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## **Ling Developments Limited**

VILLAGE ROAD, CHILDS ERCALL

### **Report on Phase 1 Desk Study & Phase 2 Ground Investigation**

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## **1.0 INTRODUCTION**

Spilman Associates Limited have been appointed by Ling Developments Limited to carry out a combined Phase 1 Desk Study and Phase 2 Ground Investigation for a proposed residential development at Village Road, Childs Ercall, Market Drayton, Shropshire, TF9 2BZ.

The proposed development layout is shown on the drawing reproduced at Appendix A. The development comprises three detached residential properties with associated site access, driveways, garages and gardens.

This report presents the findings of desk study research, an intrusive investigation and associated monitoring and laboratory testing.

The report is intended to satisfy the Local Authority in respect of contamination and ground gas investigations and recommend appropriate remedial works to mitigate any potentially adverse impacts identified.

In addition the report provides recommendations on geotechnical and foundation issues to satisfy the requirements of the Building Regulations.

The site has been subject to a previous "Contamination Assessment" dated October 2004 carried out by Egniol Limited. A copy of this report is reproduced at Appendix B.

## **2.0 SITE LOCATION AND DESCRIPTION**

### **2.1 Site Location**

The site is located at National Grid Reference 366470E 325090N on the west side of Childs Ercall (Figure 1) and approximately 9km south of Market Drayton.

## 2.2 Site Description

The site is broadly rectangular in shape with approximate maximum dimensions of 72m by 35m (Figure 2). A topographic survey has been provided for the site and is reproduced at Appendix C.

A site walkover survey was carried out on 22<sup>nd</sup> January 2021 and record photographs are reproduced at Appendix D.

At the time of the walkover survey the site comprised unused open ground.

Access to the site is from Village Road which forms the southern site boundary. Tarmac surfacing leads from the road in the southeast part of the site towards the centre of the site where there is a mix of tarmac and hardcore surfacing with occasional sections of concrete. In the northern part of the site is a concrete slab on which a portal frame building previously sat.

Scrub vegetation was present in the northeast and southwest parts of the site. A manhole cover is present in the southern part of the site.

The site falls gently from the north to the south with an overall drop in height of around 2.7m (see topographic survey at Appendix C). The elevation at the centre of the site is around 81m AOD.

The site is bounded by hedges to the west and east beyond which are residential properties. A stone wall is present along the northern boundary beyond which is a grass field. Village Road forms the site's southern boundary. Further residential properties are present on the south side of Village Road.

Overhead electricity cables are present along the southern site boundary supported on poles just to the west and east of the site boundary respectively.



The site lies in a semi-rural village setting.

### **3.0 SITE HISTORY**

The site history has been assessed by reference to readily available historic Ordnance Survey (OS) Plans copies of which are reproduced at Appendix E.

The 1<sup>st</sup> Edition 1881 OS Plan shows the site to be occupied by a small building in the southwest corner presumed to be a house. A small outbuilding is present to the rear of the house adjacent to the western site boundary. A school is recorded to the east of the site with the church beyond. To the west are several houses and a “Smithy”. The land to the north is a field. A farmhouse and farm buildings are located to the southwest of the site with a field immediately to the south of Village Road. Pumps (and wells) are recorded on the many nearby properties.

The site is unchanged on the 1902 OS Plan.

The 1954 OS Plan shows a rectangular building in the central part of the site which is understood to have been a garage operated by Butters Coaches which set up in Childs Ercall around 1927 and operated here until around 2006. The previously marked small buildings in the southwest part of the site remains.

The 1970 OS Plan shows the building in the centre of the site with a small extension on its east side. The building/site is marked as a “Garage”.

The site is unchanged on the 1994 OS Plan. New houses have been constructed to the west and east of the site by this time.

By 2000 the garage building in the central part of the site has been demolished and replaced by a new building in the northern part of the site.

Butter Coaches are understood to have ceased operations at the site around 2006. Sometime between 2006 and the 2018 topographic survey all buildings within the site were demolished.

#### **4.0 GEOLOGY**

The site geology has been assessed by reference to the 1:50,000 scale Geological Map Sheet 138 (Wem) published by the British Geological Survey.

No made ground is recorded on or in the vicinity of the site.

The site is shown to be underlain by glacial till deposits, although the nature or thickness of these deposits is not defined.

The glacial deposits are underlain by solid strata of the Bridgnorth Sandstone Formation (formerly referred to as the Lower Mottled Sandstone) of the Triassic Period. The Bridgnorth Sandstone Formation typically comprises brick red with some buff mottling medium grained cross bedded aeolian sandstones.

There are no geological faults on or close to the site. The closest fault is NE-SW trending and located around 250m to the southeast of the site. A similarly trending fault is marked around 450m to the northwest of the site.

#### **5.0 MINING**

The site does not lie within a mining area accordingly there are no requirements for further consideration of mining issues in relation to the proposed development.

## **6.0 HYDROLOGY & HYDROGEOLOGY**

### **6.1 Hydrology**

There are no significant watercourses within 500m of the site. The closest water feature is a small pond shown 180m to the south of the site. The closest watercourse is the south flowing Allford Brook located between 800m and 1km to the east of the site.

The site does not lie within an area prone to fluvial flooding as defined by the Environment Agency.

There are no recorded surface water abstractions within 500m of the site.

### **6.2 Hydrogeology**

The solid strata underlying the site are classified as a Principal Aquifer by the Environment Agency. The glacial deposits are classified as a Secondary Undifferentiated Aquifer.

There are no recorded groundwater abstractions within 500m of the site. There is one recorded groundwater abstraction with 1km of the site located 697m to the northwest of the site. This is for general farming and domestic uses.

The site does not lie within a Groundwater Source Protection Zone as defined by the Environment Agency. The closest Groundwater Source Protection Zone to the site is located approximately 1.7km to the southeast and is defined as Total Catchment (Zone 3).

Numerous pumps and one well are recorded on Historic OS Plans and the positions of these within 250m of the site boundary are shown on Figure 3. None of these are recorded on the 1970s OS Plan and they are assumed to be disused by this time.

The British Geological Survey (BGS) have records of boreholes associated with water wells/or groundwater monitoring at 6 locations within 1km of the site these are shown on Figure 4. Details held by BGS are summarised below:

Reference on Figure 4	BGS Reference	Distance (m)	Direction	Details
A	SJ62NE77	240	SE	No information available. Reference states "War Office"
B	SJ62NE80	250	NW	42m deep borehole drilled for BGS in 2002 as part of research project. No water level information but water sample take at 7m. Borehole now decommissioned
C	SJ62NE16B SJ62NE47 SJ62NE52	300	E	3 boreholes to 42m depth drilled in 1941 and 1943 for RN Air Station, Hinstock. Water depths 7.6m to 9.1m. Boreholes subsequently taken over by Severn Trent Water. Boreholes disused by 1980
D	SJ62NE81	400	N	27m deep borehole drilled in 1941. Water depth 8.1m. Current status unknown
E	SJ62NE67	800	NE	10m deep brick lined well (previously supplied 2 cottages). Water levels in 1970s 1.65m to 4.96m. Reported disused by 1980
F	SJ62NE23	1000	E	37.8m deep borehole. Drilled and pump tested in 1978. Water struck at 5.5m depth rising to 1.4m. Current status unknown.

## 7.0 ENVIRONMENTAL DATABASE SEARCH

An Environmental Database Search has been obtained for the site and is reproduced in full in Report No P21004/02. Key findings of the search are summarised below:

- there are no recorded landfill sites within 250m of the site
- there are no Integrated Pollution Control (IPC) regulated processes within 250m of the site

- there are no Integrated Pollution Prevention and Control (IPPC) regulated processes within 250m
- there are no Local Authority Contaminated Land Register Entries or Notices within 250m of the site
- there are no Substantiated Pollution Incidents within 250m of the site
- there are no Pollution Incidents to Controlled Waters within 250m of the site
- there are two recorded prosecutions relating to authorised processes. These relate to spreading excessive amounts of effluent treatment dairy sludge 186m NW of the site and 191m east of the site. Both incidents were prosecuted in 2007
- the site lies in an area where no radon gas protective measures are required in new buildings
- The British Geological Survey (BGS) have assessed the following ground stability hazard potentials for the site:

Collapsible Ground	Very Low
Compressible Ground	No Hazard
Ground Dissolution	No Hazard
Landslide	Very Low
Running Sand	Very Low
Shrinking and Swelling Clay	Very Low

## **8.0 REVIEW OF 2004 CONTAMINATION ASSESSMENT**

### **8.1 General**

A copy of the 2004 Contamination Assessment carried out by Engiol Limited is reproduced at Appendix B. The investigation was undertaken when the site was still operational as a coach depot and garage. A plan is included within the report which shows site features and trial pit positions. However, this plan is not to scale and is schematic only. The approximate positions of key features have been interpolated from the existing plan and other information and are shown on Figure 5 and include:

- main coach garage building in the northwest part of the site
- vehicle inspection pit in northeast
- above ground diesel tank between the garage and vehicle inspection pit
- buried oil/water trap or tank in the southwest (assumed to be an oil interceptor)
- buried diesel tank adjacent to the southern site boundary to the west of the site entrance

### **8.2 Investigation and Ground Conditions**

The contamination investigation comprised the excavation of 5 no machine dug trial pits extending to depths in the range 0.85m to 3.90m. The trial pits encountered a thin covering of made ground over predominantly sand, although clay was identified in TP2 from 1.90m to 2.90m and in TP3 from 2.50m to 3.20m.

No groundwater was encountered in any of the trial pits.

### 8.3 Visual or Olfactory Evidence of Contamination

Visual or olfactory evidence of potential contamination was identified as follows:

Trial Pit	Depth (m)	Description
TP1	0.55 – 0.90	Slight darkened stain and petrochemical odour
TP2	1.40 – 1.90	Strong petrochemical odour detected with black sheen present
	1.90 – 2.90	Petrochemical stain and strong petrochemical odour present
TP3	1.40 – 2.50	Slight petrochemical odour
	2.50 – 3.10	Strong petrochemical odour

The trial pit log for TP4 does not record any evidence of contamination. However, within the text of the report it states that:

“A strong petrochemical odour was almost immediately detected on excavation of Trial Pit 4. This became very strong as the trial pit progressed with a sheen evident within the sands below the Made Ground in particular.”

### 8.4 Contamination Assessment

Seven samples were tested for a range of metals. These were all below current screening values with the exception of lead in TP3 at 0.30m with a concentration of 243.4mg/kg compared to the current screening value of 200mg/kg.

Concentrations of PAH, phenols and cyanide are all at relatively low concentrations and below current guidance.

Testing for hydrocarbons was limited to determining concentration of mineral oil and GRO (gasoline range organics) neither of which would be used in a current assessment of potential hydrocarbon contamination. Nonetheless concentrations of both mineral oils and GROs are relatively low when compared to the visual and olfactory evidence of hydrocarbon contamination reported. Mineral oil concentrations exceeded 1000mg/kg in one sample only (TP4 0.20m to 0.30m: 1204mg/kg). GRO concentrations were less than 15mg/kg in all samples except TP2 at 1.60m in which a concentration of 93.2mg/kg was detected.

The Engiol report concluded that existing fuel tanks and associated hydrocarbon impacted soils should be removed from site. The extent of such removal works was not defined.

The Engiol report contains no assessment of ground gas or vapour risk to the proposed residential development; although the potential for volatilisation of hydrocarbons is acknowledged within the report.

## **9.0 CONCEPTUAL SITE MODEL**

### **9.1 Legislative Background**

The legislative framework for managing the liabilities imposed by contaminated land in the UK is detailed within Part IIA of the Environmental Protection Act 1990. Under the Act contaminated land is defined as any land in, on or under which there are substances that cause significant harm or have the potential to cause significant harm to health or the environment or where pollution of controlled waters is being or likely to be caused.

The environmental impact of the site has been considered using a risk-based approach incorporating the accepted Source-Pathway-Receptor model (“pollutant linkage”). The source is identified as a function of the nature of any contaminants which may be present. The receptor is the point in the environment at which damage may occur if the contaminant is present



at a level sufficient to cause harm. The pathway is the route in the environment by which the contaminant may be transferred from the source to the receptor. For there to be a significant risk there must be a link between an identified pollutant source and a receptor.

## 9.2 Preliminary Conceptual Site Model

In order to understand the potential risks associated with the site a preliminary conceptual site model has been developed to include the potential contamination sources, the geological and hydrogeological setting, potential pathways and receptors and an initial risk assessment.

The preliminary conceptual site model is shown diagrammatically on Figure 6.

## 9.3 Potential Sources of Contamination

Early OS Plans show the site to be occupied by a residential property in the southwest corner with the remainder of the site comprising garden or field. This use is likely to have been non-contaminative. A Smithy was previously located to the west of the site and could be a potential source of contamination if any waste materials (predominantly ash and clinker) had been deposited on the site.

However, the most significant potentially contaminative use of the site is its long use as a coach garage and depot by Butters Coaches. This use is understood to have commenced around 1927 and continued until 2006.

The use comprised an initial garage in the central part of the site which was subsequently replaced by a new garage building in the northern part of the site believed to have been constructed in the 1990s.

Investigations carried out in 2004 identified significant potential point sources of contamination in the form of a below ground diesel tank adjacent

to the southern site boundary. This tank is understood to have initially been used for petrol and was registered with the Petroleum Officer until 1979 when its use was changed to diesel. In addition an above ground diesel tank was present in the northern part of the site. This is presumed to have been constructed at a similar time to the 1990s coach garage.

Principal sources of contamination are likely to be petroleum hydrocarbons associated with fuel storage and use. Potential spillages could have occurred during tank filling, vehicle filling or from direct leakage from damaged tanks or fuel lines. The 2004 contamination assessment identified significant visual and olfactory evidence of contamination by petroleum hydrocarbons albeit that laboratory determined concentrations of mineral oils and GRO were lower than might have been anticipated. Other sources of contamination would be the oil interceptor in the western part of the site together with more widespread impacts from small scale leakages of fuel or lubricants from vehicle maintenance and servicing areas.

#### 9.4 Receptors

The following receptors have been identified for the site:

- ◆ Humans including end-users of the site, construction workers, occupiers of adjacent properties and the general public
- ◆ Controlled waters (surface water and groundwater)
- ◆ Buildings and services.

## 9.5 Potential Pathways

The following potential pathways have been considered in relation to the receptors identified at 9.4 above:

<u>Receptor</u>	<u>Pathway</u>
Human Health	<ul style="list-style-type: none"><li>- Ingestion</li><li>- Inhalation</li><li>- Dermal contact</li><li>- Adsorption</li><li>- Explosion</li><li>- Asphyxiation</li></ul>
Controlled Waters	<ul style="list-style-type: none"><li>- Direct and indirect discharge to surface water</li><li>- Direct and indirect discharge to groundwater</li></ul>
Buildings & Services	<ul style="list-style-type: none"><li>- Direct contact with contaminated materials</li><li>- Migration/accumulation of ground gases</li><li>- Corrosive attack</li></ul>

## 9.6 Preliminary Risk Assessment

The preliminary risk assessment indicates a high risk of the site being impacted by residual hydrocarbon soil and groundwater contamination which may have the potential to impact human health through direct contact or exposure to hydrocarbon.

Wider impacts on the environment are likely to relate to controlled waters and more particularly groundwaters. The site is considered to be of moderate environmental sensitivity due to its location above a principal

aquifer, although the site does not lie within a Groundwater Source Protection Zone as defined by the Environment Agency.

Historically groundwater was used for domestic consumption and early OS Plans show many pumps and wells within the confines of many domestic properties close to the site (see Figure 3) the majority of these are likely to have become disused with the arrival of mains water.

Larger users would have been the former RN Air Station (see Section 6.2 above and Figure 4). Again the majority of these uses now appear to have ceased. There is only one remaining licensed groundwater abstraction within 1km of the site and this is located 697m to the northwest of the site. The water abstracted is for general farming and domestic use.

The potential for impacts on surface waters are considered to be very low as there are no significant surface watercourses within 250m of the site.

This preliminary risk assessment is further reviewed and revised to take account of the findings of the current ground investigation works at Section 13.0 below.

## **10.0 PRELIMINARY ENABLING WORKS**

Preliminary enabling works were carried out by Ling Developments Limited to facilitate the ground investigation works.

These works comprised the location and removal of the below ground fuel tanks located in the southern part of the site adjacent to Village Road.

Two approximately 500 gallon capacity tanks were identified below a concrete slab at the position shown on Figure 7. The tanks were found to be fluid filled containing a mixture of water and diesel. The contents of the tanks were pumped out into IBCs for subsequent off-site disposal by specialist contractor.

The fuel tanks were then dug out. There was no evidence of a concrete surround around the tanks. The tanks were in direct contact with the surrounding soil which was noted to be visually and olfactorily impacted by hydrocarbons.

The excavated tanks were temporarily stored on a concrete hardstanding (see Photographs as Appendix E) prior to off-site disposal.

The hydrocarbon impacted soils comprised sands and clayey sands which had become heavily saturated with water due to ingress from a surface water drain adjacent to the tank excavation area. This drain was subsequently blocked off to prevent further water ingress.

Some of the obviously impacted soil from around the tank was temporarily excavated and stockpiled on a hardstanding area. The remainder was left in place in the area of the tank and immediately to the west for subsequent off-site disposal.

## **11.0 GROUND INVESTIGATION**

### **11.1 Initial Site Investigation Works**

The initial site works were carried out 4<sup>th</sup> February 2021 and comprised the following:

- the drilling of 3 no mini-rig boreholes (BH1 to BH3) to refusal at depths in the range 3.15m to 4.15m. All boreholes were logged by a Geotechnical Engineer and detailed records are reproduced at Appendix G
- excavation of 5 no machine dug trial pits to depths in the range 1.00m to 1.70m (TP1 to TP5). All trial pits were logged by a Geotechnical Engineer and detailed records are reproduced at Appendix H

- excavations in the vicinity of the former below ground fuel tanks to sample undisturbed natural soils below the tanks

The location of the exploratory works are shown on Figure 7.

The objectives of the initial site works was to provide a broad characterisation of the near surface soils by the use of trial pits. The mini-rig boreholes BH1 and BH2 were located close to the former above ground fuel tank and below ground fuel tanks respectively to determine potential hydrocarbon impacts at these locations.

## 11.2 Supplementary Site Works

Supplementary site works were carried out between 26<sup>th</sup> February and 1<sup>st</sup> March 2021 and comprised the following:

- the drilling of an additional 4 no mini-rig boreholes (BH4 to BH7) to refusal at depths in the range 2.80m to 3.85m. Borehole records are reproduced at Appendix G
- the drilling of 1 no rotary cored bored to a depth of 18.50m (BH101). The borehole was logged by a Geotechnical Engineer and detailed records are reproduced at Appendix I.

The objectives of the supplementary site works were to provide a further assessment of shallow groundwater across the entire site (BH4 to BH7). The deeper rotary borehole was intended to allow an assessment of potential hydrocarbon impacts on the Bridgnorth Sandstone, to determine groundwater levels in the aquifer and to allow the testing of sandstone and groundwater samples for hydrocarbons.

### 11.3 In situ Testing

#### 11.3.1 Standard Penetration Tests

Standard Penetration Tests (SPTs) were carried out in BH1, BH2, BH3 and BH7. The test results are shown on the borehole records at Appendix G and summarised at Appendix J.

#### 11.3.2 PID Screening

Selected samples from boreholes, trial pits and excavation sample points below the underground base were subjected to screening with a portable Photoionisation Device (PID) to determine the presence of volatile organic compounds (VOCs).

The PID test procedure entailed putting a nominal 0.5kg sample in a heavy duty bag which was then sealed. The soil within the bag was broken into small particles and the bag was shaken for 30 seconds to allow any vapours within the soil to be released into the headspace. A headspace analysis was then carried out by pushing the sample pipe of the PID through the side of the plastic bag and ensuring a seal between the bag and pipe.

The PID readings are detailed at Appendix K.

### 11.4 Instrumentation

Combined gas and groundwater monitoring standpipes were installed in BH1, BH2, BH4, BH5, BH6, BH7 and BH101. Installation details are shown on the borehole records at Appendix G and I and are summarised at Appendix L.

Vapour, gas and groundwater level monitoring was carried out on six occasions in BH1 and BH2 and two occasions in BH4, BH5, BH6, BH7 and BH101.

Vapour monitoring was carried out with a portable Photoionisation Device (PID) and gas monitoring was carried out with a portable infrared gas analyser (Gas Data GFM 436). Groundwater depths were determined with a combined electronic dip and oil/water interface meter.

Vapour, gas and groundwater level monitoring results are reproduced at Appendix M.

## 11.5 Laboratory Testing

### 11.5.1 Soil Contamination Testing

Five near surface soil samples from trial pits TP1 to TP5 were tested for the following determinands:

- ◆ Former ICRCL Suite
- ◆ Speciated Polycyclic Aromatic Hydrocarbons (PAH)
- ◆ Total Petroleum Hydrocarbons (TPH) with an Aromatic/Aliphatic Split
- ◆ Asbestos Screen

The test results are reproduced in full at Appendix N and are summarised on Table 1.

An additional 7 soil samples from mini-rig boreholes BH1 and BH2 were tested for TPH and BTEX compounds only and the test results are reproduced at Appendix O and summarised on Table 2.



Six rock samples from rotary cored borehole BH101 were tested for TPH and BTEX compounds and test results are reproduced at Appendix P and summarised on Table 3.

Following removal of the underground fuel tanks in the southern part of the underlying natural soil was exposed (see Photographs at Appendix F) and three samples were tested for TPH and BTEX compounds. The test results are reproduced at Appendix Q and summarised on Table 4.

#### 11.5.2 Groundwater Contamination Testing

Groundwater samples were obtained using disposable bailers from BH1 and BH2 on 10/02/21 and 16/02/21 and were analysed for TPH and BTEX compounds. The test results are reproduced at Appendix R and S respectively.

Groundwater samples were obtained from BH2, BH4, BH5, BH6, BH7 and BH101 on 02/03/21 using disposable bailers. No sample was obtained from BH1 as it was dry. An additional discrete groundwater sample was taken from 10.50m in BH101 using a Hydrasleeve sampler. All samples were analysed for TPH and BTEX compounds and the results are reproduced at Appendix T.

For ease of reference all groundwater contamination results are summarised on Table 5.

### 11.5.3 Geotechnical Testing

Selected soil samples were tested for the following parameters:

- ◆ Moisture Content
- ◆ Liquid Limit
- ◆ Plastic Limit
- ◆ Soluble Sulphate
- ◆ pH
- ◆ Particle Size Distribution

The test results are reproduced at Appendix U.

## 12.0 **GROUND CONDITIONS**

### 12.1 Made Ground

Made ground was encountered in all exploratory holes and ranged in thickness from 0.20m (TP3) to 1.10m (TP5).

The made ground comprised predominantly reworked topsoil and subsoil materials with occasional inclusions of brick, ash and clinker. At some locations there was a surface layer roadstone or concrete.

In TP5 a buried slab approximately 100mm in thickness was encountered from 0.30m to 0.40m which may represent the floor slab from the earliest coach garage building.

### 12.2 Topsoil/Subsoil

Undisturbed topsoil/subsoil was encountered in TP3 from 0.20m to 0.50m and in BH5 from 0.30m to 0.90m. This material comprised sandy silt.

### 12.3 Glacial Deposits

The made ground and topsoil/subsoil where present was underlain by glacial deposits. The base of the glacial deposits was not proved in the trial pits but was identified in all mini-rig boreholes as follows:

Borehole	Depth to Base of Glacial Deposits (m)
BH1	3.80
BH2	1.70
BH3	3.70
BH4	3.00
BH5	2.70
BH6	2.60
BH7	3.80

The glacial deposits comprise predominantly very loose to medium dense slightly gravelly clayey sand. However, significant bands of soft to stiff (but generally firm) gravelly very sandy clay were identified in BH1, BH3 and BH5 with thinner bands of clay or very clayey sand in BH2, BH4 and BH5. The incidence of clay bands is summarised below:

Borehole	Depth of Clay (m)
BH1	2.50 – 3.50
BH2	1.50 – 1.70
BH3	2.40 – 3.70
BH4	2.05 – 2.15
BH5	2.60 – 2.70
BH6	1.10 – 1.90

## 12.4 Bridgnorth Sandstone Formation

Solid strata of the Bridgnorth Sandstone Formation was encountered in all mini-rig boreholes and was proved to a maximum depth of 18.50m by rotary coring in BH101.

The Bridgnorth Sandstone Formation generally comprised very weak red brown fine grained sandstone.

## 12.5 Groundwater

Groundwater was encountered during drilling all mini-rig boreholes except BH1, BH2 and BH5 at depths below around 2m. Subsequent monitoring identified the following range of groundwater depths:

Borehole	Depth to Base of Glacial Deposits (m)
BH1	3.12 - >3.50
BH2	1.96 – 2.28
BH4	1.07 – 1.22
BH5	1.45 – 1.54
BH6	0.55 – 0.60
BH7	1.52 – 1.55
BH101	3.28 – 3.29

## 13.0 **CONTAMINATION ASSESSMENT**

### 13.1 Visual and Olfactory Evidence of Potential Contamination

No visual or olfactory evidence of soil contamination was identified in any of the soil samples from boreholes or trial pits except BH2 (located immediately adjacent to the former underground fuel tanks) and soil samples taken from the natural soils immediately below the underground fuel tanks.

In BH2 there was no visual evidence of hydrocarbon contamination although olfactory evidence was noted as follows:

Depth (m)	Description
1.00 – 1.70	Strong hydrocarbon odour
1.70 – 2.50	Moderate hydrocarbon odour
2.50 – 3.15	Strong hydrocarbon odour

Samples of the natural soils below the buried tanks again showed no visual signs of contamination but exhibited a “strong hydrocarbon/petrochemical odour”.

It is noteworthy that samples from the current investigation appear to show significantly less hydrocarbon contamination than those reported on in the 2004 Contamination Investigation undertaken when the site was still operational as a coach garage and depot. This may be attributable to the removal of potential hydrocarbon sources following the closure of the site in 2006 and some natural degradation of hydrocarbons between 2006 and the present day.

### 13.2 PID Screening

Soil samples from boreholes, trial pits and excavations below the buried tanks were all screened for VOCs using a PID. Readings were below 1ppm in all samples except those from BH2 and the tank base excavations.

PID readings exceeding 1ppm are summarised below:

Exploratory Hole	Depth (m)	PID Reading (ppm)
BH2	1.00 – 1.50	21.8
BH2	1.70 – 2.00	1.3
BH2	2.00 – 2.50	5.7
BH2	2.50 – 3.00	17.0
Tank Base T1	2.00	35.9
Tank Base T2	2.00	11.9
Tank Base T3	2.00	9.6

### 13.3 Soil Contamination

#### 13.3.1 Metals

The soil test results have been assessed against the published CLEA Soil Guideline Values (SGVs). Where no SGVs are available the results have been assessed against the LQM/CIEH S4ULs. Lead has been assessed against the potential Category 4 Screening Level (C4SL) of 200mg/kg in the absence of any updated CLEA SGVs. All results are based on a residential end-use. The test results are summarised below:

Determinand	Values Detected (mg/kg)					Screening Value (mg/kg)
	TP1 0.30m	TP2 0.20m	TP3 0.40m	TP4 0.15m	TP5 0.60m	
Arsenic	9.2	18.4	6.0	9.7	4.3	32
Boron	< 0.5	1.5	0.5	1.4	< 0.5	291
Cadmium	2.4	2.6	< 0.5	3.8	< 0.5	10
Chromium	16.7	27.4	14.1	27.0	11.7	910
Chromium VI	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	6
Copper	60.3	155	47.9	233	37.7	2330
Lead	176	275	45.6	647	69.1	200
Mercury	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	40
Nickel	30.4	59.8	14.0	27.2	9.5	130
Selenium	10.4	< 1.0	< 1.0	< 1.0	< 1.0	350
Zinc	539	943	158	714	91.9	3750

Concentrations of all determinands were below appropriate screening values with the exception of lead.

Lead was elevated in two samples with concentrations of 275mg/kg (TP2: 0.20m) and 647mg/kg (TP4: 0.15m).

### 13.3.2 Cyanide and Phenols

Concentrations of free cyanide and phenols were below the screening values in all samples.

### 13.3.3 Polycyclic Aromatic Hydrocarbons (PAH)

Total PAH concentrations ranged from <0.4mg/kg to 34.6mg/kg. All individual PAH compounds were below the appropriate screening values except in TP2 at 0.20m in which exceedances occurred for benzo(b)fluoranthene, benzo(a)pyrene and dibenzo(ah)anthracene and in TP4 at 0.15m in which exceedances occurred for benzo(a)pyrene and dibenzo(ah)anthracene.

### 13.3.4 Total Petroleum Hydrocarbons (TPH)

TPH concentrations for both aromatic and aliphatic compounds over all carbon ranges were below the appropriate screening value in all samples except TP4 at 0.15m and BH2 at 2.50m to 3.00m

In TP4 at 0.15m TPH C21 – C35 Aromatic were recorded at 2100mg/kg compared to the screening value of 1100mg/kg.

In BH2 at 2.50m to 3.00m the following exceedances were noted:

	Measured Value (mg/kg)	Screening Value (mg/kg)
TPH (C8 – C10 Aliphatic)	51.4	27
TPH (C8 – C10 Aromatic)	39.1	34
TPH (C12 – C16 Aromatic)	219	140

BTEX compounds were at concentrations below the appropriate screening value in all samples.

### 13.3.5 Asbestos

Five soil samples were screened for asbestos fibres and none were detected.

## 13.4 Groundwater Contamination

Groundwater contamination test results are presented in full at Appendix R, S and T and are summarised on Table 5.

Samples from BH4, BH6 and BH7 and BH101 showed no evidence of hydrocarbon contamination.



Samples from BH1, BH2 and BH5 showed evidence of being impacted by hydrocarbons.

In BH1 (located below the position of the more recent above ground diesel tank) TPH concentrations were initially 1130ug/l falling to 22.1ug/l on the second monitoring visit. In BH2 (adjacent to the underground fuel tanks) concentrations were 710ug/l, 542ug/l and 25.9ug/l over the three successive sampling visits. The sample from BH5 had a TPH concentration of 565ug/l. The split of aromatic/aliphatic compounds and the carbon ranges identified are indicative of diesel and degraded diesel contamination.

Samples of groundwater from within the Bridgnorth Sandstone Formation aquifer showed no evidence of hydrocarbon impacts.

### 13.5 Revised Conceptual Model

A qualitative risk assessment has been carried out based on the accepted source-pathway-receptor pollutant linkages methodology. The assessment considers a site specific revised conceptual site model designed from the preliminary conceptual site model and information obtained from the current investigation. The revised conceptual model shown on Figure 8.

### 13.6 Human Health Soil Contamination Remediation Proposals

Concentrations of all determinands were below recognised human health soil screening values with the exception of lead, some PAH compounds and TPH. These elevated concentrations pose a potential hazard with respect to human health without appropriate remedial measures.

Appropriate remedial measures should be designed to sever the identified pollutant linkage. This could be achieved by the provision of a clean cover layer or the removal of impacted soils. The provision of a clean cover layer would be most cost-effective and is accordingly recommended.

The cover layer should comprise a minimum 600mm of clean topsoil and/or subsoil which will effectively isolate any residual contaminants from the site end-users thus breaking the identified pollutant linkage. The cover layer should be provided to all garden and landscape areas. No special measures are considered necessary beneath buildings, parking areas and other areas of hardstanding.

Care should be taken to ensure that all imported clean cover materials are uncontaminated. Appropriate testing and validation of the remedial works should be carried out to the satisfaction of the Local Authority. The remedial works should be completed and validated before the development is first occupied.

### 13.7 Controlled Waters Contamination Remediation Proposals

Significant contamination of near surface soils has only been identified in the area of the former underground fuel tanks.

The contents of the tanks (a diesel water mix) and the tanks have already been removed thereby removing the primary contamination source.

Testing of the natural soils immediately below the base of the tank identified olfactory and PID evidence of hydrocarbon impacts although laboratory testing of three soil samples indicated TPH concentration in the range 50mg/kg to 283mg/kg. However, immediately adjacent to the underground tanks in BH2 the following profile of TPH concentrations was recorded:

Borehole	Depth (m)	TPH Concentration (mg/kg)
BH2	0.50 – 1.00	25.8
	1.00 – 1.50	388
	1.70 – 2.00	18.0
	2.00 – 2.50	502
	2.50 – 3.00	1960

The samples from BH2 from 1.70m to 3.00m correspond with the upper part of the Bridgnorth Sandstone Formation while samples above this are within the glacial deposits and made ground.

Rotary cored samples from adjacent BH101 were tested for TPH at depths of 4.00m, 6.00m, 8.00m, 10.00m, 13.00m and 15.50m and showed no evidence of TPH within the sandstone.

The available evidence suggests the localised presence of hydrocarbon impacted soils in the vicinity of the former underground fuel tanks. Soils around the tanks was assessed on a visual and olfactory basis to be impacted by hydrocarbons. However, no evidence of free product was identified in any of the excavations. Whilst there is no evidence of any significant vertical migration of the hydrocarbons as a precautionary measure and to achieve some betterment it is proposed that hydrocarbon impacted soils around the former underground tank area to be excavated and removed from site for off-site treatment/disposal.

It is intended that the extent of excavation be based on visual and olfactory evidence of hydrocarbon impacted soils backed up by PID readings. However, once the excavation has been completed the base and sides will be sampled and tested to verify that TPH concentrations fall below a screening value of 500mg/kg.

The remedial works should also include exploratory excavations in the vicinity of the oil interceptors reported in the 2004 investigation by not yet identified on site.

The completed excavation will be backfilled with imported inert materials.

Whilst localised hydrocarbon impacts were noted in some samples of shallow groundwater these were not considered to warrant remediation and in BH1 and BH2 hydrocarbons showed reducing concentrations over time. Significant reductions in hydrocarbon concentrations were noted in shallow groundwater in BH2 since removal of the underground fuel tanks indicating that these were the source of the hydrocarbons. Given the above findings there is considered to be no requirement for any further assessment or remediation of shallow groundwater particularly given the there is no discernible impact on groundwater from BH101 sealed within the sandstone aquifer.

BH101 should be fully decommissioned once no longer required to ensure that it does not provide a potential future pathway to the aquifer. The works should be carried out in accordance with Environment Agency Guidance dated October 2012 “Good Practice for Decommissioning Redundant Boreholes and Wells”.

Appropriate testing and validation of the remedial works should be carried out to the satisfaction of the Local Authority. The remedial works should be completed and validated before the development is first occupied.

### 13.8 Unexpected Contamination

In the event of unexpected contamination not identified by this report being identified during site works then further advice should be sought and the Local Authority should be informed.

## 14.0 GROUND GASES

Vapour, ground gas and water level monitoring was carried out in two boreholes (BH1 and BH2) on six occasions between 4<sup>th</sup> February and 9<sup>th</sup> March 2021. A further five boreholes from the supplementary investigation were monitored on two occasions. The results are reproduced in full at Appendix M.

The monitoring procedure for all monitoring wells was as follows:

1. Determine borehole gas flow rate
2. Determine PID reading
3. Determine concentrations of methane, carbon dioxide and oxygen
4. Dip groundwater level

Initial readings were taken for VOCs using a portable PID. Readings were less than 1ppm in all boreholes except BH1 and BH2. In BH1 PID readings ranged from 0.0ppm to 4.2ppm. More elevated readings were identified in BH2 ranging from 4.8ppm to 78.8ppm.

Methane was absent in all boreholes except BH2 on all monitoring visits. In BH2 a methane concentration of 2.4% was recorded on 10<sup>th</sup> February 2021 and corresponded with the peak PID reading of 78.8ppm. It is considered that this reading of “methane” was impacted by the presence of hydrocarbon vapours rather than the actual presence of methane.

Carbon dioxide concentrations were below 5% in all boreholes except BH2 on all monitoring visits. Concentrations of carbon dioxide exceeded 5% with values of 6.2% and 5.7% on 10<sup>th</sup> and 16<sup>th</sup> February 2021.

Borehole gas flow rates were less than 0.5 litres per hour in all boreholes on all monitoring visits. Atmospheric pressures during the monitoring ranged from 994 to 1020 millibars. Four of the six monitoring visits were carried out at atmospheric pressures at or below 1000 millibars.

Worst case Gas Screening Values (GSVs) for the site have been calculated as follows in accordance with CIRIA C665 (2007) Assessing Risks Posed by Hazardous Ground Gases to Buildings:

GSV <sub>carbon dioxide</sub>	0.031l/hr
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These results would classify the site as Characteristic Situation 1 (CS1), however, as the maximum carbon dioxide concentration exceeds 5% the classification should be advanced to a Characteristic Situation 2 (CS2).

The nature of the gas protection measures has been determined in accordance with BS8485:2015 + A1:2019 Code of Practice for the Design of Protective Measures for Methane and Carbon Dioxide Ground Gases for New Buildings.

A site classification of Characteristic Situation 2 (CS2) would require 3.5 points of protection in accordance with the British Standard which could be achieved as follows:

Item	Description	Points Score
(a)	Sub slab venting below beam and block floor to achieve good performance	1.5
(b)	Proprietary gas resistant membrane to entire building footprint, sealed around services penetrations and continuous across the cavity. Installation to be fully verified and tested in accordance with CIRIA C735 (2014)	2.0
	Total Points Score	3.5

Due to the identified presence of hydrocarbons at the site the proprietary gas resistant membrane should be fully resistant to hydrocarbon vapours as well as methane and carbon dioxide.

The gas protection measures should be designed, detailed and installed by an appropriately experienced contractor.

The gas protection measures should be inspected, tested and validated in accordance with CIRIA C735 (2014) and an appropriate verification report should be submitted to the Local Authority

## **15.0 ENGINEERING CONSIDERATIONS**

### **15.1 Foundations**

In the northern half of the site the thickness of the glacial deposits was recorded as 3.80m (in BH1 and BH7). The deposits were predominantly loose to medium dense sand, although in BH1 a band of soft slightly gravelly very sandy clay was recorded from 2.50m to 3.50m.

SPT N values within the glacial deposits were very variable ranging from 0 in BH7 at 3.00m where the SPT rods sank under their own weight to a maximum value of 17 in BH1 at 1.00m.

SPT N values for BH1 and BH7 are shown graphically on Figure 9. The low and variable density of the glacial deposits is such that they would not be suitable for the use of conventional shallow strip footings which would be subject to potentially excessive total and differential settlements.

Given the presence of a competent sandstone strata at 3.80m the use of driven piles acting in end-bearing in the sandstone may be the most appropriate foundation solution. Advice should be sought from a specialist piling contractor on the most appropriate pile type and its load bearing characteristics.

Pile design can be carried out from SPT N values within the very weak sandstone which recorded values of 53 for 75mm penetration (BH1:4.00m to 4.15m) and 51 for 200mm (BH1: 3.50m to 3.85m).

In the southern part of the site Bridgnorth Sandstone was encountered at 1.70m in BH2, initially comprising very dense sandy grading into very weak sandstone at 2.50m. BH4, which was drilled at an elevation around 1m higher than BH2, identified competent sandstone at 3.00m; although nearby BH3 recorded the sandstone at 3.70m.

SPT N values within the sandstone were as follows:

BH2	3.00 – 3.15	58 for 75mm
BH3	4.00 – 4.15	63 for 75mm

Again pile could be employed in the southern part of the site as proposed for the north. Although given that site levels are to be reduced in the area of the southern plot then it may be feasible to use deep trench fill foundations extending into the sandstone. Within the sandstone an allowable bearing pressure of 200kN/m<sup>2</sup> would be appropriate for foundation design. At this loading intensity settlements would be limited to acceptable levels.

All foundation excavations should be inspected and approved by the Building Inspector.

In the event of ground conditions differing from these identified by this investigation then further geotechnical advice should be sought.



## 15.2 Building Near Trees

There are several trees around the site perimeter. However, significant clay deposits have not been identified at the site with the majority of soil being granular in nature. Given this and the saturated nature of the near surface soils the potential for significant heave or shrinkage is assessed to be very low and does not warrant the inclusions of any specialist protection measures.

## 15.3 Excavations

Excavations are anticipated to be of variable short-term stability. In the granular deposits of the made ground and glacial deposits some instability should be anticipated.

Where man entry is required the excavation sides should be appropriately battered or shored in accordance with Health & Safety Executive Guidance.

## 15.4 Groundwater

Shallow perched groundwater has been identified at the site and consequently groundwater ingress should be anticipated within shallow excavation. Groundwater ingress may be associated with instability and “washing in” of silt and sand sized particles.

It should be noted that groundwater levels can be subject to seasonal fluctuations and longer-term groundwater monitoring has not been carried out.

### 15.5 Buried Concrete

Sulphate and pH test results indicate an appropriate design class for buried concrete of DS-1 in accordance with BRE Special Digest 1 (2005). The Aggressive Chemical Environment for Concrete (ACEC) class for the site would be AC-1 assuming mobile groundwater conditions for buried concrete.

### 15.6 Water Supply Pipework

Due to the presence of hydrocarbon contamination at the site is considered that conventional polyethylene water supply pipework would be unacceptable. Specialist protective pipework is recommended. The selection of pipework should be agreed with the water supply company.

### 15.7 Soakaways

The use of soakaways for the disposal of rainfall runoff is not recommended given the identified soil contamination at the site.

## **TABLES**

**TABLE 1: SUMMARY OF SOIL CONTAMINATION RESULTS (TRIAL PITS)**

Trial Pit	TP1	TP2	TP3	TP4	TP5	CLEA SGV or	
						LQM/CIEH S4UL	
Depth (m)	0.30	0.20	0.40	0.15	0.60		
Arsenic	mg/kg	9.2	18.4	6.0	9.7	4.3	32
Boron	mg/kg	< 0.5	1.5	0.5	1.4	< 0.5	291
Cadmium	mg/kg	2.4	2.6	< 0.5	3.8	< 0.5	10
Chromium	mg/kg	16.7	27.4	14.1	27.0	11.7	910 <sup>1</sup>
Chromium VI	mg/kg	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	6
Copper	mg/kg	60.3	155	47.9	233	37.7	2330
Lead	mg/kg	176	275	45.6	647	69.1	200 <sup>2</sup>
Mercury	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	40 <sup>3</sup>
Nickel	mg/kg	30.4	59.8	14.0	27.2	9.5	130
Selenium	mg/kg	10.4	< 1.0	< 1.0	< 1.0	< 1.0	350
Zinc	mg/kg	539	943	158	714	91.9	3750
Cyanide (free)	mg/kg	< 1.0	< 1.0	< 1.0	6.5	< 1.0	20 <sup>4</sup>
Phenols	mg/kg	< 5	< 5	< 5	< 5	< 5	780
Naphthalene	mg/kg	< 0.1	0.2	< 0.1	0.5	< 0.1	2.3
Acenaphthylene	mg/kg	< 0.1	0.4	< 0.1	0.3	< 0.1	170
Acenaphthene	mg/kg	< 0.1	0.2	< 0.1	0.2	< 0.1	210
Fluorene	mg/kg	< 0.1	0.1	< 0.1	< 0.1	< 0.1	170
Phenanthrene	mg/kg	< 0.1	1.9	< 0.1	0.8	< 0.1	95
Anthracene	mg/kg	< 0.1	1.1	< 0.1	0.6	< 0.1	2400
Fluoranthene	mg/kg	< 0.1	5.0	< 0.1	1.8	< 0.1	280
Pyrene	mg/kg	< 0.1	4.3	< 0.1	1.4	< 0.1	620
Benzo(a)Anthracene	mg/kg	< 0.1	3.0	< 0.1	1.2	< 0.1	7.2
Chrysene	mg/kg	< 0.1	2.7	< 0.1	1.0	< 0.1	15
Benzo(b)Fluoranthene	mg/kg	< 0.1	2.7	< 0.1	2.4	< 0.1	2.6
Benzo(k)Fluoranthene	mg/kg	< 0.1	3.0	< 0.1	2.4	< 0.1	77
Benzo(a)Pyrene	mg/kg	< 0.1	3.5	< 0.1	3.8	< 0.1	2.2
Indeno(123-cd)Pyrene	mg/kg	< 0.1	3.2	< 0.1	4.2	< 0.1	27
Dibenzo(ah)Anthracene	mg/kg	< 0.1	0.7	< 0.1	1.6	< 0.1	0.24
Benzo(ghi)Perylene	mg/kg	< 0.1	2.5	< 0.1	5.4	< 0.1	320
PAH (Total)	mg/kg	< 0.4	34.6	< 0.4	27.6	< 0.4	N/A
Asbestos	N/A	ND	ND	ND	ND	ND	ND
Benzene	ug/kg	<10	<10	<10	<10	<10	87
EthylBenzene	ug/kg	<10	<10	<10	<10	<10	47,000
Xylenes	ug/kg	<10	<10	<10	<10	<10	56,000 <sup>5</sup>
Toluene	ug/kg	<10	<10	<10	<10	<10	130,000
TPH (C5 - C6 Aliphatic)	mg/kg	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	42
TPH (C6 - C8 Aliphatic)	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	100
TPH (C8 - C10 Aliphatic)	mg/kg	<1	<1	<1	1.1	<1	27
TPH (C10 - C12 Aliphatic)	mg/kg	<1	<1	<1	1.5	<1	130
TPH (C12 - C16 Aliphatic)	mg/kg	<1	<1	<1	5.7	1.3	1100
TPH (C16 - C21 Aliphatic)	mg/kg	<1	1.8	<1	21.7	<1	65,000 <sup>6</sup>
TPH (C21 - C35 Aliphatic)	mg/kg	6.2	15.5	<1	504	12.4	65,000 <sup>6</sup>
TPH (C35 - C40 Aliphatic)	mg/kg	<1	3.4	<1	102	2.6	65,000 <sup>7</sup>
TPH (C40 - C44 Aliphatic)	mg/kg	<1	1.7	<1	74.3	3.4	65,000 <sup>7</sup>
TPH (C6 - C7 Aromatic)	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	70
TPH (C7 - C8 Aromatic)	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	130
TPH (C8 - C10 Aromatic)	mg/kg	<1	<1	<1	2.8	<1	34
TPH (C10 - C12 Aromatic)	mg/kg	<1	<1	<1	2.7	2.1	74
TPH (C12 - C16 Aromatic)	mg/kg	<1	2.2	<1	19.4	1.6	140
TPH (C16 - C21 Aromatic)	mg/kg	4.4	15.6	<1	111	6.2	260
TPH (C21 - C35 Aromatic)	mg/kg	53.7	140	<1	2100	50.1	1100
TPH (C35 - C40 Aromatic)	mg/kg	19.2	37.8	<1	883	14.0	1100 <sup>8</sup>
TPH (C40 - C44 Aromatic)	mg/kg	3.3	8.0	<1	259	7.6	1100 <sup>8</sup>

<sup>1</sup> S4UL quoted is for Chromium III<sup>2</sup> Results assessed against Category 4 Screening Level<sup>3</sup> Total Mercury concentration assessed against S4UL for inorganic mercury<sup>4</sup> Assessed against Dutch Intervention Value<sup>5</sup> S4UL taken as 56,000ug/kg based on p-xylene<sup>6</sup> S4UL of 65,000mg/kg for aliphatic C16 - C35<sup>7</sup> S4UL of 65,000mg/kg for aliphatic C35-C44<sup>8</sup> S4UL of 1100mg/kg for aromatic C35-C44

**TABLE 2: SUMMARY OF TPH SOIL CONTAMINATION RESULTS (BOREHOLES)**

Borehole		BH1	BH1	BH2	BH2	BH2	BH2	BH2	CLEA SGV or LQM/CIEH S4UL
Depth (m)		0.50	1.50	0.50 - 1.00	1.00 - 1.50	1.70 - 2.00	2.00 - 2.50	2.50 - 3.00	
Benzene	ug/kg	<10	<10	<10	<10	<10	<10	<10	87
EthylBenzene	ug/kg	<10	<10	<10	<10	<10	<10	<10	47,000
Xylenes	ug/kg	<10	<10	<10	16.1	<10	<10	43.1	56,000 <sup>1</sup>
Toluene	ug/kg	<10	<10	<10	<10	<10	<10	<10	130,000
TPH (C5 - C6 Aliphatic)	mg/kg	< 0.01	< 0.01	< 0.01	0.02	< 0.01	< 0.01	< 0.01	42
TPH (C6 - C8 Aliphatic)	mg/kg	< 0.01	< 0.01	< 0.01	0.06	< 0.01	< 0.01	0.02	100
TPH (C8 - C10 Aliphatic)	mg/kg	<1	5.3	<1	7.4	<1	4.5	51.4	27
TPH (C10 - C12 Aliphatic)	mg/kg	<1	16.3	<1	24.1	<1	20.0	127	130
TPH (C12 - C16 Aliphatic)	mg/kg	<1	28.3	<1	76.0	2.1	109	497	1100
TPH (C16 - C21 Aliphatic)	mg/kg	<1	< 1.0	<1	71.5	3.2	133	536	65,000 <sup>2</sup>
TPH (C21 - C35 Aliphatic)	mg/kg	7.7	3.2	1.5	17.9	1.6	45.9	197	65,000 <sup>2</sup>
TPH (C35 - C40 Aliphatic)	mg/kg	1.1	<1	<1	<1	<1	1.4	6.1	65,000 <sup>3</sup>
TPH (C40 - C44 Aliphatic)	mg/kg	2.0	2.1	1.2	1.7	<1	1.5	2.2	65,000 <sup>3</sup>
TPH (C6 - C7 Aromatic)	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	70
TPH (C7 - C8 Aromatic)	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	130
TPH (C8 - C10 Aromatic)	mg/kg	<1	2.6	<1	5.3	<1	2.8	39.1	34
TPH (C10 - C12 Aromatic)	mg/kg	1.5	7.4	<1	20.6	<1	15.1	1.1	74
TPH (C12 - C16 Aromatic)	mg/kg	8.3	16.1	5.8	67.7	4.3	58.7	219	140
TPH (C16 - C21 Aromatic)	mg/kg	2.5	1.4	6.5	74.2	1.5	75.9	173	260
TPH (C21 - C35 Aromatic)	mg/kg	37.4	7.7	3.7	14.7	1.4	28.7	98.2	1100
TPH (C35 - C40 Aromatic)	mg/kg	10.2	3.8	1.3	2.4	<1	2.5	5.8	1100 <sup>4</sup>
TPH (C40 - C44 Aromatic)	mg/kg	4.9	4.7	2.9	3.9	1.9	2.9	3.6	1100 <sup>4</sup>

<sup>1</sup> S4UL taken as 56,000ug/kg based on p-xylene

<sup>2</sup> S4UL of 65,000mg/kg for aliphatic C16 - C35

<sup>3</sup> S4UL of 65,000mg/kg for aliphatic C35-C44

<sup>4</sup> S4UL of 1100mg/kg for aromatic C35-C44

**TABLE 3: SUMMARY OF TPH SOIL CONTAMINATION RESULTS (ROTARY BOREHOLE)**

Borehole		BH101	BH101	BH101	BH101	BH101	BH101	CLEA SGV or LQM/CIEH S4UL
Depth (m)		4.00	6.00	8.00	10.00	13.00	15.50	
Benzene	ug/kg	<1	<1	<1	<1	<1	<1	87
EthylBenzene	ug/kg	<1	<1	<1	<1	<1	<1	47,000
Xylenes	ug/kg	<1	<1	<1	<1	<1	<1	56,000 <sup>1</sup>
Toluene	ug/kg	<1	<1	<1	<1	<1	<1	130,000
TPH (C5 - C6 Aliphatic)	mg/kg	<1	<1	<1	<1	<1	<1	42
TPH (C6 - C8 Aliphatic)	mg/kg	<1	<1	<1	<1	<1	<1	100
TPH (C8 - C10 Aliphatic)	mg/kg	<1	<1	<1	<1	<1	<1	27
TPH (C10 - C12 Aliphatic)	mg/kg	<1	<1	<1	<1	<1	<1	130
TPH (C12 - C16 Aliphatic)	mg/kg	<1	<1	<1	<1	<1	<1	1100
TPH (C16 - C21 Aliphatic)	mg/kg	<1	<1	<1	<1	<1	<1	65,000 <sup>2</sup>
TPH (C21 - C35 Aliphatic)	mg/kg	<1	<1	<1	<1	<1	<1	65,000 <sup>2</sup>
TPH (C35 - C44 Aliphatic)	mg/kg	<1	<1	<1	<1	<1	<1	65,000
TPH (C6 - C7 Aromatic)	mg/kg	<1	<1	<1	<1	<1	<1	70
TPH (C7 - C8 Aromatic)	mg/kg	<1	<1	<1	<1	<1	<1	130
TPH (C8 - C10 Aromatic)	mg/kg	<1	<1	<1	<1	<1	<1	34
TPH (C10 - C12 Aromatic)	mg/kg	<1	<1	<1	<1	<1	<1	74
TPH (C12 - C16 Aromatic)	mg/kg	<1	<1	<1	<1	<1	<1	140
TPH (C16 - C21 Aromatic)	mg/kg	<1	<1	<1	<1	<1	<1	260
TPH (C21 - C35 Aromatic)	mg/kg	<1	<1	<1	<1	<1	<1	1100
TPH (C35 - C44 Aromatic)	mg/kg	<1	<1	<1	<1	<1	<1	1100

<sup>1</sup> S4UL taken as 56,000ug/kg based on p-xylene

<sup>2</sup> S4UL of 65,000mg/kg for aliphatic C16 - C35

**TABLE 4: SUMMARY OF TPH SOIL CONTAMINATION RESULTS (TANK BASE)**

Sample	T1	T2	T3	CLEA SGV or LQM/CIEH S4UL
Depth (m)	2.00	2.00	2.00	LQM/CIEH S4UL
Benzene ug/kg	<10	<10	<10	87
EthylBenzene ug/kg	<10	<10	<10	47,000
Xylenes ug/kg	<10	30.5	10.4	56,000 <sup>1</sup>
Toluene ug/kg	<10	<10	<10	130,000
TPH (C5 - C6 Aliphatic) mg/kg	< 0.01	< 0.01	< 0.01	42
TPH (C6 - C8 Aliphatic) mg/kg	< 0.01	< 0.01	< 0.01	100
TPH (C8 - C10 Aliphatic) mg/kg	< 1.0	1.5	3.6	27
TPH (C10 - C12 Aliphatic) mg/kg	2.1	6.8	16.1	130
TPH (C12 - C16 Aliphatic) mg/kg	9.3	26.4	59.6	1100
TPH (C16 - C21 Aliphatic) mg/kg	9.6	28.1	64.0	65,000 <sup>2</sup>
TPH (C21 - C35 Aliphatic) mg/kg	2.9	8.9	13.5	65,000 <sup>2</sup>
TPH (C35 - C40 Aliphatic) mg/kg	<1	1.2	<1	65,000 <sup>3</sup>
TPH (C40 - C44 Aliphatic) mg/kg	<1	<1	<1	65,000 <sup>3</sup>
TPH (C6 - C7 Aromatic) mg/kg	< 0.01	< 0.01	< 0.01	70
TPH (C7 - C8 Aromatic) mg/kg	< 0.01	< 0.01	< 0.01	130
TPH (C8 - C10 Aromatic) mg/kg	<1	1.1	2.3	34
TPH (C10 - C12 Aromatic) mg/kg	1.9	5.8	12.5	74
TPH (C12 - C16 Aromatic) mg/kg	9.3	28.3	48.4	140
TPH (C16 - C21 Aromatic) mg/kg	4.9	20.4	47.4	260
TPH (C21 - C35 Aromatic) mg/kg	4.9	22.2	13.4	1100
TPH (C35 - C40 Aromatic) mg/kg	<1	8.1	<1	1100 <sup>4</sup>
TPH (C40 - C44 Aromatic) mg/kg	2.5	1.2	1.1	1100 <sup>4</sup>

<sup>1</sup> S4UL taken as 56,000ug/kg based on p-xylene

<sup>2</sup> S4UL of 65,000mg/kg for aliphatic C16 - C35

<sup>3</sup> S4UL of 65,000mg/kg for aliphatic C35-C44

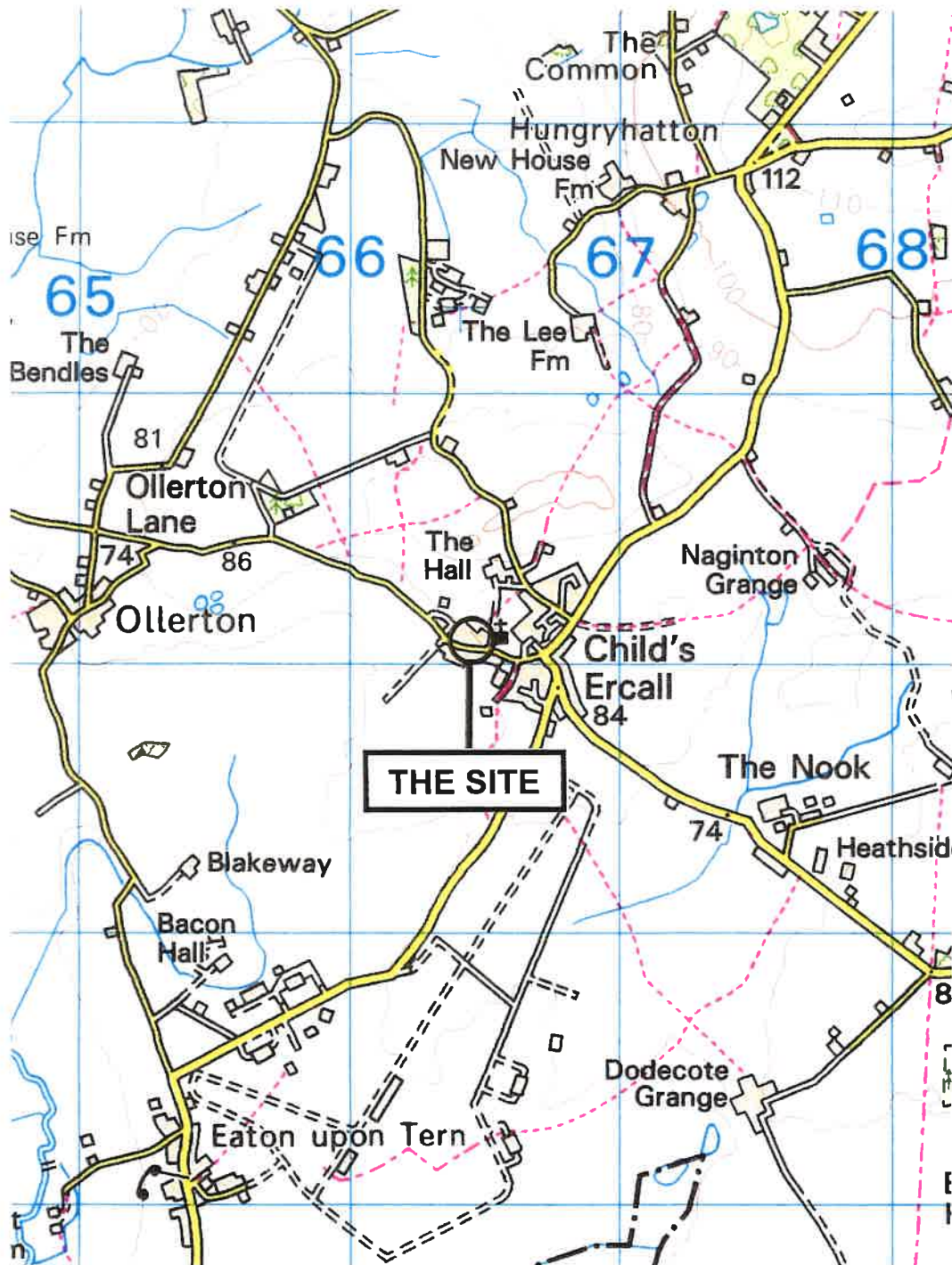
<sup>4</sup> S4UL of 1100mg/kg for aromatic C35-C44

**TABLE 5: SUMMARY OF TPH CONTAMINATION IN GROUNDWATER**

Sample	BH1	BH1	BH2	BH2	BH2	BH4	BH5	BH6	BH7	BH101	BH101	
Depth (m)	3.22	3.12	2.06	2.00	1.99	1.07	1.45	0.55	1.52	3.29	10.50	
Date	10/02/21	16/02/21	10/02/21	16/02/21	02/03/21	02/03/21	02/03/21	02/03/21	02/03/21	02/03/21	02/03/21	
Benzene	ug/l	< 1.00	< 1.00	13.0	11.0	1.77	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Toluene	ug/l	< 1.00	< 1.00	1.08	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
EthylBenzene	ug/l	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Xylenes	ug/l	< 1.00	< 1.00	2.76	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	1.24	< 1.00
MTBE	ug/l	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
TPH (C5 - C6 Aliphatic)	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH (C6 - C8 Aliphatic)	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH (C8 - C10 Aliphatic)	ug/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
TPH (C10 - C12 Aliphatic)	ug/l	8.7	< 5.0	14.5	16.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
TPH (C12 - C16 Aliphatic)	ug/l	15.1	6.3	78.3	51.0	< 5.0	< 5.0	159	< 5.0	< 5.0	< 5.0	< 5.0
TPH (C16 - C21 Aliphatic)	ug/l	8.7	< 5.0	87.2	53.5	< 5.0	< 5.0	150	< 5.0	< 5.0	< 5.0	< 5.0
TPH (C21 - C35 Aliphatic)	ug/l	573	15.8	30.2	14.6	< 5.0	< 5.0	34.8	< 5.0	< 5.0	< 5.0	< 5.0
TPH (C35 - C40 Aliphatic)	ug/l	88.4	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Total (>C5 - C40 Aliphatic)	ug/l	694	22.1	210	135	< 5.0	< 5.0	344	< 5.0	< 5.0	< 5.0	< 5.0
TPH (C6 - C7 Aromatic)	ug/l	< 1.0	< 1.0	13.0	11.0	1.8	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH (C7 - C8 Aromatic)	ug/l	< 1.0	< 1.0	1.1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH (C8 - C10 Aromatic)	ug/l	< 5.0	< 5.0	6.3	7.6	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
TPH (C10 - C12 Aromatic)	ug/l	< 5.0	< 5.0	121	160	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
TPH (C12 - C16 Aromatic)	ug/l	7.2	< 5.0	174	159	14.4	< 5.0	90.9	< 5.0	< 5.0	< 5.0	< 5.0
TPH (C16 - C21 Aromatic)	ug/l	11.5	< 5.0	125	69.6	9.7	< 5.0	104	< 5.0	< 5.0	< 5.0	< 5.0
TPH (C21 - C35 Aromatic)	ug/l	365	< 5.0	58.5	< 5.0	< 5.0	< 5.0	24.2	< 5.0	< 5.0	< 5.0	< 5.0
TPH (C35 - C40 Aromatic)	ug/l	48.9	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Total (>C5 - C40 Aromatic)	ug/l	433	<5.0	499	407	25.9	< 5.0	219	< 5.0	< 5.0	< 5.0	< 5.0
Total (>C5 - C40 Ali/Aro)	ug/l	1130	22.1	710	542	25.9	< 5.0	563	< 5.0	< 5.0	< 5.0	< 5.0



## FIGURES



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	Scheme Village Road, Childs Ercall			
	Date March 2021	Ref P21004/01	Scale 1: 25,000	Fig 1

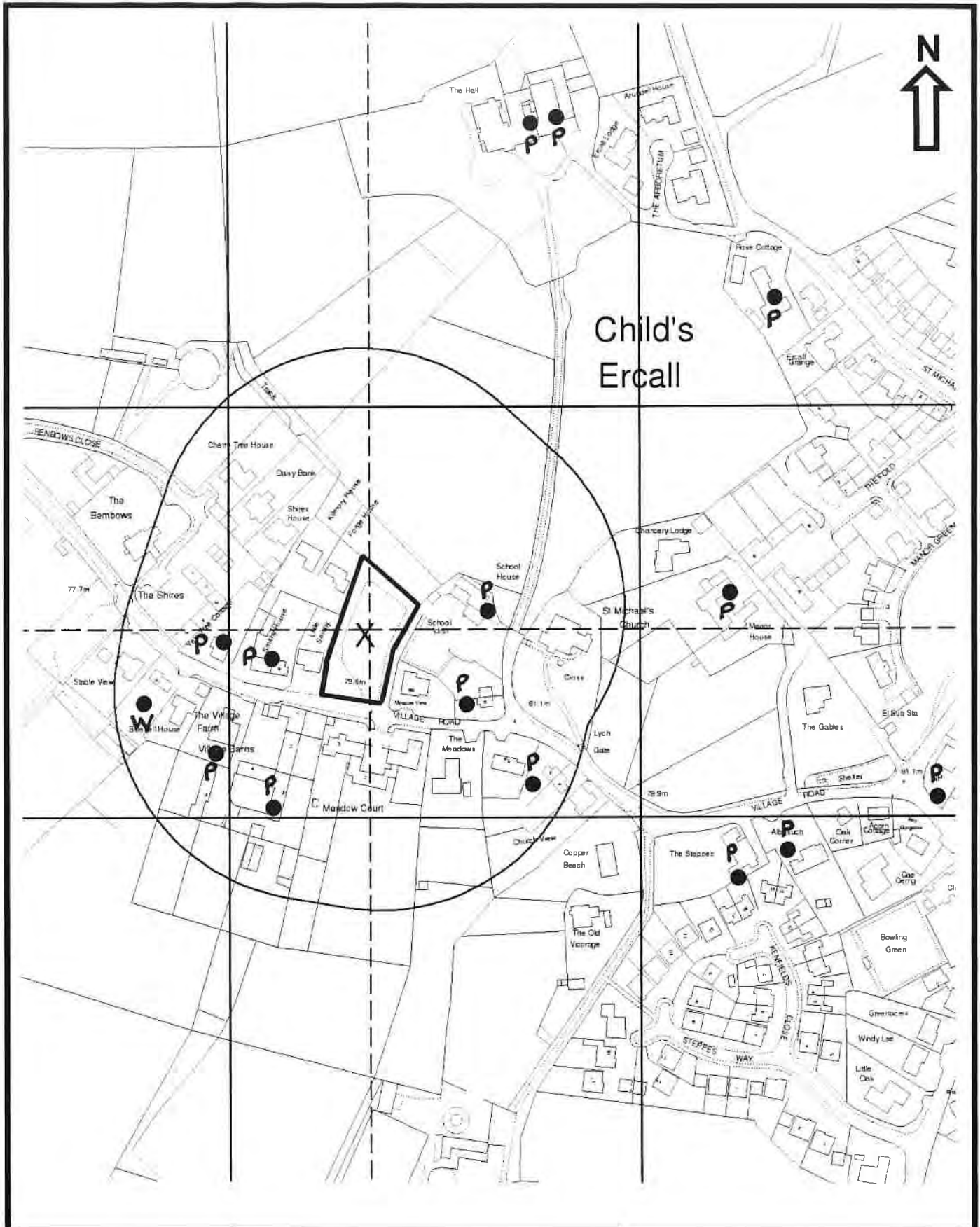


# Child's Ercall



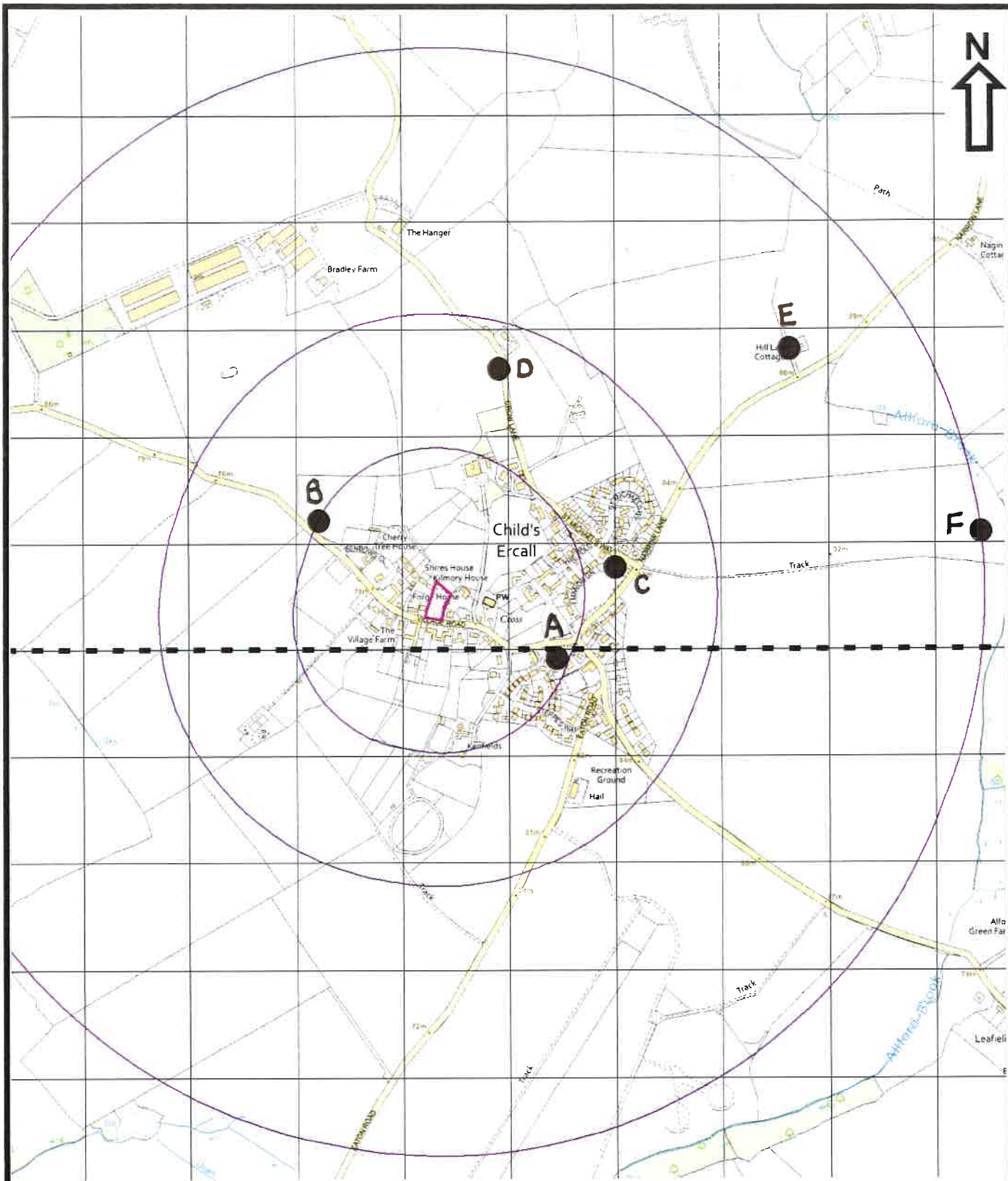
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	Scheme Village Road, Childs Ercall			
	Date March 2021	Ref P21004/01	Scale 1: 2000	Fig 2



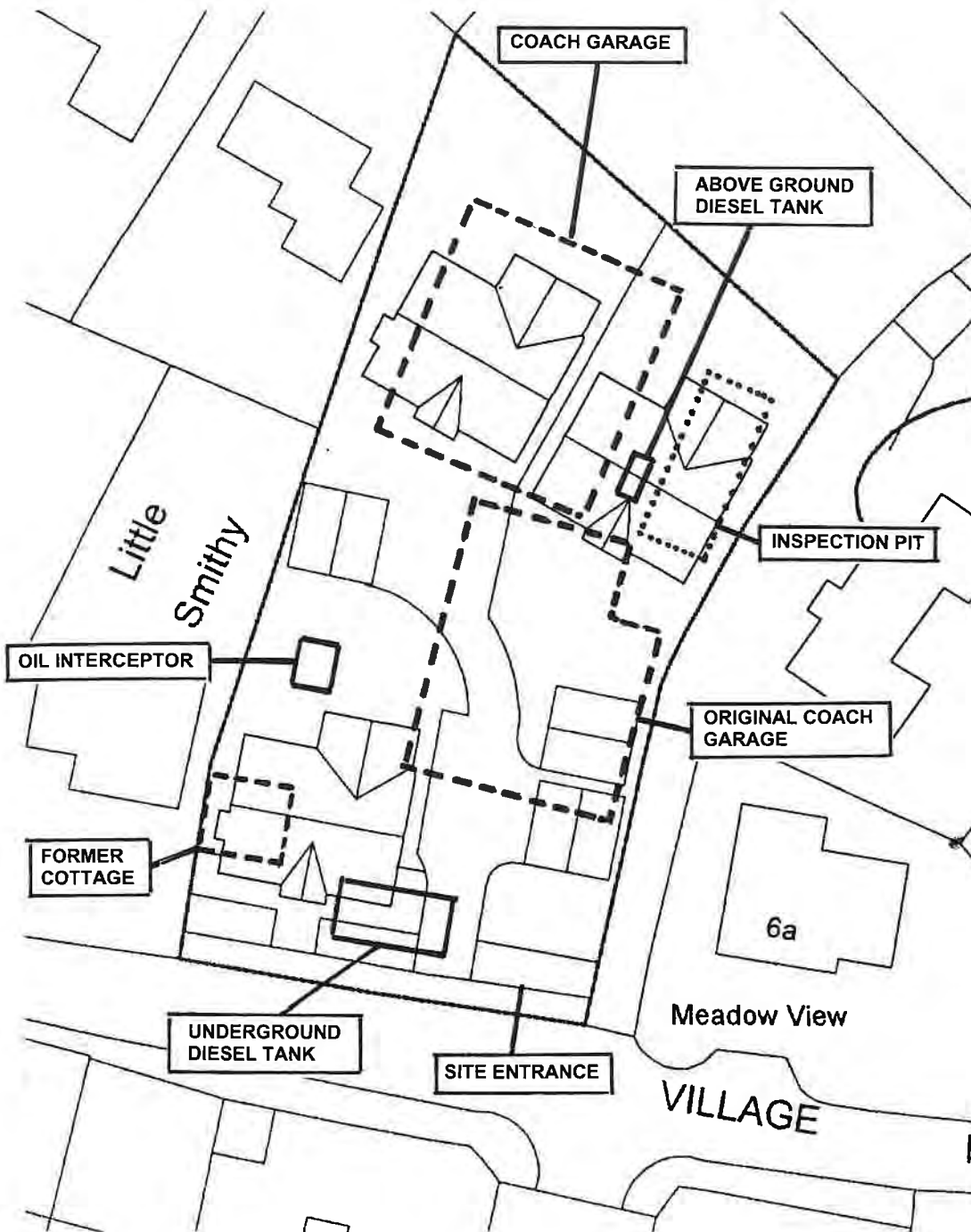
<b>SPILMAN ASSOCIATES</b> Geotechnical & Environmental Engineers Tel: 01384 820578	Client Ling Developments Limited		Title Historic Pumps & Wells	
	Scheme Village Road, Childs Ercall			
Date March 2021	Ref P21004/01	Scale 1: 2500	Fig 3	





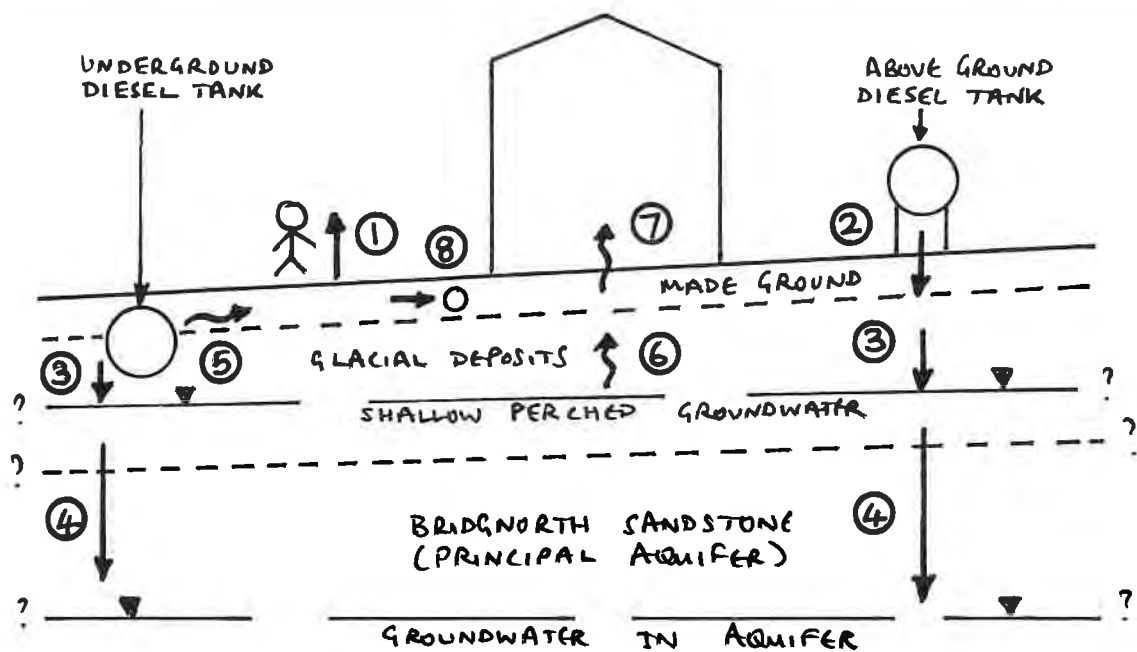
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<p><b>SPILMAN ASSOCIATES</b>          Geotechnical &amp; Environmental Engineers          Tel: 01384 820578</p>	<p>Client          Ling Developments Limited</p>		<p>Title          BGS Recorded Boreholes &amp; Wells</p>	
	<p>Scheme          Village Road, Childs Ercall</p>			
	<p>Date          March 2021</p>	<p>Ref          P21004/01</p>	<p>Scale          1:10,000</p>	<p>Fig          4</p>



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	Scheme Village Road, Childs Ercall			
	Date March 2021	Ref P21004/01	Scale 1:500	Fig 5



LIKELIHOOD OF EVENT:

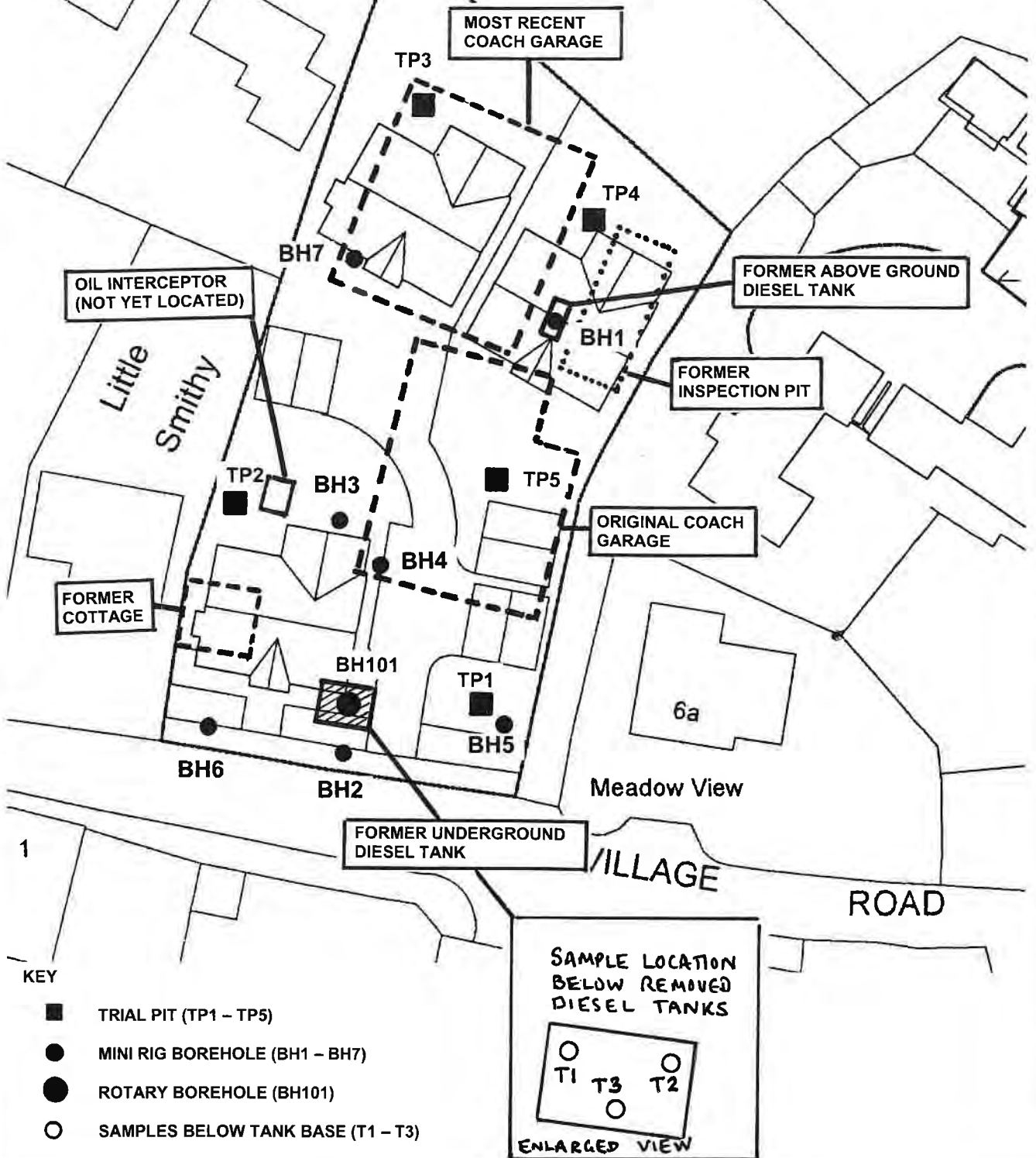
- VERY LOW (VL)
- LOW (L)
- MEDIUM (M)
- HIGH (H)

1. HUMAN HEALTH EXPOSURE PATHWAY FROM NEAR SURFACE CONTAMINATION (M)
2. LEAKS OR SPILLS FROM FORMER FUEL TANKS AND FUEL LINES (M)
3. LEACHING OF CONTAMINANTS TO SHALLOW GROUNDWATER (H)
4. LEACHING OF CONTAMINANTS TO DEEP GROUNDWATER (M)
5. HYDROCARBON VAPOURS FROM IMPACTED SOILS (M)
6. HYDROCARBON VAPOURS FROM IMPACTED GROUNDWATER (L)
7. HYDROCARBON VAPOUR INGRESS TO BUILDINGS (M)
8. CONTAMINATION IMPACTS TO BUILDINGS & SERVICES (L-M)

SIGNIFICANT SOURCE - PATHWAY - RECEPTOR POLLUTANT LINKAGES ARE PRESENT FOR

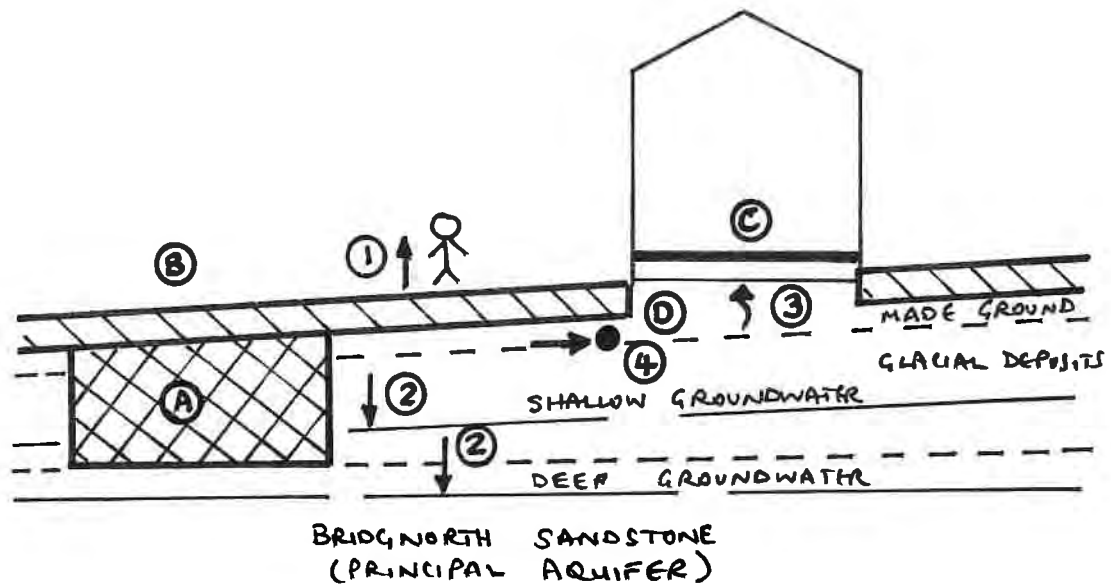
- A: HUMAN HEALTH EXPOSURE TO SOIL CONTAMINANTS
- B: HYDROCARBON VAPOUR INGRESS TO BUILDINGS
- C: LEACHING OF CONTAMINANTS TO GROUNDWATER
- D: IMPACTS TO BUILDINGS & SERVICES

<b>SPILMAN ASSOCIATES</b> Geotechnical & Environmental Engineers Tel: 01384 820578	Client Ling Developments Limited		Title Preliminary Conceptual Site Model	
	Scheme Village Road, Childs Ercall			
	Date March 2021	Ref P21004/01	Scale Not to scale	Fig 6



<b>SPILMAN ASSOCIATES</b> Geotechnical & Environmental Engineers Tel: 01384 820578	Client Ling Developments Limited	Title Location of Exploratory Works		
	Scheme Village Road, Childs Ercall			
	Date March 2021	Ref P21004/01	Scale 1:500	Fig 7





LIKELIHOOD OF SOURCE – PATHWAY – RECEPTOR LINKAGE:

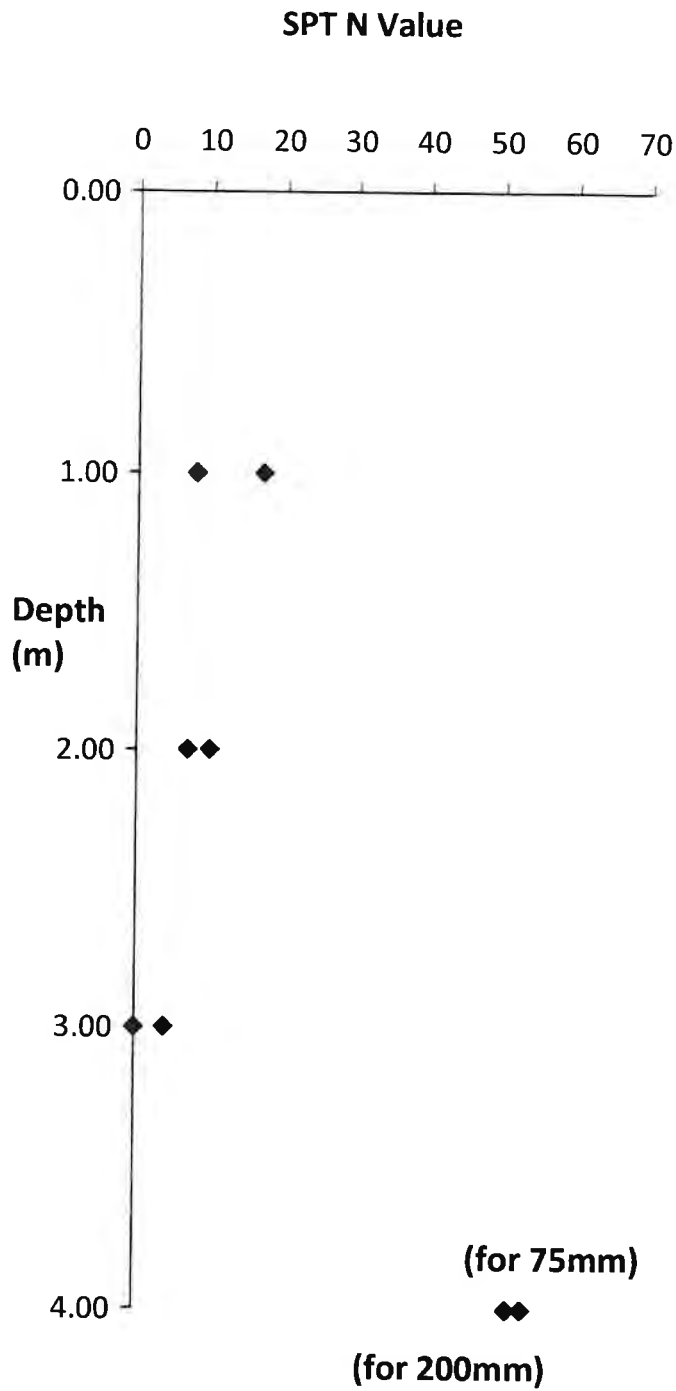
VERY LOW (VL)  
 LOW (L)  
 MEDIUM (M)  
 HIGH (H)

1. HUMAN HEALTH EXPOSURE PATHWAY FROM NEAR SURFACE CONTAMINATION (H)
2. LEACHING OF CONTAMINANTS TO GROUNDWATER (H)
3. HYDROCARBON VAPOUR INGRESS TO BUILDINGS (M)
4. CONTAMINATION IMPACTS TO BUILDING & SERVICES (M)

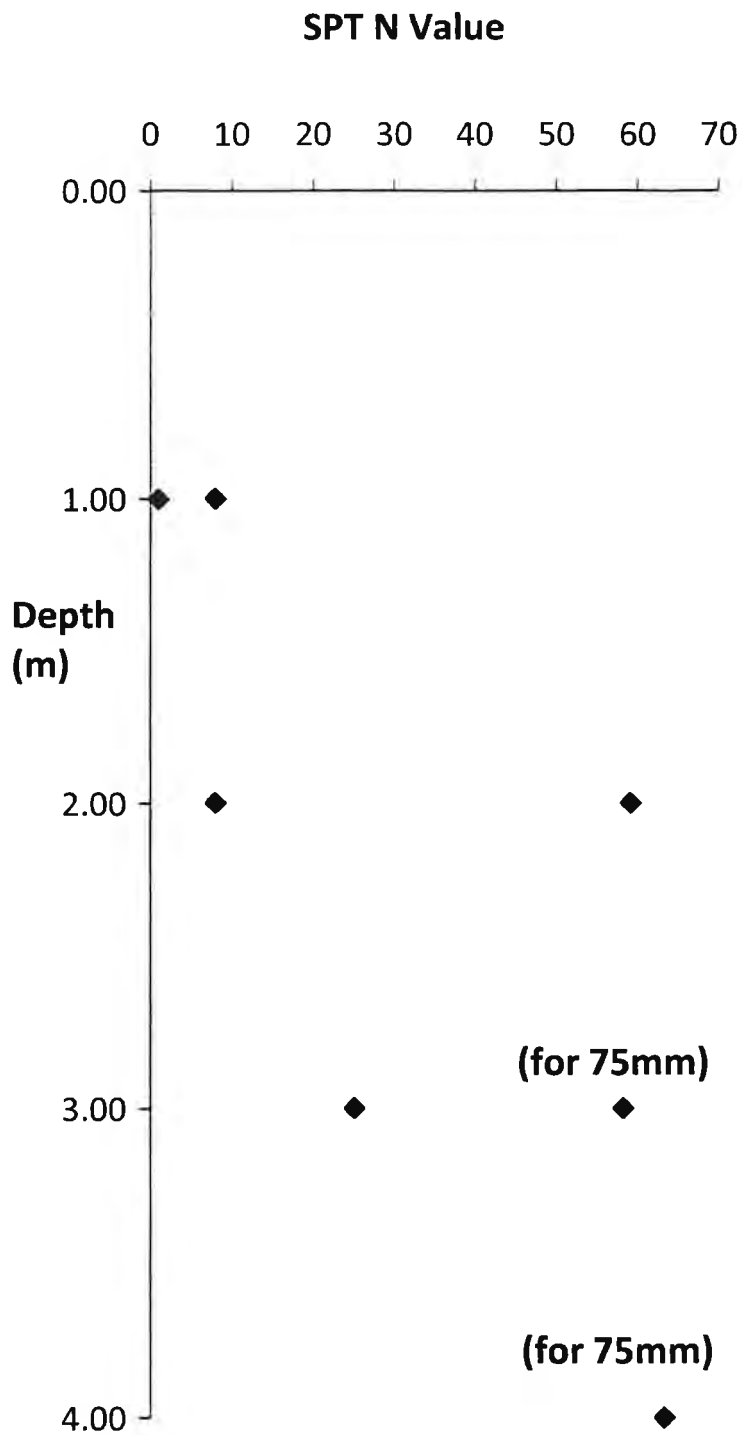
IDENTIFIED RISKS TO BE MITIGATED BY:

- A: OFF SITE DISPOSAL OF HYDROCARBON IMPACTED SOILS (SOURCE REMOVAL)
- B: 600mm CLEAN COVER LAYER TO GARDENS & LANDSCAPING AREAS (PATHWAY REMOVAL)
- C: GAS & HDROCARBON MEMBRANE & SUB SLAB VENTING (PATHWAY REMOVAL)
- D: APPROPRIATE MATERIALS FOR BUILDINGS & SERVICES (PATHWAY REMOVAL)

<b>SPILMAN ASSOCIATES</b> Geotechnical & Environmental Engineers  Tel: 01384 820578	Client Ling Developments Limited		Title Revised Conceptual Site Model	
	Scheme Village Road, Childs Ercall			
	Date March 2021	Ref P21004/01	Scale Not to scale	Fig 8

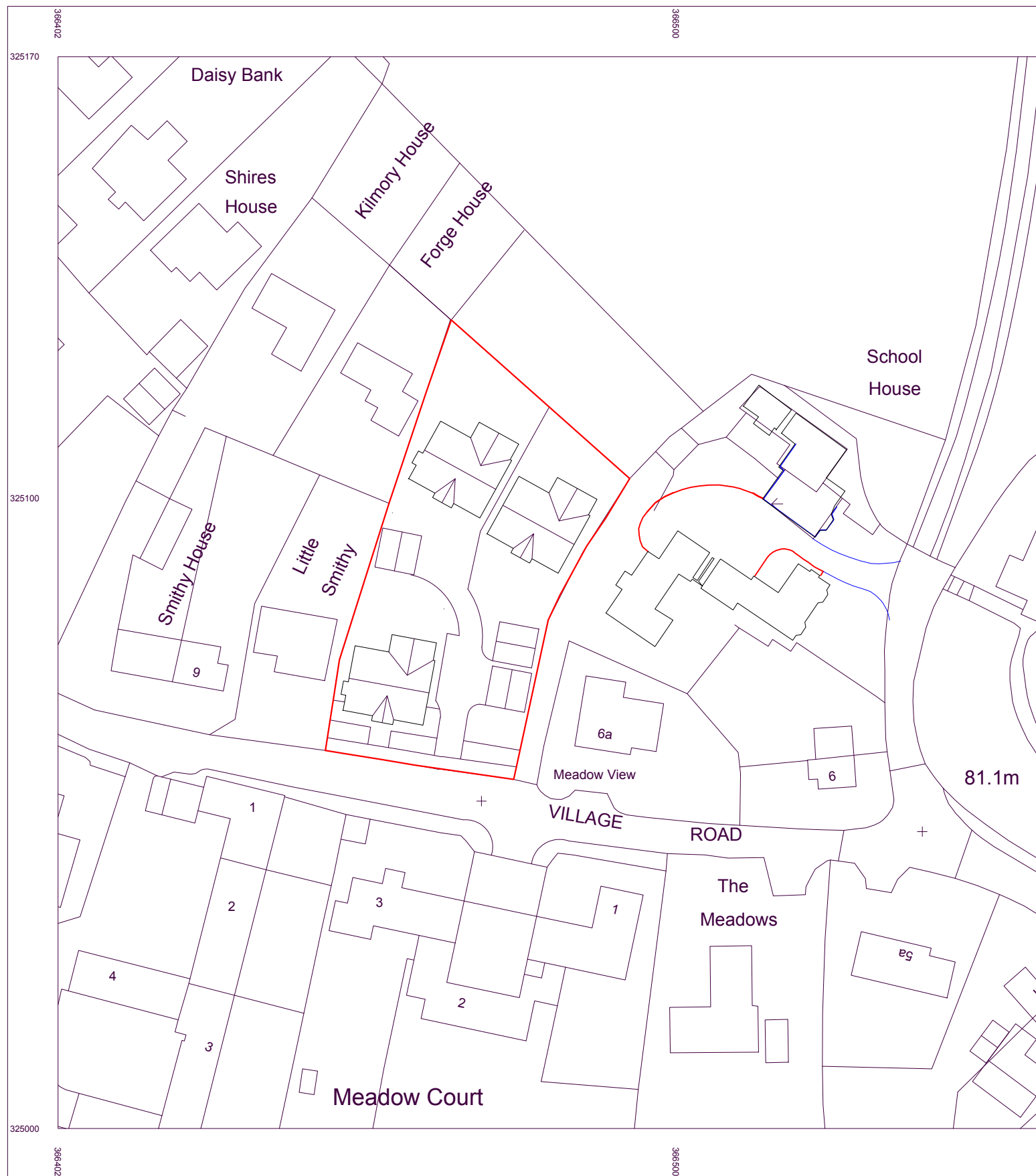


<b>SPILMAN ASSOCIATES</b> Geotechnical & Environmental Engineers  Tel: 01384 820578	Client Ling Developments Limited		Title SPT N Value vs Depth (BH1 & BH7)	
	Scheme Village Road, Childs Ercall			
	Date March 2021	Ref P21004/01	Scale Not to scale	Fig 9

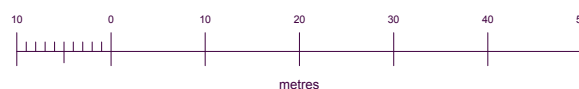


<b>SPILMAN ASSOCIATES</b> Geotechnical & Environmental Engineers  Tel: 01384 820578	Client Ling Developments Limited		Title SPT N Value vs Depth (BH2 & BH3)	
	Scheme Village Road, Childs Ercall			
	Date March 2021	Ref P21004/01	Scale Not to scale	Fig 10

## **APPENDIX A**



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## **APPENDIX B**

**Summary Of Results  
Egniol Limited - Butters Coaches**

ANALYTES	UNITS	CLIENT ID												
		CE1 (0-30m)	CE1 (0-85m)	CE2 (1-60m)	CE2 (2-90m)	CE3 (0-30m)	CE3 (1-50m)	CE4 (0-20- 0-30m)	CE4 (1-90m)	CE4 (1.50- 3-60m)	CE5 (0-25m)			
			A					A						
		S0436906	S0436907	S0436909	S0436910	S0436911	S0436912	S0436913	S0436914	S0436915	S0436916	S0436917		
Sulphide	mg/kg	<2.0	<2.0	2.7	12.7	#	22.7	#	5.3	#	#	<2.0	#	
Sulphur (total)	mg/kg	267	171	338	191	0	477	0	755	#	#	348	#	
pH	N/A	7.3	7.4	7.2	6.8	#	7.5	#	6.9	#	#	6.2	#	
Sulphate (water soluble)	g/l S04	0.084	0.061	0.044	0.052	#	0.068	#	0.175	#	#	0.232	#	
Mineral Dil	mg/kg	254.6	372.1	118.8	<0.1	<0.1	187.5	<0.1	1204.0	192.1	175.8	3.8	#	
GRO	mg/kg	<0.1	<0.1	<0.1	93.2	#	<0.1	<0.1	2.6	11.6	10.8	<0.1	#	

Results for pH1 Samples expressed as dry weight.

# : Analyte not requested

**Summary Of Results  
Egniol Limited - Butters Coaches**

ANALYTES	BH/TP REF	CE1	CE1	CE2	CE2	CE2	CE3	CE3	CE4	CE4	CE4	CE4	CE5
		(0.30m)	(0.85m)	(0.30m)	(1.60m)	(2.00m)	(0.30m)	(1.50m)	(0.20 - 0.30m)	(1.90m)	(3.50 - 3.60m)	(0.25m)	
CLIENT ID			A						A				
		S0436906	S0436907	S0436909	S0436910	S0436911	S0436912	S0436913	S0436914	S0436915	S0436916	S0436917	
Arsenic	mg/kg	1.7	7.5	8.0	1.2	#	2.7	#	4.6	#	#	3.3	#
Cadmium	mg/kg	0.3	<0.2	2.2	<0.2	#	<0.2	#	1.6	#	#	1.2	#
Chromium (hexavalent)	mg/kg	<1.0	<1.0	<1.0	<1.0	#	<1.0	#	<1.0	#	#	<1.0	#
Chromium (total)	mg/kg	13.4	19.1	13.4	19.7	#	18.1	#	15.4	#	#	12.4	#
Lead	mg/kg	85.6	84.4	163.5	29.2	#	243.4	#	160.2	#	#	122.5	#
Mercury	mg/kg	<1.0	<1.0	<1.0	<1.0	#	<1.0	#	<1.0	#	#	<1.0	#
Selenium	mg/kg	<1.0	<1.0	<1.0	<1.0	#	<1.0	#	<1.0	#	#	<1.0	#
Boron (water soluble)	mg/kg	0.8	0.9	1.4	0.9	#	0.6	#	1.4	#	#	1.4	#
Copper	mg/kg	34.2	32.6	67.2	15.3	#	27.5	#	47.9	#	#	35.2	#
Nickel	mg/kg	17.1	20.1	37.2	17.0	#	18.2	#	33.9	#	#	24.2	#
Zinc	mg/kg	278.0	334.9	679.2	70.2	#	218.6	#	472.0	#	#	377.6	#
PAH (total)	mg/kg	1.7	3.0	9.4	<0.1	#	8.4	#	4.8	#	#	<0.1	#
Phenols	mg/kg	<1.0	<1.0	<1.0	<1.0	#	<1.0	#	<1.0	#	#	<1.0	#
Cyanide (free)	mg/kg	<2.0	<2.0	<2.0	<2.0	#	<2.0	#	<2.0	#	#	<2.0	#
Cyanide (complex)	mg/kg	<2.0	<2.0	<2.0	<2.0	#	<2.0	#	<2.0	#	#	<2.0	#
Cyanide (total)	mg/kg	<2.0	<2.0	<2.0	<2.0	#	<2.0	#	<2.0	#	#	<2.0	#
Thiocyanate	mg/kg	<10	<10	<10	<10	#	<10	#	<10	#	#	<10	#
Sulphate (total)	mg/kg S04	609	332	683	293	#	1392	#	1379	#	#	907	#

Results for soil samples expressed as dry weight.  
# = Analyte not requested



## SOIL

ANALYTE	METHOD OF DETECTION	LIMIT OF DETECTION
Arsenic	ICP-OES	1.0 mg/kg
Cadmium	ICP-OES	0.2 mg/kg
Chromium (hexavalent)	ICP-OES	1.0 mg/kg
Chromium (total)	ICP-OES	0.2 mg/kg
Lead	ICP-OES	0.5 mg/kg
Mercury	ICP-OES	1.0 mg/kg
Seelenium	ICP-OES	1.0 mg/kg
Boron (water soluble)	ICP-OES	0.5 mg/kg
Copper	ICP-OES	0.2 mg/kg
Nickel	ICP-OES	0.2 mg/kg
Zinc	ICP-OES	0.2 mg/kg
PAH (total)	GC-FID	0.1 mg/kg
Phenols	Colorimetry	1.0 mg/kg
Cyanide (free)	Colorimetry	2.0 mg/kg
Cyanide (complex)	Colorimetry	2.0 mg/kg
Cyanide (total)	Colorimetry	2.0 mg/kg
Thiocyanate	Colorimetry	10 mg/kg
Sulphate (total)	ICP-OES	30 mg/kg S04
Sulphide	Colorimetry	2.0 mg/kg
Sulphur (total)	ICP-OES	10 mg/kg
pH	pH-meter	N/A
Sulphate (water soluble)	HPLC-IC	0.001 g/l S04
Mineral Oil	GC-FID	0.1 mg/kg
GRO	GC-FID	0.1 mg/kg



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Comments:

Sampling & tests marked † in this report are not included in the UKAS Accreditation Schedule for the testing laboratory.

Any opinions and interpretations expressed herein are outside the scope of the testing laboratory's UKAS Accreditation.

The Coefficient of Variation  $CV_{\dagger}$  (where  $CV_{\dagger} = \text{standard deviation}/\text{mean} \times 100$ ) is better than 15%

All analysis carried out using ECoS standard methods unless otherwise agreed

The test results in this report refer only to the actual samples on which testing has been performed.

This test report shall not be reproduced, except in full, without written approval of ECoS Environmental.

The laboratory cannot be held responsible for the condition or suitability of samples submitted for testing by a third party or for the competency of personnel other than its own staff.

Date submitted for analysis : 21/09/04

Your Job/Order Number :

Analyst(s) : HP DF SS CM CO KLH PSW DS CLH

Report Approval

Approved signatories: J R Brown (Customer Services Manager)

E Dewell (Production Manager)

P Richardson (Quality Manager)

J Stoddart (Technical Manager)

Signature :

Report date : 5 October 2004



Egniol Ltd. (Bangor)  
 Tre Felin  
 Bangor  
 Gwynedd  
 LL57 4LH

Trialpit No

**5**

Sheet 1 of 1

Project Name

Butters Coaches

Project No.

1462/SI

Co-ords: -

Level: -

Date

14/09/2004

Location: Childs Ercall

Dimensions:

2.10m

Depth  
2.60m

1.30m

Scale

1:25

Client: Celtest

Logged By  
RVW

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.25	D		0.10		MADE GROUND: Gravel (MADE GROUND)	
			0.70		SAND: Dark brown organic topsoil (TOPSOIL)	
			0.70		COBBLES: Light brown/orange gravelly COBBLES of sandstone.. Gravel is rounded to sub-rounded of sandstone.	
			1.90		Clayey SAND: Very clayey SAND with some gravel. (SANDS & GRAVELS)	
			2.60		Trialpit Completes at 2.60 m	

Remarks: No apparent contamination

Groundwater: None



AGS 14/09/2004 14:00:00



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Gwynedd  
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Trialpit No  
**4**  
Sheet 1 of 1

Project Name Butters Coaches	Project No. 1462/SI	Co-ords: - Level: -	Date 14/09/2004
Location: Childs Ercall		Dimensions: 2.10m	Scale 1:25
Client: Celtest		Depth 3.90m 1.30m	Logged By RWV

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.20-0.30	D		0.20			MADE GROUND: Gravel (MADE GROUND)
						SAND: Dark brown slightly gravelly SAND (SANDS & GRAVELS)
			0.80			SAND: Light grey slightly gravelly SAND (SANDS & GRAVELS)
			1.50			SAND: Orange/brown slightly gravelly slightly silty SAND (SANDS & GRAVELS)
1.90	D		2.20			SAND: Light brown/orange silty SAND (SANDS & GRAVELS)
			3.00			SAND: Clayey SAND with bands and lenses of sand and silt. (SANDS & GRAVELS)
3.50-3.60	D		3.90			Trialpit Complete at 3.90 m

Remarks: Adjacent to buried diesel tank

Groundwater: None







Egniol Ltd. (Bangor)  
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 Gwynedd  
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Trialpit No

**3**

Sheet 1 of 1

Project Name  
 Butters Coaches

Project No.  
 1462/SI

Co-ords: -  
 Level: -

Date  
 14/09/2004

Location: Childs Ercall

Dimensions: 2.10m






Scale  
 1:25

Depth  
 3.10m

1.30m

Logged By  
 RVW

Client: Celtest

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.30	D		0.20		 MADE GROUND: Placed angular GRAVEL. (MADE GROUND)	
					 SAND: dark brown slightly gravelly SAND (SANDS & GRAVELS)	
1.50	D		1.40		 SAND: Orange/brown SAND. Slight petrochemical odour. (ALLUVIUM)	
			2.00		 SAND: Soft clayey SAND. Slight petrochemical odour. (ALLUVIUM)	2
			2.50		 CLAY: Very Sandy CLAY. Strong petrochemical odour. (CLAY)	
			3.10		Trialpit Complete at 3.10 m	3
						4

Remarks:

Groundwater: Non



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Trialpit No  
**2**  
 Sheet 1 of 1

Project Name: Butters Coaches      Project No.: 1462/SI      Co-ords: -      Date: 14/09/2004  
 Level: -

Location: Childs Ercall      Dimensions: 2.10m  
 Depth: 2.90m      1.30m

Client: Celtest      Scale: 1:25  
 Logged By: RVW

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.30	D		0.30			MADE GROUND: Brown angular placed gravel with some sand. (MADE GROUND)
			0.80			MADE GROUND: Slightly gravelly dark brown SAND with some humic matter and cobbles of brick. (MADE GROUND)
			1.40			SAND: Slightly gravelly dark brown humic SAND. (SANDS & GRAVELS)
1.60	D		1.90			SAND: Light brown grey moist slightly gravelly SAND. Strong petrochemical odour detected with black sheen present. (SANDS & GRAVELS)
2.00	D		2.90			CLAY: Orange to brown slightly sandy gravelly CLAY with occasional silt lenses. Petrochemical stain and strong petrochemical odour present. (CLAY)
Trialpit Completes at 2.90 m						

Remarks:

Groundwater: Non





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Trialpit No

1

Sheet 1 of 1

Project Name

Butters Coaches

Project No.

1462/SI

Co-ords: -

Level: -

Date

14/09/2004

Location: Childs Ercall

Dimensions:

2.10m

Depth

0.90m

1.30m





Scale

1:25

Client: Celtest

Logged By

RVW

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
			0.10			MADE GROUND: Brown coarse angular GRAVEL. (MADE GROUND)
0.30	D		0.30			MADE GROUND: Brown angular cobbles of brick and weathered sandstone with some root material. (MADE GROUND)
			0.55			SAND: Dark brown gravelly SAND. Gravel is rounded. (SANDS & GRAVELS)
0.85	D		0.90			SAND: Light brown/orange moist gravelly SAND. Slight darkened stain and petrochemical odour. Concrete base obstruction at base of pit. (SANDS & GRAVELS)
Trialpit Complete at 0.90 m						

Remarks: Adjacent to present above ground diesel/oil tank

Groundwater: Non



AGS Ltd. 2004. Standard Trialpit Log Form (AGS 2004/01)



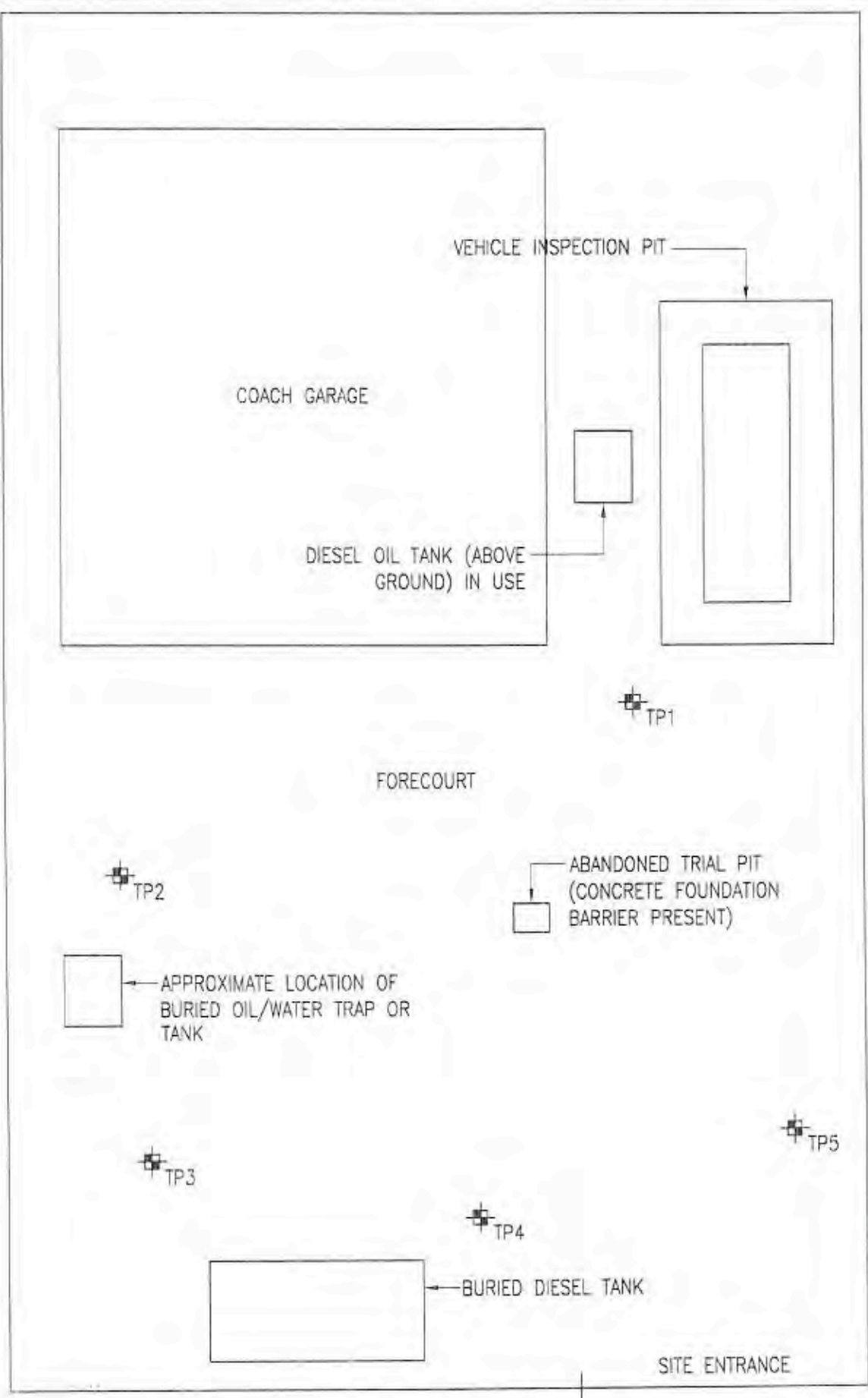
**Contamination Assessment  
Butters Coaches Depot – Childs Ercall**

**Egniol Ref: B1462 October 2004**





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**celtest**

**CHILDS ERCALL  
BUTTERS COACHES**

**SITE GROUND  
INVESTIGATION**

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**Project Title :** Contamination Assessment Phase 2 Site Investigation  
Butters Coaches Depot – Childs Ercall

**Document Title:** Contamination Assessment  
Butters Coaches Depot - Childs Ercall

**Project No.** B1462

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## 1 INTRODUCTION

In September of 2004, Egniol Limited was instructed by Celtest Ltd to undertake a Site Investigation for their client Butters Coaches at the Butters Coaches Coach Garage site in Childs Ercall.

Egniol Ltd were informed that a land contamination report is required by the owner and potential developer of Butters Coaches Bus Depot to satisfy Planning Permission conditions, and to determine ground conditions and any potential contamination. We are also under the understanding that the intended development is to consist of four residential properties the position of which on site has been illustrated within a plan supplied by the developments surveyor. The overall objective of the study is to determine the presence, nature and extent of any ground contamination and particularly that which may be associated with the sites use as a bus depot and garage, and using this information to give advice on potential environmental and financial liabilities associated with the site and its development.

The investigation allowed an understanding of the ground and environmental conditions for works during the construction phases of the development to be made, together with an appraisal of potential contaminants present on site.

Chemical testing was undertaken on samples retrieved from the site. No geotechnical testing was carried out.

This report includes a summary of the current investigation carried out on the site and a site specific contamination assessment utilising available data.



## 2 SITE DESCRIPTION

### 2.1 Site Location

The site consists of the Butters Coaches depot within the village of Childs Ercall approximately 8 miles north of Telford and is indicated on the plan below. The site is predominantly hard-standing of gravel, tarmac and concrete the exception being the land between the site perimeter on the northern and north western sides and the main site building which are characterised by scrub vegetation. The site is bounded to the east and west by residential properties, to the north by grazing land and to the south by Village Road. Beyond this road and down-slope of the site lies a residential development site in the latter stages of development.

### 2.2 Site Characteristics

The site is presently actively operating as a coach depot, with coaches and cars being parked upon the forecourt area. One above ground service tank is located adjacent and to the east of the main building as indicated on the attached plan and the location of a water/oil sump and a buried diesel tank has also been identified on the western and southern sides of the site respectively. Materials stored on the western side of the main site building were metal railings, sheets of metal, traffic cones, old vehicle tyres, an oil drum and miscellaneous automotive parts.



Plan 1. Site Location

The proposed development comprises of 4 residential houses with parking spaces upon the central portion of the site.

Access to the site is directly from Village Road. The position of buried site services were indicated by the site owner prior to the initiation of the excavation works and were shown to run in a north easterly to south westerly direction from the south eastern corner of the main coach building across the central area of the site. Boundary fencing hedges and walls restrict access from the northern eastern and western sides of the site, however public access is not restricted from the southern end during out of office hours

### 3 FIELDWORK

The fieldwork was carried out on Tuesday 14th September 2004 and comprised the excavation of 5 trial pits using a back hoe excavator. Planning of the site investigation was undertaken by an experienced Egniol Environmental Engineer who was present to oversee the site works on the day of the intrusive investigation. The intrusive part of this investigation is restricted to the forecourt area of the existing site and has concentrated upon the areas most likely to be affected by leakage or spillage from the petrochemical tanks and oil interceptor present at the site. (See Appendix 1 for trial pit locations.)

#### 3.1 Soil Sampling

All sample logging and soil description was carried out in accordance with BS 5930 (1999). Disturbed samples in particular from horizons indicating potential contamination were taken and placed in labelled sealed containers. Selected samples were then dispatched to Ecos laboratories for chemical testing following temperature controlled storage and controlled dispatch procedures including completion of chain of custody documentation.

Descriptions of the strata encountered within trial pits together with details of sample depths are given on the trial pit records presented in Appendix 2. On completion, the holes were backfilled with arising.

Trial Pits 1, 2, 3 and 4 were positioned at points upon the site thought to be most likely to be affected by potential contamination from the sites fuel tanks and interceptor. Trial Pit 5 was a point removed from the areas thought most at risk from petrochemical influence. An attempt was made to excavate a sixth trial pit at the central point upon the forecourt area, however this was abandoned due to a concrete obstruction thought to be the original site foundation base. It was not confirmed however it is thought highly likely that this base will be encountered if excavation works are undertaken for the northern half of the site.

#### 3.2 Gas Monitoring

An attempt was made to penetrate the surface hard-standing with a Spike Bar in order to monitor the undisturbed ground for ground gases, however this did not prove possible due to the impenetrable materials present. The presence of ground gases were not measured during the sinking of the trial pits as post excavation monitoring was deemed to lead to likely inaccuracies. No olfatorial indication was present to indicate gas presence.

The radon status of the area is unknown, however it is advised that the land developer makes enquiries with the local authority to ascertain whether the site is potentially at risk from radon gas and what action if any should be taken.



#### 4 Laboratory Testing

A programme of laboratory testing was scheduled by Egniol Ltd to provide data on the chemical characteristics of the soils encountered.

The following analytes were included within the testing schedule:

*Arsenic, cadmium, chromium (hexavalent), chromium (total), lead, mercury, selenium, boron (water soluble), copper, nickel, zinc, PAH(total), phenols, cyanide (free, complex and total), thiocyanate, sulphate (total), sulphide, sulphur (total), pH, sulphate (water soluble), mineral oil and gasoline range organics (GRO).*

GRO and mineral oil were specifically included in the testing schedule due to the sites present use and the olfactoral and visual evidence encountered indicating petrochemical presence within some the soils of the site.



## **5 GROUND AND GROUNDWATER**

### **5.1 General Ground Conditions**

With reference to BGS sheet 138 1:50 000 scale (solid and drift edition), the geology of the site area is recorded as being of Triassic Sandstones overlain by glacial till materials of predominantly boulder clay of Pleistocene to recent age. The sandstones of Childs Ercall are likely to vary between the soft red sandstone of Lower Mottled Sandstone to pebbly red sandstones and conglomerates of the Triassic Bunter Beds.

A layer of Made Ground was encountered in all trial pits excavated which was in turn underlain by glacial till material in 4 of the 5 excavations.

No groundwater was encountered in any of the exploratory holes undertaken in the course of this investigation.

### **5.2 Made Ground**

Underlying the tarmac and fractured tarmac hard-standing, the Made Ground is variable, both in lateral and vertical extent, with the greatest proven thickness being encountered in Trial Pit 2, where it reaches a thickness of 0.80 m (including the surface hard-standing). This material is broadly characterised by brown sandy gravels with some cobbles of sandstone and brick. The upper layer was generally placed angular gravel seemingly acting as a foundation layer below the hard-standing tarmac. Below this the gravels also consisted of sub angular to sub rounded gravels and sands and was most likely to be reworked material (including possibly reworked glacial till) from the site, including cobbles of fragmented brick within Trial Pits 1 and 2.

### **5.3 Glacial Till**

The boundary between the Made Ground and the underlying glacial till materials is not distinct and the upper obvious Made Ground layers grade into seemingly reworked material from the site, although the evidence that this material is Made Ground is not obvious.

Below the Made Ground layer the materials are predominantly gravelly and slightly gravelly sand with occasional silt lenses. Trial Pit 5 on the eastern side of the site showed a variation to the general trend having a 0.60m layer of topsoil below the surface cap which is further underlain by gravelly cobbles of sandstone. Below the layers predominated by sand, clay becomes a primary constituent of the material, ranging from very sandy clay and gravelly clay through to clayey sand. The clay constituent tends to

increase with depth in pits 2 to 5 and is not present in Trial Pit 1 where gravely sand was found to extend to the concrete base obstruction.

Petrochemical odours were apparent in Trial Pits 1, 2, 3 and 4. In Trial Pit 1 this was noticed at the base of the excavation as a mild odour which was accompanied by a dark staining of the solid trial pit base. In Trial Pits 2 and 3 a strong petrochemical odour similar to that of mineral oil was encountered at approximately 1.40m, although this may have been present to a lesser extent prior to this. Both Pits below 1.40m showed visual indication of chemical sheen which penetrated into the clays. A strong petrochemical odour was almost immediately detected on excavation of Trial Pit 4. This became very strong as the trial pit was progressed with a sheen evident within the sands below the Made Ground in particular.

#### **5.4 Groundwater Conditions**

Groundwater was not encountered in any of the trial pit locations. It is highly plausible that variations in permeability as a result of different clay proportions in the underlying Glacial Till will lead to perched water bodies during periods of heavy or extended rainfall leading in turn to varied levels of water ingress should fuel tank removal be considered. Infiltration of rainfall upon the site surface will however be limited due to the likely impermeable properties of the surface hard-standing materials. The general trend in groundwater flow direction is thought to be north to south across the site. Infiltration from the site surface is also further limited by the apparent presence of a concrete slab identified in Trial Pit 1 at 0.90m and within an abandoned trial pit at the centre of the site at approx 0.30m depth. It is perceived that shallow subsurface flow will be isolated from deeper flow at present within the northern half of the site due to this slab. The full extent of this slab is not known, however it was not present in the remaining trial pits.

It should also be noted that groundwater levels will vary in response to factors such as rainfall runoff, infiltration and leakages from any nearby sewers, pipes and sumps.



## 6 Contamination Assessment

### 6.1 Contamination

In line with current legislation, and with reference to the new regime for contaminated land set out in Part IIA of the Environmental Protection Act (1990), the ground should be assessed using a risk based approach. Under the Environmental Protection Act (1990), "contaminated land" is defined as "any land which appears to the Local Authority in whose area it is situated to be in such a condition, by reason of substances in, on, or under land, that :

significant harm is being caused or there is a significant possibility of harm being caused;  
or  
pollution of controlled waters is being, or is likely to be caused..."

"Significant harm" is defined in the guidance on risk based criteria and for this to occur these must be the result of "pollutant linkage", that is a link from which material from an identified contamination source can migrate via a pathway to a sensitive receptor.

It is known that at this site, there are several potential contamination sources. These are the existing above and below ground fuel storage tanks and their associated pipe work , the oil interceptor located on the western side of the site and the potential contamination from parked vehicles.

The main potential receptors which may be relevant for this site are as follows :

- site workers during redevelopment*
- future site users*

The main potential pathways for any contamination would be by dermal contact, inhalation and ingestion of soil particles.

### 6.2 Determination of Risk

In order for there to be any risk to exist, a "Source - Pathway - Receptor" linkage must be established. This linkage requires:

A source of contamination in, or under the ground which has the potential to cause harm or to cause pollution of controlled waters.

A pathway is one or more routes or means by, or through which a receptor is being exposed to or affected by a contaminant or, could be so exposed or affected by a contaminant.

A receptor could be a living organism, a group of living organisms, an ecological system or a piece of property.



The identification of each of these three elements is linked to the identification of the others. A pathway can only be identified if it is capable of exposing an identified receptor to an identified contaminant. That particular contaminant should likewise be capable of harming or, in the case of controlled waters, be capable of polluting that particular receptor.

If a pollutant source, pathway and receptor are found to be present then there is a risk to the identified receptor. If there is an absence of any part of the source, pathway or receptor process, there is no risk.

### 6.3 Soil Contamination Guidelines

Guidelines issued by the Department for Environment, Food and Rural Affairs (DEFRA, 2002) and by the Government's interdepartmental committee on the redevelopment of contaminated land (ICRCL, 1987) address the risks posed by soil contamination. DEFRA derive Soil Guideline Values (SGV) as generic assessment criteria for assessing the risks to human health from chronic exposure to soil contaminated with arsenic, selenium, lead, cadmium, chromium, nickel and mercury. SGVs represent "intervention values" which act as indicators to an assessor that soil concentrations above this level might present an unacceptable risk to the health of site-users and that further investigation and/or remediation is required.

The DEFRA Soil Guideline Values have been developed using the CLEA risk-based computer model using many critical assumptions about possible exposure to soil contamination to develop conceptual exposure models for four different land uses. These are :

*residential with gardens in which vegetables are grown*

*residential with gardens but without vegetable uptake*

*allotments*

*commercial/industrial use where there are open areas which are not hard surfaced.*

They do not perceive a hazard to end-users from a fully hard-surfaced development.

In the risk assessment to derive the SGV, DEFRA considers that all contaminants within the uppermost 1.00 m (based on final ground surface) are available. The current SGV are



very conservative as they do not allow for variations in soil-type or pH (apart from cadmium) or the bio-availability of the contaminants. Generally the SGV for a metal is based on the most toxic and bio-available compound. SGVs may be amended in the light of further research, but this report uses the current values.

DEFRA consider that in normal circumstances there should not be a pathway to the critical receptor (human end users) for contaminants located more than 1.00 m below final ground level, although the validity of this assumption should be considered for each particular case.

DEFRA use a figure equal to the 95 percentile of the results of chemical analysis for most metals and the geometric mean of the results of analysis for lead in the risk assessment. If one of these figures for a layer of soil within a metre of the surface exceeds an SGV there can potentially be a significant risk to human health. However, this does not necessarily imply that there is an actual risk to health, and assessment of site-specific circumstances may be necessary.

The ICRCCL guidelines define "threshold trigger" and "action trigger" concentrations for a number of the common contaminants. At concentrations below the threshold trigger concentration, there is no significant risk that a hazard will occur. The action trigger concentration is the value above which a contaminant should generally be regarded as undesirable and possibly unacceptable and some form of remedial action may be necessary. Where the levels of contaminants are between the threshold and action trigger concentrations, consideration should be given to whether further investigation is justified and whether or not specific remedial action is required.

The ICRCCL threshold trigger concentrations for metal ions have been superseded by the DEFRA values except for boron, copper and zinc which are considered to be phytotoxic (detrimental to plant growth) but not a hazard to human health at the levels likely to be encountered. The ICRCCL threshold trigger concentrations for these metal ions are those for sandy acidic ground in which plants are to be grown and are only rough indicators of the degree of contamination, no action trigger concentrations are available. The remaining contaminants considered by the ICRCCL are those commonly found in gasworks waste, for which trigger concentrations have been determined using a risk-based approach (Wilson and Stevens (1981), ERL (1988)). Similarly to the DEFRA values, the assigned ICRCCL trigger concentrations vary depending upon the proposed use of the land, with the trigger concentrations for domestic gardens (which take into account child ingestion of soil and contaminated vegetables) being lower than for parks and landscaped areas, with industrial and commercial development areas having the highest trigger concentrations. The guidance on statistical treatment of chemical analysis data for the ICRCCL is not clear, ICRCCL (1987) appears to suggest that the highest value should be taken, whilst ERL (1988), which provides the scientific basis for the ICRCCL document, states that one should use the arithmetic mean of the highest 20% of the results.

Given no reference is made to Mineral Oil and GRO in the DEFRA or ICRCCL guidance values, reference has also been made to the Moen et al 1986 guidance values for these

analytes. Although now not the most current values, given limited data for any site, they are accepted to still provide some indication of clean up requirements for that site. The Moen guidance gives three threshold values which refer to A – A reference value B – An indicative value for further investigation C – An indicative value for cleaning up.

#### 6.4 Chemical Test Results and Significance

The following analytes were found at detectable levels:

Arsenic, cadmium, chromium (total), lead, boron (water soluble), copper, nickel, zinc, PAH (total), sulphate (total), sulphide, sulphur (total), pH, sulphate (water soluble), mineral oil, gasoline range organics (GRO). (See full results Appendix 3.)

##### *SGV's*

Only cadmium was detected marginally above the SGV value in Trial Pits 2, 4 and 5. One sample from the upper horizons of each of these trial pits (within 0.30m depth) was found to exceed the SGV value, although reference to the pH for these samples places them more or less at the threshold limit. The marginal nature of these concentrations in relation to the threshold value suggests an insignificant level in relation to potential risk.

##### *ICRCL*

Zinc which is phytotoxic and therefore may affect plant growth above the threshold value, however is not thought to pose a risk to human health was the only analyte found to exceed ICRCL threshold values. With a threshold value of 300mg/kg, the highest concentration detected was 679.2 mg/kg at 0.30m depth in Trial Pit 2. Samples from Trial Pits 1, 4 and 5 also exceeded the threshold value, those from Trial Pits 4 and 5 were within the upper 0.30m of the ground.

##### *Petrochemical Concentrations (Moen)*

Mineral oil was found in sample CE4 (0.20m – 0.30m) above the Moen indicative value for further investigation of 1000mg/kg at 1204.0 mg/kg. A further five of the total 11 samples tested showed levels of mineral oil above the reference value indicated by Moen. Four of the samples containing concentrations of mineral oil of significance, including that of Trial Pit 4, were within the upper 0.50m of the site ground. The remaining samples are from Trial Pits 1 and 2. GRO was detected above the Moen Reference Value of 20mg/kg at 93.2 mg/kg (CE2) at a depth of 1.60m which approaches the Moen further investigation value of 100 mg/kg.



## 6.5 Discussion

Although three samples show cadmium levels marginally above the SGV values, these are not considered to be of real significance and therefore no action is suggested in relation to these concentrations.

Raised zinc levels found in several samples, three of which were close to the surface of the site have the potential to affect plant growth, although considering the apparent poor organic quality of these soils, plants would not conceivably be grown without removing the hard-standing layer and improving the upper layer of the site. Improving the upper horizon of the site to a depth of 0.50m where plants were planned by replacing poor quality earth with topsoil, would eliminate this potential problem.

Petrochemical levels within some of the samples showed that levels of Mineral oil which includes diesel range components are elevated. The highest level recorded is close to the surface adjacent to the buried diesel tank at the southern end of the site and elevated levels are shown throughout this Trial Pit 4 indicating the presence of contamination throughout the full pit depth. Mineral oil is also present in both samples tested in Trial Pit 1 adjacent to the present above ground tank and where surface spillages are likely to be partially contained due to the presence of the concrete slab. Mineral oil was also detected in the upper level of Trial Pits 2 and 3 suggesting some leakage from the oil interceptor with some GRO detected at greater depth in Trial Pit 2. Olfactoral evidence from Trial Pits 2 and 3 pointed towards a greater apparent dispersal of petrochemicals in these pits than may be suggested by the chemical analysis results, however the evidence suggests a shallow horizontal layer of mineral oil contamination is more likely to be present around the oil receptor. Although also affected by a slightly raised level of zinc, Trial Pit 5 shows no significant indication of contamination.

## 6.6 Suggested Remediation and Progression

Given the highest concentration of mineral oil has been detected around the area of the diesel tank at the southern end of the site and that this concentration is above the Moen indicative value for further investigation, it is suggested that particular attention is given to this part of the site during development works.

It is suggested that a precautionary approach is adopted and that once a proposed development and finished levels are known, that further assessment of potential risk from possible contamination from petrochemicals is undertaken on the basis that:

- 1) Exposure of this material close or at the surface of the developed site should be avoided. Failure to achieve this would result in possible exposure of petrochemical

contamination and vaporisation of petrochemicals at the surface causing a pungent odour to be released, which would not be conducive to a residential site.

2) It is suggested that these materials, particularly where levels of contaminant have been shown to be high, do not remain within the upper 1.0m of the site ground in relation to finished ground levels.

3) In areas where impermeable hard-standing materials are planned this depth might be reduced.

4) It is suggested that a best practice approach would remove the most contaminated materials on site and dispose of these along with the remaining petrochemical tanks in line with best practice procedures and legal requirements. If buried fuel tanks are to be removed, any contamination within the surrounding soils should be analysed to assess whether further remediation is required.





**Contamination Assessment**  
**Butters Coaches Depot - Childs Ercall**

**Egniol Ref: B1462 October 2004**

**APPENDIX**

## Summary Of Results Egniol Limited - Butlers Coaches

ANALYTES	BH/TP REF	CLIENT ID											
		CE1 (0..30m)	CE1 (0..85m)	CE2 (0..30m)	CE2 (1..60m)	CE2 (2..00m)	CE3 (0..30m)	CE3 (1..50m)	CE4 (0..20 - 0..30m)	CE4 (1..90m)	CE4 (3..50 - 3..60m)	CE5 (0..25m)	
Sulphide	mg/kg	<2.0	<2.0	2.7	12.7	#	22.7	#	5.3	#	#	<2.0	#
Sulphur (total)	mg/kg	267	171	338	191	#	477	#	755	#	#	348	#
pH	N/A	7.3	7.4	7.2	6.8	#	7.5	#	6.9	#	#	6.2	#
Sulphate (water soluble)	g/l SO4	0.084	0.061	0.044	0.052	#	0.068	#	0.175	#	#	0.232	#
Mineral Oil	mg/kg	754.6	372.1	118.8	<0.1	<0.1	187.5	<0.1	1204.0	182.1	175.8	3.8	#
GR0	mg/kg	<0.1	<0.1	<0.1	93.2	#	<0.1	<0.1	2.6	11.6	10.8	<0.1	#

Results for soil samples expressed as dry weight.  
# - Analyte not requested

**Summary Of Results  
Egniol Limited - Butters Coaches**

ANALYTES	BH/TP REF	CLIENT ID										
		CE1 (0.30m)	CE1 (0.85m)	CE2 (0.30m)	CE2 (1.60m)	CE2 (2.00m)	CE3 (0.30m)	CE3 (1.50m)	CE4 (0.20 - 0.30m)	CE4 (1.90m)	CE4 (3.50 - 3.60m)	CE5 (0.25m)
Arsenic	mg/kg	1.7	7.5	8.0	1.2	#	2.7	#	4.6	#	3.3	#
Cadmium	mg/kg	0.3	<0.2	2.2	<0.2	#	<0.2	#	1.6	#	1.2	#
Chromium (hexavalent)	mg/kg	<1.0	<1.0	<1.0	<1.0	#	<1.0	#	<1.0	#	<1.0	#
Chromium (total)	mg/kg	13.4	19.1	13.4	19.7	#	18.1	#	15.4	#	12.4	#
Lead	mg/kg	85.6	84.4	163.5	29.2	#	243.4	#	160.2	#	122.5	#
Mercury	mg/kg	<1.0	<1.0	<1.0	<1.0	#	<1.0	#	<1.0	#	<1.0	#
Selenium	mg/kg	<1.0	<1.0	<1.0	<1.0	#	<1.0	#	<1.0	#	<1.0	#
Boron (water soluble)	mg/kg	0.8	0.9	1.4	0.9	#	0.6	#	1.4	#	1.4	#
Copper	mg/kg	34.2	32.6	67.2	15.3	#	27.5	#	47.9	#	35.2	#
Nickel	mg/kg	17.1	20.1	37.2	17.0	#	18.2	#	33.9	#	24.2	#
Zinc	mg/kg	278.0	334.9	679.2	70.2	#	218.6	#	472.0	#	377.6	#
PAH (total)	mg/kg	1.7	3.0	9.4	<0.1	#	8.4	#	4.8	#	<0.1	#
Phenols	mg/kg	<1.0	<1.0	<1.0	<1.0	#	<1.0	#	<1.0	#	<1.0	#
Cyanide (free)	mg/kg	<2.0	<2.0	<2.0	<2.0	#	<2.0	#	<2.0	#	<2.0	#
Cyanide (complex)	mg/kg	<2.0	<2.0	<2.0	<2.0	#	<2.0	#	<2.0	#	<2.0	#
Cyanide (total)	mg/kg	<2.0	<2.0	<2.0	<2.0	#	<2.0	#	<2.0	#	<2.0	#
Thiocyanate	mg/kg	<10	<10	<10	<10	#	<10	#	<10	#	<10	#
Sulphate (total)	mg/kg SO4	609	332	683	293	#	1392	#	1379	#	907	#

Results for soil samples expressed as dry weight.  
# : Analyte not requested

SOIL

ANALYTE	METHOD OF DETECTION	LIMIT OF DETECTION
Arsenic	ICP-OES	1.0 mg/kg
Cadmium	ICP-OES	0.2 mg/kg
Chromium (hexavalent)	ICP-OES	1.0 mg/kg
Chromium (total)	ICP-OES	0.2 mg/kg
Lead	ICP-OES	0.5 mg/kg
Mercury	ICP-OES	1.0 mg/kg
Selenium	ICP-OES	1.0 mg/kg
Boron (water soluble)	ICP-OES	1.0 mg/kg
Copper	ICP-OES	0.5 mg/kg
Nickel	ICP-OES	0.2 mg/kg
Zinc	ICP-OES	0.2 mg/kg
PAH (total)	GC-FID	0.1 mg/kg
Phenols	Colorimetry	1.0 mg/kg
Cyanide (free)	Colorimetry	2.0 mg/kg
Cyanide (complex)	Colorimetry	2.0 mg/kg
Cyanide (total)	Colorimetry	2.0 mg/kg
Thiocyanate	Colorimetry	2.0 mg/kg
Sulphate (total)	ICP-OES	10 mg/kg
Sulphide	Colorimetry	30 mg/kg
Sulphur (total)	ICP-OES	2.0 mg/kg
pH	pH-meter	10 mg/kg
Sulphate (water soluble)	HPLC-IC	0.001 g/l SO4
Mineral Oil	GC-FID	0.1 mg/kg
GR0	GC-FID	0.1 mg/kg



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- Measurements are traceable to national and international standards.

Comments:

Sampling & tests marked † in this report are not included in the UKAS Accreditation Schedule for the testing laboratory.

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The Coefficient of Variation  $CV_T$  (where  $CV_T = \text{standard deviation}/\text{mean} \times 100$ ) is better than 15%.

All analysis carried out using ECoS standard methods unless otherwise agreed. The test results in this report refer only to the actual samples on which testing has been performed.

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Date submitted for analysis : 21/09/04

Your Job/Order Number :

Analyst(s) : HP DF SS CM CO KLH PSW DS CLH

Report Approval

Approved signatories: J R Brown (Customer Services Manager)  
E Dewell (Production Manager)  
P Richardson (Quality Manager)  
J Stoddart (Technical Manager)

Signature :

Report date : 5 October 2004



**Analytical Test Report  
For**

**EGNIOL LIMITED  
Tre Felin  
Bangor  
Gwynedd  
North Wales  
LL57 4LH**

**PROJECT ID: BUTTERS COACHES**

**Report No.: R04/3985**

**Copies To:  
Mr R Woodford  
File**

**ECOS ENVIRONMENTAL**  
Low Moor Business Park, Common Road, Bradford BD12 0NB  
Tel: 01274 691122 - Fax: 01274 608100  
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E-mail: info@ecos.co.uk

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Registered Office: Parkside Lane, Dewsbury Road, Leeds LS11 5SX



Egniol Ltd. (Bangor)  
 Tre Felin  
 Bangor  
 Gwynedd  
 LL57 4LH

Trialpit No  
**5**  
 Sheet 1 of 1

Project Name  
 Butters Coaches

Project No.  
 1462/SI

Co-ords: -  
 Level: -

Date  
 14/09/2004

Location: Childs Ercall

Dimensions: 2.10m

Scale  
 1:25

Client: Celtest

Depth  
 2.60m

1.30m

Logged By  
 RVW

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.25	D		0.10		MADE GROUND: Gravel (MADE GROUND)	
					SAND: Dark brown organic topsoil (TOPSOIL)	
			0.70		COBBLES: Light brown/orange gravelly COBBLES of sandstone. Gravel is rounded to sub-rounded of sandstone.	
			1.90		Clayey SAND: Very clayey SAND with some gravel. (SANDS & GRAVELS)	
			2.60		Triaspit Complete at 2.60 m	

Remarks: No apparent contamination

Groundwater: None





Egniol Ltd. (Bangor)  
 Tre Felin  
 Bangor  
 Gwynedd  
 LL57 4LH

Trialpit No  
**4**  
 Sheet 1 of 1

Project Name  
 Butters Coaches

Project No.  
 1462/SI

Co-ords: -  
 Level: -

Date  
 14/09/2004

Location: Childs Ercall

Dimensions: 2.10m







Scale  
 1:25

Client: Celtest

Depth  
 3.90m

1.30m

Logged By  
 RVW

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.20-0.30	D		0.20		 MADE GROUND: Gravel (MADE GROUND)	
			0.80		 SAND: Dark brown slightly gravelly SAND (SANDS & GRAVELS)	
			1.50		 SAND: Light grey slightly gravelly SAND (SANDS & GRAVELS)	
1.90	D		2.20		 SAND: Orange/brown slightly gravelly slightly silty SAND (SANDS & GRAVELS)	
			3.00		 SAND: Light brown/orange silty SAND (SANDS & GRAVELS)	
3.50-3.60	D		3.90		 SAND: Clayey SAND with bands and lenses of sand and silt. (SANDS & GRAVELS)	
						Trialpit Complete at 3.90 m

Remarks: Adjacent to buried diesel tank

Groundwater: None



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Egniol Ltd. (Bangor)  
 Tre Felin  
 Bangor  
 Gwynedd  
 LL57 4LH

Trialpit No

**3**

Sheet 1 of 1

Project Name  
 Butters Coaches

Project No.  
 1462/SI

Co-ords: -  
 Level: -

Date  
 14/09/2004

Location: Childs Ercall

Dimensions: 2.10m






Depth  
 3.10m

1.30m

Scale  
 1:25

Logged By  
 RVW

Client: Celtest

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.30	D		0.20		 MADE GROUND. Placed angular GRAVEL. (MADE GROUND)	
					 SAND: dark brown slightly gravelly SAND. (SANDS & GRAVELS)	
1.50	D		1.40		 SAND: Orange/brown SAND. Slight petrochemical odour. (ALLUVIUM)	
			2.00		 SAND: Soft clayey SAND. Slight petrochemical odour. (ALLUVIUM)	2
			2.50		 CLAY: Very Sandy CLAY. Strong petrochemical odour. (CLAY)	
			3.10		Trialpit Complete at 3.10 m	3
						4

Remarks:

Groundwater: Non



14/09/2004 9:40:11 AM Scanfile: 14622/SI 01 (Butts) 2004 Mar 01



Egniol Ltd. (Bangor)  
 Tre Felin  
 Bangor  
 Gwynedd  
 LL57 4LH

Trialpit No  
**2**  
 Sheet 1 of 1

Project Name  
 Butters Coaches

Project No.  
 1462/SI

Co-ords: -  
 Level: -

Date  
 14/09/2004

Location: Childs Ercall

Dimensions: 2.10m

Scale  
 1:25

Client: Celtest

Depth  
 2.90m

1.30m

Logged By  
 RVW

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.30	D		0.30			MADE GROUND: Brown angular placed gravel with some sand. (MADE GROUND)
			0.80			MADE GROUND: Slightly gravelly dark brown SAND with some humic matter and cobbles of brick. (MADE GROUND)
			1.40			SAND: Slightly gravelly dark brown humic SAND. (SANDS & GRAVELS)
1.60	D		1.90			SAND: Light brown grey moist slightly gravelly SAND. Strong petrochemical odour detected with black shoen present. (SANDS & GRAVELS)
2.00	D		2.90			CLAY: Orange to brown slightly sandy gravelly CLAY with occasional silt lenses. Petrochemical stain and strong petrochemical odour present. (CLAY)
Trialpit Complete at 2.90 m						

Remarks:

Groundwater: Non



AGS (14/09/2004) Butters Coaches Trialpit Log of level 2004 Rev 02



Egmiol Ltd. (Bangor)  
Tre Felin  
Bangor  
Gwynedd  
LL57 4LH

Trialpit No  
**1**  
Sheet 1 of 1

Project Name  
Butters Coaches

Project No.  
1462/SI

Co-ords: -  
Level: -

Date  
14/09/2004

Location: Childs Ercall

Dimensions: 2.10m

Scale  
1:25

Client: Celtest

Depth  
0.90m



Logged By  
RVW

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.30	D		0.10			MADE GROUND: Brown coarse angular GRAVEL. (MADE GROUND)
			0.30			MADE GROUND: Brown angular cobbles of brick and weathered sandstone with some root material. (MADE GROUND)
			0.55			SAND: Dark brown gravelly SAND. Gravel is rounded. (SANDS & GRAVELS)
0.85	D		0.90			SAND: Light brown/orange moist gravelly SAND. Slight darkened stain and petrochemical odour. Concrete base obstruction at base of pit. (SANDS & GRAVELS)
Trialpit Complete at 0.80 m						

Remarks: Adjacent to present above ground diesel/oil tank

Groundwater: Non



Produced in (000 3100) Standard 7 Aug 03 v1 (04/04/04) 00

## **APPENDIX C**



Legend

- BL BOLLARD
- BS BUS STOP
- CATV CABLE TV COVER
- CL COVER LEVEL
- GPS CONCRETE PAVING SLAB
- DP DRAIN PIPE
- DK DROP KERB
- EL ELECTRICITY COVER
- EP ELECTRICITY POLE
- ER EARTH ROD
- FH FIRE HYDRANT
- FL FLOOR LEVEL
- FS FLAG STAFF
- G GAS COVER
- GLY GULLY
- GSV GAS STOP VALVE
- IC INSPECTION COVER
- IL INVERT LEVEL
- LB LITTER BIN
- LP LAMP POST
- MKR MARKER
- NB NOTICE BOARD
- P POST
- PH POST HOLE
- PLP PEDESTRIAN LAMP POST
- RE REDDING EYE
- RS ROAD SIGN
- SIN SURVEY STATION
- STY STAY WIRE
- T TELECOMMUNICATIONS COVER
- TL TRAFFIC LIGHT
- TP TELEGRAPH POLE
- TML TOP OF WALL LEVEL
- UTL UNABLE TO LIFT
- UM UNABLE TO MEASURE
- VP VENT PIPE
- WL WATER LEVEL
- WP WASTE PIPE
- WSV WATER STOP VALVE

- FENCE TYPES
- B/W BARBED WIRE
- C/B CLOSE BOARD
- F/W POST AND WIRE
- P/R POST AND RAIL
- C/L CHAIN LINK
- C/P CHESTNUT PALE
- C/W CHICKEN WIRE
- M/R METAL RAIL (SECURITY TYPE)
- P/E PANEL FENCE
- R/I IRON RAILING
- RML RETAINING WALL

Notes

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STN 2	E 366466.489	N 325048.844	H 79.344
STN 3	E 366425.568	N 325056.423	H 79.097

Client: AP ARCHITECTURE LIMITED

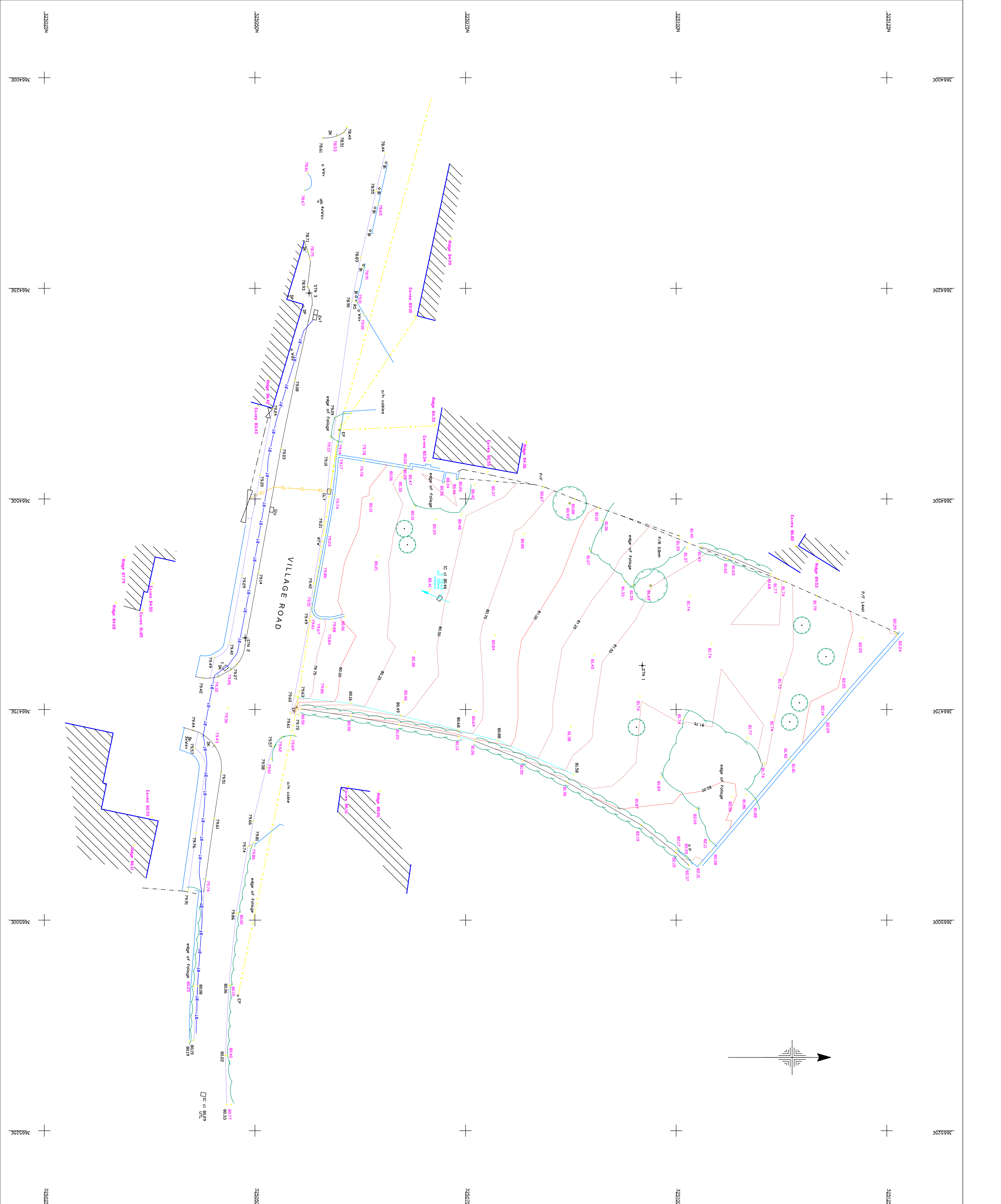
Title: VILLAGE ROAD, CHILDS ERCALL

Scale	Date	Job No	Dwg No	Rev.
1 : 200	04/02/16	10190	01	-

Surveyed by: Checked: Scanned: Levels are related to: OS DATUM (VMS)

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## **APPENDIX D**





Photo 1: View to North



Photo 2: View to East





Photo 3: View to Northwest



Photo 4: View to South





Photo 5: View to South



Photo 6: Existing Manhole Cover

## **APPENDIX E**



# Historical Mapping Legends

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

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

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

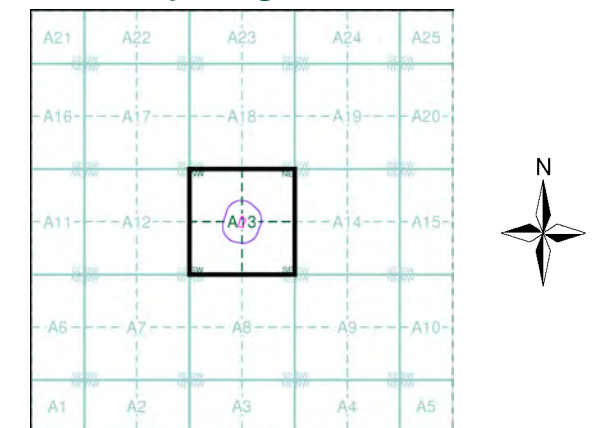
# Envirocheck®

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## Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Shropshire	1:2,500	1881	2
Shropshire	1:2,500	1902	3
Ordnance Survey Plan	1:2,500	1969 - 1970	4
Additional SIMs	1:2,500	1993	5
Large-Scale National Grid Data	1:2,500	1994	6
Historical Aerial Photography	1:2,500	2000	7

## Historical Map - Segment A13



## Order Details

Order Number: 272216423\_1\_1  
 Customer Ref: P21004  
 National Grid Reference: 366470, 325090  
 Slice: A  
 Site Area (Ha): 0.2  
 Search Buffer (m): 100

## Site Details

Village Road, Childs Ercall, MARKET DRAYTON, TF9 2BZ

**Landmark**  
 INFORMATION GROUP

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

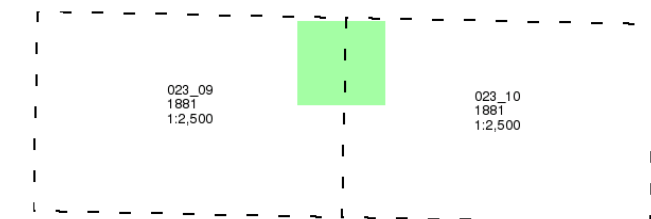
Shropshire

Published 1881

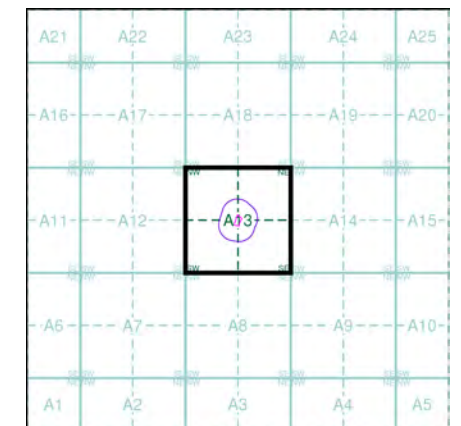
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

### Map Name(s) and Date(s)



### Historical Map - Segment A13

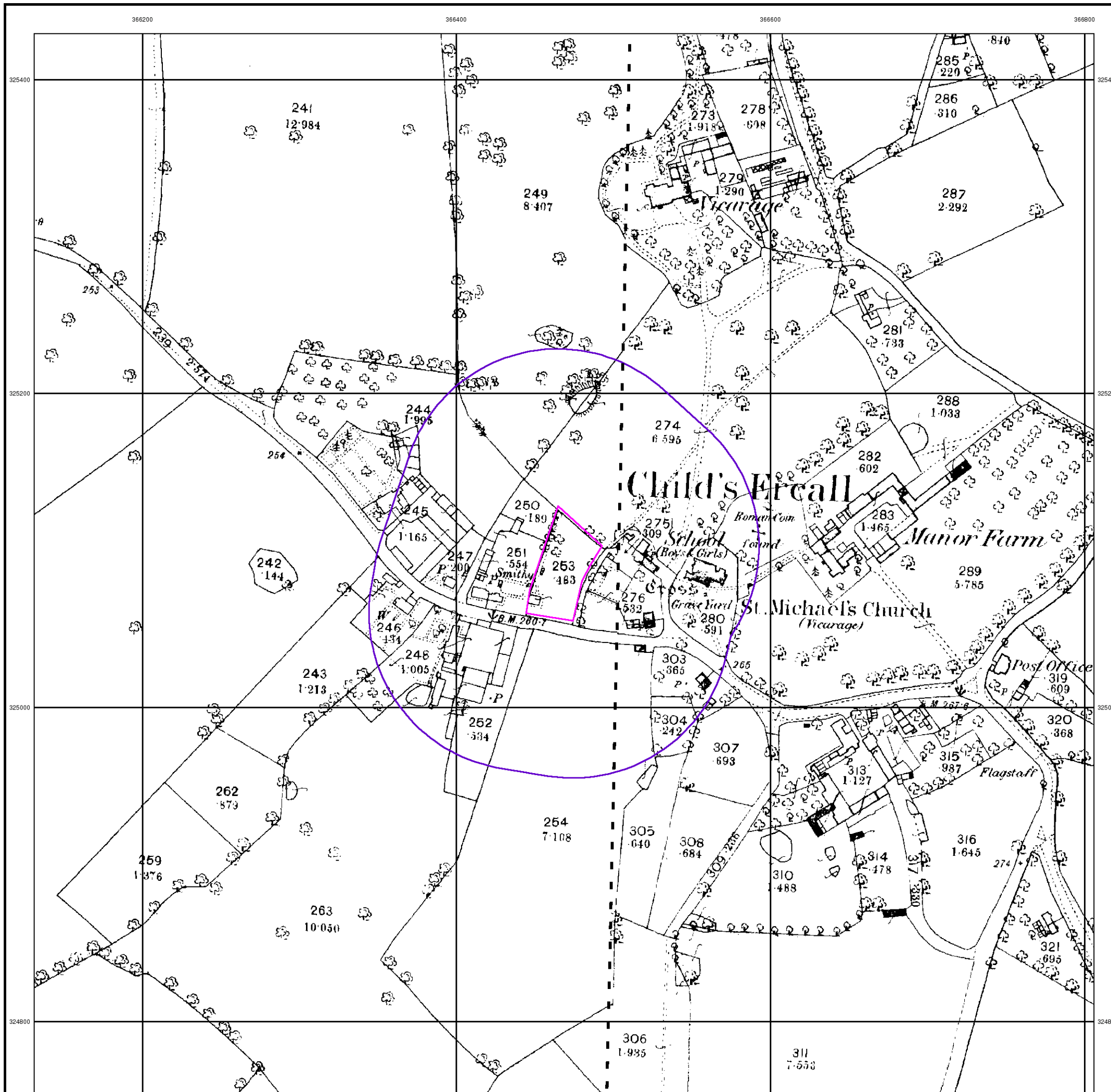


### Order Details

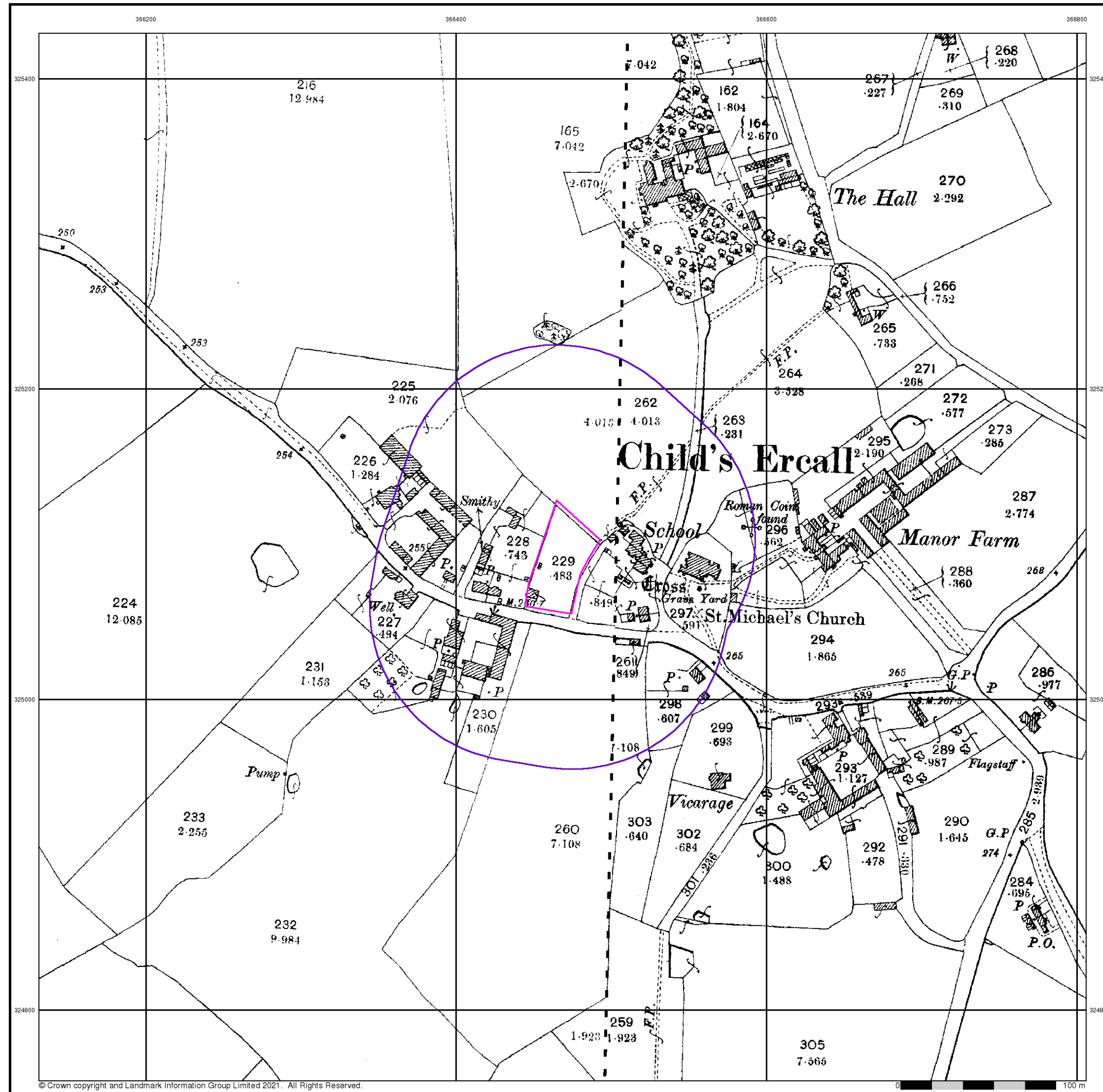
Order Number: 272216423\_1\_1  
 Customer Ref: P21004  
 National Grid Reference: 366470, 325090  
 Slice: A  
 Site Area (Ha): 0.2  
 Search Buffer (m): 100

### Site Details

Village Road, Childs Ercall, MARKET DRAYTON, TF9 2BZ

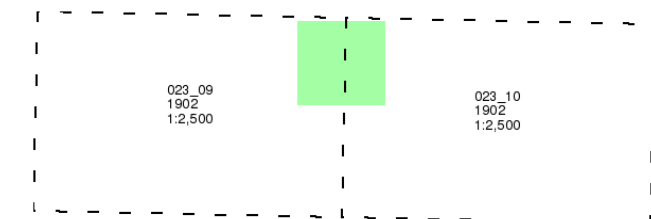




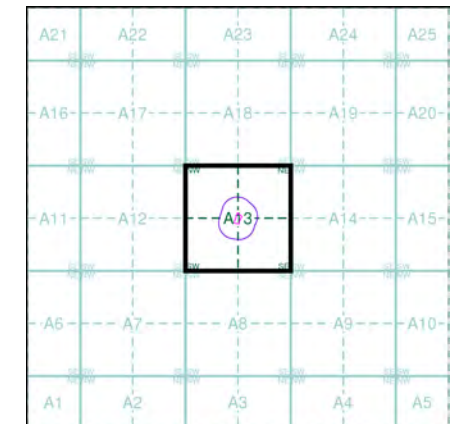


The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

### Map Name(s) and Date(s)



### Historical Map - Segment A13

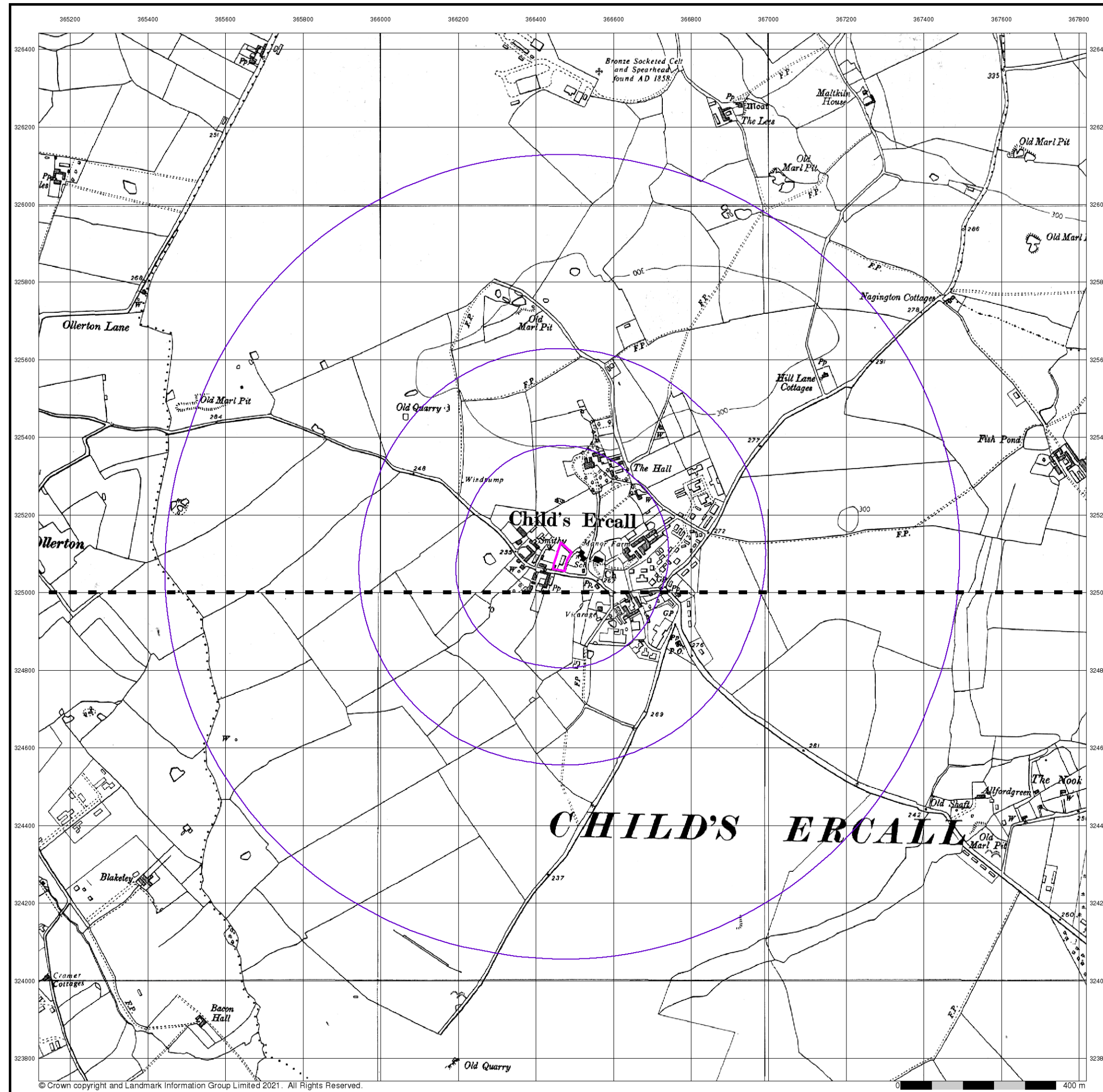


### Order Details

Order Number: 272216423\_1\_1  
 Customer Ref: P21004  
 National Grid Reference: 366470, 325090  
 Slice: A  
 Site Area (Ha): 0.2  
 Search Buffer (m): 100

### Site Details

Village Road, Childs Ercall, MARKET DRAYTON, TF9 2BZ



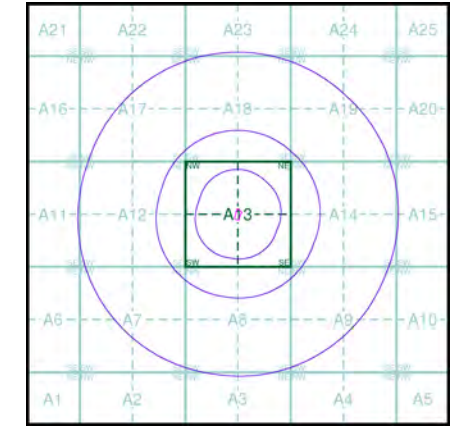
## Ordnance Survey Plan Published 1954 Source map scale - 1:10,000

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

### Map Name(s) and Date(s)

--- ---	SJ62NE		1954
--- ---	1:10,560		
--- ---	SJ62SE		1954
--- ---	1:10,560		

### Historical Map - Slice A



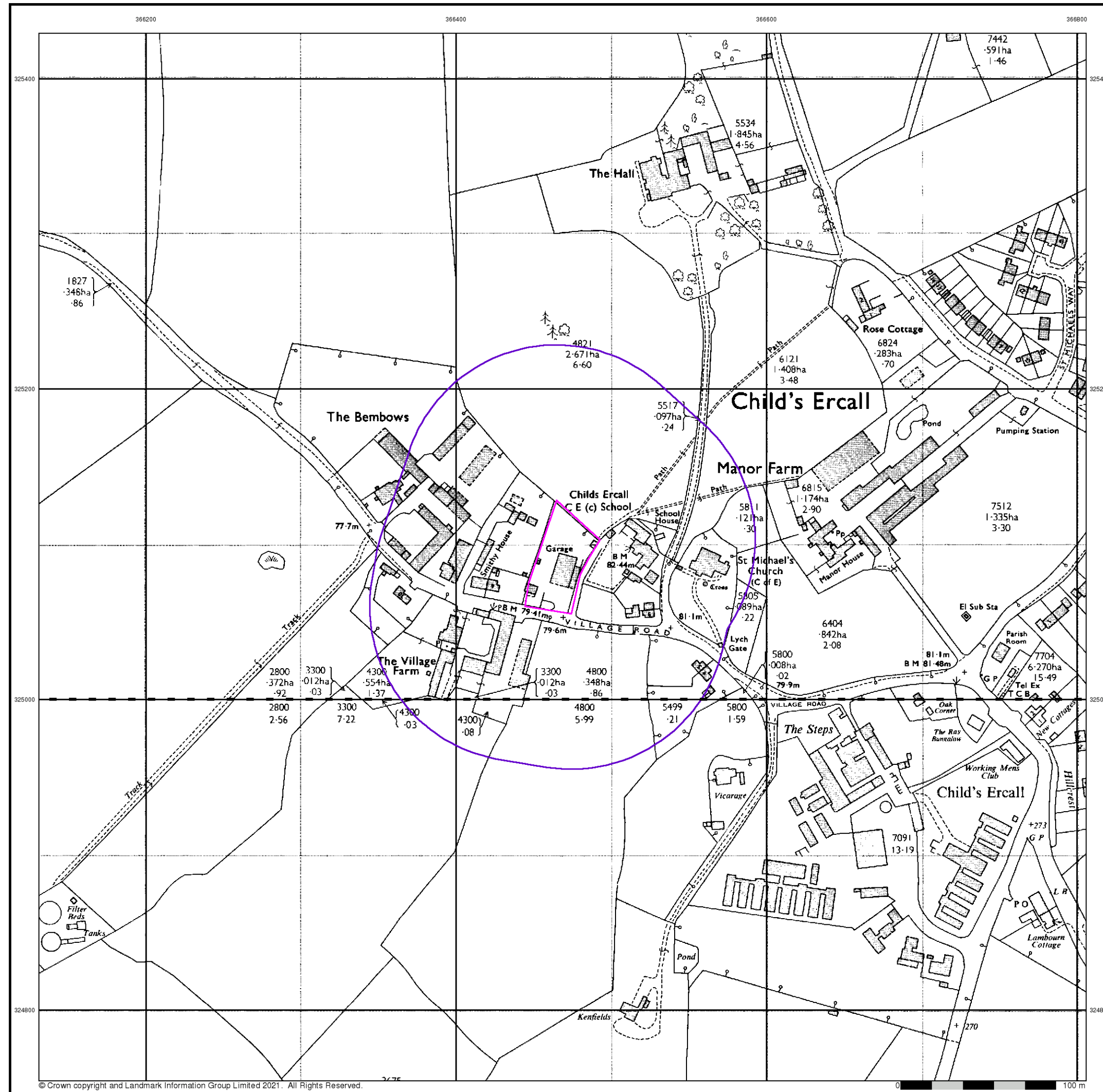
### Order Details

Order Number: 272216423\_1\_1  
 Customer Ref: P21004  
 National Grid Reference: 366470, 325090  
 Slice: A  
 Site Area (Ha): 0.2  
 Search Buffer (m): 1000

### Site Details

Village Road, Childs Ercall, MARKET DRAYTON, TF9 2BZ





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## Ordnance Survey Plan

Published 1969 - 1970

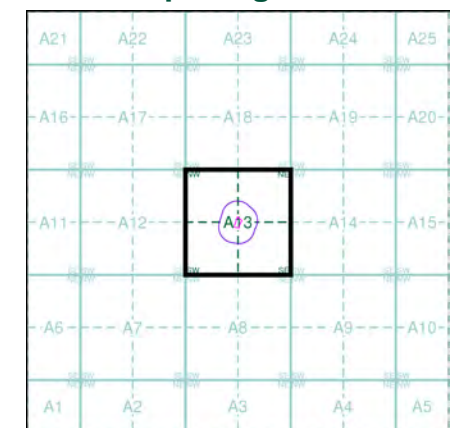
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

### Map Name(s) and Date(s)

SJ6625	1970	1:2,500
SJ6624	1969	1:2,500

### Historical Map - Segment A13

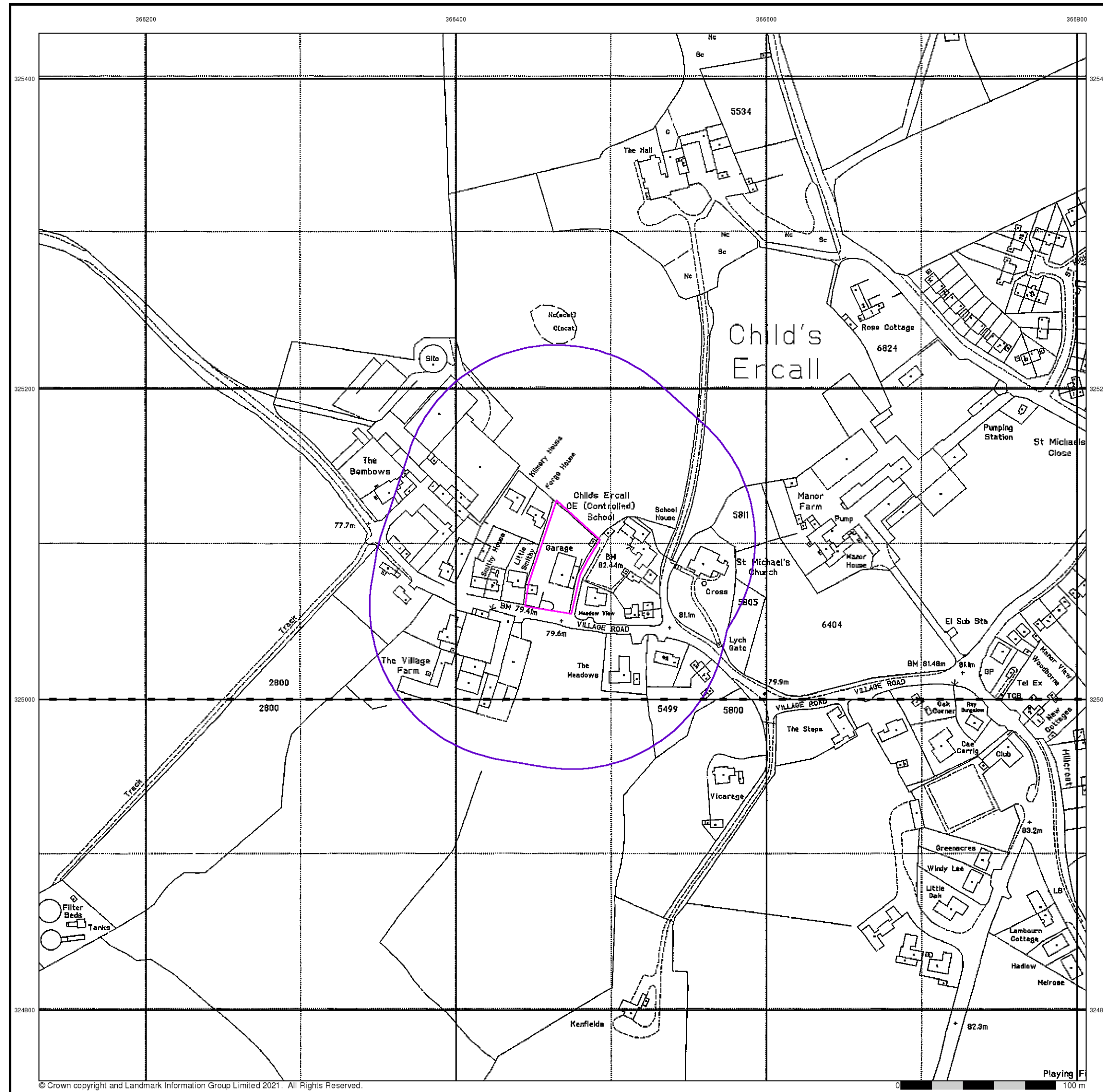


### Order Details

Order Number: 272216423\_1\_1  
 Customer Ref: P21004  
 National Grid Reference: 366470, 325090  
 Slice: A  
 Site Area (Ha): 0.2  
 Search Buffer (m): 100

### Site Details

Village Road, Childs Ercall, MARKET DRAYTON, TF9 2BZ



## Large-Scale National Grid Data

Published 1994

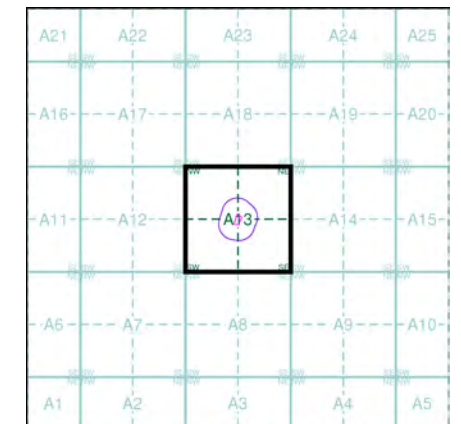
Source map scale - 1:2,500

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

### Map Name(s) and Date(s)

SJ6625	1994	1:2,500
SJ6624	1994	1:2,500

### Historical Map - Segment A13



### Order Details

Order Number: 272216423\_1\_1  
 Customer Ref: P21004  
 National Grid Reference: 366470, 325090  
 Slice: A  
 Site Area (Ha): 0.2  
 Search Buffer (m): 100

### Site Details

Village Road, Childs Ercall, MARKET DRAYTON, TF9 2BZ



## 10k Raster Mapping

Published 2000

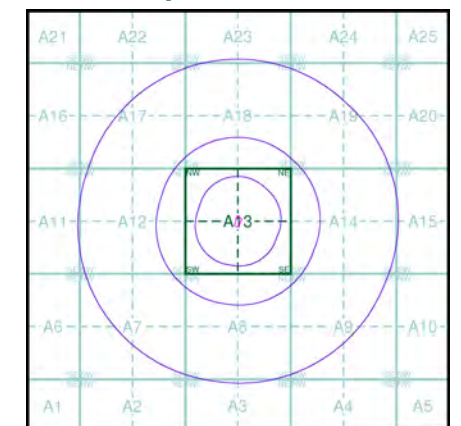
Source map scale - 1:10,000

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

### Map Name(s) and Date(s)

---	SJ62NE	
---	2000	---
---	1:10,000	---
---	---	---
---	SJ62SE	
---	2000	---
---	1:10,000	---

### Historical Map - Slice A



### Order Details

Order Number: 272216423\_1\_1  
 Customer Ref: P21004  
 National Grid Reference: 366470, 325090  
 Slice: A  
 Site Area (Ha): 0.2  
 Search Buffer (m): 1000

### Site Details

Village Road, Childs Ercall, MARKET DRAYTON, TF9 2BZ



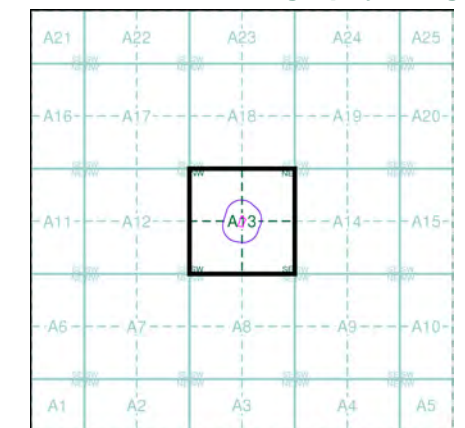


## Historical Aerial Photography

Published 2000

This aerial photography was produced by Getmapping, these vertical aerial photographs provide a seamless, full colour survey of the whole of Great Britain

### Historical Aerial Photography - Segment A13



### Order Details

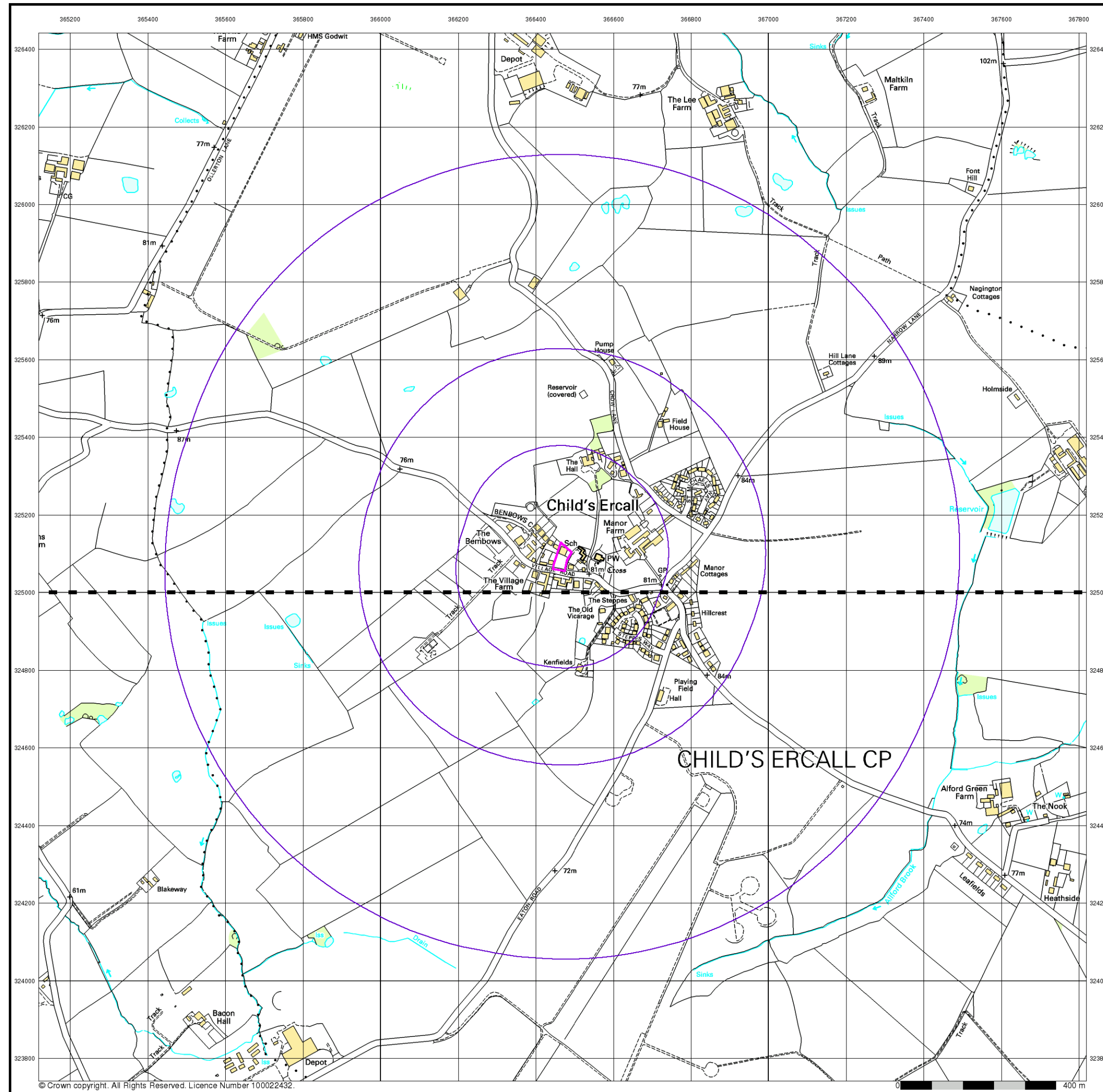
Order Number: 272216423\_1\_1  
Customer Ref: P21004  
National Grid Reference: 366470, 325090  
Slice: A  
Site Area (Ha): 0.2  
Search Buffer (m): 100

### Site Details

Village Road, Childs Ercall, MARKET DRAYTON, TF9 2BZ







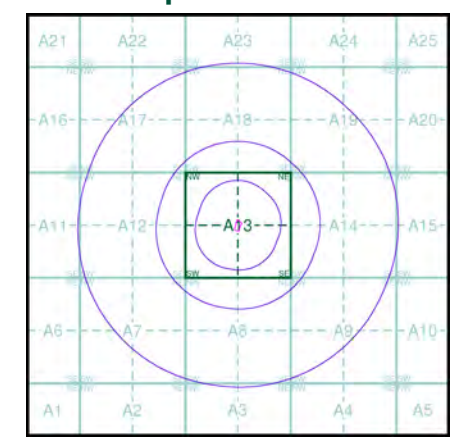
**10k Raster Mapping**  
**Published 2006**  
**Source map scale - 1:10,000**

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

**Map Name(s) and Date(s)**

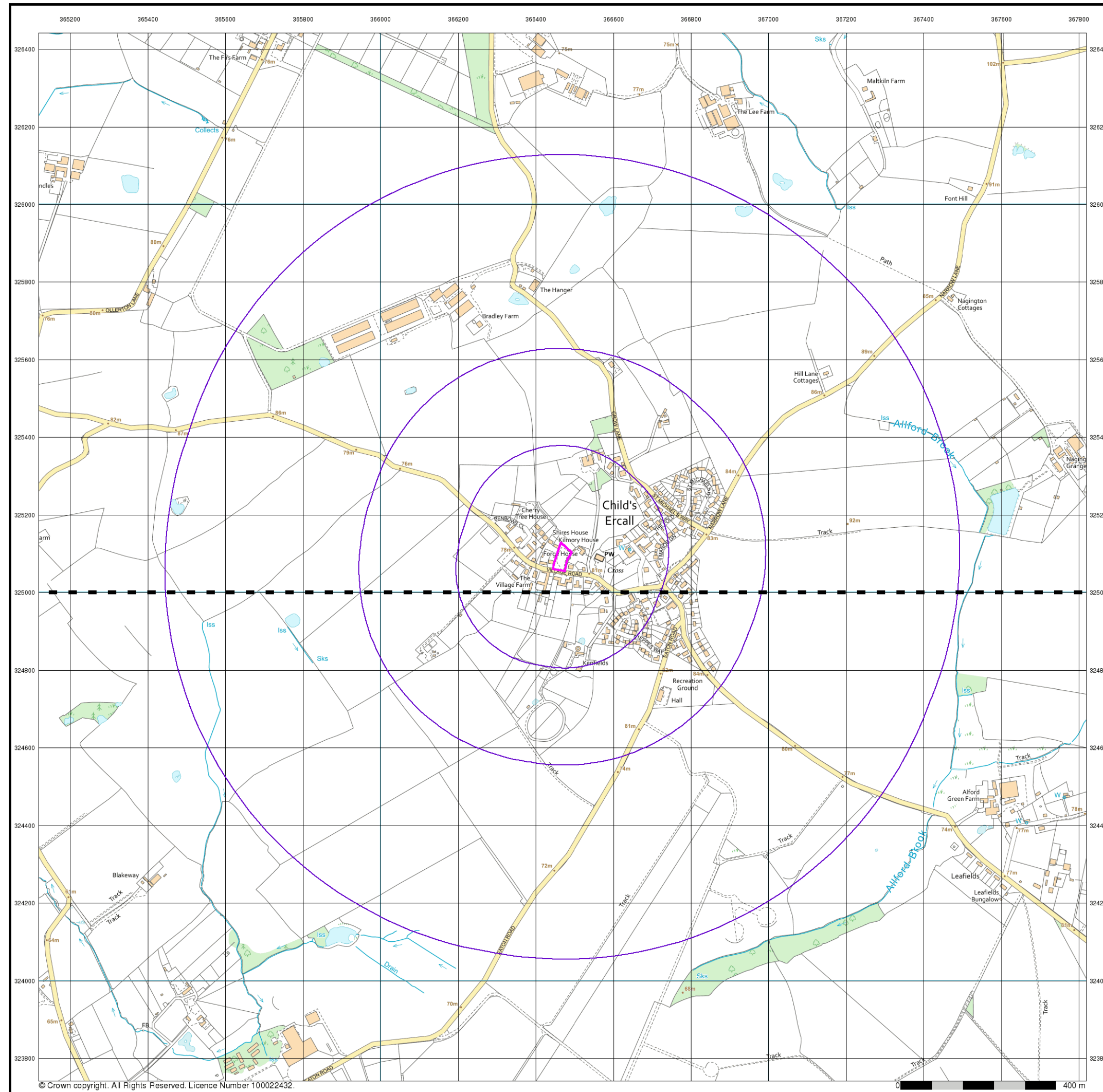
- - - - -
- SJ62NE |
- 2006 |
- 1:10,000 |
- - - - -
- SJ62SE |
- 2006 |
- 1:10,000 |
- - - - -

**Historical Map - Slice A**



**Order Details**  
 Order Number: 272216423\_1\_1  
 Customer Ref: P21004  
 National Grid Reference: 366470, 325090  
 Slice: A  
 Site Area (Ha): 0.2  
 Search Buffer (m): 1000

**Site Details**  
 Village Road, Childs Ercall, MARKET DRAYTON, TF9 2BZ



## VectorMap Local

Published 2020

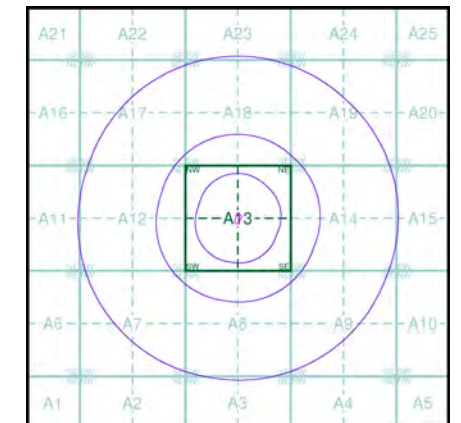
Source map scale - 1:10,000

VectorMap Local (Raster) is Ordnance Survey's highest detailed 'backdrop' mapping product. These maps are produced from OS's VectorMap Local, a simple vector dataset at a nominal scale of 1:10,000, covering the whole of Great Britain, that has been designed for creating graphical mapping. OS VectorMap Local is derived from large-scale information surveyed at 1:1250 scale (covering major towns and cities), 1:2500 scale (smaller towns, villages and developed rural areas), and 1:10 000 scale (mountain, moorland and river estuary areas).

### Map Name(s) and Date(s)

- - - - -
- | SJ62NE |
- | 2020 |
- | Variable |
- - - - -
- | SJ62SE |
- | 2020 |
- | Variable |
- - - - -

### Historical Map - Slice A



### Order Details

Order Number: 272216423\_1\_1  
 Customer Ref: P21004  
 National Grid Reference: 366470, 325090  
 Slice: A  
 Site Area (Ha): 0.2  
 Search Buffer (m): 1000

### Site Details

Village Road, Childs Ercall, MARKET DRAYTON, TF9 2BZ

## **APPENDIX F**





Photo 1: Excavated Underground Tanks Awaiting Off-Site Disposal



Photo 2: Natural Soils Below Former Underground Tanks

## **APPENDIX G**

Spilman Associates 38 South Avenue Stourbridge West Midlands DY8 3XY  01384 820578 tel		<b>MINI RIG BOREHOLE RECORD</b>			BH No. <b>BH1</b>
<b>Site Location</b>		Village Road, Childs Ercall			<b>Job No.</b> <b>P21004</b>
<b>Client Name</b>		Ling Developments Limited			
<b>Date of Drilling</b>		04/02/21	<b>Grid Ref</b>		
Strata Depth (m)	Sample Depth (m)	Strata Description	Legend	Casing and Test Record	Water/ Reduced Levels (m)
0.00	Continuous sample	Loose brown sandy slightly gravelly silt (topsoil) with occasional brick fragments (MADE GROUND)			
0.95		Loose to medium dense red brown slightly gravelly clayey SAND. (GLACIAL DEPOSITS)		SPT N = 17	
2.50		Soft occasionally firm red brown slightly gravelly very sandy CLAY. (GLACIAL DEPOSITS)		SPT N = 7	
3.50		Medium dense red brown clayey SAND with rare gravel (GLACIAL DEPOSITS)		SPT N = 4	
3.80		Very weak red brown slightly silty fine grained SANDSTONE (BRIDGNORTH SANDSTONE FORMATION)		SPT N = 53 for 75mm	
4.15					

<b>Key to samples/in situ tests:-</b> SPT Standard Penetration Test N N value C <sub>u</sub> Undrained Shear Strength (from Shear Vane)	<b>Remarks:-</b>  1. No groundwater encountered 2. Slotted 50mm ID HDPE pipe from 1.00m to 3.50m with pea gravel surround. Plain pipe from surface to 1.00m with bentonite seal. Pipe capped with bung and gas tap 3. No visual or olfactory evidence of contamination
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






Spilman Associates 38 South Avenue Stourbridge West Midlands DY8 3XY  01384 820578 tel		<b>MINI RIG BOREHOLE RECORD</b>			BH No. <b>BH3</b>		
Site Location		Village Road, Childs Erroll				Job No. <b>P21004</b>	
Client Name		Ling Developments Limited				Date of Drilling	
Date of Drilling		04/02/21	Grid Ref				
Strata Depth (m)	Sample Depth (m)	Strata Description	Legend	Casing and Test Record	Water/ Reduced Levels (m)		
0.00	Continuous sample	Grey sandy gravel of roadstone (MADE GROUND)		SPT N = 1			
0.15		Loose black and dark brown slightly sandy slightly gravelly silt (topsoil) with occasional brick fragments (MADE GROUND)					
1.05	Very loose brown with some black inclusions slightly gravelly silty SAND. (GLACIAL DEPOSITS)		1	SPT N = 8			
1.45	Loose brown slightly gravelly fine to medium grained SAND. (GLACIAL DEPOSITS)		2	SPT N = 25			
2.40	Firm occasionally stiff brown and red brown sandy to very sandy CLAY (GLACIAL DEPOSITS)		3	SPT N = 63 for 75mm			
3.70	Very weak red brown silty fine grained SANDSTONE (BRIDGNORTH SANDSTONE FORMATION)		4				
4.15			5				
			6				
			7				
			8				
			9				

<b>Key to samples/in situ tests:-</b> SPT Standard Penetration Test N N value C <sub>u</sub> Undrained Shear Strength (from Shear Vane)	<b>Remarks:-</b> 1. Moderate seepage at 2.00m 2. No visual or olfactory evidence of contamination 3. No standpipe installed
--	--



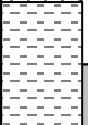
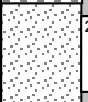


Spilman Associates 38 South Avenue Stourbridge West Midlands DY8 3XY  01384 820578 tel		<b>MINI RIG BOREHOLE RECORD</b>			BH No. <b>BH4</b>
<b>Site Location</b>		Village Road, Childs Ercall			<b>Job No.</b> <b>P21004</b>
<b>Client Name</b>		Ling Developments Limited			
<b>Date of Drilling</b>		25/02/21	<b>Grid Ref</b>		
Strata Depth (m)	Sample Depth (m)	Strata Description	Legend	Casing and Test Record	Water/ Reduced Levels (m)
0.00	Continuous sample	Concrete over roadstone (MADE GROUND)			
0.20		Loose dark brown very silty gravelly sand (TOPSOIL/SUBSOIL)			
0.90		Very loose brown slightly gravelly fine to medium grained sand (GLACIAL DEPOSITS)		1	
1.50		Loose red brown fine grained SAND (GLACIAL DEPOSITS)			
2.15		...with band of firm brown and red brown sandy slightly gravelly clay from 2.05 to 2.15m		2	
3.00		Loose red brown slightly gravelly coarse grained SAND (GLACIAL DEPOSITS)			
3.20		Very weak red brown slightly silty fine grained SANDSTONE (BRIDGNORTH SANDSTONE FORMATION)		3	
				4	
				5	
				6	
				7	
				8	
				9	

<b>Key to samples/in situ tests:-</b> SPT Standard Penetration Test N N value C <sub>u</sub> Undrained Shear Strength (from Shear Vane)	<b>Remarks:-</b> <ol style="list-style-type: none"> <li>Groundwater encountered at 2.00m</li> <li>Slotted 50mm ID HDPE pipe from 0.50m to 2.20m with pea gravel surround. Plain pipe from surface to 0.50m with bentonite seal. Pipe capped with bung and gas tap</li> <li>No visual or olfactory evidence of contamination</li> </ol>
--	---

Spilman Associates 38 South Avenue Stourbridge West Midlands DY8 3XY  01384 820578 tel		<b>MINI RIG BOREHOLE RECORD</b>			BH No. <b>BH5</b>
<b>Site Location</b>		Village Road, Childs Ercall			<b>Job No.</b> <b>P21004</b>
<b>Client Name</b>		Ling Developments Limited			
<b>Date of Drilling</b>		25/02/21	<b>Grid Ref</b>		
Strata Depth (m)	Sample Depth (m)	Strata Description	Legend	Casing and Test Record	Water/ Reduced Levels (m)
0.00	Continuous sample	Brick and concrete rubble (MADE GROUND)			
0.30		Loose dark brown sandy gravelly silt (TOPSOIL/SUBSOIL)			
0.90		Loose red brown slightly clayey fine grained SAND (GLACIAL DEPOSITS)		1	
		.. with some fine to medium subangular to rounded gravel from 1.90m			
		... with band of firm red brown and brown silty very sandy clay from 2.60 to 2.70m			
2.70		Very weak red brown slightly silty fine grained SANDSTONE (BRIDGNORTH SANDSTONE FORMATION)		3	
2.85					
				4	
				5	
				6	
				7	
				8	
				9	

<b>Key to samples/in situ tests:-</b> SPT Standard Penetration Test N N value C <sub>u</sub> Undrained Shear Strength (from Shear Vane)	<b>Remarks:-</b> 1. No groundwater encountered 2. Slotted 50mm ID HDPE pipe from 0.50m to 2.65m with pea gravel surround. Plain pipe from surface to 0.50m with bentonite seal. Pipe capped with bung and gas tap 3. No visual or olfactory evidence of contamination
--	--

<b>Spilman Associates</b> 38 South Avenue Stourbridge West Midlands DY8 3XY  01384 820578 tel		<b>MINI RIG BOREHOLE RECORD</b>			<b>BH No.</b> <b>BH6</b>	
		<b>Site Location</b> Village Road, Childs Ercall				
		<b>Client Name</b> Ling Developments Limited			<b>Job No.</b> <b>P21004</b>	
		<b>Date of Drilling</b> 25/02/21	<b>Grid Ref</b>			
<b>Strata Depth (m)</b>	<b>Sample Depth (m)</b>	<b>Strata Description</b>	<b>Legend</b>	<b>Casing and Test Record</b>	<b>Water/ Reduced Levels (m)</b>	
0.00	Continuous sample	Loose dark brown sandy slightly gravelly silt with occasional brick fragments (MADE GROUND)				
0.70		Loose brown slightly gravelly fine grained SAND (GLACIAL DEPOSITS)				
1.10		Firm red brown with some light brown mottling slightly gravelly sandy CLAY (GLACIAL DEPOSITS)				
1.90		Loose brown slightly gravelly very clayey SAND (GLACIAL DEPOSITS) .. with some fine to medium subangular to rounded gravel from 1.90m				
2.60 2.80		Very weak red brown slightly silty fine grained SANDSTONE (BRIDGNORTH SANDSTONE FORMATION)				
3						
4						
5						
6						
7						
8						
9						

<b>Key to samples/in situ tests:-</b> SPT Standard Penetration Test N N value C <sub>u</sub> Undrained Shear Strength (from Shear Vane)	<b>Remarks:-</b> <ol style="list-style-type: none"> <li>1. Groundwater encountered at 2.00m</li> <li>2. Slotted 50mm ID HDPE pipe from 0.50m to 2.30m with pea gravel surround. Plain pipe from surface to 0.50m with bentonite seal. Pipe capped with bung and gas tap</li> <li>3. No visual or olfactory evidence of contamination</li> </ol>
--	---



## **APPENDIX H**

# SPILMAN ASSOCIATES

Geotechnical and Environmental Engineers

38 South Avenue  
Stourbridge  
West Midlands DY8 3XY

Tel: 01384 820578

TRIAL PIT NO: TP1

## TRIAL PIT RECORD

**Client:** Ling Developments Limited

**Excavation Method:** Tracked Excavator

**Site:** Village Road, Childs Ercall

**Logged By:** HDS

**Date:** 04/02/21

**Job Number:** P21004

### Depth (m)

### Strata Description

0 – 0.70

Loose dark brown sandy silt (topsoil) with occasional brick fragments (MADE GROUND)

0.70 – 1.00

Loose orange brown silty gravelly SAND. Gravel is fine to medium subangular to subrounded (GLACIAL DEPOSITS)

No visual or olfactory evidence of contamination

**Stability of Excavation:** Stable

**Groundwater Observations:** Slight water ingress at 1.00m

**Samples Taken:** SB @ 0.30m; SB @ 1.00m

**Insitu Testing:** None

# SPILMAN ASSOCIATES

Geotechnical and Environmental Engineers

38 South Avenue  
Stourbridge  
West Midlands DY8 3XY

Tel: 01384 820578

TRIAL PIT NO: TP2

## TRIAL PIT RECORD

**Client:** Ling Developments Limited

**Excavation Method:** Tracked Excavator

**Site:** Village Road, Childs Ercall

**Logged By:** HDS

**Date:** 04/02/21

**Job Number:** P21004

Depth (m)	Strata Description
0 – 0.90	Loose dark brown and dark grey sandy slightly gravelly silt with some ash and clinker (MADE GROUND)
0.90 – 1.70	Loose brown silty gravelly SAND. Gravel is fine to medium subangular to subrounded (GLACIAL DEPOSITS)
	No visual or olfactory evidence of contamination

**Stability of Excavation:** Unstable below 0.90m

**Groundwater Observations:** Moderate water ingress at 1.20m

**Samples Taken:** SB @ 0.20m: SB @ 1.70m

**Insitu Testing:** None

# SPILMAN ASSOCIATES

Geotechnical and Environmental Engineers

38 South Avenue  
Stourbridge  
West Midlands DY8 3XY

Tel: 01384 820578

TRIAL PIT NO: TP3

## TRIAL PIT RECORD

**Client:** Ling Developments Limited      **Excavation Method:** Tracked Excavator  
**Site:** Village Road, Childs Ercall      **Logged By:** HDS  
**Date:** 04/02/21      **Job Number:** P21004

Depth (m)	Strata Description
0 – 0.20	Grey sandy gravel of roadstone (MADE GROUND)
0.20 – 0.50	Loose brown sandy silt (TOPSOIL)
0.50 – 1.00	Loose red brown slightly silty slightly gravelly SAND. Gravel is fine to medium subangular to subrounded (GLACIAL DEPOSITS)
	No visual or olfactory evidence of contamination

**Stability of Excavation:** Stable  
**Groundwater Observations:** Ground saturated below 0.50m  
**Samples Taken:** SB @ 0.40m; SB @ 1.00m  
**Insitu Testing:** None

# SPILMAN ASSOCIATES

Geotechnical and Environmental Engineers

38 South Avenue  
Stourbridge  
West Midlands DY8 3XY

Tel: 01384 820578

TRIAL PIT NO: TP4

## TRIAL PIT RECORD

**Client:** Ling Developments Limited      **Excavation Method:** Tracked Excavator

**Site:** Village Road, Childs Ercall      **Logged By:** HDS

**Date:** 04/02/21      **Job Number:** P21004

Depth (m)	Strata Description
0 – 0.40	Loose brown sandy slightly gravelly silt (topsoil) with occasional brick fragments (MADE GROUND)
0.40 – 1.20	Loose red brown silty slightly gravelly SAND. Gravel is fine to medium subangular to subrounded (GLACIAL DEPOSITS)
	No visual or olfactory evidence of contamination

**Stability of Excavation:** Unstable throughout

**Groundwater Observations:** Slight water ingress at 1.00m

**Samples Taken:** SB @ 0.15m: SB @ 1.20m

**Insitu Testing:** None



# SPILMAN ASSOCIATES

Geotechnical and Environmental Engineers

38 South Avenue  
Stourbridge  
West Midlands DY8 3XY

Tel: 01384 820578

TRIAL PIT NO: TP5

## TRIAL PIT RECORD

**Client:** Ling Developments Limited      **Excavation Method:** Tracked Excavator

**Site:** Village Road, Childs Ercall      **Logged By:** HDS

**Date:** 04/02/21      **Job Number:** P21004

Depth (m)	Strata Description
0 – 0.30	Grey sandy gravel of roadstone (MADE GROUND)
0.30 – 0.40	Concrete slab (MADE GROUND)
0.40 – 0.55	Brick rubble (MADE GROUND)
0.55 – 1.10	Loose grey brown sandy silt (topsoil) with occasional ash and clinker (MADE GROUND)
1.10 – 1.50	Loose brown silty slightly gravelly SAND. Gravel is fine to medium subangular to subrounded (GLACIAL DEPOSITS)
	No visual or olfactory evidence of contamination

**Stability of Excavation:** Slightly unstable

**Groundwater Observations:** Damp below 1.00m

**Samples Taken:** SB @ 0.60m; SB @ 1.50m

**Insitu Testing:** None

## **APPENDIX I**

Spilman Associates 38 South Avenue Stourbridge West Midlands DY8 3XY  01384 820578 tel		<b>ROTARY BOREHOLE RECORD</b>					<b>BH No. 101</b>	
		<b>Site Location</b> Village Road, Childs Ercall						
		<b>Client Name</b> Ling Developments Limited					<b>Job No. P21004</b>	
		<b>Date of Drilling</b> 26/02/21 – 01/03/21			<b>Grid Ref</b>			
Strata Depth (m)	Drilling Method	Strata Description	Legend	TCR %	SCR %	RQD %	Water/Reduced Levels (m)	
0.00	Rotary Open	Grey brown sandy gravel of roadstone (MADE GROUND)						
1.80		Brown slightly gravelly clayey SAND (GLACIAL DEPOSITS)						
2.40		Red brown SANDSTONE (BRIDGNORTH SANDSTONE FORMATION)						
3.50	Rotary Cored	Very weak red brown fine grained SANDSTONE with extremely closely to closely spaced sub-horizontal planar smooth discontinuities (BRIDGNORTH SANDSTONE FORMATION)		63				
5.00		Very weak red brown fine grained SANDSTONE with closely to medium spaced sub-horizontal planar smooth discontinuities (BRIDGNORTH SANDSTONE FORMATION)		68				
		No core recovery 8.00m to 9.50m		91				
				0				
				90				

**Key to samples/in situ tests:-**  
 TCR Total Core Recovery  
 SCR Solid Core Recovery  
 RQD Rock Quality Designation  
 W Water  
 SPT Standard Penetration Test  
 CPT Cone Penetration Test  
 N N value

**Remarks:-**

- Borehole drilled with air mist flush
- Groundwater encountered at 9.00m
- 50mm ID slotted pipe from 11.00m to 18.50m with pea gravel surround. Plain pipe from surface to 11.0m with bentonite seal. Pipe terminated with bung and gas tap

Spilman Associates 38 South Avenue Stourbridge West Midlands DY8 3XY  01384 820578 tel		<b>ROTARY BOREHOLE RECORD</b>					<b>BH No. 101</b>	
<b>Site Location</b>		Village Road, Childs Ercall					<b>Job No. P21004</b>	
<b>Client Name</b>		Ling Developments Limited						
<b>Date of Drilling</b>		26/02/21 – 01/03/21		<b>Grid Ref</b>				
<b>Strata Depth (m)</b>	<b>Drilling Method</b>	<b>Strata Description</b>	<b>Legend</b>	<b>TCR %</b>	<b>SCR %</b>	<b>RQD %</b>	<b>Water/ Reduced Levels (m)</b>	
10	Rotary Cored	Very weak red brown fine grained SANDSTONE with closely to medium spaced sub-horizontal planar smooth discontinuities (BRIDGNORTH SANDSTONE FORMATION)		10				
11				92				
12				92				
13								
14				88				
15				96				
16								
17.00								
18.50								
19								
		Very weak red brown fine to medium grained SANDSTONE with very closely spaced sub-horizontal planar smooth discontinuities (BRIDGNORTH SANDSTONE FORMATION)		100				

<b>Key to samples/in situ tests:-</b> TCR Total Core Recovery SCR Solid Core Recovery RQD Rock Quality Designation W Water SPT Standard Penetration Test CPT Cone Penetration Test N N value	<b>Remarks:-</b> 1. Borehole drilled with air mist flush 2. Groundwater encountered at 9.00m 3. 50mm ID slotted pipe from 11.00m to 18.50m with pea gravel surround. Plain pipe from surface to 11.0m with bentonite seal. Pipe terminated with bung and gas tap
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## **APPENDIX J**



### SUMMARY OF SPT 'N' RESULTS

Borehole	Depth (m)	N Value	Blows for 75mm Penetration					
BH1	1.00 - 1.45	17	5	4	4	5	4	4
	2.00 - 2.45	7	4	3	2	2	2	1
	3.00 - 3.45	4	2	2	1	1	1	1
	4.00 - 4.45	53 for 75mm	10	53 for 75mm				
BH2	1.00 - 1.45	8	3	3	2	2	2	2
	2.00 - 2.45	59	6	10	15	12	14	18
	3.00 - 3.45	58 for 75mm	14	58				
BH3	1.00 - 1.45	1	1	0	1	0	0	0
	2.00 - 2.45	8	2	2	2	2	2	2
	3.00 - 3.45	25	1	1	4	6	7	8
	4.00 - 4.45	63 for 75mm	17	63				
BH7	1.00 - 1.45	8	2	2	2	2	2	2
	2.00 - 2.45	10	3	2	2	3	2	3
	3.00 - 3.45*	0	0	0	0	0	0	0
	3.50 - 3.84	51 for 200mm	1	1	2	7	42 for 50mm	

\* SPT sank 450mm under own weight

## **APPENDIX K**

### PID SCREENING RESULTS

Exploratory Hole	Depth (m)	PID Reading (ppm)
BH1	0.50	0.0
	1.50	0.2
	2.50	0.0
	3.50	0.0
BH2	0.30	0.3
	0.50 - 1.00	0.9
	1.00 - 1.50	21.8
	1.50 - 1.70	0.9
	1.70 - 2.00	1.3
	2.00 - 2.50	5.7
BH3	0.30	0.0
	1.50	0.0
	2.50	0.0
BH4	0.60	0.4
	1.20	0.0
	1.80	0.0
	2.80	0.1
BH5	0.50	0.0
	1.20	0.0
	1.80	0.0
	2.40	0.0
	2.70	0.0
BH6	0.80	0.0
	1.10	0.0
	1.70	0.0
	2.00	0.0
	2.70	0.0
BH7	0.10	0.7
	1.00	0.4
	2.00	0.2
	3.50	0.1
BH101	4.00	0.2
	5.00	0.1
	6.00	0.2
	6.50	0.1
	7.00	0.1
	8.00	0.2
	10.00	0.2
	11.50	0.0
	12.80	0.1
	13.00	0.2
	14.50	0.0
	15.50	0.0
	17.00	0.0
18.50	0.0	

## PID SCREENING RESULTS

Exploratory Hole	Depth (m)	PID Reading (ppm)
TP1	0.30	0.0
	1.00	0.0
TP2	0.20	0.0
	1.70	0.0
TP3	0.40	0.7
	1.00	0.0
TP4	0.15	0.2
	1.20	0.0
TP5	0.60	1.8
	1.50	0.0
Tank Base	T1	35.9
	T2	11.9
	T3	9.6

## **APPENDIX L**

**STANDPIPE INSTALLATION DETAILS**

Borehole	Plain Pipe (m)	Slotted Pipe (m)	Response Zone (m)	Approximate Ground Level (m AOD)
BH1	0 - 1.00	1.00 - 3.50	1.00 - 4.15	81.63
BH2	0 - 1.00	1.00 - 2.60	1.00 - 3.15	79.92
BH4	0 - 0.50	0.50 - 2.20	0.50 - 3.20	80.96
BH5	0 - 0.50	0.50 - 2.65	0.50 - 2.85	80.16
BH6	0 - 0.50	0.50 - 2.30	0.50 - 2.80	79.31
BH7	0 - 0.50	0.50 - 3.60	0.50 - 3.85	81.71
BH101	0 - 11.00	11.00 - 18.50	11.00 - 18.50	79.79



## **APPENDIX M**















## **APPENDIX N**



Unit A2  
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Ponswood Industrial Estate  
St Leonards on Sea  
East Sussex  
TN38 9BY  
Telephone: (01424) 718618

[cs@elab-uk.co.uk](mailto:cs@elab-uk.co.uk)  
[info@elab-uk.co.uk](mailto:info@elab-uk.co.uk)

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**THE ENVIRONMENTAL LABORATORY LTD**

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**Analytical Report Number:** 21-32015

**Issue:** 1

**Date of Issue:** 15/02/2021

**Contact:** Nicki Spilman

**Customer Details:** Spilman Associates Ltd  
38 South Avenue  
Stourbridge  
West MidlandsDY9 3XY

**Quotation No:** Q19-01596


**Order No:** P21004A

**Customer Reference:** P21004A

**Date Received:** 08/02/2021

**Date Approved:** 15/02/2021

**Details:** Village Road, Childs Ercall

**Approved by:** 

Mike Varley, Technical Manager

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Any comments, opinions or interpretations expressed herein are outside the scope of UKAS accreditation (Accreditation Number 2683)

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## Sample Summary

Report No.: 21-32015, issue number 1

Elab No.	Client's Ref.	Date Sampled	Date Scheduled	Description	Deviations
226948	TP1 0.30	04/02/2021	08/02/2021	Sandy loam	
226949	TP2 0.20	04/02/2021	08/02/2021	Sandy loam	
226950	TP3 0.40	04/02/2021	08/02/2021	Loamy sand	
226951	TP4 0.15	04/02/2021	08/02/2021	Sandy loam	
226952	TP5 0.60	04/02/2021	08/02/2021	Loamy sand	



# Results Summary

Report No.: 21-32015, issue number 1

ELAB Reference	226948	226949	226950	226951
Customer Reference				
Sample ID				
Sample Type	SOIL	SOIL	SOIL	SOIL
Sample Location	TP1	TP2	TP3	TP4
Sample Depth (m)	0.30	0.20	0.40	0.15
Sampling Date	04/02/2021	04/02/2021	04/02/2021	04/02/2021

Determinand	Codes	Units	LOD				
<b>Soil sample preparation parameters</b>							
Moisture Content	N	%	0.1	15.1	19.8	15.1	17.8
Material removed	N	%	0.1	< 0.1	30.3	< 0.1	22.9
Description of Inert material removed	N		0	None	Stones,clinker	None	Stones,clinker
<b>Metals</b>							
Arsenic	M	mg/kg	1	9.2	18.4	6.0	9.7
Cadmium	M	mg/kg	0.5	2.4	2.6	< 0.5	3.8
Chromium	M	mg/kg	5	16.7	27.4	14.1	27.0
Copper	M	mg/kg	5	60.3	155	47.9	233
Lead	M	mg/kg	5	176	275	45.6	647
Mercury	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5
Nickel	M	mg/kg	5	30.4	59.8	14.0	27.2
Selenium	M	mg/kg	1	10.4	< 1.0	< 1.0	< 1.0
Zinc	M	mg/kg	5	539	943	158	714
<b>Inorganics</b>							
Complex Cyanide	N	mg/kg	1	< 1.0	< 1.0	< 1.0	6.5
Elemental Sulphur	M	mg/kg	20	< 20	23	< 20	< 20
Free Cyanide	N	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0
Hexavalent Chromium	N	mg/kg	0.8	< 0.8	< 0.8	< 0.8	< 0.8
Total Sulphide	N	mg/kg	2	< 2	< 2	< 2	< 2
Total Cyanide	M	mg/kg	1	< 1.0	< 1.0	< 1.0	6.5
Acid Soluble Sulphate (SO4)	U	%	0.02	0.03	0.04	< 0.02	0.04
Water Soluble Boron	N	mg/kg	0.5	< 0.5	1.5	0.5	1.4
<b>Miscellaneous</b>							
pH	M	pH units	0.1	6.9	7.2	7.0	7.1
<b>Phenols</b>							
Total Monohydric Phenols	N	mg/kg	5	< 5	< 5	< 5	< 5
<b>Polyaromatic hydrocarbons</b>							
Naphthalene	M	mg/kg	0.1	< 0.1	0.2	< 0.1	0.5
Acenaphthylene	M	mg/kg	0.1	< 0.1	0.4	< 0.1	0.3
Acenaphthene	M	mg/kg	0.1	< 0.1	0.2	< 0.1	0.2
Fluorene	M	mg/kg	0.1	< 0.1	0.1	< 0.1	< 0.1
Phenanthrene	M	mg/kg	0.1	< 0.1	1.9	< 0.1	0.8
Anthracene	M	mg/kg	0.1	< 0.1	1.1	< 0.1	0.6
Fluoranthene	M	mg/kg	0.1	< 0.1	5.0	< 0.1	1.8
Pyrene	M	mg/kg	0.1	< 0.1	4.3	< 0.1	1.4
Benzo(a)anthracene	M	mg/kg	0.1	< 0.1	3.0	< 0.1	1.2
Chrysene	M	mg/kg	0.1	< 0.1	2.7	< 0.1	1.0
Benzo(b)fluoranthene	M	mg/kg	0.1	< 0.1	2.7	< 0.1	2.4
Benzo(k)fluoranthene	M	mg/kg	0.1	< 0.1	3.0	< 0.1	2.4
Benzo(a)pyrene	M	mg/kg	0.1	< 0.1	3.5	< 0.1	3.8
Indeno(1,2,3-cd)pyrene	M	mg/kg	0.1	< 0.1	3.2	< 0.1	4.2
Dibenzo(a,h)anthracene	M	mg/kg	0.1	< 0.1	0.7	< 0.1	1.6
Benzo[g,h,i]perylene	M	mg/kg	0.1	< 0.1	2.5	< 0.1	5.4
Total PAH(16)	M	mg/kg	0.4	< 0.4	34.6	< 0.4	27.6



# Results Summary

Report No.: 21-32015, issue number 1

ELAB Reference	226948	226949	226950	226951
Customer Reference				
Sample ID				
Sample Type	SOIL	SOIL	SOIL	SOIL
Sample Location	TP1	TP2	TP3	TP4
Sample Depth (m)	0.30	0.20	0.40	0.15
Sampling Date	04/02/2021	04/02/2021	04/02/2021	04/02/2021

Determinand	Codes	Units	LOD				
<b>BTEX</b>							
Benzene	M	ug/kg	10	< 10.0	< 10.0	< 10.0	< 10.0
Toluene	M	ug/kg	10	< 10.0	< 10.0	< 10.0	< 10.0
Ethylbenzene	M	ug/kg	10	< 10.0	< 10.0	< 10.0	< 10.0
Xylenes	M	ug/kg	10	< 10.0	< 10.0	< 10.0	< 10.0
MTBE	N	ug/kg	10	< 10.0	< 10.0	< 10.0	< 10.0
<b>TPH CWG</b>							
>C5-C6 Aliphatic	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01	< 0.01
>C6-C8 Aliphatic	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01	< 0.01
>C8-C10 Aliphatic	N	mg/kg	1	< 1.0	< 1.0	< 1.0	1.1
>C10-C12 Aliphatic	M	mg/kg	1	< 1.0	< 1.0	< 1.0	1.5
>C12-C16 Aliphatic	M	mg/kg	1	< 1.0	< 1.0	< 1.0	5.7
>C16-C21 Aliphatic	M	mg/kg	1	< 1.0	1.8	< 1.0	21.7
>C21-C35 Aliphatic	M	mg/kg	1	6.2	15.5	< 1.0	504
>C35-C40 Aliphatic	M	mg/kg	1	< 1.0	3.4	< 1.0	102
>C40-C44 Aliphatic	N	mg/kg	1	< 1.0	1.7	< 1.0	74.3
Total aliphatic hydrocarbons (>C5 - C44)	N	mg/kg	1	8.4	23.4	1.4	711
>C5-C7 Aromatic	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01	< 0.01
>C7-C8 Aromatic	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01	< 0.01
>C8-C10 Aromatic	N	mg/kg	1	< 1.0	< 1.0	< 1.0	2.8
>C10-C12 Aromatic	M	mg/kg	1	< 1.0	< 1.0	< 1.0	2.7
>C12-C16 Aromatic	M	mg/kg	1	< 1.0	2.2	< 1.0	19.4
>C16-C21 Aromatic	M	mg/kg	1	4.4	15.6	< 1.0	111
>C21-C35 Aromatic	M	mg/kg	1	53.7	140	< 1.0	2100
>C35-C40 Aromatic	M	mg/kg	1	19.2	37.8	< 1.0	883
>C40-C44 Aromatic Soil	N	mg/kg	1	3.3	8.0	< 1.0	259
Total aromatic hydrocarbons (>C5 - C44)	N	mg/kg	1	82.0	204	< 1.0	3380
Total petroleum hydrocarbons (>C5 - C44)	N	mg/kg	1	90.3	228	2.2	4090





# Results Summary

Report No.: 21-32015, issue number 1

ELAB Reference	226952
Customer Reference	
Sample ID	
Sample Type	SOIL
Sample Location	TP5
Sample Depth (m)	0.60
Sampling Date	04/02/2021

Determinand	Codes	Units	LOD	
<b>Soil sample preparation parameters</b>				
Moisture Content	N	%	0.1	15.3
Material removed	N	%	0.1	< 0.1
Description of Inert material removed	N		0	None
<b>Metals</b>				
Arsenic	M	mg/kg	1	4.3
Cadmium	M	mg/kg	0.5	< 0.5
Chromium	M	mg/kg	5	11.7
Copper	M	mg/kg	5	37.7
Lead	M	mg/kg	5	69.1
Mercury	M	mg/kg	0.5	< 0.5
Nickel	M	mg/kg	5	9.5
Selenium	M	mg/kg	1	< 1.0
Zinc	M	mg/kg	5	91.9
<b>Inorganics</b>				
Complex Cyanide	N	mg/kg	1	< 1.0
Elemental Sulphur	M	mg/kg	20	< 20
Free Cyanide	N	mg/kg	1	< 1.0
Hexavalent Chromium	N	mg/kg	0.8	< 0.8
Total Sulphide	N	mg/kg	2	< 2
Total Cyanide	M	mg/kg	1	< 1.0
Acid Soluble Sulphate (SO4)	U	%	0.02	0.02
Water Soluble Boron	N	mg/kg	0.5	< 0.5
<b>Miscellaneous</b>				
pH	M	pH units	0.1	6.1
<b>Phenols</b>				
Total Monohydric Phenols	N	mg/kg	5	< 5
<b>Polyaromatic hydrocarbons</b>				
Naphthalene	M	mg/kg	0.1	< 0.1
Acenaphthylene	M	mg/kg	0.1	< 0.1
Acenaphthene	M	mg/kg	0.1	< 0.1
Fluorene	M	mg/kg	0.1	< 0.1
Phenanthrene	M	mg/kg	0.1	< 0.1
Anthracene	M	mg/kg	0.1	< 0.1
Fluoranthene	M	mg/kg	0.1	< 0.1
Pyrene	M	mg/kg	0.1	< 0.1
Benzo(a)anthracene	M	mg/kg	0.1	< 0.1
Chrysene	M	mg/kg	0.1	< 0.1
Benzo(b)fluoranthene	M	mg/kg	0.1	< 0.1
Benzo(k)fluoranthene	M	mg/kg	0.1	< 0.1
Benzo(a)pyrene	M	mg/kg	0.1	< 0.1
Indeno(1,2,3-cd)pyrene	M	mg/kg	0.1	< 0.1
Dibenzo(a,h)anthracene	M	mg/kg	0.1	< 0.1
Benzo[g,h,i]perylene	M	mg/kg	0.1	< 0.1
Total PAH(16)	M	mg/kg	0.4	< 0.4

# Results Summary

Report No.: 21-32015, issue number 1

ELAB Reference	226952
Customer Reference	
Sample ID	
Sample Type	SOIL
Sample Location	TP5
Sample Depth (m)	0.60
Sampling Date	04/02/2021

Determinand	Codes	Units	LOD	
<b>BTEX</b>				
Benzene	M	ug/kg	10	< 10.0
Toluene	M	ug/kg	10	< 10.0
Ethylbenzene	M	ug/kg	10	< 10.0
Xylenes	M	ug/kg	10	< 10.0
MTBE	N	ug/kg	10	< 10.0
<b>TPH CWG</b>				
>C5-C6 Aliphatic	N	mg/kg	0.01	< 0.01
>C6-C8 Aliphatic	N	mg/kg	0.01	< 0.01
>C8-C10 Aliphatic	N	mg/kg	1	< 1.0
>C10-C12 Aliphatic	M	mg/kg	1	< 1.0
>C12-C16 Aliphatic	M	mg/kg	1	1.3
>C16-C21 Aliphatic	M	mg/kg	1	< 1.0
>C21-C35 Aliphatic	M	mg/kg	1	12.4
>C35-C40 Aliphatic	M	mg/kg	1	2.6
>C40-C44 Aliphatic	N	mg/kg	1	3.4
Total aliphatic hydrocarbons (>C5 - C44)	N	mg/kg	1	21.3
>C5-C7 Aromatic	N	mg/kg	0.01	< 0.01
>C7-C8 Aromatic	N	mg/kg	0.01	< 0.01
>C8-C10 Aromatic	N	mg/kg	1	< 1.0
>C10-C12 Aromatic	M	mg/kg	1	2.1
>C12-C16 Aromatic	M	mg/kg	1	1.6
>C16-C21 Aromatic	M	mg/kg	1	6.2
>C21-C35 Aromatic	M	mg/kg	1	50.1
>C35-C40 Aromatic	M	mg/kg	1	14.0
>C40-C44 Aromatic Soil	N	mg/kg	1	7.6
Total aromatic hydrocarbons (>C5 - C44)	N	mg/kg	1	82.5
Total petroleum hydrocarbons (>C5 - C44)	N	mg/kg	1	104



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Tel: +44 (0)1424 718618, Email: info@elab-uk.co.uk, Web: www.elab-uk.co.uk

## Results Summary

Report No.: 21-32015, issue number 1

### Asbestos Results

Analytical result only applies to the sample as submitted by the client. Any comments, opinions or interpretations (marked #) in this report are outside UKAS accreditation (Accreditation No2683). They are subjective comments only which must be verified by the client.

Elab No	Depth (m)	Clients Reference	Description of Sample Matrix #	Asbestos	Gravimetric Analysis Total	Gravimetric Analysis by ACM Type	Free Fibre Analysis	Total Asbestos
226948	0.30	TP1	Brown sandy soil with stones,clinker	No asbestos detected	n/t	n/t	n/t	n/t
226949	0.20	TP2	Brown sandy soil with	No asbestos detected	n/t	n/t	n/t	n/t
226950	0.40	TP3	Brown sandy soil	No asbestos detected	n/t	n/t	n/t	n/t
226951	0.15	TP4	Brown sandy soil with stones,clinker	No asbestos detected	n/t	n/t	n/t	n/t
226952	0.60	TP5	Brown sandy soil	No asbestos detected	n/t	n/t	n/t	n/t

## Method Summary

Report No.: 21-32015, issue number 1

Parameter	Codes	Analysis Undertaken On	Date Tested	Method Number	Technique
<b>Soil</b>					
Free cyanide	N	As submitted sample	10/02/2021		Colorimetry
Sulphide	N	As submitted sample	10/02/2021	109	Colorimetry
Hexavalent chromium	N	As submitted sample	10/02/2021	110	Colorimetry
pH	M	Air dried sample	12/02/2021	113	Electromeric
Acid Soluble Sulphate	U	Air dried sample	11/02/2021	115	Ion Chromatography
Phenols in solids	N	As submitted sample	09/02/2021	121	HPLC
Elemental Sulphur	M	Air dried sample	10/02/2021	122	HPLC
PAH (GC-FID)	M	As submitted sample	10/02/2021	133	GC-FID
Low range Aliphatic hydrocarbons soil	N	As submitted sample	10/02/2021	181	GC-MS
Low range Aromatic hydrocarbons soil	N	As submitted sample	10/02/2021	181	GC-MS
BTEX in solids	M	As submitted sample	10/02/2021	181A	GC-MS
Water soluble boron	N	Air dried sample	10/02/2021	202	Colorimetry
Total cyanide	M	As submitted sample	10/02/2021	204	Colorimetry
TPH CWG soil by gc-gc	M	As submitted sample	10/02/2021	271	
Asbestos identification	U	Air dried sample	12/02/2021	280	Microscopy
Aqua regia extractable metals	M	Air dried sample	10/02/2021	300	ICPMS

Tests marked N are not UKAS accredited



## Report Information

Report No.: 21-32015, issue number 1

### Key

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U	hold UKAS accreditation
M	hold MCERTS and UKAS accreditation
N	do not currently hold UKAS accreditation
^	MCERTS accreditation not applicable for sample matrix
*	UKAS accreditation not applicable for sample matrix
S	Subcontracted to approved laboratory UKAS Accredited for the test
SM	Subcontracted to approved laboratory MCERTS/UKAS Accredited for the test
NS	Subcontracted to approved laboratory. UKAS accreditation is not applicable.
I/S	Insufficient Sample
U/S	Unsuitable sample
n/t	Not tested
<	means "less than"
>	means "greater than"

LOD LOD refers to limit of detection, except in the case of pH soils and pH waters where it means limit of discrimination.  
Soil sample results are expressed on an air dried basis (dried at < 30°C), and are uncorrected for inert material removed.  
ELAB are unable to provide an interpretation or opinion on the content of this report.  
The results relate only to the sample received.  
PCB congener results may include any coeluting PCBs  
Uncertainty of measurement for the determinands tested are available upon request  
Unless otherwise stated, sample information has been provided by the client. This may affect the validity of the results.

### Deviation Codes

- 
- |   |  |
|---|--|
| a | No date of sampling supplied                             |
| b | No time of sampling supplied (Waters Only)               |
| c | Sample not received in appropriate containers            |
| d | Sample not received in cooled condition                  |
| e | The container has been incorrectly filled                |
| f | Sample age exceeds stability time (sampling to receipt)  |
| g | Sample age exceeds stability time (sampling to analysis) |

Where a sample has a deviation code, the applicable test result may be invalid.

### Sample Retention and Disposal

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All soil samples will be retained for a period of one month  
All water samples will be retained for 7 days following the date of the test report  
Charges may apply to extended sample storage

## **APPENDIX O**





Unit A2  
Windmill Road  
Ponswood Industrial Estate  
St Leonards on Sea  
East Sussex  
TN38 9BY  
Telephone: (01424) 718618

[cs@elab-uk.co.uk](mailto:cs@elab-uk.co.uk)  
[info@elab-uk.co.uk](mailto:info@elab-uk.co.uk)

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## THE ENVIRONMENTAL LABORATORY LTD

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**Analytical Report Number:** 21-32016

**Issue:** 1

**Date of Issue:** 15/02/2021

**Contact:** Nicki Spilman

**Customer Details:** Spilman Associates Ltd  
38 South Avenue  
Stourbridge  
West MidlandsDY9 3XY

**Quotation No:** Q19-01596

**Order No:** P21004B

**Customer Reference:** P21004B

**Date Received:** 08/02/2021

**Date Approved:** 15/02/2021

**Details:** Village Road, Childs Ercall

**Approved by:** 

Mike Varley, Technical Manager

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Any comments, opinions or interpretations expressed herein are outside the scope of UKAS accreditation (Accreditation Number 2683)

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This report may only be reproduced in full

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## Sample Summary

Report No.: 21-32016, issue number 1

Elab No.	Client's Ref.	Date Sampled	Date Scheduled	Description	Deviations
226953	BH1 0.50	04/02/2021	08/02/2021	Loamy sand	
226954	BH1 1.50	04/02/2021	08/02/2021	Sand	
226955	BH2 0.50 - 1.00	04/02/2021	08/02/2021	Loamy sand	
226956	BH2 1.00 - 1.50	04/02/2021	08/02/2021	Loamy sand	
226957	BH2 1.70 - 2.00	04/02/2021	08/02/2021	Sand	
226958	BH2 2.00 - 2.50	04/02/2021	08/02/2021	Sand	
226959	BH2 2.50 - 3.00	04/02/2021	08/02/2021	Sand	



2683



# Results Summary

Report No.: 21-32016, issue number 1

ELAB Reference	226953	226954	226955	226956	226957
Customer Reference					
Sample ID					
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL
Sample Location	BH1	BH1	BH2	BH2	BH2
Sample Depth (m)	0.50	1.50	0.50 - 1.00	1.00 - 1.50	1.70 - 2.00
Sampling Date	04/02/2021	04/02/2021	04/02/2021	04/02/2021	04/02/2021

Determinand	Codes	Units	LOD					
<b>BTEX</b>								
Benzene	M	ug/kg	10	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0
Toluene	M	ug/kg	10	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0
Ethylbenzene	M	ug/kg	10	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0
Xylenes	M	ug/kg	10	< 10.0	< 10.0	< 10.0	16.1	< 10.0
MTBE	N	ug/kg	10	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0
<b>TPH CWG</b>								
>C5-C6 Aliphatic	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01	0.02	< 0.01
>C6-C8 Aliphatic	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01	0.06	< 0.01
>C8-C10 Aliphatic	N	mg/kg	1	< 1.0	5.3	< 1.0	7.4	< 1.0
>C10-C12 Aliphatic	M	mg/kg	1	< 1.0	16.3	< 1.0	24.1	< 1.0
>C12-C16 Aliphatic	M	mg/kg	1	< 1.0	28.3	< 1.0	76.0	2.1
>C16-C21 Aliphatic	M	mg/kg	1	< 1.0	< 1.0	< 1.0	71.5	3.2
>C21-C35 Aliphatic	M	mg/kg	1	7.7	3.2	1.5	17.9	1.6
>C35-C40 Aliphatic	M	mg/kg	1	1.1	< 1.0	< 1.0	< 1.0	< 1.0
>C40-C44 Aliphatic	N	mg/kg	1	2.0	2.1	1.2	1.7	< 1.0
Total aliphatic hydrocarbons (>C5 - C44)	N	mg/kg	1	12.6	56.3	4.3	199	7.7
>C5-C7 Aromatic	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
>C7-C8 Aromatic	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
>C8-C10 Aromatic	N	mg/kg	1	< 1.0	2.6	< 1.0	5.3	< 1.0
>C10-C12 Aromatic	M	mg/kg	1	1.5	7.4	< 1.0	20.6	< 1.0
>C12-C16 Aromatic	M	mg/kg	1	8.3	16.1	5.8	67.7	4.3
>C16-C21 Aromatic	M	mg/kg	1	2.5	1.4	6.5	74.2	1.5
>C21-C35 Aromatic	M	mg/kg	1	37.4	7.7	3.7	14.7	1.4
>C35-C40 Aromatic	M	mg/kg	1	10.2	3.8	1.3	2.4	< 1.0
>C40-C44 Aromatic Soil	N	mg/kg	1	4.9	4.7	2.9	3.9	1.9
Total aromatic hydrocarbons (>C5 - C44)	N	mg/kg	1	65.5	43.6	21.4	189	10.3
Total petroleum hydrocarbons (>C5 - C44)	N	mg/kg	1	78.1	100	25.8	388	18.0



## Results Summary

Report No.: 21-32016, issue number 1

ELAB Reference	226958	226959
Customer Reference		
Sample ID		
Sample Type	SOIL	SOIL
Sample Location	BH2	BH2
Sample Depth (m)	2.00 - 2.50	2.50 - 3.00
Sampling Date	04/02/2021	04/02/2021

Determinand	Codes	Units	LOD		
<b>BTEX</b>					
Benzene	M	ug/kg	10	< 10.0	< 10.0
Toluene	M	ug/kg	10	< 10.0	< 10.0
Ethylbenzene	M	ug/kg	10	< 10.0	< 10.0
Xylenes	M	ug/kg	10	< 10.0	43.1
MTBE	N	ug/kg	10	< 10.0	< 10.0
<b>TPH CWG</b>					
>C5-C6 Aliphatic	N	mg/kg	0.01	< 0.01	< 0.01
>C6-C8 Aliphatic	N	mg/kg	0.01	< 0.01	0.02
>C8-C10 Aliphatic	N	mg/kg	1	4.5	51.4
>C10-C12 Aliphatic	M	mg/kg	1	20.0	127
>C12-C16 Aliphatic	M	mg/kg	1	109	497
>C16-C21 Aliphatic	M	mg/kg	1	133	536
>C21-C35 Aliphatic	M	mg/kg	1	45.9	197
>C35-C40 Aliphatic	M	mg/kg	1	1.4	6.1
>C40-C44 Aliphatic	N	mg/kg	1	1.5	2.2
Total aliphatic hydrocarbons (>C5 - C44)	N	mg/kg	1	315	1420
>C5-C7 Aromatic	N	mg/kg	0.01	< 0.01	< 0.01
>C7-C8 Aromatic	N	mg/kg	0.01	< 0.01	< 0.01
>C8-C10 Aromatic	N	mg/kg	1	2.8	39.1
>C10-C12 Aromatic	M	mg/kg	1	15.1	1.1
>C12-C16 Aromatic	M	mg/kg	1	58.7	219
>C16-C21 Aromatic	M	mg/kg	1	75.9	173
>C21-C35 Aromatic	M	mg/kg	1	28.7	98.2
>C35-C40 Aromatic	M	mg/kg	1	2.5	5.8
>C40-C44 Aromatic Soil	N	mg/kg	1	2.9	3.6
Total aromatic hydrocarbons (>C5 - C44)	N	mg/kg	1	187	539
Total petroleum hydrocarbons (>C5 - C44)	N	mg/kg	1	502	1960

## Method Summary

Report No.: 21-32016, issue number 1

Parameter	Codes	Analysis Undertaken On	Date Tested	Method Number	Technique
<b>Soil</b>					
Low range Aliphatic hydrocarbons soil	N	As submitted sample	10/02/2021	181	GC-MS
Low range Aromatic hydrocarbons soil	N	As submitted sample	10/02/2021	181	GC-MS
BTEX in solids	M	As submitted sample	10/02/2021	181A	GC-MS
TPH CWG soil by gc-gc	M	As submitted sample	10/02/2021	271	

Tests marked N are not UKAS accredited



## Report Information

Report No.: 21-32016, issue number 1

### Key

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U	hold UKAS accreditation
M	hold MCERTS and UKAS accreditation
N	do not currently hold UKAS accreditation
^	MCERTS accreditation not applicable for sample matrix
*	UKAS accreditation not applicable for sample matrix
S	Subcontracted to approved laboratory UKAS Accredited for the test
SM	Subcontracted to approved laboratory MCERTS/UKAS Accredited for the test
NS	Subcontracted to approved laboratory. UKAS accreditation is not applicable.
I/S	Insufficient Sample
U/S	Unsuitable sample
n/t	Not tested
<	means "less than"
>	means "greater than"

LOD LOD refers to limit of detection, except in the case of pH soils and pH waters where it means limit of discrimination.  
Soil sample results are expressed on an air dried basis (dried at < 30°C), and are uncorrected for inert material removed.  
ELAB are unable to provide an interpretation or opinion on the content of this report.  
The results relate only to the sample received.  
PCB congener results may include any coeluting PCBs  
Uncertainty of measurement for the determinands tested are available upon request  
Unless otherwise stated, sample information has been provided by the client. This may affect the validity of the results.

### Deviation Codes

- 
- |   |  |
|---|--|
| a | No date of sampling supplied                             |
| b | No time of sampling supplied (Waters Only)               |
| c | Sample not received in appropriate containers            |
| d | Sample not received in cooled condition                  |
| e | The container has been incorrectly filled                |
| f | Sample age exceeds stability time (sampling to receipt)  |
| g | Sample age exceeds stability time (sampling to analysis) |

Where a sample has a deviation code, the applicable test result may be invalid.

### Sample Retention and Disposal

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All soil samples will be retained for a period of one month  
All water samples will be retained for 7 days following the date of the test report  
Charges may apply to extended sample storage



## **APPENDIX P**



# Final Report

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**Report No.:** 21-06605-1  
**Initial Date of Issue:** 08-Mar-2021  
**Client:** Spilman Associates Ltd  
**Client Address:** 38 South Avenue  
Stourbridge  
DY8 3XY  
**Contact(s):** Harry Spilman  
**Project:** P21004H Village Road, Childs Ercall  
**Quotation No.:** Q21-23068  
**Date Received:** 03-Mar-2021  
**Order No.:**  
**Date Instructed:** 03-Mar-2021  
**No. of Samples:** 6  
**Turnaround (Wkdays):** 5  
**Results Due:** 09-Mar-2021  
**Date Approved:** 08-Mar-2021

**Approved By:**

**Details:** Glynn Harvey, Technical Manager

---

## Results - Soil

**Project: P21004H Village Road, Childs Ercall**

Client: Spilman Associates Ltd	Chemtest Job No.:		21-06605	21-06605	21-06605	21-06605	21-06605	21-06605	21-06605	
Quotation No.: Q21-23068	Chemtest Sample ID.:		1152808	1152809	1152810	1152811	1152812	1152813	1152813	
	Sample Location:		BH101	BH101	BH101	BH101	BH101	BH101	BH101	
	Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	
	Top Depth (m):		4.00	6.00	8.00	10.00	13.00	15.50		
	Date Sampled:		26-Feb-2021	26-Feb-2021	26-Feb-2021	26-Feb-2021	26-Feb-2021	26-Feb-2021	26-Feb-2021	
Determinand	Accred.	SOP	Units	LOD						
Moisture	N	2030	%	0.020	12	12	9.0	9.2	9.0	7.8
Florisil Cleanup	N		-	N/A	Done	Done	Done	Done	Done	Done
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	< 10	< 10	< 10	< 10	< 10	< 10
Benzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methyl Tert-Butyl Ether	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

## Test Methods

SOP	Title	Parameters included	Method summary
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2680	TPH A/A Split	Aliphatics: >C5-C6, >C6-C8,>C8-C10, >C10-C12, >C12-C16, >C16-C21, >C21-C35, >C35- C44Aromatics: >C5-C7, >C7-C8, >C8- C10, >C10-C12, >C12-C16, >C16- C21, >C21- C35, >C35- C44	Dichloromethane extraction / GCxGC FID detection
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.

## **Report Information**

### **Key**

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U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

### **Sample Deviation Codes**

---

A - Date of sampling not supplied

B - Sample age exceeds stability time (sampling to extraction)

C - Sample not received in appropriate containers

D - Broken Container

E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

### **Sample Retention and Disposal**

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All soil samples will be retained for a period of 45 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

[customerservices@chemtest.com](mailto:customerservices@chemtest.com)

## **APPENDIX Q**





Unit A2  
Windmill Road  
Ponswood Industrial Estate  
St Leonards on Sea  
East Sussex  
TN38 9BY  
Telephone: (01424) 718618

[cs@elab-uk.co.uk](mailto:cs@elab-uk.co.uk)  
[info@elab-uk.co.uk](mailto:info@elab-uk.co.uk)

---

## THE ENVIRONMENTAL LABORATORY LTD

---

**Analytical Report Number:** 21-32017

**Issue:** 1

**Date of Issue:** 15/02/2021

**Contact:** Nicki Spilman

**Customer Details:** Spilman Associates Ltd  
38 South Avenue  
Stourbridge  
West MidlandsDY9 3XY

**Quotation No:** Q19-01596


**Order No:** P21004C

**Customer Reference:** P21004C

**Date Received:** 09/02/2021

**Date Approved:** 15/02/2021

**Details:** Village Road, Childs Ercall

**Approved by:** 

Mike Varley, Technical Manager

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Any comments, opinions or interpretations expressed herein are outside the scope of UKAS accreditation (Accreditation Number 2683)

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## Sample Summary

Report No.: 21-32017, issue number 1

Elab No.	Client's Ref.	Date Sampled	Date Scheduled	Description	Deviations
226960	T1 2.00	04/02/2021	09/02/2021	Loamy sand	
226961	T2 2.00	04/02/2021	09/02/2021	Loamy sand	
226962	T3 2.00	04/02/2021	09/02/2021	Loamy sand	



# Results Summary

Report No.: 21-32017, issue number 1

ELAB Reference	226960	226961	226962
Customer Reference			
Sample ID			
Sample Type	SOIL	SOIL	SOIL
Sample Location	T1	T2	T3
Sample Depth (m)	2.00	2.00	2.00
Sampling Date	04/02/2021	04/02/2021	04/02/2021

Determinand	Codes	Units	LOD			
<b>BTEX</b>						
Benzene	M	ug/kg	10	< 10.0	< 10.0	< 10.0
Toluene	M	ug/kg	10	< 10.0	< 10.0	< 10.0
Ethylbenzene	M	ug/kg	10	< 10.0	< 10.0	< 10.0
Xylenes	M	ug/kg	10	< 10.0	30.5	10.4
MTBE	N	ug/kg	10	< 10.0	< 10.0	< 10.0
<b>TPH CWG</b>						
>C5-C6 Aliphatic	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01
>C6-C8 Aliphatic	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01
>C8-C10 Aliphatic	N	mg/kg	1	< 1.0	1.5	3.6
>C10-C12 Aliphatic	M	mg/kg	1	2.1	6.8	16.1
>C12-C16 Aliphatic	M	mg/kg	1	9.3	26.4	59.6
>C16-C21 Aliphatic	M	mg/kg	1	9.6	28.1	64.0
>C21-C35 Aliphatic	M	mg/kg	1	2.9	8.9	13.5
>C35-C40 Aliphatic	M	mg/kg	1	< 1.0	1.2	< 1.0
>C40-C44 Aliphatic	N	mg/kg	1	< 1.0	< 1.0	< 1.0
Total aliphatic hydrocarbons (>C5 - C44)	N	mg/kg	1	25.3	73.6	157
>C5-C7 Aromatic	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01
>C7-C8 Aromatic	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01
>C8-C10 Aromatic	N	mg/kg	1	< 1.0	1.1	2.3
>C10-C12 Aromatic	M	mg/kg	1	1.9	5.8	12.5
>C12-C16 Aromatic	M	mg/kg	1	9.3	28.3	48.4
>C16-C21 Aromatic	M	mg/kg	1	4.9	20.4	47.4
>C21-C35 Aromatic	M	mg/kg	1	4.9	22.2	13.4
>C35-C40 Aromatic	M	mg/kg	1	< 1.0	8.1	< 1.0
>C40-C44 Aromatic Soil	N	mg/kg	1	2.5	1.2	1.1
Total aromatic hydrocarbons (>C5 - C44)	N	mg/kg	1	24.8	87.1	126
Total petroleum hydrocarbons (>C5 - C44)	N	mg/kg	1	50.1	161	283

## Method Summary

Report No.: 21-32017, issue number 1

Parameter	Codes	Analysis Undertaken On	Date Tested	Method Number	Technique
<b>Soil</b>					
Low range Aliphatic hydrocarbons soil	N	As submitted sample	11/02/2021	181	GC-MS
Low range Aromatic hydrocarbons soil	N	As submitted sample	11/02/2021	181	GC-MS
BTEX in solids	M	As submitted sample	11/02/2021	181A	GC-MS
TPH CWG soil by gc-gc	M	As submitted sample	10/02/2021	271	

Tests marked N are not UKAS accredited



2683



## Report Information

Report No.: 21-32017, issue number 1

### Key

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U	hold UKAS accreditation
M	hold MCERTS and UKAS accreditation
N	do not currently hold UKAS accreditation
^	MCERTS accreditation not applicable for sample matrix
*	UKAS accreditation not applicable for sample matrix
S	Subcontracted to approved laboratory UKAS Accredited for the test
SM	Subcontracted to approved laboratory MCERTS/UKAS Accredited for the test
NS	Subcontracted to approved laboratory. UKAS accreditation is not applicable.
I/S	Insufficient Sample
U/S	Unsuitable sample
n/t	Not tested
<	means "less than"
>	means "greater than"

LOD LOD refers to limit of detection, except in the case of pH soils and pH waters where it means limit of discrimination.  
Soil sample results are expressed on an air dried basis (dried at < 30°C), and are uncorrected for inert material removed.  
ELAB are unable to provide an interpretation or opinion on the content of this report.  
The results relate only to the sample received.  
PCB congener results may include any coeluting PCBs  
Uncertainty of measurement for the determinands tested are available upon request  
Unless otherwise stated, sample information has been provided by the client. This may affect the validity of the results.

### Deviation Codes

- 
- |   |  |
|---|--|
| a | No date of sampling supplied                             |
| b | No time of sampling supplied (Waters Only)               |
| c | Sample not received in appropriate containers            |
| d | Sample not received in cooled condition                  |
| e | The container has been incorrectly filled                |
| f | Sample age exceeds stability time (sampling to receipt)  |
| g | Sample age exceeds stability time (sampling to analysis) |

Where a sample has a deviation code, the applicable test result may be invalid.

### Sample Retention and Disposal

---

All soil samples will be retained for a period of one month  
All water samples will be retained for 7 days following the date of the test report  
Charges may apply to extended sample storage

## **APPENDIX R**



Unit A2  
Windmill Road  
Ponswood Industrial Estate  
St Leonards on Sea  
East Sussex  
TN38 9BY  
Telephone: (01424) 718618

[cs@elab-uk.co.uk](mailto:cs@elab-uk.co.uk)  
[info@elab-uk.co.uk](mailto:info@elab-uk.co.uk)

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**THE ENVIRONMENTAL LABORATORY LTD**

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**Analytical Report Number:** 21-32083

**Issue:** 1

**Date of Issue:** 16/02/2021

**Contact:** Nicki Spilman

**Customer Details:** Spilman Associates Ltd  
38 South Avenue  
Stourbridge  
West MidlandsDY9 3XY

**Quotation No:** Q19-01596


**Order No:** P21004E

**Customer Reference:** P21004E

**Date Received:** 11/02/2021

**Date Approved:** 16/02/2021

**Details:** Village Road, Childs Ercall

**Approved by:** 

Mike Varley, Technical Manager

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## Sample Summary

Report No.: 21-32083, issue number 1

Elab No.	Client's Ref.	Date Sampled	Date Scheduled	Description	Deviations
227278	BH1 3.22	10/02/2021	11/02/2021		
227279	BH2 2.06	10/02/2021	11/02/2021		



## Results Summary

Report No.: 21-32083, issue number 1

ELAB Reference	227278	227279
Customer Reference		
Sample ID		
Sample Type	WATER	WATER
Sample Location	BH1	BH2
Sample Depth (m)	3.22	2.06
Sampling Date	10/02/2021	10/02/2021

Determinand	Codes	Units	LOD		
<b>BTEX</b>					
Benzene	N	ug/l	1	< 1.00	13.0
Toluene	N	ug/l	1	< 1.00	1.08
Ethylbenzene	N	ug/l	1	< 1.00	< 1.00
Xylenes	N	ug/l	1	< 1.00	2.76
MTBE	N	ug/l	1	< 1.00	< 1.00
<b>TPH CWG</b>					
>C5-C6 Aliphatic	N	ug/l	1	< 1.0	< 1.0
>C6-C8 Aliphatic	N	ug/l	1	< 1.0	< 1.0
>C8-C10 Aliphatic	N	ug/l	5	< 5.0	< 5.0
>C10-C12 Aliphatic	N	ug/l	5	8.7	14.5
>C12-C16 Aliphatic	N	ug/l	5	15.1	78.3
>C16-C21 Aliphatic	N	ug/l	5	8.7	87.2
>C21-C35 Aliphatic	N	ug/l	5	573	30.2
>C35-C40 Aliphatic	N	ug/l	5	88.4	< 5.0
Total (>C5-C40) Aliphatic	N	ug/l	5	694	210
>C5-C7 Aromatic	N	ug/l	1	< 1.0	13.0
>C7-C8 Aromatic	N	ug/l	1	< 1.0	1.1
>C8-C10 Aromatic	N	ug/l	5	< 5.0	6.3
>C10-C12 Aromatic	N	ug/l	5	< 5.0	121
>C12-C16 Aromatic	N	ug/l	5	7.2	174
>C16-C21 Aromatic	N	ug/l	5	11.5	125
>C21-C35 Aromatic	N	ug/l	5	365	58.5
>C35-C40 Aromatic	N	ug/l	5	48.9	< 5.0
Total (>C5-C40) Aromatic	N	ug/l	5	433	499
Total (>C5-C40) Ali/Aro	N	ug/l	5	1130	710



## Method Summary

Report No.: 21-32083, issue number 1

Parameter	Codes	Analysis Undertaken On	Date Tested	Method Number	Technique
<b>Water</b>					
Aliphatic/Aromatic hydrocarbons in water	N		16/02/2021		GC-FID
Aromatic hydrocarbons in water	N		16/02/2021		GC-FID
BTEX in waters	N		15/02/2021	200	GC-MS
Low range Aliphatic hydrocarbons water	N		15/02/2021	200	GC-MS
Low range Aromatic hydrocarbons water	N		15/02/2021	200	GC-MS
Aliphatic hydrocarbons in water	N		15/02/2021	215	GC-FID
Aromatic hydrocarbons in water	N		15/02/2021	215	GC-FID

Tests marked N are not UKAS accredited



## Report Information

Report No.: 21-32083, issue number 1

### Key

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U	hold UKAS accreditation
M	hold MCERTS and UKAS accreditation
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SM	Subcontracted to approved laboratory MCERTS/UKAS Accredited for the test
NS	Subcontracted to approved laboratory. UKAS accreditation is not applicable.
I/S	Insufficient Sample
U/S	Unsuitable sample
n/t	Not tested
<	means "less than"
>	means "greater than"
LOD	<p>LOD refers to limit of detection, except in the case of pH soils and pH waters where it means limit of discrimination.</p> <p>Soil sample results are expressed on an air dried basis (dried at &lt; 30°C), and are uncorrected for inert material removed.</p> <p>ELAB are unable to provide an interpretation or opinion on the content of this report. The results relate only to the sample received.</p> <p>PCB congener results may include any coeluting PCBs</p> <p>Uncertainty of measurement for the determinands tested are available upon request</p> <p>Unless otherwise stated, sample information has been provided by the client. This may affect the validity of the results.</p>

### Deviation Codes

---

- a No date of sampling supplied
- b No time of sampling supplied (Waters Only)
- c Sample not received in appropriate containers
- d Sample not received in cooled condition
- e The container has been incorrectly filled
- f Sample age exceeds stability time (sampling to receipt)
- g Sample age exceeds stability time (sampling to analysis)

Where a sample has a deviation code, the applicable test result may be invalid.

### Sample Retention and Disposal

---

All soil samples will be retained for a period of one month  
All water samples will be retained for 7 days following the date of the test report  
Charges may apply to extended sample storage

## **APPENDIX S**



Unit A2  
Windmill Road  
Ponswood Industrial Estate  
St Leonards on Sea  
East Sussex  
TN38 9BY  
Telephone: (01424) 718618

[cs@elab-uk.co.uk](mailto:cs@elab-uk.co.uk)  
[info@elab-uk.co.uk](mailto:info@elab-uk.co.uk)

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**THE ENVIRONMENTAL LABORATORY LTD**

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**Analytical Report Number:** 21-32181

**Issue:** 1

**Date of Issue:** 24/02/2021

**Contact:** Nicki Spilman

**Customer Details:** Spilman Associates Ltd  
38 South Avenue  
Stourbridge  
West MidlandsDY9 3XY

**Quotation No:** Q19-01596

**Order No:** P21004F

**Customer Reference:** P21004F

**Date Received:** 18/02/2021

**Date Approved:** 24/02/2021

**Details:** Village Road, Childs Ercall

**Approved by:** 

Mike Varley, Technical Manager

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## Sample Summary

Report No.: 21-32181, issue number 1

Elab No.	Client's Ref.	Date Sampled	Date Scheduled	Description	Deviations
227882	BH1 3.12	16/02/2021	18/02/2021		
227883	BH2 2.00	16/02/2021	18/02/2021		





## Results Summary

Report No.: 21-32181, issue number 1

ELAB Reference	227882	227883
Customer Reference		
Sample ID		
Sample Type	WATER	WATER
Sample Location	BH1	BH2
Sample Depth (m)	3.12	2.00
Sampling Date	16/02/2021	16/02/2021

Determinand	Codes	Units	LOD		
<b>BTEX</b>					
Benzene	N	ug/l	1	< 1.00	11.0
Toluene	N	ug/l	1	< 1.00	< 1.00
Ethylbenzene	N	ug/l	1	< 1.00	< 1.00
Xylenes	N	ug/l	1	< 1.00	< 1.00
MTBE	N	ug/l	1	< 1.00	< 1.00
<b>TPH CWG</b>					
>C5-C6 Aliphatic	N	ug/l	1	< 1.0	< 1.0
>C6-C8 Aliphatic	N	ug/l	1	< 1.0	< 1.0
>C8-C10 Aliphatic	N	ug/l	5	< 5.0	< 5.0
>C10-C12 Aliphatic	N	ug/l	5	< 5.0	16.0
>C12-C16 Aliphatic	N	ug/l	5	6.3	51.0
>C16-C21 Aliphatic	N	ug/l	5	< 5.0	53.5
>C21-C35 Aliphatic	N	ug/l	5	15.8	14.6
>C35-C40 Aliphatic	N	ug/l	5	< 5.0	< 5.0
Total (>C5-C40) Aliphatic	N	ug/l	5	22.1	135
>C5-C7 Aromatic	N	ug/l	1	< 1.0	11.0
>C7-C8 Aromatic	N	ug/l	1	< 1.0	< 1.0
>C8-C10 Aromatic	N	ug/l	5	< 5.0	7.6
>C10-C12 Aromatic	N	ug/l	5	< 5.0	160
>C12-C16 Aromatic	N	ug/l	5	< 5.0	159
>C16-C21 Aromatic	N	ug/l	5	< 5.0	69.6
>C21-C35 Aromatic	N	ug/l	5	< 5.0	< 5.0
>C35-C40 Aromatic	N	ug/l	5	< 5.0	< 5.0
Total (>C5-C40) Aromatic	N	ug/l	5	< 5.0	407
Total (>C5-C40) Ali/Aro	N	ug/l	5	22.1	542



## Method Summary

Report No.: 21-32181, issue number 1

Parameter	Codes	Analysis Undertaken On	Date Tested	Method Number	Technique
<b>Water</b>					
Aliphatic/Aromatic hydrocarbons in water	N		24/02/2021		GC-FID
Aromatic hydrocarbons in water	N		24/02/2021		GC-FID
BTEX in waters	N		22/02/2021	200	GC-MS
Low range Aliphatic hydrocarbons water	N		22/02/2021	200	GC-MS
Low range Aromatic hydrocarbons water	N		22/02/2021	200	GC-MS
Aliphatic hydrocarbons in water	N		22/02/2021	215	GC-FID
Aromatic hydrocarbons in water	N		22/02/2021	215	GC-FID

Tests marked N are not UKAS accredited



## Report Information

Report No.: 21-32181, issue number 1

### Key

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U	hold UKAS accreditation
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SM	Subcontracted to approved laboratory MCERTS/UKAS Accredited for the test
NS	Subcontracted to approved laboratory. UKAS accreditation is not applicable.
I/S	Insufficient Sample
U/S	Unsuitable sample
n/t	Not tested
<	means "less than"
>	means "greater than"

LOD LOD refers to limit of detection, except in the case of pH soils and pH waters where it means limit of discrimination.  
Soil sample results are expressed on an air dried basis (dried at < 30°C), and are uncorrected for inert material removed.  
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The results relate only to the sample received.  
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Uncertainty of measurement for the determinands tested are available upon request  
Unless otherwise stated, sample information has been provided by the client. This may affect the validity of the results.

### Deviation Codes

---

- a No date of sampling supplied
- b No time of sampling supplied (Waters Only)
- c Sample not received in appropriate containers
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- f Sample age exceeds stability time (sampling to receipt)
- g Sample age exceeds stability time (sampling to analysis)

Where a sample has a deviation code, the applicable test result may be invalid.

### Sample Retention and Disposal

---

All soil samples will be retained for a period of one month  
All water samples will be retained for 7 days following the date of the test report  
Charges may apply to extended sample storage

## **APPENDIX S**



Unit A2  
Windmill Road  
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[info@elab-uk.co.uk](mailto:info@elab-uk.co.uk)

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**THE ENVIRONMENTAL LABORATORY LTD**

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**Analytical Report Number:** 21-32464  
**Issue:** 1  
**Date of Issue:** 10/03/2021  
**Contact:** Nicki Spilman  
**Customer Details:** Spilman Associates Ltd  
38 South Avenue  
Stourbridge  
West MidlandsDY9 3XY  
**Quotation No:** Q19-01596  
**Order No:** P21004I  
**Customer Reference:** P21004I  
**Date Received:** 04/03/2021  
**Date Approved:** 10/03/2021  
**Details:** Village Road, Childs Ercall  
**Approved by:** 

Mike Varley, Technical Manager

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## Sample Summary

Report No.: 21-32464, issue number 1

Elab No.	Client's Ref.	Date Sampled	Date Scheduled	Description	Deviations
229335	BH2 1.99	02/03/2021	04/03/2021		
229336	BH4 1.07	02/03/2021	04/03/2021		
229337	BH5 1.45	02/03/2021	04/03/2021		
229338	BH6 0.55	02/03/2021	04/03/2021		
229339	BH7 1.52	02/03/2021	04/03/2021		
229340	BH101 3.29	02/03/2021	04/03/2021		
229341	BH101 10.50	02/03/2021	04/03/2021		



## Results Summary

Report No.: 21-32464, issue number 1

				229335	229336	229337	229338	229339	229340	229341
ELAB Reference				229335	229336	229337	229338	229339	229340	229341
Customer Reference										
Sample ID										
Sample Type				WATER	WATER	WATER	WATER	WATER	WATER	WATER
Sample Location				BH2	BH4	BH5	BH6	BH7	BH101	BH101
Sample Depth (m)				1.99	1.07	1.45	0.55	1.52	3.29	10.50
Sampling Date				02/03/2021	02/03/2021	02/03/2021	02/03/2021	02/03/2021	02/03/2021	02/03/2021
Determinand	Codes	Units	LOD							
<b>BTEX</b>										
Benzene	N	ug/l	1	1.77	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Toluene	N	ug/l	1	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Ethylbenzene	N	ug/l	1	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Xylenes	N	ug/l	1	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	1.24	< 1.00
MTBE	N	ug/l	1	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
<b>TPH CWG</b>										
>C5-C6 Aliphatic	N	ug/l	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
>C6-C8 Aliphatic	N	ug/l	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
>C8-C10 Aliphatic	N	ug/l	5	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
>C10-C12 Aliphatic	N	ug/l	5	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
>C12-C16 Aliphatic	N	ug/l	5	< 5.0	< 5.0	159	< 5.0	< 5.0	< 5.0	< 5.0
>C16-C21 Aliphatic	N	ug/l	5	< 5.0	< 5.0	150	< 5.0	< 5.0	< 5.0	< 5.0
>C21-C35 Aliphatic	N	ug/l	5	< 5.0	< 5.0	34.8	< 5.0	< 5.0	< 5.0	< 5.0
>C35-C40 Aliphatic	N	ug/l	5	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Total (>C5-C40) Aliphatic	N	ug/l	5	< 5.0	< 5.0	344	< 5.0	< 5.0	< 5.0	< 5.0
>C5-C7 Aromatic	N	ug/l	1	1.8	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
>C7-C8 Aromatic	N	ug/l	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
>C8-C10 Aromatic	N	ug/l	5	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
>C10-C12 Aromatic	N	ug/l	5	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
>C12-C16 Aromatic	N	ug/l	5	14.4	< 5.0	90.9	< 5.0	< 5.0	< 5.0	< 5.0
>C16-C21 Aromatic	N	ug/l	5	9.7	< 5.0	104	< 5.0	< 5.0	< 5.0	< 5.0
>C21-C35 Aromatic	N	ug/l	5	< 5.0	< 5.0	24.2	< 5.0	< 5.0	< 5.0	< 5.0
>C35-C40 Aromatic	N	ug/l	5	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Total (>C5-C40) Aromatic	N	ug/l	5	25.9	< 5.0	219	< 5.0	< 5.0	< 5.0	< 5.0
Total (>C5-C40) Ali/Aro	N	ug/l	5	25.9	< 5.0	563	< 5.0	< 5.0	< 5.0	< 5.0





## Method Summary

Report No.: 21-32464, issue number 1

Parameter	Codes	Analysis Undertaken On	Date Tested	Method Number	Technique
<b>Water</b>					
Aliphatic/Aromatic hydrocarbons in water	N		10/03/2021		GC-FID
Aromatic hydrocarbons in water	N		10/03/2021		GC-FID
BTEX in waters	N		08/03/2021	200	GC-MS
Low range Aliphatic hydrocarbons water	N		08/03/2021	200	GC-MS
Low range Aromatic hydrocarbons water	N		08/03/2021	200	GC-MS
Aliphatic hydrocarbons in water	N		09/03/2021	215	GC-FID
Aromatic hydrocarbons in water	N		09/03/2021	215	GC-FID

Tests marked N are not UKAS accredited



## Report Information

Report No.: 21-32464, issue number 1

### Key

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### Deviation Codes

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### Sample Retention and Disposal

---

All soil samples will be retained for a period of one month  
All water samples will be retained for 7 days following the date of the test report  
Charges may apply to extended sample storage

## **APPENDIX U**



**Sulphate Content (Gravimetric Method) for 2:1 Soil: Water Extract and pH Value - Summary of Results**  
**Tested in accordance with BS1377 : Part 3 : 2018, Clause 7.6 & Clause 12**

Job No. 29502	Project Name Village Road, Childs Erccall	Programme	
		Samples received	09/02/2021
Project No. P21004	Client Spilman Associates Ltd	Schedule received	08/02/2021
		Project started	09/02/2021
		Testing Started	12/02/2021

Hole No.	Sample				Soil description	Dry Mass passing 2mm %	SO4 Content mg/l	pH	Remarks
	Ref	Top m	Base m	Type					
BH1	-	1.50	-	D	Reddish brown slightly gravelly silty very sandy CLAY (gravel is fmc and sub-angular)	88	240	7.08	
BH1	-	3.50	-	D	Reddish brown clayey SAND with rare fm sub-angular gravel	96	190	7.25	
BH3	-	0.30	-	D	Dark grey gravelly clayey SAND (gravel is fm and sub-rounded)	94	240	7.28	
BH3	-	1.50	-	D	Reddish brown clayey gravelly SAND (gravel is fm and sub-angular to sub-rounded)	81	300	7.28	

	<b>Test Report by K4 SOILS LABORATORY</b> Unit 8 Olds Close Olds Approach Watford Herts WD18 9RU Tel: 01923 711 288 Email: James@k4soils.com	<b>Checked and Approved</b> Initials      J.P Date:          15/02/2021
	Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)	MSF-5-R29



## Summary of Natural Moisture Content, Liquid Limit and Plastic Limit Results

Job No. 29502	Project Name Village Road, Childs Ercall	Programme	
		Samples received	09/02/2021
Project No. P21004	Client Spilman Associates Ltd	Schedule received	08/02/2021
		Project started	09/02/2021
		Testing Started	11/02/2021

Hole No.	Sample				Soil Description	NMC %	Passing 425µm %	LL %	PL %	PI %	Remarks
	Ref	Top m	Base m	Type							
T1	-	2.00	-	D	Dark pinkish brown slightly gravelly clayey silty SAND (gravel is fm and sub-rounded to sub-angular)	16	85	24	11	13	

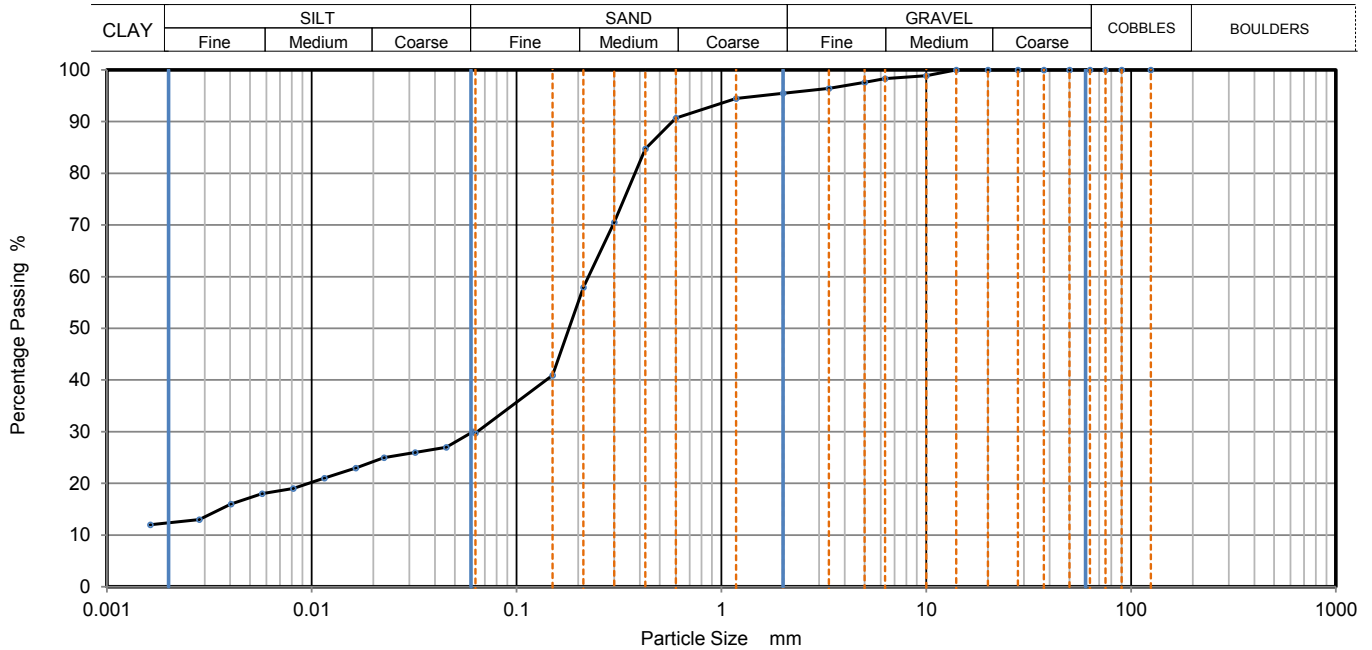
<p><b>Test Methods: BS1377: Part 2: 1990:</b>          Natural Moisture Content : clause 3.2          Atterberg Limits: clause 4.3, 4.4 and 5.0</p>	<p><b>Test Report by K4 SOILS LABORATORY</b>          Unit 8 Olds Close Olds Approach          Watford Herts WD18 9RU</p> <p>Tel: 01923 711 288          Email: James@k4soils.com</p>	<p><b>Checked and Approved</b></p> <p>Initials     J.P</p> <p>Date:        15/02/2021</p>
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## PARTICLE SIZE DISTRIBUTION

Job Ref	29502
Borehole/Pit No.	T1
Sample No.	-
Depth Top	2.00 m
Depth Base	- m
Sample Type	D
Samples received	09/02/2021
Schedules received	08/02/2021
Project started	09/02/2021
Date tested	12/02/2021

Site Name	Village Road, Childs Erccall		
Project No.	P21004	Client	Spilman Associates Ltd
Soil Description	Dark pinkish brown slightly gravelly clayey silty SAND (gravel is fm and sub-rounded to sub-angular)		
Test Method	BS1377:Part 2: 1990, clause 9.0		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0613	30
90	100	0.0453	27
75	100	0.0320	26
63	100	0.0225	25
50	100	0.0164	23
37.5	100	0.0115	21
28	100	0.0081	19
20	100	0.0057	18
14	100	0.0040	16
10	99	0.0028	13
6.3	98	0.0016	12
5	98		
3.35	96		
2	96		
1.18	95		
0.6	91		
0.425	85	Particle density (assumed)	
0.3	71	2.70	Mg/m3
0.212	58		
0.15	41		
0.063	30		

Sample Proportions	% dry mass
Very coarse	0.0
Gravel	4.5
Sand	65.8
Silt	17.4
Clay	12.3

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	
Curvature Coefficient	

Remarks  
Preparation and testing in accordance with BS1377 unless noted below



**K4 Soils Laboratory**  
 Unit 8, Olds Close, Watford, Herts, WD18 9RU  
 Email: james@k4soils.com  
 Tel: 01923 711288

**Checked and Approved**

Initials: J.P  
 Date: 15/02/2021

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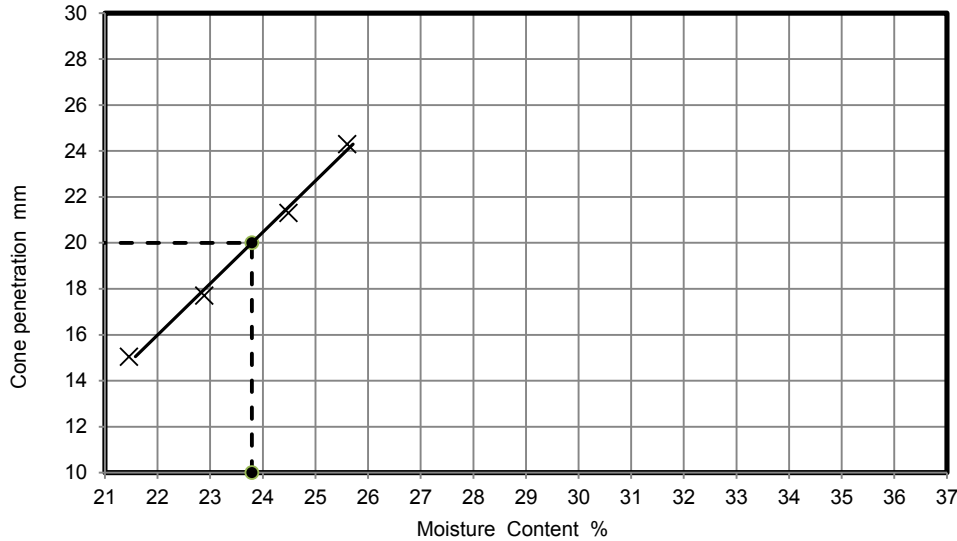
Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

MSF-5-R3



## LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX

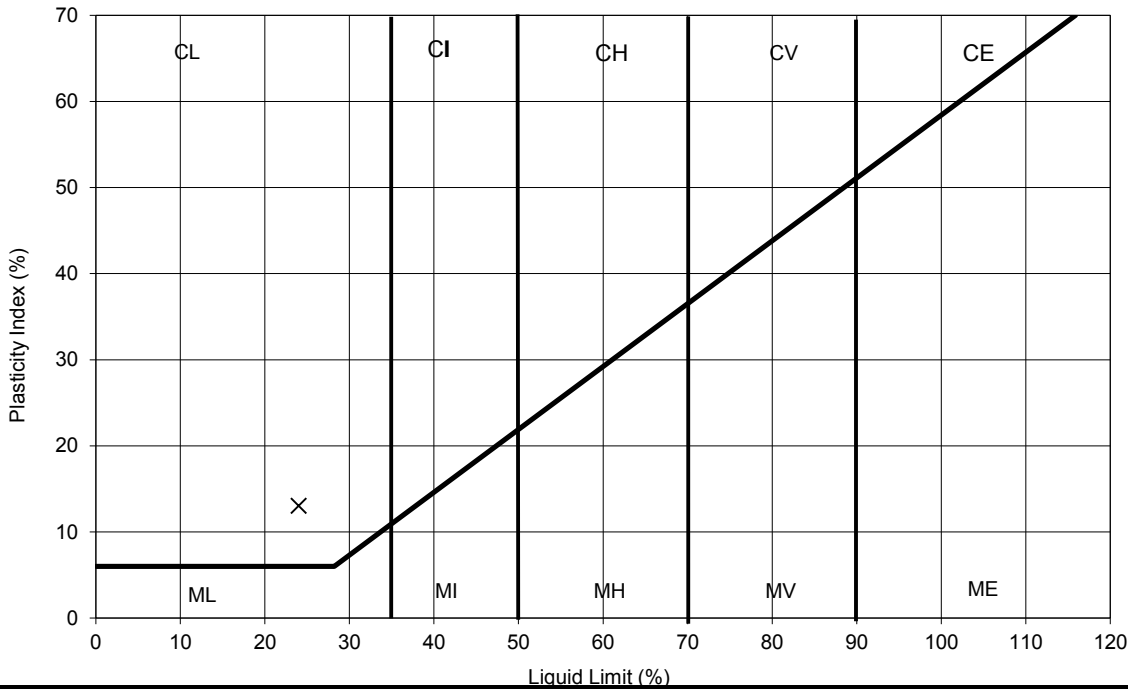
		Job No.		29502	
		Borehole/Pit No.		T1	
Site Name		Village Road, Childs Ercall			
Project No.		P21004	Client	Spilman Associates Ltd	
Soil Description		Dark pinkish brown slightly gravelly clayey silty SAND (gravel is fm and sub-rounded to sub-angular)			
		Depth Top		2.00 m	
		Depth Base		- m	
		Sample Type		D	
		Samples received		09/02/2021	
		Schedules received		08/02/2021	
Project Started		09/02/2021			
Date Tested		11/02/2021			



NATURAL MOISTURE CONTENT	16	%
% PASSING 425µm SIEVE	85	%
LIQUID LIMIT	24	%
PLASTIC LIMIT	11	%
PLASTICITY INDEX	13	%

**Remarks**

### PLASTICITY INDEX



**TEST METHOD**

BS1377: Part 2 :Clause 4.3 : 1990 Determination of the liquid limit by the cone penetrometer method  
 BS1377: Part 2 :Clause 5.0 : 1990: Determination of the plastic limit and plasticity index  
 BS1377: Part 2 :Clause 3.2 : 1990:Determination of the moisture content by the oven drying method  
 Test Report by K4 SOILS LABORATORY Unit 8 Olds Close Olds Approach Watford Herts WD18 9RU  
 Tel: 01923 711 288 Email: James@k4soils.com

**Checked and Approved**

Initials: J.P  
 Date: 15/02/2021

