubes with liners driven into the ground and retracted to obtain samples. The liners are split, logged, tested, and subsampled as required.



#### 5.5 Dynamic Probing (DP)

Dynamic Probing involves driving a cone point using a percussive hammer and recording the number of blows required for each increment of penetration. The particular testing method employed was DPSH-A as prescribed under BS EN 1997-:2004 and EN ISO 22476-2.

#### 5.6 Hand Penetrometer (HP)

Hand penetrometer tests were performed on samples of cohesive materials recovered within the boreholes. The test is used to approximate undrained shear strength and in turn has been used to give an indication of consistency as defined in BS5930.

#### 5.7 Soil Sampling

Soil samples were recovered from the exploratory holes during the ground investigation and stored/transported in containers appropriate for the laboratory testing undertaken. Sample types and depths are recorded on the relevant exploratory hole records.

#### 5.8 Groundwater Sampling

Groundwater samples were recovered from the wells using dedicated bailers and stored/transported in containers appropriate for the laboratory testing undertaken.



#### 6.0 **GROUND CONDITIONS**

#### 6.1 General

The expected ground conditions were anticipated to comprise Made Ground over Glaciofluvial Deposits over Enville Member strata to depth. The investigation confirmed the anticipated ground conditions. A thin capping of hardstanding was encountered at surface.

A summary of the encountered conditions is presented below.

Strata	Base Depth (mbgl)			
	DS01	DS02		
Hardstanding	0.20	0.15		
Made Ground	0.80	0.70		
Glaciofluvial Deposits	2.70	3.00+		
Enville Member	3.00+	-		

The naming of geological strata is tentative and should be used as a guide. Interpolation between or below investigation points should be treated with caution. The description of soils and rocks was in accordance with BS5930.

#### 6.2 Hardstanding

Positions DS01 and DS02 were located within the car park/yard area on site; asphalt and reinforced concrete was encountered to depths of between 0.15 and 0.20mbgl.

#### 6.3 Made Ground

Made Ground was encountered to depths of between 0.70 and 0.80mbgl and in summary comprised: Dark brown/brown/reddish, sandy, GRAVEL and CLAY with red brick, sandstone, clinker and carbonaceous material.

#### 6.4 Glaciofluvial Deposits

Glaciofluvial Deposits were encountered to depths of between 2.70 and 3.00mbgl and in summary comprised orange-brown to reddish-brown, slightly gravelly, clayey, SAND with occasional black mottling. Sands are fine. Gravels are subangular to rounded sandstone gravels occasionally calcareous with occasional bands of gravels and cobbles.

#### 6.5 Enville Member

Enville Member strata was encountered to depths of 3.00mbgl and in summary comprised stiff, reddish brown, black mottling, slightly sandy, slightly gravelly, CLAY with sandstone gravels, occasional calcareous fragments.

#### 6.6 Roots and Rootlets

No roots or rootlets were identified in the boreholes.



#### 6.7 Field Evidence of Contamination

No evidence of possible soil contamination (such as staining, malodours, or brightly coloured soils) was identified in the field. Made Ground was identified 0.70 to 0.80mbgl, and such materials may be imported from an unknown source or mixed with hazardous materials, and as such may contain a wide range of potential contaminants. All such materials should be treated as suspect unless proven otherwise. Preliminary testing has been carried out, as described in section 10.0.

#### 6.8 Groundwater

Groundwater was struck during the excavation of DS02 with short term standing water depths in the order of 1.75mbgl after 20 minutes and 0.80mbgl after 40 minutes.

The level of water in a borehole can be affected by the drilling process and speed of infiltration; short-term rest levels should be used with caution.

#### 6.9 Stability and Casing

DS02 collapsed to 2.80mbgl after completion, on account of water ingress. The boreholes were not cased.



#### 7.0 FIELD TESTING

#### 7.1 Super Heavy Dynamic Probing (SHDP)

The SHDP tests results are summarised below:



Note: gridlines shown are approximate and indicative only

#### 7.2 Hand Penetrometers (HP)

The Hand Penetrometer results are summarised below:

Strata	Base Depth Range	Results (kN/m <sup>2</sup> )	Consistency
Glaciofluvial Deposits	2.70 - 3.00+	75-200	Firm to Very Stiff
Enville Member	3.00+	187.5	Very Stiff



#### 8.0 GEOTECHNICAL LABORATORY TESTING

#### 8.1 Geotechnical Laboratory Testing

Samples were selected for geotechnical testing, based on the following rationale:

- For general classification purposes, representative cohesive natural samples of soil were analysed for 2no. 1pt Atterberg Limit (Plasticity Index) tests (PI).
- Moisture content (MC) determinations were carried out in association with the Atterberg limit tests.
- For general classification purposes, a representative sample of granular soils was selected for Particle Size Distribution by wet sieving (PSD).
- To determine the required concrete specification to resist chemical attack, a sample was tested for pH and soil soluble sulphate. (pH/SO4)
- A sample of groundwater were also tested for pH and total sulphate (pH/SO4).

Sample Strata Test MC PI PSD pH/SO4 DS01 – 0.85m Made Ground Х \_ --DS01 – 1.20m Glaciofluvial Deposits Х \_ Х \_ DS01 – 1.00m Water Х -DS02 – 0.80m **Glaciofluvial Deposits** Х Х \_ -Х Х DS02 – 1.20m \_ -

A summary of the testing scheduled is given below:

The results are discussed in the relevant sections.

#### 8.2 Particle Size Distribution

The results of the Particle Size Distribution analysis are summarised below.

Strata	No. of tests	% Clay/Silt	% Sand	% Gravel	% Cobbles
Glaciofluvial	1	16.1	46.4	37.6	0.0
Deposits (Granular)					

#### 8.3 Plasticity Indexes (Atterberg Limits)

The results of the Atterberg Limit tests are summarised below.

Strata	No. of tests	Plasticity Index %		
		Minimum	Maximum	Average
Glaciofluvial Deposits (Cohesive)	2	8.9	19.5	14.2



A modified plasticity index (PI') was calculated following the NHBC methodology, to account for any non-shrinkable percentage not passing the  $425\mu m$  sieve:

Strata	No. of tests	Modified Plasticity Index %		
		Minimum	Maximum	Average
Glaciofluvial Deposits (Cohesive)	2	6.4	15.0	10.7

#### 8.4 Water Content

The results of the water content (or *moisture content*) tests are summarised below.

Strata	No. of tests	Moisture content %			
		Minimum	Maximum	Average	
Glaciofluvial	2	15.5	16.2	15.9	
Deposits (Cohesive)					
Glaciofluvial	1	9.4	9.4	9.4	
Deposits (Granular)					

#### 8.5 pH and Sulphate

The results of the pH and water-soluble Sulphate tests are summarised on the following table.

Strata	No. of tests	Water soluble Sulphate (SO <sub>4</sub> g/l)	pH (value)
Made Ground	2	0.0548 - 0.0811	7.7 - 11.6
Groundwater	1	0.0334 (total Sulphate)	10.2



#### 9.0 GEOTECHNICAL ASSESSMENT

#### 9.1 General

The proposed development was understood to comprise construction of new automatic gates.

Groundwater seepage was struck at 1.80mbgl during the excavation of DS02 with a short-term standing water depth of 0.80mbgl after 40 minutes. Groundwater levels may vary seasonally and may also become perched.

The Glaciofluvial Deposits comprised a mixture of cohesive and granular material. Very soft strata encountered, extending to depths in the order of 1.40mbgl. The engineering characteristics of these materials are such that high total and differential settlements may occur at relatively light foundation bearing capacities.

The final foundation scheme will depend on other constraints and should be evolved in consultation with the design team. Based on the low bearing pressures and high settlements that may occur in shallow soil, and to prevent rotational movements, consideration might be given to a single continuous strip foundation across the full width of the gate.

#### 9.2 Volume Change Potential

The formation is classified as a low volume change potential. In the absence of trees, a minimum foundation depth of 0.75mbgl is recommended, to avoid issues with seasonal heave.

#### 9.3 Traditional Shallow Foundations

The following recommendations are made where traditional foundations are to be used.

The primary design parameter for shallow foundations is maximum net allowable bearing pressure, which takes into account a tolerable degree of settlement, and is dependent not only on soil conditions but also the foundation dimensions, ground levels, sloping ground, and the symmetry of loading, amongst others.

All traditional shallow foundations should be taken through any Made Ground, soft or loose zones, disturbed soils, major root zones, or desiccated materials and taken wholly into or onto the firm clayey sand of the Glaciofluvial Deposits strata.

A long narrow strip foundation, as described above, symmetrically loaded and up to a width of 1.00m, may be designed based on a maximum allowable net bearing pressure of 40 kN/m<sup>2</sup>.

This assessment includes an appropriate factor of safety against shear failure, and settlements should remain within appropriate limits. This figure should be sufficient for the type of construction proposed.

In general terms, settlement will be broadly proportional to loading. Under no circumstances should a safe bearing pressure be exceeded (at which point there is a risk of shear failure). Foundations should be subject to sensibly uniform loading, to minimise differential settlement.



Given the variability in engineering characteristics of the strata at the anticipated formation level, it is recommended that all foundations are lightly reinforced to account for potential differential settlements.

The Glaciofluvial Deposits strata will soften rapidly when exposed to free water. The final 50mm of any foundation trench should not be excavated until immediately before concreting, unless blinded or otherwise protected immediately after excavation.

#### 9.4 Excavations

The risks arising from excavation works should be properly assessed and appropriate safety precautions should be adopted. Reference may be made to various guidance including BS8000-1:1989, BS6031:2009 and CIRIA C97.

The likelihood of excavation instability through different strata has been assessed as summarised below. It should be noted that all open unsupported excavations have the potential to collapse.

Strata	Stability
Made	Generally unstable. May be battered back to a safe angle. Deeper excavations may
Ground	require trench support.
Glaciofluvial	Marginally stable in the short term. Spalling and collapse should be expected,
Deposits	particularly in long or deep excavations which are left open for prolonged periods.

Excavations which are to remain open for prolonged periods will require trench support.

All excavations taken beneath the water table are likely to become highly unstable. Significant collapse and over-dig expected. Dewatering and full-trench support may need to be considered.

It is considered that normal-rated plant and machinery will be sufficient for undertaking excavations.

Care should be taken so as not to undermine existing structures, services, or adjacent property.

Adjacent excavations should generally be tackled in order of depth with the deepest first. Vehicles and spoil heaps etc. should not surcharge excavations, and edge protection and fencing should be used as appropriate. Frozen materials should generally not be used as backfill.

#### 9.5 Pavements

The design of pavements will depend on the performance requirements and specification, as well as the ground conditions and finished levels etc. The suitability of shallow soils encountered as a formation level for pavements is summarised as follows:

Strata	Base Depth	Suitability
Made	0.70 to	Only suitable for pavements with low performance requirements.
Ground	0.80mbgl	CBR values for these materials will not reflect the possible
		settlements that may occur. The materials will be frost susceptible
		so a minimum pavement thickness of 450mm will be required. The



Strata	Base Depth	Suitability
		formation should be subject to a suitable programme of treatment
		and the sub-bases appropriately engineered.
Glaciofluvial	2.70 to	These materials are generally a suitable formation level. The
Deposits	3.00mbgl	formation may be frost susceptible and a minimum pavement of
		450mm should be considered. TRRL 1132 suggests a CBR of around
		3%, assuming average construction conditions and a high-water
		table. Cohesive formations will degrade rapidly if exposed to
		standing water and should be protected.

The formation level should be carefully inspected, and any soft or loose zones should be removed and replaced with engineering fill, well-compacted in layers to a suitable specification. Consideration might be given to installing geotextiles. All engineering fill should be granular and non-frost susceptible (i.e. <10% fine material passing 425 $\mu$ m sieve).

Any hard spots in the formation level such as old foundations may induce reflective cracking in the pavement and allowance should be made for removing any slabs or other hard spots etc. that may be present.

#### 9.6 Building Materials

All sub surface concrete should be designed and specified in accordance with BS8500-1:2015+A1:2016. The results of the Sulphate and pH analyses fell into Class DS-1 and an ACEC class AC-1 is appropriate.



#### **10.0 CONTAMINATION LABORATORY TESTING**

#### **10.1** Scheduled Testing

Samples were selected for geochemical (contamination) analysis, based on the following rationale:

• Waste classification testing on one sample was included in the scope of works, to provide a preliminary assessment for waste handling. In the absence of any areas to specifically target, a representative sample of Made Ground was selected for testing.

The scope and extent of testing was considered appropriate and in accordance with the Conceptual Site Model and preliminary risk assessment.

Sample	Strata	LS1	Asbestos	LS2
DS01 – 0.45m	Made Ground	Х	Х	Х

The relevant screening suites are defined below. Where duplicate analysis exists between suites, each test is performed only once:

Suite	Definition
LS1 (soil)	Screening suite: pH, fraction of organic carbon, Metals and Non Metals, water soluble Sulphate Sulphide total Cyanide total Phenols speciated PAH's
Asbestos	Asbestos screen: Laboratory screening for fibres and Asbestos Containing Materials; identification where identified. Using polarising light and dispersion staining as described in HSG 248, HSE Contract Research Report No 83/1996and in Davies et al, 1996
LS2	Waste Acceptance Criteria: Total Organic Carbon, Loss on Ignition, BTEX, speciated PCB's, Mineral Oil (EC10 – EC40), pH, Acid Neutralisation Capacity, speciated PAH's, 10:1 leachable Metals and Non Metals.

The results are discussed in the relevant sections.



#### 11.0 PRELIMINARY CONTAMINATION ASSESSMENT

Whilst a full geo-environmental risk assessment was outside the scope of this report, the following preliminary observations have been made.

The ground and groundwater conditions encountered in section 6.0 did not identify any potentially suspect ground condition.

The results of the chemical analysis on Made Ground did not exceed screening criteria for commercial premises (i.e. workplaces frequented by adult workers where there is minimal soft landscaping).

As always, any Made Ground, shallow soils which have been disturbed, or those showing field evidence of possible contamination such as staining, should be treated as suspect, handled with appropriate care, and relevant advice sought from a qualified professional.



#### 12.0 PRELIMINARY WASTE ASSESSMENT

#### 12.1 General

Waste may be defined as any substance or object in Annex 1 of the Waste Framework Directive which the holder discards, intends to discard, or is required to discard. Subject to compliance with waste regulations, soils may either be handled as either:

- 0 Non-Waste, and re-used (either on-site or on another site), or
- Waste, and disposed of (to a waste management facility). 0

Given the confines of the site, it was anticipated that all materials would be disposed of from site as waste.

The waste producer has a legal duty of care to ensure that waste materials are handled properly and sent to the appropriate licenced facility. Substantial tax penalties and fines are being levied by the regulators. Inspection, testing, segregation etc will be required on site, and the support of a suitably qualified consultant should be sought; therefore, the advice in this section is preliminary only.

#### 12.2 Waste Disposal

Where materials are not re-used they must be handled as Waste, and must be sent to a licenced waste management facility. Waste is classified as follows:

- Step 1: Does the material contain dangerous substances that qualify as Hazardous Waste as prescribed under the Waste Framework Directive.
- Step 2: Does the leachability criteria allow the materials to be sub-classified as Stable Non Reactive Waste (SNRHW) or as Inert Waste.

A material is therefore either Hazardous or Non-Hazardous Waste; Hazardous may be sub-classified as SNRHW and Non- Hazardous Waste may be sub-classified as Inert.

Soil	Waste designation	Details
Made	Non-hazardous	The soil analysis was not identified as hazardous but the WAC test did
Ground		not meet the requirements for Inert waste. Interpretation: Non
		Hazardous waste. The tests failing the criteria were: Antimony.

The results of the soil analysis have been classified as follows:

With reference to the current List of Wastes (formerly European Waste Catalogue), waste soils and stone derived from construction and demolition sites may be disposed of under either of the following codes as appropriate:

Waste	Code	Description
Hazardous	17 05 03*	soil and stones containing dangerous substances
Non-Hazardous	17 05 04	soil and stones other than those mentioned in 17 05 03

(Note, the asterix is a Mirror Entry, as defined in the List of Wastes, conferring the relationship with the non-hazardous code 17-05-04).



#### REFERENCES

A number of technical references have been referred to in the preparation of this document, including:

- Smith, I. (2014) Smith's Elements of Sil Mechanics. Chichester. Wiley Blackwell. 9<sup>th</sup> Edition.
- Highways England 2009. Interim Advice Note 73/06 revision 1: Design Guidance for Road Pavement foundations (draft HD25)
- BRE Design Guide 365. Soakaway design ("DG365")
- Radon: Guidance on protective measures for new buildings, BRE Report BR 211, 2015 2ND edition
- o Groundwater protection: Principles and practice (GP3) August 2013 Version 1.1
- Revised EU Waste Framework Directive 2008 2008/98/EC [transposed into English law under The Waste (England and Wales) Regulations 2011]
- European Community (EC) Directive 1999/31/EC [transposed into English law under the Landfill (England and Wales) Regulations 2002]
- Defining Waste Recovery Permanent Deposit of Waste on Land, EPR13 v1.0, EA 2010
- The definition of waste: Development Industry Code of Practice, v2, CL:AIRE 2011
- Guidance on the classification and assessment of waste Technical Guidance WM3 ("WM3") EA publication (1st edition 2015)



#### **REPORT CONDITIONS**

#### The Client

This report may also be used only by the client named in section 1 and their appointed project team for the purpose of design, obtaining planning, building regulations approval, and in connection with finance. This report must not be used by any other persons or for other purposes without express written agreement of Land Science.

#### General

Land Science takes all reasonable professional care in preparation of this report, using current standards and industry practice. However, the evaluation of ground conditions depends on an interpretation and extrapolation of the conditions revealed by a limited data set. The level of risk is related to the extent of investigation and no site is ever free of risk. The client should understand their risks and liabilities. We accept no liability whatsoever in respect of:

- The scope, extent or design of an investigation.
- Any conditions not directly revealed by the investigation.
- Published standards or methodologies used or adopted in this report.
- The opinion of any other party including any regulator, authority or stakeholder.
- Any dispute, claim or consequential loss arising from any findings of this report.
- Third party information and data.

This report relates solely to ground-related matters as set out in the objectives and makes no representation on other matters such as ecology, arboriculture, invasive plant species, the condition of buildings and structures, hazardous building materials such as insulation or asbestos, the locations of boundaries, unexploded ordnance, and or planning constraints etc. Further reports should be commissioned in this respect as appropriate.

#### **Regulators and Approvals**

This (and any other) report should be submitted to relevant authorities for their own assessments and to provide their approval or comments accordingly. This should be in good time before commencing on site in case additional work is to be carried out.

Standards, technical guidance and regulatory positions change over time and which may therefore affect the findings and recommendations made in this report; this should be verified by the client prior to any critical project milestones. Where this information is used in design, the designer should verify that the information is appropriate and has been used correctly.

#### Variations with time

The report relates to conditions revealed at the time of the investigation and any monitoring visits. Some parameters may vary over time or seasonally; groundwater levels, ground gas compositions, or concentrations of contaminants are particularly variable in this respect. Further monitoring or verification should be considered as appropriate.



#### GLOSSARY OF TERMS

ACM	Asbestos Containing Material
BGS	British Geological Survey
BRE	Building Research Establishment
BS	British Standard
C4SL	Category 4 Screening Level
CBR	California Bearing Ratio
CDM	Construction Design and Management regulations
CIRIA	Construction Industry Research and Information Association
CL:AIRE	Contaminated Land: Applications in Real Environments
CLEA	Contaminated Land Exposure Assessment model
CSM	Conceptual Site Model
EA	Environment Agency
EQS	Environmental Quality Standards
FOC	Fraction of Organic Carbon
GAC	Generic Assessment Criterion
GQRA	Generic Quantitative Risk Assessment
mbgl	Meters Below Ground Level
NHBC	National House Building Council
mOD	Metres above Ordnance Datum
PAH's	Polycyclic Aromatic Hydrocarbons
PHE	Public Health England
PID	Photo-Ionisation Detector
PQRA	Preliminary Quantitative Risk Assessment
PSD	Particle Size Distribution Test
RMS	Remediation Method Statement
S4UL	Suitable for Use Level
SOM	Soil Organic Matter
SPZ	Source Protection Zone
SPT	Standard Penetration Test
SSSI	Sites of Special Scientific Interest
ST-WEL	Short Term Workplace Exposure Limit
SVOC's	Semi-Volatile Organic Compounds
ТРН	Total Petroleum Hydrocarbons
TRRL / TRL	Transport Road Research Laboratory
TWA-WEL	Time Weighted Average Workplace Exposure Limit
UK HBF	United Kingdom House Building Federation
VOC's	Volatile Organic Compounds
WAC	Waste Acceptance Criteria



## **FIGURES**



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Client: Environment Agency

Checked by: ET

Prepared by: LS

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Version: 01

Date: 03/01/2024

Sheet: 1 of 1



# **APPENDIX A**



WWW.LANDSCIENCE.CO.UK 0345 604 6494 UNIT 10, 19 ALBERT DRIVE BURGESS HILL, **WEST SUSSEX**, RH15 9TN 2ND FLOOR, 25-28 FIELD STREET, **LONDON**, WC1X 9DA



# **APPENDIX B**

			Bright	on   Lond	don   Bristol	Site		Numbor
Lan	d 🌮 Sc	ien	Ce	084 ww.landso	15 604 6494 cience.co.uk	Halfords Park, Halfords Lane, Smethwick B66 1EI	L	DS01
Excavation	Method	Dimensi	ions	Ground	Level (mOD)	Client		Job
Drive-in Win	dowless Sampler					Environment Agency		Number LS7367
		Locatio	n	Dates	101/2024	Project Contractor		Sheet
					/01/2024	Land Science		1/1
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description		Kater Vater
					(0.20)	Reinforced CONCRETE (HARDSTANDING)		
					(0.20) (0.20) (0.20) (0.40)	Reddish, sandy, GRAVEL. Sands are fine to mediu Gravels are medium to coarse, angular to subrour brick fill. (MADE GROUND) Plastic sheeting at base (0.20mbgl).	um. nded: red	
0.45 0.45 0.50-0.75	D E D				 (0.40) 	Dark brown, sandy, gravelly, CLAY. Sands are fine medium. Gravels are fine to medium, subangular to subrounded: red brick, clinker, carbonaceous mate (MADE GROUND) Reddish clay band 0.50-0.60mbgl.	e to to erial.	
0.85	E				0.80	Orange/brown, slightly gravelly, clayey, SAND. Sa fine. Gravels are fine to coarse, subangular to rou sandstones, occasionally calcareous. (GLACIOFL DEPOSITS)	nds are nded: UVIAL	
1.20	D				- - - - -	Yellowish sand and sandstone cobble band be	etween	
					- - -	1.30-1.40mbgl.		
1.80	D				- (1.90) 	ыесотипg reddisn aтter 1.70mbgi.		
2.20	D				- - - - -			
2.50	D				- - - 2.70	Stiff reddish clay band with fine gravels and bla streaks between 2.60-2.65mbgl.	ack	
2.80 2.80	HP 187.5kPa D				(0.30)	Stiff, reddish brown, black mottling, slightly sandy, gravelly, CLAY. Sands are fine. Gravels are fine: sandstones, occasionally calcareous. (ENVILLE M Sand band at 2.85mbgl.	slightly /IEMBER)	
					3.00	Complete at 3.00m		····
					-  -			
					-  			
					- 			
Remarks					-		Scalo	Logged
GROUNDW/ CASING: No INSTALLATIO	ATER: None encount casing used. ON: None.	tered.					(approx)	By
BACKFILL: E SLOW PRO NOTES: Har	Backfilled with arising GRESS: None. Ind excavated inspect	ion nit to r	1.20mbal. Borehole terminated	at target	depth		1:20 Figure N	LS 0.
						LS736	57.DS01	

Lan	d 🄊 Sc	ier	Bright	ton   Lond 084	don   Bristol 15 604 6494	Site Halfords Park, Halfords Lane, Smethwick B66 1EL		Numbe	er 2
Excavation Drive-in Win	Method dowless Sampler	Dimens	vions	Ground	Level (mOD)	Client Environment Agency		Job Numbe	er 7
		Locatio	n	Dates		Project Contractor		Sheet	
				05	6/01/2024	Land Science		1/1	
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description		Legend	Water
					(0.15)	ASPHALT (HARDSTANDING)		· · · · · · · · · · · · · · · · · · ·	
					- 0.15 - (0.10) - 0.25	Pale brown, sandy, GRAVEL. Sands are fine to me Gravels are medium, angular to subrounded: sands (MADE GROUND)	dium. stone fill.		
			Water strike(1) at 0.40m, fell to 1.75m in 20 mins,		 (0.45)	Brown, sandy, GRAVEL. Sands are fine to medium are fine to coarse, angular to subrounded: red brick fragments, whole red brick, sandstone. (MADE GR	. Gravels ( OUND)		<b>∇</b> 1
0.50 0.50	D E		sealed at 0.80m.		-	Becoming wet 0.40-0.70mbgl.			
0.80 0.80	D E				- 0.70 	Reddish brown, occasional black mottling, slightly o clayey, SAND. Sands are fine. Gravels are fine to n subangular to rounded: sandstones, occasionally calcareous. (GLACIOFLUVIAL DEPOSITS)	gravelly, nedium,	<u></u>	
1.00	w				- - -			<u> </u>	
1.20	D				-	Becoming sandy CLAY after 1.20mbgl.			
					-	Becoming gravelly 1.20-1.40mbgi.			
1.60	HP 75kPa				-	Clayey sand band at 1.50mbgl.			
1.80 1.80	HP 100kPa D				- - - (2.30)	Clayey sand band at 1.70mbgl.		<u></u>	<b>▼</b> 1
					 - -			<u>,</u>	
2.20 2.20	HP 200kPa D							<u>, , , , , , , , , , , , , , , , , , , </u>	
2.40	HP 200kPa								
2.60	HP 125kPa				 	Gravels becoming finer and less frequent after 2.50mbgl.		<u>,</u>	
2.80	HP 162.5kPa				-  	Sandstone cobble hand at 2.80mbd			
2.00					- - - 3.00			<u>.</u>	
					-	Complete at 3.00m			
					- -				
					-				
					  -  -				
Remarks GROUNDW	ATER: Groundwater	seepage	at 0.40mbgl, standing at 1.75m	hbgl after 2	20mins. Stand	ing at 0.80mbgl after 40mins.	Scale (approx)	Logge By	d
CASING: No INSTALLATIO BACKFILL: E	o casing used. ON: None. Backfilled with arising	js.					1:20	LS	
NOTES: Har	ad excavated inspect	tion pit to	1.20mbgl. Borehole terminated	l at target	depth. Collaps	sed to 2.80mbgl.	Figure N LS736	<b>o.</b> 7.DS02	

Lan	Land Science Brighton   London   Brist 0845 604 649 www.landscience.co.						Site Halfords Park, Halfords Lane, Smethwick B66 1EL							Probe Number DP01	
<b>Method</b> Dynamic Pr	obing	Cone Dimensions	Ground L	.evel (mOD)	Client Enviro	onment	Agenc	у						Job Num LS7:	<b>ber</b> 367
		Location	<b>Dates</b> 01/0	1/2024	Engineer						<b>Sheet</b> 1/1		t '1		
Depth (m)	Blows for Depth Incremen	t Field Records	Level (mOD)	Depth (m)	0	2 4	4	Blows 6	for De	<b>pth Inc</b> 10	remen 12	t 14	16	18	20
				0.00											=
				0.50											
															+
1.00-1.10 1.10-1.20 1.20-1.30	2 1 2			1.00											+
1.30-1.40 1.40-1.50 1.50-1.60	2 4 7			1.50											+
1.70-1.80 1.80-1.90 1.90-2.00	11 12 12			· 											$\square$
2.00-2.10 2.10-2.20 2.20-2.30	15 13 14			2.00											+
2.30-2.40 2.40-2.50 2.50-2.60 2.60-2.70	12 19 14 11			2.50											
2.70-2.70 2.70-2.80 2.80-2.90 2.90-3.00	6 6 5			- 				-							+
				3.00											+
				3.50											$\pm$
				-   											+
				4.00											+
				4.50											
				- 											+
				5.00											+
				5.50											
				- 											+
				6.00 											+
				6.50											
															+
				7.00											+
				7.50											
				8.00											+
Remarks	<u> </u>	1	F	0.00			1		1				Scale (approx)	Logg By	jed
												-	1:40 Figure	D No.	F
													LS73	367.DP	'01

		•	on   Bristol	stol Site							Prob Num	robe lumber		
Lan	0 5	cience	084 www.landsci	5 604 6494 ence.co.uk	Halfo	rds Park, H	lalfords L	ane, Sm	ethwick	B66 1E	Ľ		DP	02
<b>Method</b> Dynamic Pr	obing	Cone Dimensions	Ground L	₋evel (mOD)	Client Enviro	onment Ag	ency						Job Numl LS73	<b>ber</b> 367
		Location	Dates 01/0	1/2024	Engine	er						Sheet 1/1		<b>t</b> '1
Depth (m)	Blows for Depth Incremen	t Field Records	Level (mOD)	Depth (m)	Blows for Depth Increment						t 7	8		10
				0.00			1	+	Ť	Ť		Ĭ		+
				-										+
				0.50										
				-										+
1.00-1.10	1			1.00										+
1.20-1.30	1 3			-			_							+
1.40-1.50 1.50-1.60 1.60-1.70	4 5 5			1.50										
1.70-1.80 1.80-1.90	5			-					_					+
1.90-2.00 2.00-2.10 2.10-2.20	3			2.00										+
2.20-2.30 2.30-2.40	3 4			-				_						+
2.40-2.50 2.50-2.60 2.60-2.70	5 4 4			2.50										$\square$
2.70-2.80 2.80-2.90	3 4			-				_						+
2.90-3.00	3			3.00										+
				-										+
				3.50										$\square$
				-										+
				4.00										+
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				4.50										$\square$
				-										+
				5.00										+
				-										+
				5.50										
				-										+
				6.00										+
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				6.50										$\Box$
				-										+
				7.00										+
														+
				7.50									$\square$	$\downarrow$
				-				_						+-
Remarks				8.00				_				Scale	Logg	Jed
											C	approx)	by	_
											F	1:40 Figure	DI No.	F
												LS73	367.DP	02



# **APPENDIX C**



#### SUMMARY OF MOISTURE CONTENT AND ATTERBERG LIMIT DETERMINATIONS

the second second		And and a second se									
Ŝc	ien	ce	Site Name: Halfords Park			Samples R	eceived:	09/01/2024			
00			Reference:	LS7367		Reported:		12/01/202	.4		
Position	Depth m	Sample D	escription		Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity Index %	Passing 425µm %	Modified PI %	
DS01	1.20	Orangy bi	rown silty clav	yey very gravelly SAND	9.4						
DS02	0.80	Brown gra	avelly very cla	ayey SAND	16.2	24.0	15.1	8.9	72.0	6.4	
DS02	1.20	Brown sa	ndy very grav	elly CLAY	15.5	33.7	14.2	19.5	76.7	15.0	



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# **APPENDIX D**



Ladislav Stehlik Land Science Unit 10 19 Albert Drive Burgess Hill West Sussex RH15 9TN



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

**t:** 01923 225404 **f:** 01923 237404

e: reception@i2analytical.com

e: ladislav.stehlik@landscience.co.uk

#### Analytical Report Number : 24-77626

Project / Site name:	Halfords Park, Halfords Lane, Smethwick B66 1EL	Samples received on:	10/01/2024
Your job number:	LS7367	Samples instructed on/ Analysis started on:	10/01/2024
Your order number:		Analysis completed by:	18/01/2024
Report Issue Number:	1	Report issued on:	18/01/2024
Samples Analysed:	1 leachate sample - 2 soil samples - 1 water sample		

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 reportingleachates- 2 weeks from reportingwaters- 2 weeks from reportingasbestos- 6 months from reporting

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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.





Project / Site name: Halfords Park, Halfords Lane, Smethwick B66 1EL

Lab Sample Number				2925099	2925100
Sample Reference				DS01	DS01
Sample Number				None Supplied	None Supplied
Depth (m)				0.45	0.85
Date Sampled				05/01/2024	05/01/2024
Time Taken				None Supplied	None Supplied
		<b>C</b>			
Analytical Parameter (Soil Analysis)	Units	mit of detection	Accreditation Status		
Stone Content	%	0.1	NONE	26	19
Moisture Content	%	0.01	NONE	10	11
Total mass of sample received	kg	0.001	NONE	0.8	0.3
Asbestos in Soil	Туре	N/A	ISO 17025	Not-detected	-
Asbestos Analyst ID	N/A	N/A	N/A	IZJ	N/A
General Inorganics					
pH - Manual	pH Units	N/A	MCERTS	8.4	-
pH - Automated	pH Units	N/A	MCERTS	11.6	7.7
Total Cyanide	mg/kg	1	MCERTS	< 1.0	-
Water Soluble SO4 16hr extraction (2:1 Leachate				0.0911	0.0549
Equivalent)	g/l	0.00125	MCERTS	0.0811	0.0546
Sulphide	mg/kg	1	MCERTS	2	-
Fraction Organic Carbon (FOC) Automated	N/A	0.001	MCERTS	0.014	-
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	1.4	-
Loss on Ignition @ 450oC	%	0.2	MCERTS	4.2	-
Acid Neutralisation Capacity	mmol/kg	-999	NONE	5.4	-
Total Phenols					
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	-
				-	
Speciated PAHs					
Naphthalene	mg/kg	0.05	MCERTS	0.47	-
Acenaphthylene	mg/kg	0.05	MCERTS	0.05	-
Acenaphthene	mg/kg	0.05	MCERTS	0.71	-
Fluorene	mg/kg	0.05	MCERTS	0.34	-
Phenanthrene	mg/kg	0.05	MCERTS	0.2	-
Anthracene	mg/kg	0.05	MCERTS	0.05	-
Fluoranthene	mg/kg	0.05	MCERTS	0.14	-
Pyrene	mg/kg	0.05	MCERTS	0.12	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.07	-
Chrysene	mg/kg	0.05	MCERTS	0.11	-
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	0.1	-
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.05	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.09	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.06	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	-
Benzo(ghi)pervlene	mg/kq	0.05	MCERTS	0.07	-
Coronene	mg/kg	0.05	NONE	< 0.05	-
Total PAH		0.05	NONE	-	
Total WAC-17 PAHs	mg/kg	0.85	NONE	2.63	-





Project / Site name: Halfords Park, Halfords Lane, Smethwick B66 1EL

Lab Sample Number				2925099	2925100
Sample Reference				DS01	DS01
Sample Number				None Supplied	None Supplied
Depth (m)				0.45	0.85
Date Sampled				05/01/2024	05/01/2024
Time Taken				None Supplied	None Supplied
		Ę.			
Analytical Parameter (Soil Analysis)	Units	mit of detection	Accreditation Status		
Heavy Metals / Metalloids			-		
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	8.7	-
Barium (aqua regia extractable)	mg/kg	1	MCERTS	120	-
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.8	-
Boron (water soluble)	mg/kg	0.2	MCERTS	1.8	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.6	-
Chromium (hexavalent)	mg/kg	1.2	NONE	< 1.2	-
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	16	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	58	-
Lead (agua regia extractable)	mg/kg	1	MCERTS	46	-
Mercury (agua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	-
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	19	-
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	-
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	31	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	120	-
Monoaromatics & Oxygenates	ua/ka	5	MCEDTS	< 5.0	
Telvene	µg/kg	5	MCEDTS	< 5.0	-
Ethylhonzono	µg/kg	5	MCERTS	< 5.0	-
	µg/kg	5	MCERTS	< 5.0	-
p & III-xylene	µg/kg	5	MCERTS	< 5.0	-
С-хунспе	-3/-3	-		< 5.0	-
Total BTEX	µg/kg	5	MCERTS	< 5.0	-
Mineral Oil (C10 - C40)	ma/ka	10	NONE	. 10	
H_CU_1D_AL	119/109	-0		< 10	-
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 -	Total PCBs by GC-MS					
	Total PCBs	mg/kg	0.007	MCERTS	< 0.007	-

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





Project / Site name: Halfords Park, Halfords Lane, Smethwick B66 1EL

Lab Sample Number				2925098
Sample Reference				DS02
Sample Number				None Supplied
Depth (m)				1.00
Date Sampled				05/01/2024
Time Taken				None Supplied
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status	

**General Inorganics** 

pH (L099)	pH Units	N/A	ISO 17025	10.2
Sulphate as SO4	mg/l	0.045	ISO 17025	33.4

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





Project / Site name: Halfords Park, Halfords Lane, Smethwick B66 1EL

Lab Sample Number				2925101
Sample Reference				DS01
Sample Number				None Supplied
Depth (m)				0.45
Date Sampled				05/01/2024
Time Taken				None Supplied
Analytical Parameter (Leachate Analysis)	Units	Limit of detection	Accreditation Status	

#### 10:1 WAC Leachate

Arsenic	mg/l	0.001	ISO 17025	0.0097
Barium	mg/l	0.00005	ISO 17025	0.0055
Cadmium	mg/l	0.0001	ISO 17025	< 0.0001
Chromium	mg/l	0.0004	ISO 17025	0.0029
Copper	mg/l	0.0007	ISO 17025	0.0055
Mercury	mg/l	0.0005	ISO 17025	< 0.0005
Molybdenum	mg/l	0.0004	ISO 17025	0.0168
Nickel	mg/l	0.0003	ISO 17025	0.0003
Lead	mg/l	0.001	ISO 17025	< 0.0010
Antimony	mg/l	0.0017	ISO 17025	0.0069
Selenium	mg/l	0.004	ISO 17025	< 0.0040
Zinc	mg/l	0.0004	ISO 17025	< 0.0004
Chloride	mg/l	0.15	ISO 17025	4.4
Fluoride	mg/l	0.05	ISO 17025	0.77
Sulphate	mg/l	0.1	ISO 17025	15
Total dissolved solids	mg/l	4	ISO 17025	75
Total monohydric phenols	mg/l	0.01	ISO 17025	< 0.010
Dissolved organic carbon	mg/l	0.1	NONE	11.8

#### 10:1 WAC Leachate

Arsenic	mg/kg	0.01	NONE	0.0971
Barium	mg/kg	0.0005	NONE	0.0552
Cadmium	mg/kg	0.0008	NONE	< 0.0008
Chromium	mg/kg	0.004	NONE	0.029
Copper	mg/kg	0.007	NONE	0.055
Mercury	mg/kg	0.005	NONE	< 0.0050
Molybdenum	mg/kg	0.004	NONE	0.168
Nickel	mg/kg	0.003	NONE	0.0031
Lead	mg/kg	0.01	NONE	< 0.010
Antimony	mg/kg	0.017	NONE	0.069
Selenium	mg/kg	0.04	NONE	< 0.040
Zinc	mg/kg	0.004	NONE	< 0.0040
Chloride	mg/kg	1.5	NONE	44
Fluoride	mg/kg	0.5	NONE	7.7
Sulphate	mg/kg	1	NONE	150
Total dissolved solids	mg/kg	40	NONE	750
Total monohydric phenols	mg/kg	0.1	NONE	< 0.10
Dissolved organic carbon	mg/kg	1	NONE	118

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





#### Project / Site name: Halfords Park, Halfords Lane, Smethwick B66 1EL

\* 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 *
2925099	DS01	None Supplied	0.45	Brown sand with gravel and stones.
2925100	DS01	None Supplied	0.85	Brown sand with gravel and stones.





Project / Site name: Halfords Park, Halfords Lane, Smethwick B66 1EL

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
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.	L038-PL	D	MCERTS
BS EN 12457-2 (10:1) Leachate Prep	10:1 (as recieved, moisture adjusted) end over end extraction with water for 24 hours. Eluate filtered prior to analysis.	In-house method based on BSEN12457-2.	L043-PL	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""	L046-PL	W	NONE
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	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	on of water soluble boron in soil by hot water wed by ICP-OES. In-house method based on Second Site Properties version 3		D	MCERTS
Loss on ignition of soil @ 450oC	gnition of soil @ 450oC Determination of loss on ignition in soil by gravimetrically In house method. with the sample being ignited in a muffle furnace.		L047-PL	D	MCERTS
Mineral Oil (Soil) C10 - C40	Determination of mineral oil fraction extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L076-PL	D	NONE
Moisture Content	oisture Content Moisture content, determined gravimetrically. (30 oC) In h		L019-UK/PL	w	NONE
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 (skalar)	L080-PL	w	MCERTS
Speciated WAC-17 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270.	L064-PL	D	MCERTS
PCB's By GC-MS in soil	Determination of PCB by extraction with acetone and hexane followed by GC-MS.	In-house method based on USEPA 8082	L027-PL	D	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
pH at 20oC in soil	Determination of pH in soil by addition of water followed by electrometric measurement.	In house method.	L005-PL	w	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Sulphate in water	Determination of sulphate in water after filtration by acidification followed by ICP-OES. Accredited Matrices SW, GW, PW.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	w	ISO 17025





Project / Site name: Halfords Park, Halfords Lane, Smethwick B66 1EL

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
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.	L019-UK/PL	D	NONE
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 (Skalar)	L080-PL	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.	In house method.	L009-PL	D	MCERTS
BTEX in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS. Individual components MCERTS accredited	In-house method based on USEPA8260. Refer to CoA for analyte specific accreditation	L073B-PL	w	MCERTS
pH at 20oC in water (automated)	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In house method.	L099-PL	w	ISO 17025
Total BTEX in soil (Poland)	Determination of BTEX in soil by headspace GC-MS. Individual components MCERTS accredited	EX in soil by headspace GC-MS. In-house method based on USEPA8260. Refer to ts MCERTS accredited CoA for analyte specific accreditation		w	MCERTS
Fraction Organic Carbon FOC Automated Determination of fraction of organic carbon in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.		In house method	L009	D	MCERTS
Hexavalent chromium in soil (Lower Level)	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method by continuous flow analyser.	L080-PL	W	NONE
D.O. for Gravimetric Quant if Screen/ID positive	Dependent option for Gravimetric Quant if Screen/ID positive scheduled.	In house asbestos methods A001 & A006.	A006-PL	D	NONE
Metals in leachate by ICP-OES	Metals in leachate by ICP-OES Determination of metals in leachate by acidification In-house method based of followed by ICP-OES. for the Determination of th		L039-PL	W	ISO 17025
Chloride 10:1 WAC	Determination of Chloride colorimetrically by discrete analyser.	In house based on MEWAM Method ISBN 0117516260.	L082-PL	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-PL	W	ISO 17025
Sulphate 10:1 WAC	Determination of sulphate in leachate by ICP-OES	In-house method based on MEWAM 1986 Methods for the Determination of Metals in Soil""	L039-PL	W	ISO 17025
Total dissolved solids 10:1 WAC	Determination of total dissolved solids in water by EC probe using a factor of 0.6.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L031-PL	w	ISO 17025
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





Project / Site name: Halfords Park, Halfords Lane, Smethwick B66 1EL

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Dissolved organic carbon 10:1 WAC	Determination of dissolved inorganic carbon in leachate by TOC/DOC NDIR Analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	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 rev onnea (augusti (cast number). 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.

#### Information in Support of Analytical Results

#### List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total



#### Project / Site name: Halfords Park, Halfords Lane, Smethwick B66 1EL

This deviation report indicates the sample and test deviations that apply to the samples submitted for analysis. Please note that the associated result(s) may be unreliable and should be interpreted with care.

Key: a - No sampling date b - Incorrect container c - Holding time d - Headspace e - Temperature

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
DS02	None Supplied	W	2925098	С	pH at 20oC in water (automated)	L099-PL	С



# **APPENDIX E**



### **Envirocheck**<sup>®</sup> Report:

### Mining and Ground Stability Datasheet

#### **Order Details:**

### Order Number: 330836852\_1\_1

### Customer Reference: LS7367

### National Grid Reference: 402280, 289590

Slice:

### Site Area (Ha):

0.16 Search Buffer (m): 1000

#### Site Details:

Environment Agency, Unit A Halfords Park Halfords Lane SMETHWICK B66 1EL

#### **Client Details:**

Mr E Toms Land Science Ltd Unit 10 19 Albert Drive Burgess Hill West Sussex RH15 9TN





### Contents

<b>Report Section and Details</b>	Page Number					
Summary	-					
The Summary section provides an overview of the data contained within the report, detailing the or the existence of a data set in relation to the buffer selected. For ease of reference, the report is broken down into 4 sections of data; Mining and Natural Cav Use Information (1:2,500), Historical Land Use Information (1:10,000) and Ground Stability Data	The Summary section provides an overview of the data contained within the report, detailing the number of data set features or the existence of a data set in relation to the buffer selected. For ease of reference, the report is broken down into 4 sections of data; Mining and Natural Cavities Data, Historical Land Use Information (1:2,500), Historical Land Use Information (1:10,000) and Ground Stability Data (1:50,000).					
Mining and Natural Cavities Data	1					
The Mining and Natural Cavities Data section features data sets related to the existence of mining areas and their potential hazards; and details of naturally formed cavities. Data sets within this section are not plotted, with the exception of BGS Recorded Mineral Sites and Potential Mining Areas which feature on the Historical L and Use Information (1:10,000) map.						
Historical Land Use Information (1:2,500)	-					
The Historical Land Use Information (1:2,500) section contains data captured from analysis carried out by Landmark of 1:1,250 and 1:2,500 scale historical Ordnance Survey mapping, identifying areas where, historically, the land uses were potentially contaminative. For the purpose of this Envirocheck module, only historical data relating to mining and ground stability has been included and plotted on the corresponding Historical Land Use Information (1:2,500) map. This section also includes the Subterranean Features data set, which details various man-made and man-used underground spaces obtained from the Subterranea						
Historical Land Use Information (1:10,000)	2					
The Historical Land Use (1:10,000) section covers data captured from the systematic analysis of 1:10, 560 and 1:10,000 scale historical Ordnance Survey mapping dating back to the mid-19th of contaminative past industrial land uses. For the purpose of this Envirocheck module, only data relating to mining and ground stability has on the accompanying Historical Land Use Information (1:10,000) map.	arried out by Landmark of century, identifying potentially s been included and plotted					
Ground Stability Data (1:50,000)	3					
The Ground Stability (1:50,000) section includes the BGS Geosure data suite, reporting features separate maps. Also reported is brine subsidence, brine mining and salt mining data sets, of wh Mining Related Features are plotted, and subsidence insurance claims and insurance investigat plotted.	s to 250m and plotted onto 3 ich Brine Pumping and Salt ions data, which is not					
Historical Map List	4					
The Historical Map List section details the historical mapping that has been analysed for your si Land Use Information sections.	te, in relation to the Historical					
Data Currency	6					
Data Suppliers	7					
Useful Contacts	8					
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#### Report Version v53.0

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### Summary

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m
Mining and Natural Cavities Data					
BGS Recorded Mineral Sites	pg 1			1	2
Coal Mining Affected Areas	pg 1	Yes	n/a	n/a	n/a
Man Made Mining Cavities					
Mining Instability			n/a	n/a	n/a
Natural Cavities					
Non Coal Mining Areas of Great Britain				n/a	n/a
Potential Mining Areas					
Historical Land Use Information (1:2,500)					
Extractive Industries or Potential Excavations from 1855-1909 (100m)				n/a	n/a
Extractive Industries or Potential Excavations from 1893-1915 (100m)				n/a	n/a
Extractive Industries or Potential Excavations from 1906-1937 (100m)				n/a	n/a
Extractive Industries or Potential Excavations from 1924-1949 (100m)				n/a	n/a
Extractive Industries or Potential Excavations from 1950-1980 (100m)				n/a	n/a
Subterranean Features (100m)				n/a	n/a
Historical Land Use Information (1:10,000)					
Air Shafts					
Disturbed Ground					
General Quarrying					
Heap, unknown constituents					
Mineral Railway	pg 2			1	1
Mining & quarrying general					
Mining of coal & lignite	pg 2		1		
Quarrying of sand & clay, operation of sand & gravel pits	pg 2				4
Former Marshes					
Potentially Infilled Land (Non-Water)	pg 2		1		5
Potentially Infilled Land (Water)	pg 2				1
Ground Stability Data (1:50,000)					
CBSCB Compensation District			n/a	n/a	n/a
Brine Pumping Related Features					
Brine Subsidence Solution Area					
Potential for Collapsible Ground Stability Hazards	pg 3	Yes		n/a	n/a
Potential for Compressible Ground Stability Hazards	pg 3	Yes		n/a	n/a
Potential for Ground Dissolution Stability Hazards	pg 3	Yes		n/a	n/a
Potential for Landslide Ground Stability Hazards	pg 3	Yes		n/a	n/a
Potential for Running Sand Ground Stability Hazards	pg 3	Yes	Yes	n/a	n/a
Potential for Shrinking or Swelling Clay Ground Stability Hazards	pg 3	Yes	Yes	n/a	n/a
Salt Mining Related Features					

Order Number: 330836852\_1\_1 Date: 11-Jan-2024



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Summary



### **Mining and Natural Cavities Data**

Map ID		Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Recorded Mine	eral Sites				
1	Site Name: Location: Source: Reference: Type: <b>Status:</b> Operator: Operator: Operator Location: Periodic Type: Geology: Commodity: Positional Accuracy:	Sandwell Park Colliery Sandwell, Smethwick, West Midlands British Geological Survey, National Geoscience Information Service 39037 Underground <b>Ceased</b> Unknown Operator Not Supplied Carboniferous Pennine Coal Measures Group Coal - Deep Located by supplier to within 10m	A13NW (NW)	364	1	401970 289815
	BGS Recorded Mine	eral Sites				
2	Site Name: Location: Source: Reference: Type: <b>Status:</b> Operator: Operator Location: Periodic Type: Geology: Commodity: Positional Accuracy:	Summit Bridge Sand Pit Galton Bridge, Sandwell, Smethwick, West Midlands British Geological Survey, National Geoscience Information Service 39038 Opencast <b>Ceased</b> Unknown Operator Not Supplied Quaternary Glaciofluvial Deposits, Devensian Sand Located by supplier to within 10m	A12SE (W)	586	1	401705 289371
3	BGS Recorded Mine Site Name: Location: Source: Reference: Type: Status: Operator: Operator: Operator: Operator: Periodic Type: Geology: Commodity: Positional Accuracy:	eral Sites West Smethwick Sandwell, Sandwell, West Midlands British Geological Survey, National Geoscience Information Service 45534 Opencast Ceased Unknown Operator Not Supplied Quaternary Glaciofluvial Deposits, Devensian Sand Located by supplier to within 10m	A7NW (W)	988	1	401323 289245
	Coal Mining Affecte	d Areas				
	Description:	In an area which may be affected by coal mining activity. It is recommended that a coal mining report is obtained from the Coal Authority. Contact details are included in the Useful Contacts section of this report.	A13SE (W)	0	2	402280 289586
	Non Coal Mining Ar	eas of Great Britain				
	No Hazard					



### Historical Land Use Information (1:10,000)

Map ID		Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
4	Mineral Railway Use: Not Supplied Date of Mapping: 1890 - 1955		A12NE (NW)	377	-	401938 289790
5	Mineral Railway Use: Not Supplied Date of Mapping: 1921 - 1955		A12NE (W)	569	-	401712 289732
6	Mining of coal & lignite Use: Not Supplied Date of Mapping: 1890 - 1947		A13NW (N)	235	-	402192 289828
7	Quarrying of sand & clay, operation of san           Use:         Not Supplied           Date of Mapping:         1904	d & gravel pits	A12SE (W)	582	-	401712 289362
8	Quarrying of sand & clay, operation of san           Use:         Not Supplied           Date of Mapping:         1890	d & gravel pits	A18NW (N)	928	-	402134 290529
9	Quarrying of sand & clay, operation of san           Use:         Not Supplied           Date of Mapping:         1890 - 1904	d & gravel pits	A7NW (W)	929	-	401390 289234
10	Quarrying of sand & clay, operation of san           Use:         Not Supplied           Date of Mapping:         1890	d & gravel pits	A18NW (N)	950	-	402222 290560
11	Potentially Infilled Land (Non-Water)           Use:         Unknown Filled Ground           Date of Mapping:         1989	(Pit, quarry etc)	A13NW (N)	246	-	402180 289836
12	Potentially Infilled Land (Non-Water)           Use:         Unknown Filled Ground           Date of Mapping:         1989	(Pit, quarry etc)	A12SE (W)	582	-	401712 289362
13	Potentially Infilled Land (Non-Water) Use: Unknown Filled Ground Date of Mapping: 1989	(Pit, quarry etc)	A12NW (W)	893	-	401365 289613
14	Potentially Infilled Land (Non-Water)           Use:         Unknown Filled Ground           Date of Mapping:         1980	(Pit, quarry etc)	A18NW (N)	928	-	402134 290529
15	Potentially Infilled Land (Non-Water) Use: Unknown Filled Ground Date of Mapping: 1989	(Pit, quarry etc)	A7NW (W)	929	-	401390 289234
16	Potentially Infilled Land (Non-Water)           Use:         Unknown Filled Ground           Date of Mapping:         1980	(Pit, quarry etc)	A18NW (N)	950	-	402222 290560
17	Potentially Infilled Land (Water)           Use:         Unknown Filled Ground           Date of Mapping:         1904	Pond, marsh, river, stream, dock etc)	A19SW (NE)	574	-	402686 290033



### Ground Stability Data (1:50,000)

Map ID		Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	CBSCB Compensa	tion District				
	The site does not fal	Il within the brine compensation area.				
	Brine Subsidence S	Solution Area				
	The site does not fal	Il within the brine subsidence solution area.				
	Potential for Collap	sible Ground Stability Hazards				
18	Hazard Potential: Source:	Very Low British Geological Survey, National Geoscience Information Service	A13SE (W)	0	1	402280 289586
	Potential for Comp	ressible Ground Stability Hazards				
	Hazard Potential: Source:	No Hazard British Geological Survey, National Geoscience Information Service	A13SE (W)	0	1	402280 289586
	Potential for Groun	d Dissolution Stability Hazards				
	Hazard Potential: Source:	No Hazard British Geological Survey, National Geoscience Information Service	A13SE (W)	0	1	402280 289586
	Potential for Lands	lide Ground Stability Hazards				
19	Hazard Potential: Source:	Very Low British Geological Survey, National Geoscience Information Service	A13SE (W)	0	1	402280 289586
	Potential for Runni	ng Sand Ground Stability Hazards				
20	Hazard Potential: Source:	Very Low British Geological Survey, National Geoscience Information Service	A13SE (W)	0	1	402280 289586
	Potential for Runni	ng Sand Ground Stability Hazards				
	Hazard Potential: Source:	No Hazard British Geological Survey, National Geoscience Information Service	A13NE (E)	48	1	402352 289607
	Potential for Shrink	king or Swelling Clay Ground Stability Hazards				
21	Hazard Potential: Source:	Very Low British Geological Survey, National Geoscience Information Service	A13NW (N)	54	1	402276 289666
	Potential for Shrinking or Swelling Clay Ground Stability Hazards					
	Hazard Potential: Source:	No Hazard British Geological Survey, National Geoscience Information Service	A13SE (W)	0	1	402280 289586
	Potential for Shrink	king or Swelling Clay Ground Stability Hazards				
	Hazard Potential: Source:	No Hazard British Geological Survey, National Geoscience Information Service	A13NW (N)	134	1	402276 289746
	Potential for Shrink	king or Swelling Clay Ground Stability Hazards				
	Hazard Potential: Source:	No Hazard British Geological Survey, National Geoscience Information Service	A13NW (N)	187	1	402253 289797



#### The following mapping has been analysed for Historical Land Use Information (1:2,500):

1:2,500	Mapsheet	Published Date
Staffordshire	068_15	1889
Staffordshire	068_15	1904
Staffordshire	068_15	1917
Staffordshire	068_15	1937
Ordnance Survey Plan	SP0189	1958



### **Historical Map List**

#### The following mapping has been analysed for Historical Land Use Information (1:10,000):

1:10,560	Mapsheet	Published Date
Worcestershire	002_SW	1890
Worcestershire	005_NW	1890
Staffordshire	068_SE	1890
Staffordshire	072_NE	1890
Worcestershire	002_SW	1904
Worcestershire	005_NW	1904
Warwickshire	007_SE	1904
Staffordshire	068_SE	1904
Staffordshire	068_SW	1904
Staffordshire	072_NW	1904
Worcestershire	005_NE	1905
Warwickshire	013_NE	1905
Staffordshire	072_NE	1905
Warwickshire	007_SE	1921
Warwickshire	013_NE	1921
Staffordshire	068_SE	1921
Staffordshire	068_SW	1921
Staffordshire	072_NE	1921
Staffordshire	072_NW	1921
Worcestershire	002_SW	1938
Worcestershire	005_NE	1938
Worcestershire	005_NW	1938
Warwickshire	007_SE	1938
Warwickshire	013_NE	1938
Staffordshire	068_SE	1945
Staffordshire	072_NE	1946
Staffordshire	072_NW	1946
Staffordshire	068_SW	1947
Ordnance Survey Plan	SP08NW	1955
Ordnance Survey Plan	SP09SW	1955
1:10,000	Mapsheet	Published Date
Ordnance Survey Plan	SP09SW	1980
Ordnance Survey Plan	SP08NW	1989



### **Data Currency**

Mining and Cavities Data	Version	Update Cycle	
BGS Recorded Mineral Sites British Geological Survey - National Geoscience Information Service	June 2023	Bi-Annually	
Coal Mining Affected Areas The Coal Authority - Property Searches	February 2023	Annual Rolling Update	
Man Made Mining Cavities Stantec UK Ltd	December 2022	Bi-Annually	
Mining Instability Ove Arup & Partners	June 1998	Not Applicable	
Natural Cavities Stantec UK Ltd	December 2022	Bi-Annually	
Non Coal Mining Areas of Great Britain British Geological Survey - National Geoscience Information Service	May 2015	Not Applicable	
Historical Land Use Information (1:2,500)	Version	Update Cycle	
Subterranean Features Landmark Information Group Limited	July 2023	Bi-Annually	
Ground Stability Data (1:50,000)	Version	Update Cycle	
Ground Stability Data (1:50,000) CBSCB Compensation District Cheshire Brine Subsidence Compensation Board (CBSCB) Cheshire Brine Subsidence Compensation Board (CBSCB)	Version August 2011 November 2020	Update Cycle As notified	
Ground Stability Data (1:50,000)         CBSCB Compensation District         Cheshire Brine Subsidence Compensation Board (CBSCB)         Cheshire Brine Subsidence Compensation Board (CBSCB)         Potential for Collapsible Ground Stability Hazards         British Geological Survey - National Geoscience Information Service	Version August 2011 November 2020 April 2020	Update Cycle As notified As notified	
Ground Stability Data (1:50,000)         CBSCB Compensation District         Cheshire Brine Subsidence Compensation Board (CBSCB)         Cheshire Brine Subsidence Compensation Board (CBSCB)         Potential for Collapsible Ground Stability Hazards         British Geological Survey - National Geoscience Information Service         Potential for Compressible Ground Stability Hazards         British Geological Survey - National Geoscience Information Service	Version         August 2011         November 2020         April 2020         January 2019	Update Cycle As notified As notified As notified	
Ground Stability Data (1:50,000)         CBSCB Compensation District         Cheshire Brine Subsidence Compensation Board (CBSCB)         Cheshire Brine Subsidence Compensation Board (CBSCB)         Potential for Collapsible Ground Stability Hazards         British Geological Survey - National Geoscience Information Service         Potential for Compressible Ground Stability Hazards         British Geological Survey - National Geoscience Information Service         Potential for Ground Dissolution Stability Hazards         British Geological Survey - National Geoscience Information Service	Version August 2011 November 2020 April 2020 January 2019 January 2019	Update Cycle As notified As notified As notified As notified	
Ground Stability Data (1:50,000)CBSCB Compensation DistrictCheshire Brine Subsidence Compensation Board (CBSCB)Cheshire Brine Subsidence Compensation Board (CBSCB)Potential for Collapsible Ground Stability HazardsBritish Geological Survey - National Geoscience Information ServicePotential for Compressible Ground Stability HazardsBritish Geological Survey - National Geoscience Information ServicePotential for Ground Dissolution Stability HazardsBritish Geological Survey - National Geoscience Information ServicePotential for Ground Dissolution Stability HazardsBritish Geological Survey - National Geoscience Information ServicePotential for Landslide Ground Stability HazardsBritish Geological Survey - National Geoscience Information Service	VersionAugust 2011 November 2020April 2020January 2019January 2019January 2019January 2019	Update Cycle As notified As notified As notified As notified	
Ground Stability Data (1:50,000)CBSCB Compensation DistrictCheshire Brine Subsidence Compensation Board (CBSCB)Cheshire Brine Subsidence Compensation Board (CBSCB)Potential for Collapsible Ground Stability HazardsBritish Geological Survey - National Geoscience Information ServicePotential for Compressible Ground Stability HazardsBritish Geological Survey - National Geoscience Information ServicePotential for Ground Dissolution Stability HazardsBritish Geological Survey - National Geoscience Information ServicePotential for Landslide Ground Stability HazardsBritish Geological Survey - National Geoscience Information ServicePotential for Landslide Ground Stability HazardsBritish Geological Survey - National Geoscience Information ServicePotential for Landslide Ground Stability HazardsBritish Geological Survey - National Geoscience Information ServicePotential for Running Sand Ground Stability HazardsBritish Geological Survey - National Geoscience Information Service	Version         August 2011         November 2020         April 2020         January 2019         January 2019         January 2019         January 2019         January 2019         January 2019	Update Cycle As notified	
Ground Stability Data (1:50,000)CBSCB Compensation DistrictCheshire Brine Subsidence Compensation Board (CBSCB)Cheshire Brine Subsidence Compensation Board (CBSCB)Potential for Collapsible Ground Stability HazardsBritish Geological Survey - National Geoscience Information ServicePotential for Compressible Ground Stability HazardsBritish Geological Survey - National Geoscience Information ServicePotential for Ground Dissolution Stability HazardsBritish Geological Survey - National Geoscience Information ServicePotential for Landslide Ground Stability HazardsBritish Geological Survey - National Geoscience Information ServicePotential for Running Sand Ground Stability HazardsBritish Geological Survey - National Geoscience Information ServicePotential for Running Sand Ground Stability HazardsBritish Geological Survey - National Geoscience Information ServicePotential for Shrinking or Swelling Clay Ground Stability HazardsBritish Geological Survey - National Geoscience Information Service	VersionAugust 2011 November 2020April 2020January 2019January 2019January 2019January 2019January 2019January 2019January 2019January 2019	Update Cycle As notified	



A selection of organisations who provide data within this report

Data Supplier	Data Supplier Logo		
Ordnance Survey	Map data		
British Geological Survey	British Geological Survey		
The Coal Authority	The Coal Authority		
Ove Arup	ARUP		
Stantec UK Ltd	Stantec		
Wardell Armstrong	your earth our world		
Johnson Poole & Bloomer	JPB		



### **Useful Contacts**

Contact	Name and Address	Contact Details
1	British Geological Survey - Enquiry Service British Geological Survey, Environmental Science Centre, Keyworth, Nottingham, Nottinghamshire, NG12 5GG	Telephone: 0115 936 3143 Fax: 0115 936 3276 Email: enquiries@bgs.ac.uk Website: www.bgs.ac.uk
2	<b>The Coal Authority - Property Searches</b> 200 Lichfield Lane, Mansfield, Nottinghamshire, NG18 4RG	Telephone: 0345 762 6848 Fax: 01623 637 338 Email: groundstability@coal.gov.uk Website: www2.groundstability.com
3	Ove Arup & Partners Central Square, Forth Street, Newcastle upon Tyne, Tyne and Wear, NE1 3PL	Telephone: 0191 261 6080 Fax: 0191 261 7879
-	Landmark Information Group Limited Imperium, Imperial Way, Reading, Berkshire, RG2 0TD	Telephone: 0844 844 9952 Fax: 0844 844 9951 Email: customerservices@landmarkinfo.co.uk Website: www.landmarkinfo.co.uk



# **APPENDIX F**

UK Health Security Agency

# Report of address search for radon risk



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Address searched: Environment Agency, Unit A, Halfords Park, Halfords Lane, Smethwick, B66 1EL Date of report: 29 January 2024

#### **Guidance for existing properties**

#### Is this property in a radon Affected Area? - No

A radon Affected Area is defined as where the radon level in at least one property in every hundred is estimated to exceed the Action Level.

#### The estimated probability of the property being above the Action Level for radon is: 0-1%

The probability result is only valid for properties above ground. All basement and cellar areas are considered to be at additional risk from high radon levels.

The result may not be valid for buildings larger than 25 metres.

If this site if for redevelopment, you should undertake a GeoReport provided by the British Geological Survey.

This report informs you of the estimated probability that this particular property is above the Action Level for radon. This does not necessarily mean there is a radon problem in the property; the only way to find out whether it is above or below the Action Level is to carry out a radon measurement in an existing property.

Radon Affected Areas are designated by the UK Health Security Agency. UKHSA advises that radon gas should be measured in all properties within Radon Affected Areas.

If you are buying a currently occupied property in a Radon Affected Area, you should ask the present owner whether radon levels have been measured in the property. If they have, ask whether the results were above the Radon Action Level and if so, whether remedial measures were installed, radon levels were re-tested, and the results of re-testing confirmed the effectiveness of the measures.

Further information is available from UKHSA or https://www.ukradon.org

#### Guidance for new buildings and extensions to existing properties

# What is the requirement under Building Regulations for radon protection in new buildings and extensions at the property location? - <u>None</u>

If you are buying a new property in a Radon Affected Area, you should ask the builder whether radon protective measures were incorporated in the construction of the property.

See the Radon and Building Regulations for more details.

#### UKHSA guidance for occupiers and prospective purchases



**Existing radon test results:** There is no public record of individual radon measurements. Results of previous tests can only be obtained from the seller. Radon levels can be significantly affected by changes to the building or its use, particularly by alterations to the heating and ventilation which can also be affected by changes in occupier. If in doubt, test again for reassurance.

**Radon Bond:** This is simply a retained fund, the terms of which are negotiated between the purchaser and the vendor. It allows the conveyance of the property to proceed without undue delay. The purchaser is protected against the possible cost of radon reduction work and the seller does not lose sale proceeds if the result is low. Make sure the agreement allows enough time to complete the test, get the result and arrange the work if needed.

**High Results:** Exposure to high levels of radon increases the risk of developing lung cancer. If a test in a home gives a result at or above the Action Level of 200 Becquerels per cubic metre of air (Bq/m3), formal advice will be given to lower the level. Radon reduction will also be recommended if the occupants include smokers or ex-smokers when the radon level is at or above the Target Level of 100 Bq/m3; these groups have a higher risk. Information on health risks and radon reduction work is available from UKHSA. Guidance about radon reduction work is also available from some Local Authorities, the Building Research Establishment and specialist contractors.

UKHSA designated radon website:	https://www.ukradon.org
Building Research Establishment:	http://www.bre.co.uk/page.jsp?id=3137

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