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SPECIFICATION
FOR
REMEDIALATION WORKS
AT
HOUGH LANE,
WOMBWELL
ON BEHALF OF
BEN BAILEY HOMES LIMITED



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1.0 INTRODUCTION

- 1.1 This document has been prepared on behalf of our Client Ben Bailey Homes Limited for the proposed redevelopment works on a site at Hough Lane, Wombwell as shown on our site location plan 232095/01 and no liability is accepted for its contents in whole or part to any third party.
- 1.2 This Specification is based primarily on the findings of ground investigations carried out by Joynes Pike & Associates Limited and detailed in our Consolidated Geo-Environmental Assessment Report Ref: DRS/RMB/232095.20051540 and Johnson Poole and Bloomer, a copy of which is enclosed as Appendix B.
- 1.3 The site had two major previous uses, those being a foundry and a landfill used for disposal of the foundry by-products. The site is proposed to be redeveloped with residential housing comprising two to three-storey houses and flats of conventional construction with timber first floors.
- 1.4 The site reclamation and redevelopment works are to be carried out and organised by a suitably experienced Contractor and the Contractor (appointed by the Developer) is required to undertake the works detailed in this Specification. It is anticipated that Joynes Pike & Associates Limited will be appointed as the Supervising Engineer.
- 1.5 This Specification has been prepared for the purposes of remediation of contamination at Hough Lane, Wombwell site as well as advising on the geotechnical issues on site. Acceptance criteria have been specified for validation testing and the quality of any imported soils brought to the site. The works will include;
- Removal and validation of the substation present on site (after suitable decommissioning).
 - Pumping dry of the oil interceptor and validation of the surrounding area after the underground tank has been removed.
 - Grubbing up and breaking out all hardstanding, floor slabs, foundations, machine bases and deep pits in the former foundry areas. The breaking out of foundations, machine bases and pits should be to 2.0m below the proposed capillary break with levels being re-instated in accordance with the Highways Agency Specification for Highway Works, Series 600 – Earthworks, dated May 2001.
 - Provision of gas protection measures within foundation design of properties;
 - Provision of capping within garden areas; and the validation of various stages of the works.

- 1.6 This Specification should be submitted to Barnsley Metropolitan Borough Council and the NHBC for approval prior to any irrevocable actions and prior to adopting the Specification on site.

2.0 THE SITE

2.1 Location and Access

2.1.1 The site is approximately 6.5 hectares in area and is located off Hough Lane, south west of Wombwell town centre at National Grid Reference SE 3898 0237 as shown on the site location plan, drawing no. 232095/01.

2.1.2 Access to the site is gained via the main gates off Hough Lane. A further two access points are present on Hough Lane and one locked access gate is present at the roundabout on the A9195 Dearne Valley Parkway.

2.2 Site Description

2.2.1 The site is bound to the north by Hough Lane beyond which is an existing Ben Bailey Homes Limited development and a community centre. To the east the site is partially bound by existing industrial premises and open fields. To the south of the site are open fields and to the west is an operational railway.

2.2.2 The site generally slopes away from Hough Lane to the south west and the site is currently terraced from the northern boundary to the southern boundary.

2.2.3 There is one remaining building on the site associated with the electric sub-station. Hardstanding is present at the surface across approximately half of the site associated with the former foundry.

2.2.4 The locations of live services on the site are known and the electric supply is currently live on the northern half of the site.

2.2.5 Numerous mature/semi-mature trees are situated on and around the site as shown on our site plan drawing 232095/03.

2.2.6 A retaining wall is present on the far north eastern boundary.

2.3 Site History

2.3.1 The historical maps for the area have been reviewed and the pertinent points are summarised in the table below. It is not the intention to give a detailed history of the site and its surroundings, as this has been supplied within our previous report for the site.

Feature	Location	Maps
Wooded areas and open fields	On site	1851-1929
Well	On site	1892
Railway	West of site	1901
Foundry	On site	1929 - 2000
Infilling to south of site	On Site	1961 - 2000
Small Industrial Unit	On site	2000 - Present

2.3.2 In summary the northern half of the site has previously been used as a foundry. Part of the southern area has previously been used as a licensed landfill for the foundry.

2.3.3 The Envirocheck report showed the landfill to be present on part of the southern are of the site.

2.4 Geology, Hydrogeology and Hydrology

2.4.1 We have inspected the 1:50,000 Geological Survey Sheet 87 'Barnsley' together with the Geological Survey memoir.

2.4.2 The 1:50,000 scale Geological Maps show the solid geology underlying the site to be Middle Coal Measures comprising mudstones, siltstones and sandstones. The northern eastern half of the site is shown to be over the Woolley Edge Rock with another mudstone unit separating this from an unnamed sandstone unit. There is an unnamed coal seam believed to cross the northern section of the site. These strata are overlain by a thickness of weathered materials derived from the underlying bedrock.

2.4.3 According to the Environment Agency Groundwater Vulnerability Map Sheet 11 'South Penines', the site is shown to be underlain by strata which represent a Minor Aquifer overlain with soils of low leaching potential. This means that the soils have good or some ability to attenuate/diffuse source pollutants, which cannot as a result move readily to the underlying groundwater.

2.4.4 The nearest water abstraction licenses are between 501 and 1000m from the site. It is considered highly unlikely that conditions on this site will significantly affect water abstracted at that distance. The status of the

aquifer indicates that is unlikely to be used as a major source of potable water.

2.4.5 There is one partially culverted watercourse which crosses the site in an adit and exits in the southern area, as shown on the utility survey by Tower Surveys.

2.4.6 All of the above is covered in more detail within our Consolidated Geo-Environmental Assessment Report ref: DRS/RMB/232095.20051540.

2.5 Environmental Considerations

2.5.1 A review of the information contained within the supplied Envirocheck report was made in our Consolidated Geo-Environmental Assessment Report. The main points from this report are summarised below (unless the same detail has been covered in the above sections).

- Landfills – There is on know landfill on site and one located between 500 – 1000m from the site boundary. The landfill known to be present on site was observed during the site walkover and subsequently the waste management license associated with this has successfully been handed back to the Environment Agency after a consultation and monitoring period. The landfill was licensed to accept industrial type wastes and difficult types of waste (both from the foundry).
- Discharge consents – There is one discharge consent between 500m and 1000m for the purposes of site drainage.

2.6 Proposed Development

2.6.1 It is understood that the site is to be developed for residential housing comprising two and three-storey houses and flats of conventional construction

2.6.2 The current proposed layout of the development is shown on the enclosed Ben Bailey Homes drawing 2461/01 Rev.B.

2.7 Regulatory Consultation

2.7.1 Our Consolidated Geo-Environmental Assessment Report ref: DRS/RMB/232095.20051540 dated 02nd February has been presented to the NHBC for approval purposes. The response received is contained within Appendix C. Two copies were also issued to Ben Bailey Homes for submission in relation to planning issues and for budgetary purposes.

3.0 CONCEPTUAL SITE MODEL

3.1 Potential Sources of Contamination

3.1.1 The following potential **on site** sources of ground contamination have been identified:

- Previous use as a foundry and associated processes
- Made Ground present on site arising from foundry uses.
- Landfill present on site and importation of materials including asbestos.
- Spillage and leakage of oil/diesel or chemicals from the tanks/drums on site.
- Maintenance of equipment and vehicles on site.
- Substation on site which may give rise to contamination.

3.2 Receptors of Contamination and Migration Pathways

3.2.1 Receptors are defined as human or non-human organisms that have the potential to experience adverse effects from direct or indirect exposure to contaminated media. Migration pathways are defined as the course a chemical takes from a source to an exposed organism or receptor. The exposure pathway can be direct (i.e. stays within the same exposure media) or indirect transport, from one media to another.

3.2.2 The following potential human and environmental receptors have been identified on the site for the redevelopment of domestic houses and gardens.

- Future end users (residents);
- Plants and vegetables grown in garden areas;
- Occupants of neighbouring residential properties;
- Site construction and maintenance workers;
- Building materials.

3.2.3 The following potential migration pathways have been identified on the site:-

- **Inhalation-**

Human health can potentially be at risk from breathing dust and vapours from contaminated soil in the outdoor air. Vapours from contaminated soil and groundwater can also migrate into buildings and be inhaled by occupants;

- **Ingestion-**

Human health can be potentially at risk from eating and swallowing contaminated soil and groundwater. Ingestion can also occur by deliberately eating contaminated soil or indirectly by eating and smoking with dirty hands etc., or by ingestion of fugitive dust;

- **Dermal Contact-**
Human health can be potentially at risk from direct skin contact with contaminated soil and groundwater causing skin conditions such as dermatitis etc. Certain contaminants can be absorbed into the body through the skin or enter directly through open cuts and abrasions;
- **Uptake by Plant and vegetables-**
Some contaminants may be toxic to plants (phytotoxic) but not necessarily to human health at the same concentrations. Also plants may uptake contaminants through their roots;
- **Migration of Contaminated Water-**
Depending on the permeability of the ground conditions and any other man made voids or preferential pathways, contaminated groundwater can potentially migrate laterally or vertically affecting the surface and groundwaters;
- **Leaching-**
Infiltration of water through the soil and waste can leach out soluble contaminants resulting in groundwater pollution;
- **Migration of Ground Gas-**
Depending on the permeability of the ground conditions and any other man made voids, ground gases can potentially migrate laterally or vertically where it may enter and accumulate in unprotected buildings;
- **Aggressive Attack-**
Some building materials can be damaged by direct contact with aggressive ground conditions, for example sulphate attack on concrete and hydrocarbon attack on plastics.

3.3 Source-Pathway-Receptor Relationships

3.3.1 For the intended use of the site for domestic housing with gardens, the following potential Source-Pathway-Receptor relationships have been identified:-

SOURCE	PATHWAY	RECEPTORS	RISK
Contaminated Soil	Ingestion, Dermal Contact, Inhalation	Future resident construction workers	Low
Contaminated Soil	Root uptake & Subsequent Ingestion	Plants, vegetables & residents	Medium
Contaminated Soil	Leaching	Groundwater	Low
Contaminated Soil	Aggressive attack	Building materials	Low
Ground Gas (Carbon Dioxide and Radon)	Lateral & vertical migration	Future site users Neighbouring occupants	Medium
Former drums/tanks, machinery maintenance	Leakage	Soil and groundwater	Medium
Contaminated Groundwater/Leachate	Aggressive attack	Building Materials	Low

- 3.3.2 Drawing 232095/04 shows a Preliminary Pre-Development Conceptual Site Model for the site with drawing 232095/05 showing an un-remediated schematic conceptual site model and drawing 232095/06 showing a remediated version.

4.0 RESULTS OF THE INVESTIGATION

4.1 General

- 4.1.1 The ground conditions encountered during the two site investigations by Johnson Poole and Bloomer and Joynes Pike & Associates Limited generally encountered similar ground and this is discussed further in the Consolidated Report enclosed as Appendix B. The ground conditions generally comprised Made Ground and where the natural ground was encountered this consisted of a sandy silty CLAY beneath which was bedrock. The landfill area had evidence of asbestos fragments within the infill.

4.2 Ground Conditions

- 4.2.1 The JPB report indicates a range in thickness of MADE GROUND to be predominantly less than 4.0m beneath the former buildings and greater than 4.0m where the former landfill is. A copy of the report is included within JPA Consolidated report n Appendix B.
- 4.2.2 The ground conditions encountered by JPA beneath the site was predominantly very similar to that previously encountered and reported within the JPB report. The MADE GROUND encountered in the further investigation ranged from 1.2m to 4.0m below existing ground level. The predominant MADE GROUND generally comprised a medium dense foundry sand with ash, clinker and slag gravel. Where the former foundry buildings were located there was a thickness of concrete, reinforced in places. The concrete bases were generally up to 0.3m in thickness with one gable end wall noted to have footings up to 2.0m thick.
- 4.2.3 The natural ground beneath the MADE GROUND was generally a firm, brown, slightly sandy, silty CLAY, beneath which was bedrock comprising Middle Coal Measures.
- 4.2.4 Six rotary open boreholes were drilled to determine the presence or absence of an unnamed coal seam and to assess if workings are present. Coal was encountered in one of the six boreholes drilled to determine the unnamed seam and a further three elsewhere on the site. The other boreholes drilled to determine the unnamed seam encountered a very dark, grey/black MUDSTONE at the same level of the coal. No evidence of workings was encountered (such as voids, broken ground, loss of flush etc.) Due to the findings highlighted in this section it is believed that there will be no risk of settlement due to coal mine workings beneath the site as the coal

seam is of discontinuous and poor quality and grades from a poor quality coal to a black carbonaceous mudstone.

- 4.2.5 There were various pits identified associated with the former foundry on site. These pits were of various sizes and shapes and have been highlighted within the Consolidated Report enclosed in Appendix B.

4.3 Contamination Testing

- 4.3.1 The legislative framework for the regulation of contaminated land is contained in Part IIA of the Environmental Protection Act 1990, which was implemented in the Contaminated Land (England) Regulations 2000. This legislation allows for identification and remediation of land where contamination is causing unacceptable risks to human health or the wider environment. The basis of the UK contaminated land policy is the 'Suitable for Use' approach, which states that land should be suitable for its current use and made suitable for any new use as official permission (through the planning process) is given for that use.
- 4.3.2 Under Part IIA of the Environmental Protection Act 1990, contaminated land is defined as land where significant harm is being caused or there is a significant possibility of such harm being caused or where pollution of controlled waters is being, or is likely to be caused. For significant harm to occur, a significant pollutant linkage must exist i.e. there must be a contamination source, a relevant receptor and a plausible migration pathway, by which the contaminant can cause significant harm to the receptor.
- 4.3.3 As part of the new regulatory framework discussed above, the UK Government published on 14th March 2002, the Contaminated Land Exposure Assessment model (CLEA). This presents new Soil Guideline Values, which are 'generic' guideline values for assessing the risks to human health from chronic exposure to contaminated soils. The Soil Guideline Values represent 'intervention values' above which the levels of soil contamination might represent an unacceptable risk to the health of site-users such that further investigation and/or remediation is required. The Soil Guideline Values are not intended to represent binding standards or statutory objectives.
- 4.3.4 The Soil Guideline Values have only been derived on the basis of a particular land use. Currently there are three types of 'standard' land use for which Soil Guideline Values have been developed, namely residential; allotments; and commercial/industrial. For each standard land use there are a number of different exposure routes which may or may not be active depending on the site-specific scenario and proposed land use. The Soil Guideline Values discussed below represent worst-case exposure scenarios with all exposure routes active for residential with plant uptake.
- 4.3.5 At the time of writing the Consolidated Geo-Environmental Assessment Report, Soil Guideline Values had only been prepared for arsenic,

cadmium, chromium, inorganic mercury, nickel, selenium, lead, ethylbenzene and toluene. The Soil Guideline Values have replaced the withdrawn ICRL trigger concentrations. Where no Soil Guideline Values have been prescribed for certain contaminants, the results have been assessed by comparison to in-house version 5 screening values used by Joynes Pike & Associates Limited. The JPA in-house screening values have been calculated using published toxicological data and the CLEA model and have been approved for use by a number of Local Authority Environmental Health & Contaminated Land Departments.

4.3.6 The results of the analysis were assessed using statistical tests as outlined in CLR 7. Appropriate US_{95} values have been calculated for each of the identified strata types on site with the following being recorded as having concentrations of determinands in excess of the relevant SGV or JPA in-house trigger concentration value (Version 5, Sept 2005) for a proposed end use of residential with gardens. The following main strata types have been identified;

- MADE GROUND – brick rubble (Type A)
- MADE GROUND – foundry sand (Type B)
- MADE GROUND – gravel (Type C)
- Natural CLAY

4.3.7 Brick Rubble Made Ground (Type A)

The results of the four samples of brick rubble made ground indicate that the determinands were either below the published SGV or the Tier 1 in-house screening values (IHSV) with the exception of:

- Arsenic with a US^{95} of 40.42 mg/kg compared to the SGV of 20 mg/kg
- Lead with US^{95} of 499.86 mg/kg compared to the SGV of 450 mg/kg
- Nickel with a US^{95} of 59.51 mg/kg compared to the SGV of 50 mg/kg
- Benzo (a) pyrene with US^{95} of 1.19 mg/kg compared to the IHSV of 1.1 mg/kg
- Benz (b) fluoranthene with US^{95} of 1.19 mg/kg compared to the IHSV of 1.1 mg/kg
- Chrysene with US^{95} of 1.24 mg/kg compared to the IHSV of 1.1 mg/kg

4.3.8 Foundry Sand Made Ground (Type B)

The results of the eleven samples of foundry sand made ground indicate that the determinands were either below the published SGV or the Tier 1 IHSV with the exception of:

- Arsenic with a US^{95} of 35.3 mg/kg compared to the SGV of 20 mg/kg
- Nickel with a US^{95} of 143.37 mg/kg compared to the SGV of 50 mg/kg

- Elevated PAH.

4.3.9 Gravelly Made Ground (Type C)

The results of the eight samples of gravelly made ground indicate that the determinands were either below the published SGV or the Tier 1 IHSV with the exception of:

- Arsenic with a US⁹⁵ of 34.95 mg/kg compared to the SGV of 20 mg/kg
- Nickel with a US⁹⁵ of 74.43 mg/kg compared to the SGV of 50 mg/kg
- Lead with US⁹⁵ of 464.62 mg/kg compared to the SGV of 450 mg/kg
- Chrysene with US⁹⁵ of 1.29 mg/kg compared to the IHSV of 1.1 mg/kg

4.3.10 Natural Clay

The results of the four samples of natural clay indicate that the determinands were below either the published SGV or the Tier 1 IHSV:

- 4.3.11 Hydrocarbons odours that were noted by JPB during the site investigation were tested and showed no significant levels of contamination
- 4.3.12 It should be noted that the classification of soil for waste disposal purposes and any resulting waste acceptance criteria (WAC testing) required under the Landfill Regulations introduced in July 2005 is beyond the scope of this report.

5.0 PROPOSED REMEDIATION WORKS

5.1 Remediation Philosophy

5.1.1 The proposed remediation of soil contamination at the Hough Lane, Wombwell site has been based on the 'Suitable for Use' approach as advocated by Part IIA of the Environmental Protection Act 1990. The basis of the suitable for use approach is that land should be suitable for its current use and made suitable for any new use as official permission is given for that use. In addition, the requirements for remediation of contaminated land should be limited to the work necessary to prevent unacceptable risks to human health and the environment in relation to the current use, or officially permitted future use, of the land.

5.1.2 Under Part IIA of the Environmental Protection Act 1990 Contaminated Land is defined as land where significant harm is being caused or there is a significant possibility of such harm being caused, or where pollution of controlled waters is being, or is likely to be caused. For significant harm to occur, a significant pollutant linkage must exist i.e. there must be a contamination source, a relevant receptor and a plausible migration pathway, by which the contaminant can cause significant harm, to the receptor.

5.2 Recommended Remedial Strategy

5.2.1 Based on the results of the investigation, the Revised Conceptual Site Model and the Risk Assessments, it is recommended that the following remedial works are undertaken in the context of the development proposals.

5.2.2 Suitable decommissioning and removal of the substation present on site. Validation samples should also be taken from beneath this area following removal of the substation. The excavations can be suitably backfilled in an engineered manner with either natural soil arisings from any excavations or processed, crushed and screened demolition materials as outlined below. At this stage it should be assumed that a maximum of approximately 70m³ will require removal and suitable disposal from site.

5.2.3 The oil interceptor observed on site currently has liquid present within it. This should be pumped dry. Following this, the area around the interceptor should be broken out and the plastic vessel removed. Validation samples should be taken and sent for suitable contamination testing. The excavation can be suitably backfilled in an engineered manner with either natural soil arisings from any excavations or processed, crushed and screened demolition materials as outlined below. At this stage it should be assumed that approximately 75m³ will require removal and suitable disposal from this area of the site.

5.2.4 Grubbing up and breaking out in part of hardstanding, floor slabs, foundations, machine bases and deep pits in the former foundry areas of

the site should take place. Where there are no deep pits or foundations and the bases are underlain by uniform moderately dense foundry sand, then this will be proof rolled at depths set by the formation levels or base of the capping in rear gardens. When considering the former pits/deeper foundations, machine bases or variable made ground, these should be excavated, with all sides and bases broken out to 2.0m below the capping layer. Excavation sides should be battered back at a minimum of 1v:1h gradient and locally deepened where there are deeper services. This material as well as stockpiled demolition material should be crushed, screened and reused to produce either a class 6F2 material or where possible a Type 1 material. The excavations should then be re-instated using a class 6F2 material benched into the sides of the excavation in accordance with Highways Agency Specification. There is sufficient laboratory testing to show that this material is acceptable for re-use beneath capping but if any unusual material is encountered it should be stockpiled separately and tested.

- 5.2.5 The material excavated should be replaced in an engineered manner and benched into the sides of the excavation in accordance with the Highways Agency Specification for Highway Works, Series 600 – Earthworks, dated May 2001 to allow a minimum safe bearing capacity of 50 kN/m² for the use of raft foundations and beneath roads. Appropriate testing will be carried out on all treated ground through plate load tests.
- 5.2.6 Excavations should be surveyed in order to fully assess the impact and location of these backfilled excavations in relation to the proposed finished levels and plot layouts.
- 5.2.7 Testing in the form of plate load tests should be carried out utilising a 600mm plate generally loaded to 150kN/m² or three times the working load of the proposed foundations, whichever is the greater. The allowable total deflection should be set at 10mm at three times the working load. Where the formation layer is to be proof rolled then tests should be carried out on a 35m grid. Where the localised removal of obstructions to a depth of 2.0m below the base of the capping or where a localised two metre turnover is carried out, tests should be carried out at 1.0m below and formation level on a 35m grid. Should the deepening be more localised then more targeted testing should be carried out at the discretion of the supervising engineer.
- 5.2.8 The culvert running beneath the site will require fully proving in order to avoid damage during construction. This is likely to involve working in confined spaces in order to unblock the culvert and gain access with the probe. As part of the redevelopment of the site the culvert is to be diverted. Made Ground materials excavated as part of these works should be processed to remove deleterious components and oversized fragments should be crushed to produce an engineered material before re-use as an engineered backfill. All of this material will be retained beneath the capping required on site.

- 5.2.9 During the raising of site levels, where natural ground is to remain in garden areas a minimum growing medium of 225mm of site won topsoil (following further testing) should be provided. Where MADE GROUND is to remain in garden areas it should be capped with a minimum of 600mm of clean material, with 225mm of clean site won or imported topsoil and 375mm of clean site won or imported clay rich material. In the area of the former foundry landfill a minimum of 150mm thick hard to dig layer comprising site won demolition materials should be provided at the base of the capping which would comprise 225mm of topsoil and 225mm of clay rich material. Should asbestos be noted within the MADE GROUND then an assessment by an engineer from Joynes Pike and Associates should assess as to whether the capping needs increasing to 1.0m.
- 5.2.10 Excavation arisings within Made Ground materials, will be suitable for retention and re-use on site, subject to waste management exemption, beneath the appropriate thickness of capping layer providing it is typical of that material type previously excavated.
- 5.2.11 Testing on imported material for capping is to be at a frequency of one test per 250m³ of material; tested for a full suite of determinands that will be compared with the stated acceptable levels of determinands in Appendix A.
- 5.2.12 The capping thickness will be validated through machine or hand excavated trial pits in the rear garden of plots with enough plots being validated to gain a reasonable level of confidence in the capping thickness. It is envisaged that plots will have topsoil placed in phases as they are to be released for sale. As a consequence it is probable that the ratio of validation will vary between 1 plot in 3 to 1 plot in 5.
- 5.2.13 During excavation of contaminated soil and the placement of certifiably clean capping soils, the Contractor will employ all reasonable measures to ensure segregation of the of the contaminated and clean soils. Similarly, the Contractor shall employ all reasonable measures to prevent cross contamination during the handling of the clean and contaminated soils particularly during the loading and movement of wagons.
- 5.2.14 Should unexpected contamination be encountered during development that has not been identified previously during the ground investigations, then the Supervising Engineer shall be notified immediately and the works in the affected area of the site suspended until the Supervising Engineer has carried out an inspection and made appropriate recommendations.
- 5.2.15 Should it be necessary to excavate and dispose off-site contaminated soil in order to facilitate the required thickness of clean soil and maintain ground levels, then the Contractor shall supply the Supervising Engineer with details of the receiving landfill site. On completion of the disposal of the contaminated soil, the Contractor shall provide the Supervising Engineer with the waste consignment notes.

5.3 Gas Protection to Dwellings

- 5.3.1 Joynes Pike and Associates are currently undertaking an extended gas monitoring period on the site and will make recommendations on the findings.
- 5.3.2 *Basic radon gas protective measures are required on this site. Accordingly membranes must, as a minimum, be appropriate to prevent ingress of both radon and carbon dioxide.*
- 5.3.3 In order to prevent cold bridging and damp penetration above the membrane, a cavity tray should be incorporated above the membrane.

5.4 Supervision

- 5.4.1 The Contractor is to provide a competent representative on site for the duration of the Works to liaise with the Supervising Engineer and Employer to provide all necessary supervision to produce workmanship to the complete satisfaction of the Engineer. The Contractor must also provide adequate engineering staff to ensure accurate quality control. The Contractor's staff and Sub-Contractors must have had experience of similar works. The Contractor is to notify the Engineer in writing of the identity of his representative. All excavations must have a suitable banksman.

5.5 Disposal of Solids

- 5.5.1 The Works will generate potentially hazardous materials.
- 5.5.2 Before any contaminated material leaves the site, the Contractor shall satisfy the Engineer that the disposal operation will not breach the Waste Management Duty of Care (1991) requirements of the Environmental Protection Act 1990. In addition the Contractor shall ensure that the disposal operation is carried out in accordance with the requirements of the appropriate Local Authorities and Environment Agency.
- 5.5.3 Loading of vehicles shall be performed in an organised manner so as to prevent the spread of contaminants. All vehicles are to be sheeted and clean prior to leaving the site. The Contractor shall take all reasonable and applicable measures to prevent the escape of material during transportation.
- 5.5.4 The Contractor shall provide the Engineer with the following details of appropriately licensed disposal site(s) to which wastes are to be transferred at least one week in advance to disposal:
- Name, address and telephone number of disposal site and contact name;

- Extract of disposal site Waste Management Licence confirming that the waste may be accepted;
- Name, address and telephone number of the appropriate Environment Agency office;
- Copy of consignment note for each load of material carried off site including proof of receipt of material at an appropriate landfill site.

5.5.5 No waste shall be disposed of until the Engineer has given written prior approval, and is satisfied that the site is properly licensed to receive the waste.

5.5.6 Should asbestos be encountered within excavation arisings then the materials should be assessed by a suitable engineer from Joynes Pike and Associates as to whether it requires removing from site as a special waste.

5.6 Highways

5.6.1 For the majority of the site, internal development roads, car parking, drives and paths will be constructed on proof rolled medium dense sand or deeper excavations backfilled with a compacted engineered granular material in accordance with section 5.2.5. Settlement potential in these areas will be minimal and construction should be based on a CBR value of between 2% and 5%.

5.6.2 Where adoptable roads cross the former landfill, construction details should be agreed with the Local Authority Highways Department. This will involve proof rolling of the excavation and where necessary, due to either unacceptable exposed material or deflections, localised excavation of the landfill material and where necessary screening out of deleterious material and crushing of any oversized material before re-use of the granular product to re-instate the excavation. It is anticipated this will be carried out to a maximum depth of 2.0m and an average of 1.5m below existing levels dependant upon the results of proof rolling.

6.0 HEALTH AND SAFETY

6.1 The Contractor shall be responsible for ensuring that the remedial works activities, whether on or off the site, are carried out in full compliance with the appropriate health and safety legislation, at current amendments, and with the appropriate guidance documents and approved Codes of Practice published by the Health & Safety Executive. Relevant legislation and guidance includes, but is by no means limited to the following (together with any amendments or updates):-

- BS 6187 Code of Practice for Demolition;
- Health and Safety at Work Act 1974;
- Management of Health and Safety at Work Regulations 1992;
- Construction (Design and Management) Regulations 1994;
- Control of Substances Hazardous to Health Regulations 1988;

- Health and Safety Executive Report Ref. HS(G)66 'Protection of the workers and the general public during the development of contaminated land' 1994;
 - The Construction (Health, Safety and Welfare) Regulations 1996.
- 6.2 The Contractor should be aware of the potentially contaminated nature of the Made Ground at the site and a high standard of health and safety awareness should be adopted in order to protect the health of workers and the general public. The Contractor shall therefore implement the appropriate precautions given in the HSE report HS(G)66 entitled 'Protection of workers and the general public during the redevelopment of contaminated land'. A 'decontamination unit' will be required during the removal of any heavily contaminated materials (this should not be a major issue on this site apart from the potential risk of asbestos containing materials within the landfill backfill).
- 6.3 The remedial work shall be carried out with the minimum amount of disturbance and inconvenience to the neighbouring occupants and the general public. The site should be securely fenced from the general public to prevent unauthorised access or trespassing. Any excavations should be fenced off, labelled and covered if left open overnight.
- 6.4 The Contractor shall take all measures necessary to suppress the emission of dust and odours during the remedial works to minimise nuisance to neighbouring occupants and the general public.
- 6.5 A Health and Safety Plan for the Works shall be developed by the Contractor. No works will be permitted until an adequate plan has been submitted to the Planning Supervisor.

7.0 CONSTRAINTS

7.1 General

- 7.1.1 The work will be carried out to ensure minimum disturbance and inconvenience both to the general public and the commercial business of Ben Bailey Homes Limited. The site will be fully fenced prior to commencement of site works. The Contractor will be required to ensure all works and equipment do not present a hazard to persons on site. All equipment must be adequately labelled and the working areas of any excavations are to be fenced to ensure hazardous areas are clearly identified. The Principal Contractor will be required to produce a detailed Health and Safety Plan including method statements and risk assessments for the proposed site remediation works and only the critical issues with regard to potential environmental impacts are noted below.

7.2 Hours Of Working

- 7.2.1 Normal working hours will be 7:30 to 18:00 Monday to Friday and 7:30 to 13:00 Saturday unless otherwise instructed by the Planning Authority. No Sunday working is allowed. Access outside these hours will be available but only for emergency activities. During the winter months, the above times may be reduced.

7.3 Site Access

- 7.3.1 Access to the site is likely to be Hough Lane. Care shall be given to ingress and egress from the site onto the main carriageway and consideration given to other road users.

7.4 Traffic Management

- 7.4.1 The Contractor, his Sub-Contractor, his Sub-Contractors and Suppliers shall comply with any requirements for the routing of their vehicles. The Contractor shall erect and maintain in good condition signs of a type approved by the Engineer giving effect to these routing requirements.
- 7.4.2 The Contractor will maintain suitable access to the site at all times. Road signs will be provided by the Contractor on all access points, warning of the site access. The type, size, number and location of the signs shall be in accordance with Chapter 8 of HMSO Traffic Signs Manual and shall be agreed with the Highways Authority. All necessary signs must be erected prior to commencing works.
- 7.4.3 All vehicles on site will be driven in an appropriate and safe manner and will be parked in appropriate areas. Visitors to the site will park vehicles in a designated area and only vehicles authorised to be on site will be allowed past the designated parking area. All vehicles which leave the site will be checked and if required subject to wheel cleaning operations to ensure that

the highways are kept in an acceptable condition. The Contractor will take all steps necessary to prevent and if required remove any mud, debris or spoil resulting from the works being deposited on the roads, adjacent to or approaching the site, to the satisfaction of the Highways Authority. Where required sheeting facilities should be provided along with cleaning facilities for wheels. All vehicles leaving the site will be authorised to do so, if suitable, by the Site Checker / Gateman employed by the Contractor. Leakage from the lorries will not be allowed. Vehicle movements within the site will be controlled to minimise the coating of wheels / tracks with excavated arisings, particularly in areas of contaminated materials they will be cleaned prior to moving into adjacent uncontaminated areas leaving the site.

- 7.4.4 In the event of the Highway becoming contaminated with site arisings, vehicle movements will be suspended until the surface has been cleaned. Repeat occurrences will require vehicle movements to be suspended until more adequate wheel cleaning facilities are in place. Public highways adjacent to the site should be inspected daily during the works to ensure that cleanliness is being maintained at an acceptable standard.
- 7.4.5 Any restrictions to commercial vehicle movements during ground remedial works to and from the site will be managed by the Contractor in accordance with any stipulations made by the relevant regulatory bodies.

7.5 Utilities Apparatus

- 7.5.1 Details of approximate locations shall be determined on site and are the sole responsibility of the Contractor. Liaison and consultation with the relevant service utility companies will be required to ensure the locations of all live services are known and the necessary procedures of working are followed. The Contractor will be required to consult with the appropriate service utility company.
- 7.5.2 The Contractor will arrange to make good, at their own expense any damage whatsoever to existing services or statutory equipment to the complete satisfaction of the Employer and the undertaker concerned, and shall keep the Employer indemnified at all times from claims in connection with such damage. All live services and equipment, which are encountered in the course of excavation shall be adequately supported and protected from damage until re-routing or other appropriate measures are agreed with the relevant statutory undertakers. Redundant services are however expected to be removed or adequately sealed.
- 7.5.3 An adequate number of fire extinguishers will be provided by the Contractor in appropriate areas. All necessary equipment will be fitted with spark arrestors.
- 7.5.4 The site is to be a 'No Smoking' area outside welfare facilities.

7.5.5 The Contractor will take appropriate precautions to protect and prevent damage to properties, utilities and surface structures, either fixed or otherwise, on or adjacent to the site in or through which works and works activities will be executed, and indemnify the Employer against all claims in connection thereto. Damage shall be promptly made good where appropriate at the Contractor's expense and third party claims shall be promptly dealt with accordingly by the Contractor.

7.5.6 The Contractor shall, where required, provide evidence of all insurances relating to works on or associated with statutory undertakers services.

7.6 Health & Safety

7.6.1 The Contractor will make sufficient allowances, and will allow sufficient time in this programme to fulfil the relevant European Directives and U.K. Health and Safety Regulations. The works will be undertaken in accordance with The Construction (Design and Management) (Amendment) Regulations 2000 (CDM). All visitors to the site will be required to undergo a site induction by the Contractor at the time of their visit and will be required, for every visit to sign the visitors book prior to entry and on exit from the site.

7.7 Temporary Works

7.7.1 The Contractor is responsible for the stability of all existing or surrounding trees, roads, sewers, embankments, buildings and structures, which are adjacent to, and may be adversely affected by the works, from the date of possession of the site until practical completion of the remediation works. Where works are to be carried out by separate contractors, the appropriate responsibilities will be borne by the relevant contractor. The Contractor will advise the overseeing organisation before commencement of the works of his proposals for any necessary supports and sequence of construction of the reclamation proposals. In addition, all temporary works will be inspected on a regular basis by the Principal Contractor.

7.8 Dust and Odour Control

7.8.1 During the works, dust suppression may be required during dry conditions. Appropriate actions will be taken by the Contractor to minimise any dust generation.

7.8.2 Daily records will be kept by the Contractor of noticeable odours at the perimeter of the site, particularly in the vicinity of occupied properties to the east, south and west. During periods of settled weather, it may be necessary for dust and odour suppression, however apart from the remote possibility in the far north western area of the site, odorous material should not pose a problem. When and if necessary suppression units may need to be employed to minimise and / or mask or neutralise any odours.

7.9 Noise Control & Vibration Control

- 7.9.1 The Contractor will employ all practicable means to minimise noise produced by site operations including plant maintenance and shrouding in compliance with the recommendations in BS 5228 : 1997 Guide to noise and vibration control on construction and open sites. The Contractor will liaise with the local Environmental Health Officer as to the noise restrictions to be complied with.
- 7.9.2 All vehicles and mechanical plant used on the site will be fitted with effective exhaust silencers and shall be maintained in good and efficient working order for the duration of the works and comply with the requirements of BS 5228.
- 7.9.3 Machines in intermittent use will be shut down in periods between work or adjusted to a minimum noise and nuisance level. The Contractor will remove from site all items of plant which are ineffectively silenced.
- 7.9.4 All compressors will be 'sound reduced' models fitted with properly lined and sealed acoustic covers which shall be kept closed whenever the machines are in use and all ancillary pneumatic tools shall be fitted with mufflers or silences of the type recommended by the manufacturers. Pumps and mechanical static plants will be enclosed by acoustic sheds or screens in accordance with BS 5228.
- 7.9.5 The Contractor will comply with the requirements of the Environmental Health Officer with regard to the control of vibration.

7.10 Complaints From The Public

- 7.10.1 The Contractor will instruct his staff to respond courteously to all complaints from the public and will immediately rectify any matter giving reasonable grounds for complaints that lie within his jurisdiction. All matters of complaint shall be immediately reported to the overseeing organisation and a log will be kept on site of all such complaints together with action taken.

7.11 Fencing

- 7.11.1 The Works area is to be bounded off by fencing at all times. Heras fencing must be provided to protect the unprotected boundaries and should be left by the Employer at the end of the Works. Additional fencing will also be required to maintain security and define safe zones. All excavations deeper than 1.0m should be surrounded by Heras fencing or similar or to be bounded by bright orange coloured plastic mesh fencing held securely in place by steel road pins.

7.12 Materials & Workmanship

- 7.12.1 All materials used in the proposed contract shall be in accordance with the relevant British Standard where such exist. Where possible, materials shall

be obtained from manufactories licensed to use the British Standards Institution Certification Trademark. All materials will be of good quality and suitable for the required purpose. Where reference to British Standards are made, the latest edition applies together with subsequent amendments.

7.13 Materials For Restoration

- 7.13.1 Materials used to repair or renew any existing features damaged as a result of the works shall, as far as possible, be visually identical to the original and also be of no lower quality compared to the original.

7.14 Temporary Storage of Fuels

- 7.14.1 Any facilities for the storage of oils fuels or chemicals shall be sited on impervious bases and surrounded by impervious bund walls. The volume of the bunded compound should be at least equivalent to the capacity of the tank plus 10%. If there is multiple tank leakage, the compound should be at least equivalent to the capacity of the largest tank, or the combined capacity of interconnected tanks, plus 10%. All filling points, vents, gauges and sight glasses must be located within the bund. The drainage system of the bund shall be sealed with no discharge to any watercourse, land or underground strata. Associated pipework should be located above ground and protected from accidental damage. All filling points and tank overflow pipe outlets should be detailed to discharge downwards into the bund.

7.15 Welfare Facilities

- 7.15.1 The Contractor will be responsible to provide suitable and adequate welfare facilities including suitable health and safety facilities. In addition, a fully furnished cabin with fax machine will be required for the Supervising Engineer and visitors.

7.16 Existing Boreholes and Services

- 7.16.1 All services to remain should be located and protected by all reasonable and practicable means. Any damage occurring shall be rectified by the Contractor at the Contractor's own cost.
- 7.16.2 There are a number of boreholes that require further gas monitoring and these should not be destroyed until the monitoring period has finished.

7.17 Contaminated Materials Arisings

- 7.17.1 Any contaminated materials including excavated / abstracted contaminated soils, or liquids will be the responsibility of the Contractor. Any such materials should be abstracted / excavated, stored and disposed of in accordance with all relevant regulations and with due regard for good working practices ensuring no unauthorised escape of materials either into the ground, surface water or atmosphere. Disposal will be in strict accordance with Duty of Care Regulations and the Contractor will notify the

Supervising Engineer of the proposed carrier and treatment / disposal facility prior to removal of any materials.

7.18 Consents, Agreements & Licenses

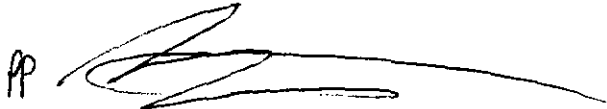
7.18.1 The abstraction, treatment and disposal of solids and liquids shall comply with the requirements of the Environment Agency together with relevant legislation. The consents and agreements will be responsibility of the Contractor. All other necessary consents or approvals shall be obtained by the Contractor prior to commencement of site works (if necessary).

We trust the above is suitable for your present requirements. We would be pleased to discuss the issues further as required. Please do not hesitate to contact us if you require further assistance in these matters.

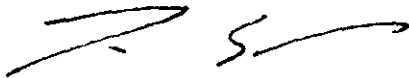
For and on behalf of Joynes Pike & Associates Limited



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DRAWINGS

Appendix A
Environmental Acceptability Criteria

ACCEPTANCE CRITERIA FOR THE IMPORTATION OF SOILS TO THE SITE OR USE OF SITE GENERATED MATERIALS AS COVER LAYER

Determinand	Maximum Acceptable Soil Concentration (mg/kg unless otherwise stated)
Arsenic	20 ⁽¹⁾
Cadmium	1 at pH 6 ⁽¹⁾ 2 at pH 7 ⁽¹⁾ 8 at pH 8 ⁽¹⁾
Chromium	130 ⁽¹⁾
Copper	8000 ⁽⁴⁾
Lead	450 ⁽¹⁾
Mercury (inorganic)	8 ⁽¹⁾
Nickel	50 ⁽¹⁾
Zinc	8500 ⁽⁴⁾
Selenium	35 ⁽¹⁾
Boron (water soluble)	130 ⁽⁴⁾
pH	<5 and >9 pH unit
Phenols	78
Sulphate	0.24% ⁽⁵⁾
Water Soluble Sulphate	1.0g/l ⁽⁵⁾
Speciated PAH	(2)
Speciated TPH by CWG	(3)
Asbestos	0.01 ⁽⁷⁾
FOC	(6)
BTEX	(3)

Notes:

- (1) Soil Guideline Value 'Residential with Plant Uptake'.
- (2) Speciated PAH to be compared to JPA In house trigger concentrations Version 6, December 2005.
- (3) TPH to be speciated by Criteria Working Group and compared to JPA In house trigger concentrations Version 6, December 2005.
- (4) Value derived by Sniffer and part of JPA In house trigger concentrations Version 6, December 2005.
- (5) Protective of building materials in line with BRE Special Digest 1, 2005.
- (6) Fraction of Organic Carbon, to be used in conjunction with Version 6, December 2005.

- (7) Asbestos containing materials (ACM's): At this time there is no definitive guidance on what level of asbestos in soil might be considered as suitable for use. If the asbestos content is equal to or greater than 0.1% w/w (1000 mg/kg) then the material is classified as Hazardous Waste. Material containing less than 0.1% w/w (10 mg/kg). Imported and/or potential source materials should be rigorously inspected for the presence of ACM's during suitability testing. Site specific liaison with Environment Agency (Waste Management Licensing) and Local Authority (Human Health) may be required.

Example: Hazardous Waste Perspective – A 1kg soil sample containing a single piece of cement material weighing 10g and containing 12% v/v Chrysotile (White) would be equal to the 0.1 w/w Hazardous Waste limit.

APPENDIX B
JPA Consolidated Report

Your Ref:

Our Ref: DRS/RMB/232095.20051540

02 February 2006

JPA
JOYNES PIKE
& ASSOCIATES LTD

CONSULTING ENGINEERS

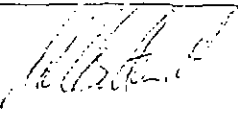
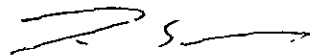
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CONSOLIDATED
GEO-ENVIRONMENTAL INVESTIGATION
REPORT
For
BEN BAILEY HOMES LIMITED
On a Site at
FORMER WOMBWELL FOUNDRY, HOUGH LANE,
WOMBWELL, BARNESLEY, SOUTH YORKSHIRE



BEN BAILEY HOMES LIMITED

LAND AT FORMER WOMBWELL FOUNDRY,
HOUGH LANE, WOMBWELL, BARNSELY

JOB NUMBER: 232095		DOCUMENT REF: DRS/RMB/232095.2005		
Status	Originated	Reviewed	Authorised	Date
				02.02.06
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232095-03	Exploratory Hole Location Plans (sheets 1 and 2)
232095-04	Preliminary Pre-Development Conceptual Site Model
232095-05	Preliminary Post-Development Conceptual Site Model
232095-06	Revised Post-Development Conceptual Site Model
232095-07	Site Location Plan
JPA/10-05-0883/101	Utilities Survey

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APPENDIX A	Johnson Poole and Bloomer Ground Report
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EXECUTIVE SUMMARY
Wombwell Foundry, Hough Lane, Wombwell

Location:	The site in its entirety covers approximately 6.5 hectares in area is centre on National Grid Reference SE 3898 0237.
History:	The site has had two major previous uses which included a foundry and landfill. There was also a well noted to be on site.
Geology & Hydrogeology:	The underlying geology is the Middle Coal Measures in particular the Wooley Edge Rock in the north of the site. The underlying strata are classified as a minor aquifer.
Environmental Considerations:	There is one landfill located on the site with an additional site within 250m of the site and one 250 – 500m from the site. There is one discharge consent within 500 – 1000m from the site.
Mineral Extraction:	There is one unnamed coal seam known to cross the site. The property is within the likely zone of influence on the surface from recorded workings in 3 seams of coal between 90m to 530m depth, the last date of working being 1980. The Coal Authority Report states that ground movement from the past coal workings should by now have ceased. The site does not lie within an area of present or future underground coal mining. The property is not within the boundary of a past, present or future opencast site. There are no recorded mineshafts on or within 20m of the site. The possibility of encountering an un-recorded mineshaft cannot be discounted, although it is considered unlikely.
Ground Conditions:	MADE GROUND; Concrete, foundry sand, ash, clinker, slag and possible asbestos This overlays natural CLAY and subsequently natural BEDROCK.
Contamination Summary:	Contamination was identified within all types of MADE GROUND found on site.
Foundation Design:	Foundations shall be a combination of strip/trench footings, rafts and piles as follows; Strip/trench footings on the periphery. Raft footings on the area formally covered by the foundry buildings following re-engineering of the fill materials. Pile footings on the area of a former landfill along with the

	areas of deep trenches.
Floor Slab Design:	Suspended ground floor slabs with gas protection measures.
Remedial Measures:	Suitable decommissioning and removal of all identified above and below ground storage tanks across the site with validation testing of the bases. Decommissioning of the substation with validation testing of the base. Grubbing up of all hardstanding. This material should be crushed, screened and reused subject to appropriate chemical contamination testing and approval from the local authority. The general MADE GROUND will be suitable for reuse on site except for within proposed garden areas (unless suitably capped) due to some elevated contaminants. It is recommended that these materials are re-used beneath drives, pathways and other hardstandings. Where MADE GROUND is present in rear gardens a 600mm capping should be provided incorporating a 150mm hard to dig layer at its base and 225mm of topsoil. This is likely to be required in the majority if not all of the proposed rear gardens.

A. FACTUAL INFORMATION

1.0 INTRODUCTION

- 1.1 This report describes a geo-environmental investigation undertaken on behalf of Ben Bailey Homes Limited on a site at Former Wombwell Foundry, Hough Lane, Wombwell, Barnsley, South Yorkshire.
- 1.2 This investigation has been carried out knowing that the site is to be developed with residential properties including apartments of traditional 2 and 3 storey constructions with associated communal landscaped areas and private gardens.
- 1.3 This report has been prepared by Joynes Pike & Associates Limited with all reasonable skill, care and diligence within the terms of the Contract with the client Ben Bailey Homes Limited, and taking account of the information made available by the client, as well as the manpower and resources devoted to it by agreement with the client. Joynes Pike & Associates Limited disclaims any responsibility to the client and others in respect of any matters outside the scope of the above Contract.
- 1.4 The objectives of the investigation were to obtain information relating to the ground and groundwater conditions at the site in order to determine suitable methods of design and construction for foundations, floor slabs and roads etc, for the proposed development and to enable formulation of an appropriate remediation strategy in the context of development proposals.
- 1.5 This report has been produced on behalf of The Client, Ben Bailey Homes Limited, and no responsibility is accepted to any Third Party for all or any part. This report should not be relied upon or transferred to any other parties without the express written authorisation of Joynes Pike & Associates Limited. If any unauthorised Third Party comes into possession of this report, they rely on it at their own risk and the authors owe them no duty of care or skill.
- 1.6 The findings and opinions conveyed via the desk study information and Johnson Poole and Bloomer Ground Report within this report are based on information obtained from a variety of sources, as detailed, which Joynes Pike & Associates Limited believes are reliable. Nevertheless, Joynes Pike & Associates Limited cannot and does not guarantee the authenticity or reliability of the information it has relied upon from these sources.
- 1.7 Whilst this report may express an opinion on the possible configuration of (strata, contaminants or gases) between or beyond exploratory hole positions or on the possible presence of features based on either visual, verbal or published evidence, this is for guidance only, and no liability can be accepted for its accuracy.
- 1.8 The comments on groundwater and ground gas conditions are based on observations made at the time of the investigation and those previously reported from third parties. It should be noted, however, that groundwater and ground gas levels may vary from those reported due to seasonal or other effects.

- 1.9 Although every effort has been made to position exploratory holes in the least sensitive areas of the site, exploratory hole positions were located approximately as part of this investigation and no guarantee can be given as to their accuracy. Consideration should be given to the possibility that exploratory holes excavated as part of this investigation, and indeed any previous ground investigation work by others, may be encountered beneath or within the influence of individual foundations. JPA cannot be held responsible for failure of excavations or structural failures caused by the location of foundations of any form of structure within the influence of exploratory holes.
- 1.10 Existing manhole covers were not lifted and drainage runs were not inspected during the course of this ground investigation. However a full service and utility survey and post demolition topographical survey has been carried out by Tower Surveys Limited prior to the site investigation works being carried out and should be read in conjunction with this report.
- 1.11 The site plans enclosed in this report should not be used for scaling purposes
- 1.12 Johnson Poole and Bloomer have undertaken a Closure Report to surrender the Waste Management Licence for the former landfill present on site. No reference or comment is made in relation to this within this report.

2.0 THE SITE

2.1 Location & Access

- 2.1.1 The site in its entirety covers approximately 6.5 hectares in area and is centred on National Grid Reference SE 3898 0237.
- 2.1.2 At the time of both the original and further investigation, access to the site was gained via the main entrance gates off Hough Lane. A further two access points are present on Hough Lane and one locked access gate is present at the roundabout on the A9195 Dearne Valley Parkway.

2.2 Site Description

- 2.2.1 At the time of the JPB investigation the site was occupied by several of the foundry buildings. These were subsequently demolished to ground floor slab level apart from the electricity substation. It was observed that this electricity substation has asbestos containing materials present within its construction.
- 2.2.2 During the further investigation works carried out by Joynes Pike and Associates it was observed that approximately one third to one half of the site comprised several flat concrete areas (the former foundry building bases and floor slabs) with the rest of the site being scrub land and areas of semi-mature to mature trees. The concrete bases are at various topographical levels as shown on the attached topographical survey.
- 2.2.3 The site is bound to the north by Hough Lane beyond which is an existing Ben Bailey Homes Limited development. To the east the site is partially bound by existing industrial premises and partially by open fields, to the south are open fields and to the west is an operational railway.
- 2.2.4 The only retaining structure noted on site was a wall to the north east of the site bounding the works beyond. This retaining structure was previously part of a foundry building and as such will require a survey and possible remedial measures.
- 2.2.5 The site generally slopes away from Hough Lane to the south west and the site is currently terraced from the northern boundary to the southern boundary.

3.0 DESK STUDY

3.1 Sources of Information

3.1.1 The following sources of information have been consulted as part of the desk study for the site;

- (a) JPA archives
- (b) Environmental database report
- (c) British Geological Survey 1:50,000 Sheet 37 'Barnsley' and 1:10,560 sheet 283 NW.
- (d) BRE 211 – Radon, guidance on protective measures for new dwellings
- (e) Law Society Guidance Notes and Directory for Coal Mining Searches
- (f) Selected County Series and Ordnance Survey plans
- (g) Johnson Poole and Bloomer Land Consultants (JPB), Ground Investigation Report Ref. DS074-46/SW dated 05 February 2004.

3.2 Site History

3.2.1 The history of the site is recorded over selected periods by the maps inspected, copies of which are supplied in the JPB report in Appendix A. The account presented in this report is restricted by specific time periods represented by these maps only.

3.2.2 Key dates in the development of the site and its environs are summarised below;

Feature	Location	Maps
Wooded areas	On site	1851-1929
Well	On site	1892
Railway	West of site	1901
Foundry	On site	1929 - 2000
Infilling to south of site	On Site	1961 – 2000

3.2.3 In summary the site has been a foundry since around 1929 with residential development taking place to the north and east of the site.

3.3 Geology, Hydrogeology and Hydrology

3.3.1 According to the inspected published geological information, the site is not underlain by any superficial deposits.

3.3.2 The solid strata in the south western half of the site is shown to be Middle Coal Measures comprising mudstones, siltstones and sandstones. The north eastern half of the site is shown to be the Woolley Edge Rock. There is an unnamed coal seam believed to cross the northern section of the site. These

strata are likely to be overlain by a thickness of weathered materials derived from the underlying bedrock.

3.3.3 According to Environment Agency Groundwater Vulnerability Map Sheet 11 'South Pennines', the site is shown to be underlain by strata which represent a **Minor Aquifer** of low leaching potential. This means that the soils have good or some ability to attenuate/diffuse source pollutants, which cannot as a result move readily to the underlying groundwater.

3.3.4 There is one partially culverted watercourse which crosses the site in an adit and exits in the southern area, as shown on the utility survey by Tower Surveys.

3.4 Mineral Extraction

3.4.1 A Coal Authority Mining Report was commissioned for the site by JPB and is attached within their ground investigation report.

3.4.2 The property is within the likely zone of influence on the surface from workings in 3 seams of coal between 90m to 530m depth, the last date of working being 1980. The Coal Authority Report states that ground movement from the past coal workings should by now have ceased.

3.4.3 The site also lies in an area where coal is believed to exist at or close to the surface.

3.4.4 The site does not lie within an area of present or future underground coal mining.

3.4.5 The property is not within the boundary of a past, present or future opencast site.

3.3.6 *There are no recorded mineshafts on or within 20m of the site. The possibility of encountering an un-recorded mineshaft cannot be discounted, although it is considered unlikely.*

3.5 Environmental Considerations

3.5.1 Specific details relating to the environmental setting of the site are presented within the environmental database report included within Appendix A. The salient issues which relate to the site are summarised as follows:

3.5.2 The Technical Report has identified one current and one former landfill within 250m of the site. It has also identified one current landfill between 250m and 500m and one former landfill between 250m and 500m. These landfills were licensed to accept industrial type wastes and difficult types of waste.

3.5.3 The landfill known to be present on the site was observed during the site walkover and subsequently the waste management license associated with this has successfully been handed back to the Environment Agency after a consultation and monitoring period.

3.5.4 There is also one landfill located between 500m and 1000m of the site boundary. The waste types deposited here are unknown.

3.5.5 There is one discharge consent between 500m and 1000m for the purposes of site drainage.

3.5.6 There are no other features contained in the report which are pertinent to the redevelopment of the site.

3.6 Radon

3.6.1 The Building Research Establishment (BRE) has revised and updated BR211 'Radon: guidance on protective measures for new dwellings', with an edition, published in late December 1999 which is now in effect.

3.6.2 The revised BR211 provides a staged framework to determine whether radon protective measures should be afforded to dwellings, as follows:

Annex A; Maps of areas where basic or full protection should be provided,

Followed by,

Annex B; Maps of areas where a geological assessment should be carried out.

The site lies in an area requiring a BGS Geological Assessment Report.

3.6.3 The Geological Assessment Report has been obtained and states that basic radon protection measures are required for the site. The report is included as Appendix E.

3.7 Asbestos

3.7.1 A full Type 3 Asbestos Survey was undertaken by JPB.

3.7.2 The electricity substation still present on site was not fully accessed during the asbestos survey because of live equipment.

3.7.3 It is recommended that if the substation is decommissioned that a Type 3 Asbestos Survey should be carried out prior to demolition.

3.7.4 The landfill on site was licensed to and is known to have accepted asbestos containing materials and therefore it is likely that there will be asbestos materials within the landfill material.

4.0 PRELIMINARY CONCEPTUAL SITE MODEL

4.1 Potential Sources of Contamination

4.1.1 The following potential on site sources of ground contamination have been identified:

- Previous use of site as a foundry and all associated processes.
- Made Ground present on site arising from foundry uses.
- Landfill present on site and importation of materials including asbestos.
- Spillage and leakage of oil/diesel or chemicals from the tanks/drums on site and previously present on site.
- Maintenance of equipment and vehicles on site.
- Potential contamination of soils with asbestos during the demolition of buildings.
- Substation present on site which may give rise to contamination.

4.1.2 The following potential off site sources of ground contamination have been identified.

- Construction of adjacent railway line.

4.1.3 A preliminary pre-development conceptual site model has been produced (drawing 232095-04) based on the suspected ground conditions from the desk study.

4.2 Receptors of Contamination and Migration Pathways

4.2.1 Receptors are defined as human or non-human organisms that have the potential to experience adverse effects from direct or indirect exposure to contaminated material.

4.2.2 Migration pathways are defined as the courses chemicals take from a source to an exposed organism or receptor. The exposure pathway can be direct (ie stays within the same exposure media) or indirect transport from one medium to another takes place.

4.2.3 The following potential human health and environmental receptors have been identified:

- Future site occupants
- Site construction and maintenance workers
- Neighbouring occupants

4.2.4 The following potential migration pathways have been identified:

- **Inhalation**

Breathing dust and vapours from contaminated soil in outdoor air. Vapours can also migrate into buildings resulting in inhalation by the occupants.

- **Ingestion**

Eating and swallowing of contaminated soil and/or groundwater either by deliberate consumption, indirectly by eating or smoking with dirty hands or by ingestion of fugitive dust.

- **Dermal Contact**

Direct contact with contaminated soil and groundwater, causing skin conditions such as dermatitis etc. Certain contaminants can be absorbed into the body through the skin or enter directly through open cuts or abrasions

- **Migration of Contaminated Water**

Contaminated groundwater can migrate laterally or vertically dependent on permeability, preferential pathways, man-made voids etc.

- **Leaching**

Infiltration of water through soil can leach out soluble contaminants resulting in groundwater pollution.

- **Leaking Tanks, Pipelines and Drains**

Hydrocarbon based contaminants can leak due to cracks in tanks, pipes and drains and spillages can occur during tank filling operations. Escaped hydrocarbons can significantly impact surrounding soil and groundwater.

- **Aggressive Attack**

Building materials can be damaged by direct contact with aggressive ground conditions, for example sulphate attack on concrete and hydrocarbon attack on plastics.

4.3 Source-Pathway-Receptors Relationships

4.3.1 A summary of the preliminary post-development conceptual site model is provided in drawing 232095-05. This is based on the information to date that consists of the desk study and has been revised with remedial options shown following completion of the site investigation in section 9.3.

4.3.2 The following potential Source-Pathway-Receptor relationships have been identified for the site bearing in mind the development proposals;

Source	Pathway	Receptor
Contaminated soil	Ingestion Dermal contact Inhalation (outdoor air)	Construction workers Future occupants
Contaminated soil	Inhalation (indoor air)	Future occupants
Contaminated soil	Leaching	Groundwater
Contaminated soil	Aggressive attack	Building materials
Former drums/ tanks, machinery maintenance	Leakage	Soil and groundwater
Substation	Leakage	Soil

5.0 INVESTIGATION METHODOLOGY

5.1 Objectives

5.1.1 Two phases of investigation have been undertaken on the site. The first phase was undertaken by Johnson Poole and Bloomer with full time supervision by Joynes Pike and Associates, with the second phase of works being undertaken solely by Joynes Pike and Associates (following demolition of the foundry buildings). The objectives of the investigation were to address the following;

- Determine geotechnical and environmental issues relating to the site in particular with relation to a residential end use.
- Full utility survey to trace all previous services due to the nature of the site and private ownership, including the attempt to trace the culverted watercourse present on site.

5.2 Clearance of Underground Services

5.2.1 Before the second phase of intrusive works were undertaken a full utility survey was undertaken by Tower Surveys Limited. The positions of exploratory holes were then scanned with a cable avoidance tool (CAT) prior to excavation.

5.3 Site Works

5.3.1 In total 39 trial pits, 19 rotary open holes, 15 windowless sampler boreholes and 9 shell and auger boreholes have been undertaken across the site in two separate phases of investigation as detailed below;

PHASE 1 – Johnson Poole and Bloomer, between 29 September and 13 October 2003.

14 trial pits to depths of between 1.5m (begl) and 4.6m (begl).

9 shell and auger boreholes to depths of between 4.5m (begl) and 9.0m (begl).

15 windowless sampler boreholes to depths of between 0.65m (begl) and 5.0m (begl).

4 rotary open holes to depths of between 15.0m (begl) and 30.0m (begl).

PHASE 2 – Joynes Pike and Associates, 23 December 2005, concentrated on the area formally dominated by the foundry buildings. The concrete base depths were determined and the majority of the internal pits were excavated with the depths of the bases proved.

25 trial pits to depths between 0.1m (begl) and 4.5m (begl).

15 rotary open holes to depths of between 1.20m (begl) and 20.0m (begl).

- 5.3.2 The approximate locations of the exploratory holes are shown on the appended Drawing No. 232095-03 with the JPA exploratory trial pit and borehole logs are presented in Appendix B and C respectively. JPB logs are enclosed within their ground report enclosed within Appendix A.
- 5.3.3 Disturbed samples were taken during the first phase of investigation at selected intervals from the strata encountered by a representative of JPB. These were placed in appropriate containers and submitted for geotechnical and chemical testing.
- 5.3.4 Standard Penetration Tests (SPT's) were undertaken at regular intervals within the cable percussion boreholes and windowless sampler boreholes to provide 'N' values for empirical assessment of strength and density parameters.
- 5.3.5 Gas/groundwater monitoring standpipes were installed within selected JPB boreholes. The standpipes were constructed using slotted pipe within a gravel surround and bentonite seal near surface, and filled with a gas tap assembly at ground level suitable for connection to propriety gas monitoring equipment. A stop cock box was placed to provide protection at ground level.
- 5.4 Chemical Laboratory Testing**
- 5.4.1 As part of the assessment for potential contamination at the site, soil samples were subjected to appropriate chemical analysis by JPB at their preferred UKAS accredited laboratory. Following statistical analysis by JPA following the initial phase of testing it was deemed that further chemical testing would not be required as suitable data sets already existed for the various material types to assess the material in accordance with current guidance (CLR 7).
- 5.4.2 In total 43 samples of representative strata were sent for a general suite of determinands.
- 5.4.3 Results of the chemical testing undertaken by JPB are presented in Appendix A.
- 5.5 Geotechnical Laboratory Testing**
- 5.5.1 Representative samples were submitted by JPB to an approved and accredited laboratory and the following tests scheduled to determine soil properties as related to foundation design and construction:
- Natural Moisture Content
 - Plasticity Index Analysis
 - Particle Size Distribution
 - Particle Density Tests
 - Compaction tests using a 2.5kg rammer
- 5.5.2 Results of the geotechnical testing are presented in Appendix A.
- 5.6 Gas/Groundwater Monitoring**
- 5.6.1 Monitoring of gas and groundwater levels has been undertaken over a one year period within the JPB installations since completion of the site work.

- 5.6.2 Measurements of concentrations of methane, carbon dioxide, oxygen, carbon monoxide and hydrogen sulphide carried out by JPB were taken using an Infra Red Gas Analyser.
- 5.6.3 Atmospheric pressure, gas flow rates and groundwater levels were also recorded on each occasion.
- 5.6.4 Results of the monitoring are presented in Appendix A within the JPB Ground Report.

6.0 RESULTS OF THE INVESTIGATION

6.1 *Strata Encountered*

- 6.1.1 The ground conditions beneath the site was predominantly very similar to that previously encountered, reported within the JPB report. The MADE GROUND encountered in the further investigation ranged from 1.2m to 4.0m below existing ground level. The predominant MADE GROUND generally comprised foundry sand with ash, clinker and slag gravel. Where the former foundry buildings were located there was a thickness of concrete, reinforced in places. The concrete bases were generally up to 0.3m in thickness with the exception of the slab encountered in TP6A where the gable end was proved to have a footing up to 2.0m thick. It may be prudent to assume that the other concrete footings on site have similar footings on the gable walls with the rest of the bases being up to 0.3m thick.
- 6.1.2 The JPB report indicates a range in thickness of the MADE GROUND to be predominantly less than 4.0m beneath the former buildings and greater than 4.0m where the former landfill is. The further investigation by JPA generally coincides with this view, however deeper MADE GROUND was encountered towards the rear of the former foundry buildings.
- 6.1.3 Generally the MADE GROUND within the landfill was similar to that previously mentioned. However the landfill was licensed to accept asbestos containing products. Asbestos fragments were noted on the ground surface and it would be prudent to assume that the landfill area contains asbestos fragments and the material, if required to go off site, should be treated as special waste requiring removal to a suitably licensed landfill.
- 6.1.3 The natural ground beneath the MADE GROUND was generally a firm brown, slightly sandy, silty CLAY, beneath which was bedrock comprising Middle Coal Measures.
- 6.1.4 Due to nearby services the previously identified well was not investigated. It is recommended by Joynes Pike and Associates that this area be supervised during the site strip phase of the remediation works.
- 6.1.5 Six rotary open boreholes were drilled to determine the presence or absence of an unnamed coal seam and to assess if workings are present. Coal was encountered in one of the six boreholes drilled to determine the unnamed seam and a further three elsewhere on the site. The other boreholes drilled to determine the unnamed seam encountered a very dark grey/black MUDSTONE at the same level as the coal. No evidence of workings was encountered (such as voids, broken ground, loss of flush etc.). Due to the findings highlighted within this section it is believed that there will be no risk of settlement due to coal mine workings beneath the site as the coal seam is of discontinuous and of poor quality and grades from a poor quality coal to a black carbonaceous mudstone.
- 6.1.6 The pits marked on drawing 232095-03 shows the location and size of the pits within the concrete bases with the majority of the depths shown via the trial pit logs appended to this report. One pit (Pit J) had a deeper concrete strip beneath approximately 0.2m wide and 3.0m deep. All pits will require grubbing out and backfilling as detailed further in the report.

6.2 Groundwater Observations

6.2.1 Groundwater was not encountered in any trial pits across the site.

6.2.2 Groundwater was recorded and monitored during the JPB shell and auger boreholes and rotary boreholes. The depths ranged from ground level to 8.44m (bgl) across the site.

6.3 Chemical Testing - Soils

6.3.1 The results of the chemical testing on soil samples have been reviewed in accordance with the legislative framework and criteria set out in Appendix D.

6.3.2 The results of the analysis have been assessed using statistical tests as outlined in CLR 7. Appropriate US₁₅ values have been calculated for each of the identified strata types on site with the following being recorded as having concentrations of determinands in excess of the relevant SGV or JPA in-house trigger concentration value (Version 5, Sept 2005) for a proposed end use of residential with gardens. The following main strata types have been identified;

- MADE GROUND – brick rubble (Type A)
- MADE GROUND – foundry sand (Type B)
- MADE GROUND – gravel (Type C)
- Natural CLAY

6.3.3 Brick Rubble Made Ground (Type A)

The results of the four samples of brick rubble made ground indicate that the determinands were either below the published SGV or the Tier 1 in-house screening values (IHSV) with the exception of:

- Arsenic with a US⁹⁵ of 40.42 mg/kg compared to the SGV of 20 mg/kg
- Lead with US⁹⁵ of 499.86 mg/kg compared to the SGV of 450 mg/kg
- Nickel with a US⁹⁵ of 59.51 mg/kg compared to the SGV of 50 mg/kg
- Benzo (a) pyrene with US⁹⁵ of 1.19 mg/kg compared to the IHSV of 1.1 mg/kg
- Benz (b) fluoranthene with US⁹⁵ of 1.19 mg/kg compared to the IHSV of 1.1 mg/kg
- Chrysene with US⁹⁵ of 1.24 mg/kg compared to the IHSV of 1.1 mg/kg

6.3.4 Foundry Sand Made Ground (Type B)

The results of the eleven samples of foundry sand made ground indicate that the determinands were either below the published SGV or the Tier 1 IHSV with the exception of:

- Arsenic with a US⁹⁵ of 35.3 mg/kg compared to the SGV of 20 mg/kg
- Nickel with a US⁹⁵ of 143.37 mg/kg compared to the SGV of 50 mg/kg
- Elevated PAH.

6.3.5 Gravelly Made Ground (Type C)

The results of the eight samples of gravelly made ground indicate that the determinands were either below the published SGV or the Tier 1 IHSV with the exception of:

- Arsenic with a US⁵⁵ of 34.95 mg/kg compared to the SGV of 20 mg/kg
- Nickel with a US⁵⁵ of 74.43 mg/kg compared to the SGV of 50 mg/kg
- Lead with US⁵⁵ of 464.62 mg/kg compared to the SGV of 450 mg/kg
- Chrysene with US⁵⁵ of 1.29 mg/kg compared to the IHSV of 1.1 mg/kg

6.3.6 Natural Clay

The results of the four samples of natural clay indicate that the determinands were below either the published SGV or the Tier 1 IHSV.

6.3.7 Hydrocarbons odours that were noted by JPB during the site investigation were tested and showed no significant levels of contamination

6.3.8 It should be noted that the classification of soil for waste disposal purposes and any resulting waste acceptance criteria (WAC testing) required under the Landfill Regulations introduced in July 2005 is beyond the scope of this report.

6.4 Geotechnical Testing

6.4.1 Three representative samples were submitted to determine plasticity Index values.

Plasticity Index Analysis - BS1377; Part 2; 1990.

6.4.2 Results of the geotechnical testing are presented in JPB Report, Appendix A.

6.4.3 These results indicate that the shallow cohesive soils encountered within the trial pits are of medium to high volume change potential in accordance with NHBC Standards Chapter 4.2. It would be prudent at this stage to assume a high volume change potential for this area of the site.

6.5 Gas/Groundwater Monitoring

6.5.1 The results of gas monitoring have been assessed based on the guidance presented in The Building Regulations Approved Document C, 2000, BRE Report 212, Construction of New Buildings on Gas Contaminated Land, 1991 and CIRIA Report 149, Protecting Development from Methane, 1995.

6.5.2 The guidance outlined within Approved Document C indicates that a gas risk assessment should be undertaken and the risks managed by remedial measures such as removing the gas generating material or the provision of gas resistant barriers within proposed dwellings.

6.5.3 From the installations constructed by JPB during the first phase of investigation the following boreholes were situated within the licensed landfill area.

- Boreholes BH8, BH22, BH25, BH26, BH27 and BH28.

Taking this in to account and due to the different conditions and compositions of the materials present on the site the results are reported as two separate areas.

Landfill area (Boreholes BH8, BH22, BH25, BH26, BH27 and BH28)

- 6.5.4 During the monitoring period, methane has been detected at concentrations ranging between 0.0% v/v and 16.0% v/v with the majority being detected within borehole BH27.
- 6.5.5 Carbon Dioxide has been detected at concentrations ranging between 0.0% v/v and 5.7% v/v on more than one occasion in each of the boreholes.
- 6.5.6 Depleted oxygen concentrations were recorded within the range 20.9% v/v and 0.0% v/v.
- 6.5.7 Average gas flow rates recorded only low peak emission rates of 0.0 to 4.0 l/h.
- 6.5.8 Hydrogen sulphide was not detected on any visit.
- 6.5.9 Groundwater has been recorded within the monitoring points at depths of from existing ground level (begl) to 8.12m (begl).

Remaining Site area

- 6.5.10 During the monitoring period, methane has been detected at concentrations ranging between 0.0% v/v and 2.0% v/v.
- 6.5.11 Carbon Dioxide has been detected at concentrations ranging between 0.0% v/v and 9.0% v/v on more than one occasion in each of the boreholes.
- 6.5.12 Depleted oxygen concentrations were recorded within the range 20.9% v/v and 0.0% v/v.
- 6.5.13 Average gas flow rates recorded only low peak emission rates of 0.0 to 4.0 l/h.
- 6.5.14 Hydrogen sulphide was not detected on any visit.
- 6.5.15 Groundwater has been recorded within the monitoring points at depths of from existing ground level (begl) to 7.61m (begl).
- 6.5.16 Due to a number of anomalies within the gas monitoring provided by JPB it is recommended that a further gas monitoring programme be carried out by JPA. This should include borehole 27 in particular, as this has had a reading of 0% v/v of oxygen with no other elevated gas levels. However it would be prudent to carry out gas monitoring in all available boreholes. Joynes Pike and Associates have carried out a preliminary inspection of the boreholes installed by JPB and currently we can confirm that gas monitoring will be able to be carried out at BH 17, 24, 26, 27 and 28. If further boreholes are encountered during this monitoring period they will be included within the report.

B. ASSESSMENT & RECOMMENDATIONS**7.0 INTRODUCTION**

- 7.1 This report has been prepared on the understanding that the site is to be developed with residential properties of traditional 2 and 3 storey construction with associated access roads, landscaped areas, and private gardens. Should the proposed site usage change significantly from the above, the contents of this report will require review and amendment as appropriate.
- 7.2 *The ground conditions are typified by the presence of MADE GROUND; concrete and foundry slag with ash, clinker, brick and slag which thickens towards the landfill.*
- 7.3 Where present the natural ground beneath the MADE GROUND comprises of a soft to firm brown sandy, silty CLAY.
- 7.4 The rockhead encountered on site is that of the middle coal measures.

8.0 MINING ASSESSMENT

8.1 Evidence of Shallow Mining

8.1.1 Following the rotary open-hole borehole investigation it has been proven that shallow coal mining does not affect the site.

8.1.2 No future underground coal mining will affect the site at this time.

8.2 Abandoned Mine Entries

8.2.1 There are no abandoned mine entries on or within 20m of the site.

8.3 Stability Assessment Criteria

8.3.1 No stabilisation works are required with respect to underground coal mining beneath the site.

9.0 ENVIRONMENTAL ASSESSMENT

9.1 Soil Contamination Summary

- 9.1.1 Contamination was encountered within the results obtained from site. These are detailed below.
- 9.1.2 From the main strata types identified in accordance with CLR 7 elevated arsenic, nickel, lead and PAHs levels including benzo(a)pyrene have been recorded within the three main MADE GROUND strata types across the site.
- 9.1.3 Natural strata types had determinands which fell below their respective guideline values and are considered as suitable for re-use on site.
- 9.1.4 During the utility survey and further site works an oil interceptor was encountered at the southern boundary of the site beneath the former vehicle workshop. This will require further investigation and remediation during the site clearance works.

9.2 Risk Assessments

- 9.2.1 It is considered that the MADE GROUND materials encountered pose a risk to human health but not to controlled waters. As such they are suitable for retention on site beneath either a suitable capping layer (pathway break) or hardstanding.
- 9.2.2 The identified oil interceptor will require further investigation during site clearance with sampling of the underlying materials to determine if contamination has taken place to identify any remediation requirements.
- 9.2.3 The substation associated with the former foundry is still operational on site. It is assumed that this is to be suitably decommissioned and relocated. Following decommissioning the underlying soils will require contamination testing for PCB suite of determinands to assess whether the underlying soils require remediation. It was observed that this building has asbestos containing materials associated with it.
- 9.2.4 If the topsoil present in the south eastern area of the site is to be stripped and stockpiled then, following the site strip this will require contamination testing to determine its suitability and re-use on site within public open space and garden areas.

9.3 Revised Conceptual Site Model

- 9.3.1 This following section summarises the findings of the investigations into the site. Drawing 232095-06 shows the identified source pathway receptors on site considering an end use of residential housing with rear gardens.

9.4 Recommended Remedial Strategy

- 9.4.1 Based on the results of the investigation, the Revised Conceptual Site Model and the Risk Assessments, it is recommended that the following remedial works are undertaken in the context of the development proposals.

- 9.4.2 Suitable decommissioning and removal of the substation present on site. Validation samples should also be taken from beneath this area following removal of the substation. The excavations can be suitably backfilled in an engineered manner with either natural soil arisings from any excavations or demolition materials as outlined below. At this stage it should be assumed that a maximum of approximately 70m³ will require removal and suitable disposal from site.
- 9.4.3 The oil interceptor observed on site has liquid present within it. This should be pumped dry. Following this the area around the interceptor should be broken out and the plastic vessel removed. Validation samples should be taken and sent for suitable contamination testing. The excavation can be suitably backfilled in an engineered manner with either natural soil arisings from any excavations or demolition materials as outlined below. At this stage it should be assumed that approximately 75m³ will require removal and suitable disposal from this area of the site.
- 9.4.4 Grubbing up and breaking out of all hardstanding, floor slabs, bases and deep pits in the former foundry areas of the site should take place. Where the former bases are to be broken out, this should take place to 2.0m below the base of the proposed capillary break. When considering the former pits, these should be excavated, with all sides and bases broken out. Excavation sides should be stepped back at a minimum of 1v:1h gradient. This material as well as stockpiled demolition material should be crushed, screened and reused. There is sufficient laboratory testing to show that this material is acceptable for re-use beneath capping but if any unusual material is encountered it should be stockpiled separately and tested. Following stockpiling of this material the underlying MADE GROUND should be 'turned over' to a depth of 2.0m. The material excavated should be replaced in an engineered manner to allow a minimum safe bearing capacity of 50 kN/m² for the use of raft foundations. This technique will also be suitable for areas where over deepening has been required for the former pits on site.
- 9.4.5 The culvert running beneath the site will require fully proving in order to avoid damage during construction. This is likely to involve working in confined spaces in order to unblock the culvert and gain access with the probe.
- 9.4.6 During the raising in site levels, where natural ground is to remain in garden areas a minimum growing medium of 250mm of site won topsoil (following further testing) should be provided. Where MADE GROUND is to remain in garden areas it should be capped with a minimum of 600mm of clean material incorporating 150mm 'hard-to-dig' layer comprising site won demolition materials, with 225mm of clean site won or imported topsoil and 225mm of clean site won or imported clay rich material.
- 9.4.7 The above remediation strategy should be agreed with the Regulatory Authorities (Local Authority, Environment Agency and NHBC if required)
- 9.5 Health & Safety
- 9.5.1 During the reclamation and construction phases of the site development it will be necessary to protect the health and safety of site personnel. General guidance on these matters is given in the Health and Safety Executive (HSE) document "Protection of Workers and the General Public during the Redevelopment of Contaminated Land".

9.5.2 In summary, the following measures are suggested to provide a minimum level of protection:

- All ground workers should be issued with the relevant protective clothing, footwear and gloves. These protective items should not be removed from the site and personnel should be instructed as to why and how they are to be used.
- Hand-washing and boot-washing facilities should be provided.
- Good practices relating to personal hygiene should be adopted on the site.
- The contractor shall satisfy the Health and Safety Executive with regard to any other matters concerning the health, safety and welfare of persons on the site.

9.6 Waste Disposal

9.6.1 Due to the implementation of the Landfill Directive any soils which may require removal from the site may be considered hazardous, however clarification should be sought from the disposal point about whether they would be licensed to receive materials with the contamination levels recorded. It is not anticipated that large quantities of material will require removal from site.

9.6.2 It may be necessary to register a waste exemption with the Environment Agency in relation to any regrading works to be undertaken.

9.7 Service Pipes

9.7.1 Certain hydrocarbons (particularly aromatic compounds) can permeate plastic water pipes and taint drinking water supplies. Other hydrocarbons can cause aggressive attack on plastic building materials. It is therefore recommended that water supply pipes should be laid above the groundwater level within a trench of clean granular material. If no significant concentrations of hydrocarbons are present, then the use of standard plastic supply pipes (such as HDPE) should be appropriate. It is also recommended that the water supply utility company is contacted to confirm that adopted protection measures are acceptable prior to progressing any construction at the site.

10.0 GEOTECHNICAL ASSESSMENT

10.1 Foundation Design

10.1.1 The most likely foundation solution for plots on this site will be dependant on the loadings, house type arrangements and relative position on site. The foundation options for the site can be split into several areas;

10.1.2 Within the vicinity of the well any plots that are affected by the feature will probably require pad and pier foundations or locally deepening and stepping back with reinforcement. It is currently believed that the well is likely to be located beneath the road construction. If this is the case then the depth will be required to be proved. Depending on the depth two options can be adopted, subject to prior Local Authority approval;

- Shallow; Break out the top and step back at a 1v:2h prior to the placement and compaction of single sized 50 – 75mm diameter stone infill.
- Deep (>5.0m); The wells depth will most likely require proving via drilling down the centre of the shaft using a shaft drilling platform. Further to this 50 – 75mm diameter stone should be used to infill the shaft and compacted with further holes drilled and grouted.

10.1.3 Where the relatively shallower predominantly foundry sand MADE GROUND is encountered a site turnover should be carried out to a minimum of 2.0m below the capillary break. All oversized material should be removed with specific notice taken of any significant slag and clinker that is likely to be encountered. Should significant quantities of this material be encountered all slag and clinker should be carefully removed and re-used in areas of Public Open Space (POS). The material should then be replaced in an engineered manner to allow raft foundations to be used.

10.1.4 Where foundations are over relatively shallower deepened sections due to former pits on site the excavations should be suitably backfilled in an engineered manner to allow raft foundations.

10.1.5 At this stage in order to limit exposure of contaminants to ground workers steel driven pile and ground beam foundations will be required where plots are located over the former landfill. Through the interpretation of intrusive investigations to date piles should be approximately 6.0m deep. Piles are also likely to be the most suitable foundation type where deep pits have been identified. The culvert will require fully proving prior to the commencement of piling to avoid damage.

10.1.6 Along the periphery of the site strip/trench fill footings are deemed suitable, deepened due to trees where applicable.

10.2 Floor Slab Design

10.2.1 Due to the presence of fill and its proposed reengineering across the site there will be greater than 600mm of MADE GROUND. Therefore the use of suspended ground floors will be required across the site.

10.2.2 It is currently Joynes Pike and Associates view that an extended gas monitoring period be carried out on the boreholes that can still be used. If this is not done, based on the information from the JPB report the site is shown to be characteristic 4 situation (as per the Wilson and Card model). This means that there is a requirement for; A well constructed suspended or ground slab, gas resistant membrane, passively ventilated underfloor sub-space, oversite capping and an in-ground venting layer.

10.2.4 These protection measures should be agreed with the Local Authority.

10.3 Building Near Trees

10.3.1 The near surface natural soils have been classed as high volume change potential, therefore specific vertical and lateral heave precautions are required due to existing or proposed trees in accordance with NHBC Standards Chapter 4.2.

10.5 Construction

10.5.1 Side stability of excavations in current made ground will be poor and should be suitably supported in accordance with current legislation and industry best practice. The stability of excavations in the engineered material should be improved.

10.6 Soakaways/Drainage

10.6.1 Due to moderate to deep thicknesses of made ground affecting the site, soakaways will be unsuitable for surface water discharge. An alternative method of draining the site should be sought.

11.0 FURTHER RECOMMENDATIONS

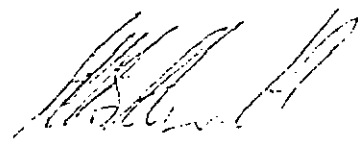
11.1 The following further works have been recommended prior to the development of the site:

- (a) Type 3 asbestos survey of substation following decommissioning.
- (b) Foundation schedule and plot specific foundation designs.
- (c) Production of a Remediation Method Statement.
- (d) Further testing of the topsoil following stockpiling.
- (e) Inspection of retaining wall on north eastern boundary of site during site works.
- (f) Repair works and further gas monitoring of available wells, in particular well 27.

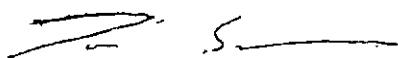
For and on Behalf of Joynes Pike and Associates Limited



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DRAWINGS

APPENDIX A

Johnson Poole and Bloomer Ground Report

1150

NATIONAL ASSOCIATION
 OF
 AGRICULTURAL MECHANICS, NATIONAL FED-
 ERATION OF SOOTHING CULTIVATORS

DS074-46:SW

JOHNSON
POOLE &
BLOOMER



GROUND INVESTIGATION
AT
WOMBWELL FOUNDRY, WOMBWELL
SOUTH YORKSHIRE

For the attention of Mr D Grove

Hill & Smith Holding plc
2 Highlands Court
Cranmore Avenue
Shirley
Solihull
West Midlands B90 4LE

5 February 2004



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- 6 Discussion
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Drawings

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| DS074/01 | General Site Location |
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- A Windowless Sampler Borehole Logs
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1 INTRODUCTION

1.1 Johnson Poole & Bloomer were commissioned by Mr D Grove of Hill & Smith Holdings plc, on behalf of Wombwell Foundry Ltd, to undertake a Ground Investigation Report on a site known as Wombwell Foundry, Hough Lane, Wombwell, Barnsley, South Yorkshire. The site location is shown on Johnson Poole & Bloomer (JPB) Drawing DS07-L/01.

1.2 We understand that Hill & Smith Holdings plc are proposing to sell the site. It is anticipated that at least half of the area would go for housing development and the rest remain as green belt or other open space.

1.3 Prior to the intrusive investigation being undertaken, JPB were provided with information to aid in the design of the most suitable ground investigation. The following was provided by Wombwell Foundry Ltd,

i) IPCC Application 2002 (which included Envirocheck Report, Coal Authority Mining Report and Historical Site Use Plans; copies of which are provided in Appendices H, I and J).

ii) British Geotechnical Ground Investigation Report No: BG2458 dated January 1998.

iii) Wardell Armstrong contamination survey referenced NPT/JNS/SM/S1217/Report dated March 1996.

The latter two items are largely superseded by the site investigation described below, but can be made available for inspection.

1.4 An intrusive investigation was subsequently designed and undertaken to assess the near surface ground conditions beneath the site and to provide an assessment with regard to geotechnical and contamination issues.

1.5 Within the southern part of the site an area remains subject to a Waste Management Licence (the 'licence'), although landfill operations within the area have been completed and the area restored. The licence is partly suspended and the ground investigation recently undertaken has including obtaining chemical, physical and gas data for the purpose of surrendering the licence. The ground investigation aspects for the surrender of the licence will be reported separately.



- 1.6 The conclusions reached in this report are necessarily restricted to those that can be determined from the information consulted and the conditions established at each of the exploratory holes. However, ground conditions are highly variable and may differ between sampling points. This could affect our interpretation. Additionally, features may exist at depth and remain undetected by investigation. Our conclusions may, therefore, be subject to amendment in the light of additional information becoming available.
- 1.7 This report has been prepared for the sole use of the specified Client in response to an agreed brief, for a stated purpose and at a particular time, and its application must be made accordingly. No duty of care extends to any third party that may make use of the information contained herein unless written confirmation of such has been provided by Johnson Poole & Bloomer.
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2 THE SITE

2.1 Site Description

The site is located off Junction 36 of the M1 on the B6096 approximately 6 km to the south east of Barnsley, at Hough Lane, Wombwell, South Yorkshire (a National Grid Reference SE 389 025). The general site location and existing site layout are shown on JPB Drawings DS074/01 and DS074/06 respectively.

At the time of the ground investigation the site comprised disused foundry buildings and adjoining offices, an area formerly used for landfill, and wooded areas surrounding the landfill towards the south of the site. The landfill area has been landscaped, as a stage in the process of surrendering the landfill licence. As part of the clearance works of the disused buildings, a mound of fly tipped waste has been created in the south of the site to the west of the licensed area. This material was seen to comprise general waste and foundry sand as well as appreciable amounts of asbestos cement profile roofing sheets. Asbestos is regarded as special waste and, as such, a duty of care applies regarding the removal of asbestos containing materials (ACMs) prior to redevelopment of the site. JPB Drawing DS074/06 shows the existing site layout, including site levels following the landscaping of the landfill area. The site is accessible by vehicle from Hough Lane, although it may also be accessed on foot from the south and the east by scrambling over or through bushes and fences.

2.2 Site History

2.2.1 The history of the site has been traced using past editions of Ordnance Survey County Series and National Grid maps dating back to 1855. The maps are listed and summarised in Table 2.2 below, together with significant land use changes for the site and its immediate surroundings. The Envirocheck Report, included in Appendix II, contains historical maps which show the progress of development of the site. Historical Site Use Maps are also included in Appendix I.



Table 2.2: Summary of Site History (to present)

Plan	On/ Off Site	Significant features or features altered since previous plan	Distance from site (m)	Bearing from site	Details
1855 County Series Plans Yorkshire 1:10,560	On	The site is part of Wombwell Wood A drain is shown	-	-	The legend shows the site occupied by 'mixed wood' Starting at the central north of the site and trending SE
	Off	At the north-western boundary is Hough Lane There is a spring marked nearby. The Wombwell Main Colliery is shown	Adjacent 20 710	On Boundary SE NW	A boiler house and various other buildings are associated Both are sandstone quarries
		Two quarries are marked within the woods.	1000/ 500	WNW/ WSW	
1893 County Series Plan Yorkshire 1:10,560	On	The woods have been cleared within the northern part of the site, and a house with a well is shown. A keepers ledge with a well is now shown in the woods. Tracks are shown within the wood	- -	Northern part of the site South west corner of the site	
	Off	There are two rows of houses on the opposite side of Hough Lane to the site. Lundhill Colliery is now marked. Five reservoirs are shown nearby. Wombwell Main Colliery has expanded to include coke ovens, a brickyard as well as a school.	10 500 100, 250, 400, 500 and 600m 710	N SE N, SE and SW NW	Terraced housing One to the north, three to the south east, and one to the south west.
1905 County Series Plan Yorkshire 1:10,560	On	A railway sidings and 'Goods shed' have been built within the western boundary of the site.	-	-	An embankment has been created within the site in order to provide level ground.
	Off	A new railroad runs adjacent to the west of the site The Lundhill Colliery is now marked as 'Old'. Sewage beds are present to the south east of the site	0-5m 500 1100 m	W SE SE	A new station has been built to the west of the site Colliery buildings have been removed.
1920 County Series Plan Yorkshire 1: 2500	On	The site has been mostly cleared of wooded areas and Wombwell Foundry is shown to occupy the northern part of the site.	-	-	A railway leads from the foundry buildings onto the main line
	Off	Houses have now been built to the west of the railway.	200	W	The land around the railway line has been cleared of trees



1938 Coomy Series Plan Yorkshire 1:10,560	On	There has been no significant change since the last plan.	-	-	Goods shed and lepers lodge are still shown.
	Off	Allotment gardens are now located behind the Pub on Hough Lane	50	NE	The pub is the St George's Arms
		There has been extensive development to the east of the site along Hough Lane	200	E	The development is progressing towards the site from Wombwell
		New housing to the west along Wood Walk	150	W	
		Sewage filter-beds are marked to the north west of the site.	400	NW	
		The various reservoirs around the site are now no longer there except the one to the SW.	600	SW	
1956 Ordnance Survey Plans 1: 10,560	On	The list of the woods have been cleared from the east of the site.	-	-	-
	Off	A building has been built, on the west side of the railway tracks.	10	W	The access is not shown.
		Continued development of houses from Wombwell towards the site.	200	NE	
		Further houses with gardens have now been built along Wood Walk within Wombwell Wood Walk.	100 - 700	WNW	This development is from Wombwell station to 'Warren House' and isolates part of Wombwell Wood.
1966 Ordnance Survey Plans 1:10,000	On	The foundry buildings have increased in size and tipping is shown to have progressed to the south of the buildings.	-	-	-
		The drain on site is now marked as 'drain'	-	-	Runs from the middle of the site to the SE
	Off	The building is growing in size on the west side of the railway tracks.	10	W	Accessed from Hemingfield Road
		Houses with gardens have now been built along the Hemingfield Road within Wombwell Wood.	20 - 400	W	-
		The Wombwell Main Colliery is marked as 'mine'.	700	NW	Soil heaps have been spread to the north.
		The sewage filter beds to north-west and south-east are no longer marked on the plan.	450/ 1000	NW/ SE	



1980 Ordnance Survey Plan 1:10,000	On	The size of the foundry has grown slightly with further development southwards	-	-	The shape of the main building is roughly as it is at present.
	Off	The building across the tracks is marked 'factory'	10	W	The land is now down as bare fields
		The terraced houses across the road from the foundry, known as Wombwell Main Row have been demolished The Wombwell Main Colliery has been completely removed along with its associated rail tracks.	15 700	N NW	
1989 Ordnance Survey Plan 1:10,000	On	Foundry buildings have been extended slightly	-	-	-
	Off	No significant changes	-	-	-

2.3 Summary

In summary, the first available plans dated 1855, showed the site to be within woods to the south-west of the town of Wombwell. The area surrounding the woods comprised of open, undeveloped fields with isolated hamlets dotted around. There was a coal mining operation at Wombwell Main Colliery offsite to the north-east of the site, with a narrow gauge railway which extended to join the main line to the north, and into Wombwell Wood to the south (presumably to transport timber for prepping up the mine workings).

By 1893 the first change on site had occurred, the northern portion of the site fronting Hough Lane which was previously wooded, is now bare pastureland. A keepers lodge with a well was shown within the site boundaries towards the southern end. Newhouses, together with adjoining football and cricket ground, have been built north of Hough Lane. The Wombwell Main Colliery had expanded and now supported a school, brick yard and coke ovens. The new Lundhill Colliery had started mining operations offsite to the south-east of the site.

The 1903 sheet showed the new Chapeltown Branch Extension which brought a main line railroad adjacent to the western boundary of the site. Indeed rail sidings and a goods shed were built within the western edge of the site. Mining activities continue offsite to the north while more houses are being built along Hough Lane near the site.



Between 1905 and 1938 the site had been mostly cleared of trees and Wombwell Foundry (iron and brass) is now shown onsite. Two buildings are shown on the northern part of the site, with evidence of tipping to the rear of the buildings (towards the south). More houses were being built in the area whilst Wombwell town was expanding onto the land to the east of the site.

By 1956, although the site essentially remained the same, house building and mining activities had continued at the same rate. A factory was now located close to the site, to the west on the opposite side of the rail tracks. The 1966 plan showed that the foundry had grown greatly in size and tipping (presumably of foundry waste) was shown extending to the south up to 100m distant from the back of the buildings.

By 1980 the mining activities in the area had been abandoned but the foundry had continued to grow in size. The terraced houses across the road from the foundry had been demolished. The site and surrounds changed little by 1989, and indeed remained much the same until the foundry ceased production in April 2003.



3 ENVIRONMENTAL SETTING

3.1 Geology and Hydrogeology

3.1.1 Published Ground Conditions

The published geology beneath the site is detailed on British Geological Survey Sheet 87 scaled 1: 50,000 and dated 1976. The site is shown to be underlain by solid geology comprising the Middle Productive Coal Measures of the Carboniferous Period, which is described in the generalised vertical section as 'Grey sandstones and shales with coal seams of variable thickness'. A seam of coal identified as being the Newhill Coal is shown to outcrop within the northern and eastern part of the site. A small fault line is also seen to trend from north to south at the eastern edge of the site. Made Ground or natural superficial deposits are not indicated to overlie the solid strata, although some is anticipated taking into account the site's former foundry use.

The likely sequence of strata and general hydrogeological conditions beneath the site are thought to be as follows:

Table 3.1: Summary of Published Geology

Strata	Description	Aquifer ³	Soil Leachability ³
MADE GROUND	None indicated (Foundry sand expected)	-	High ²
TOPSOIL	None indicated (Topsoil/ re-worked natural materials expected)	-	High ²
MIDDLE COAL MEASURES	Grey shales and sandstones with thin bands and seams of coal	Minor ¹	High ²

¹ Minor Aquifer: These can be fractured or potentially fractured rocks, which do not have a high permeability, or other formations of variable permeability. Although these aquifers will seldom produce large quantities of water for abstractions, they are important both for local supplies and supplying base flows for rivers. In certain local circumstances minor aquifers can be highly vulnerable to pollution.

² Soils of High Leaching Potential: Soils with little ability to attenuate diffuse source pollutants and in which non-adjacent diffuse source pollutants and liquid discharges have the potential to move rapidly to underlying strata or to shallow groundwater.

³ Aquifer and Soil Leachability taken from the Environment Agency's Groundwater Vulnerability Map Sheet II for South Pennines together with the Environment Agency's document 'Policy and Practice for the Protection of Groundwater'.



- 3.1.2 From our researched information, Made Ground in the form of foundry sand from progressive tipping during the foundry's operation is expected to be encountered on the site, particularly in the central and southern areas, as the historical data has shown progressive tipping on the land.
- 3.1.3 From our researched information, including supplied reports, it is known that the site is underlain by Middle Productive Coal Measures which include coal seams that have been worked historically, and that no recorded shafts are present either on or within influencing distance of the site and its boundaries. Further detail, in relation to the mining history of the site, is provided in Section 3.3 below.
- 3.1.4 It is anticipated that the solid strata dip at approximately 1 in 14 to the north-east. In addition, a small unnamed geological fault is shown to be present at the south-eastern boundary of the site. The fault trends approximately north to south with a down-throw to the east.
- 3.1.5 The Envirocheck Report indicates that within 1km of the site there is / are:
- No licenced groundwater abstractions (but four within 2km).
 - Two licenced discharge consents to the south.
 - Two recorded pollution incidents to controlled waters.
- 3.1.6 On the basis of the above information we consider the ground-waters within the vicinity of the site to be of MEDIUM sensitivity.

3.2 Hydrology

- 3.2.1 The nearest surface water features, identified from Ordnance Survey Plans, are listed below:

Table 3.2: Summary of Surface Water Features

Surface Water Feature	Distance from site	Flow direction	GQA Classification*
Culverted Stream	Onsite	south east	Not Available
Knoll Beck (Dearne Tributaries)	950m south	east	Grade "C" in 2000

* GQA = The General Quality Assessment (GQA) Classification scheme is the Environment Agency's national method for classifying water quality in rivers and canals.



3.2.2 The Envirocheck report indicates that within 1km of the site (and up to 2km for certain categories) there is / are:

- No licenced surface water abstractions. (4 up to 2km away, but all have their licences revoked.)
- 2 pollution incidents to surface waters since 1991.
Incidents were classified as "Category 3 - Minor Incidents" by the Environment Agency. They relate to discharges of "sewage" and oils.
- 2 discharge consents to controlled waters, one noted as underground and the other to Knoll Beck in the Deane Catchment area.

3.2.3 The Envirocheck Report states that the site does not lie within a river floodplain.

3.2.4 On the basis of the above information we consider the surface waters within the vicinity of the site to be of MEDIUM to LOW sensitivity.

3.3 Mining

3.3.1 Reference to the Law Society's Guidance Notes and Directory of Coal Mining Searches (1993) indicates that a Coal Authority Report is required for the subject area. A Coal Authority Report is appended to this report as Appendix I.

3.3.2 The Coal Authority Report indicates that the site is in an area known to be underlain by shallow coal seams, which may have been worked by past coal mining. It states that mine workings had been carried out in 14 seams of coal at depths in excess of 90m beneath the site, with the last known date of working being 1980. This is a little misleading because there are other seams shallower than 90m.

3.3.3 The shallower coal seam beneath the site, the Newhill Coal, which is around 0.3m thick. The Newhill Coal outcrops at the northern and eastern part of the site and dips to the east, so the seam should only be present below a small part of the proposed residential development area at the north-east. Underlying the Newhill Coal seam are other worked seams, the next being the Meltonfield Coal at 40m below it. Considering the depth and age of any such workings it is anticipated that any ground movement associated with these workings should have long since ceased.



3.3.4 The Newhill Coal was proved during the physical investigation described below. No other coal seams were found onsite as part of this investigation.

3.4 Quarrying / Landfill

Quarrying

3.4.1 Reference to the Quarry Management "Directory of Quarries, Pits and Quarrying Equipment" 2003/2004, indicates that there are no active quarries within the vicinity of the site, the nearest being some 1.5km away. Consideration of old Ordnance Survey maps, described in 2.2 above, revealed no former quarries or pits on or in the near neighbourhood of the site.

3.4.2 On the basis of the above information, quarrying activity is not considered to be significant in relation to the site.

Landfill

3.4.3 The Envirocheck Report provides details of a licence that had been granted to Wombwell Foundry Ltd to dispose of waste material in a landfill on this site. The licence, referenced WD20 B 142 MOD 4, was granted on 1 Dec 1977, and permitted the on-site disposal of:

- Detergent / Oily waste from machines
- Foundry slag
- Boiler Clinker
- Broken asbestos sheets
- Industrial Non-Hazardous Waste including – Refractory bricks, sand, general foundry debris.

This licence was replaced by another, referenced WD20 B 142 MOD 6, issued on 1 March 1997, permitting only the disposal of waste produced on site, i.e.:

- Boiler clinker
- Industrial Non-hazardous waste including – Refractory bricks, sand, general foundry debris and foundry slag.

The extent of the definitive licenced area is shown on JPB Drawing DS074/08. This is a copy of the original licence plan dated 24.11.77 provided by the Environment Agency and is rather more extensive than the supposed tip area



shown on recent published Environmental Agency maps. The 1977 licensed area is also indicated on JPB Drawing DS074/06.

3.4.4 The Envirocheck Report identifies one other waste treatment or disposal site within 1km of the subject site, a very small scrap-yard 326m north of the site.

3.4.5 Based on the available information, we do not consider landfill gas or leachate to be significant in relation to the subject site.

3.5 Radon Gas

3.5.1 Reference to Building Research Establishment Report 211 'Radon – Guidance on the Protective Measures for New Dwellings' (1999) states that a geological assessment should be carried out and consideration should be given to installing basic protection into new dwellings, if necessary. However the Envirocheck Report, using National Radiological Protection Board data, states that less than 1% of homes in the locality are recorded as being above the radon Action level and that only 'basic' radon protection measures are required in new buildings. The ground investigations described below have demonstrated the presence of carbon dioxide in the ground and it may be noted that standard precaution against this gas will be more robust than might be required to cater for any radon.

3.6 Further Envirocheck Information

3.6.1 The Envirocheck report also indicates that within 1km of the site there is / are:

- 1 authorised Air Pollution Control (APC), onsite but relating to the now discontinued foundry activities;
- 20 contemporary trade directory entries of possible contaminative use (in all directions);
- 1 registered location for the keeping and use of mobile radioactive sources.



4 GROUND INVESTIGATION WORKS

4.1 The ground investigation fieldwork was undertaken between the 29th September and 13th October, and comprised fifteen windowless sampler boreholes, four rotary open-hole drillholes, nine light cable percussive boreholes and fourteen trial pits.

4.2 The operations were supervised by an engineer from JPB and all positions were scanned with a cable avoidance tool (CAT) prior to boring.

4.3 The surveyed positions of the exploratory holes are shown on JPB Drawing DS074/06.

4.4 Windowless Sampler Boreholes

Fifteen windowless sampler boreholes were sunk by a "Competitor 130" drill rig and achieved depths of between 0.65m and 5.00m below existing ground level. In-situ cone penetration tests (CPT's) were taken at approximately metre intervals. The drilling works were undertaken by Integrated Environmental Technology Group (IETG) of Doncaster.

The samples obtained during the drilling process were examined, sampled and logged by the JPB engineer to aid in the production of the appended engineer verified borehole logs (see Appendix A). Selected samples were then scheduled and sent for chemical and physical analysis.

Upon completion, standpipes were installed in selected holes to permit monitoring of groundwater and ground gas. Details of the installations are included on the logs in Appendix A. The remaining windowless sampler boreholes were backfilled with acceptable fine chippings and bentonite pellets.

4.5 Rotary Open-hole Drillholes

Forkers Ltd. of West Bromwich, utilised a "Klemm" drill rig to sink four rotary open-hole drillholes to depths of between 15.0m and 30.0m below existing ground level using air flush techniques. The driller logged the cuttings expelled at the surface and the strata descriptions are provided on the appended drillhole logs in Appendix B.



Upon completion of the drillholes, combined groundwater / ground gas monitoring standpipes were installed in all four drillholes to a depth of 10.0m below existing ground level. The drillholes were backfilled to 10.00m below ground level using a mixture of bentonite cement grout. Slotted pipe, in a pea gravel response zone, was installed from 10.00m to 1.00m below ground level. The installation was then completed to ground level with a solid pipe section, covered with a cap, surrounded by a bentonite seal from 1.00m to 0.50m below ground level and fitted with a concreted lockable security cover at ground level.

4.6 Light Cable Percussive Boreholes

A.C. (Soil) Drilling Service, of Worksop, was commissioned to sink 9 light cable percussive boreholes to depths of between 4.50m and 9.00m below existing ground level using a Dando 150 'Shell and Auger' rig. (BH28A was abandoned at 1.50m due to an obstruction and was backfilled with arisings.) In-situ cone penetration tests (CPT's) and standard penetration tests (SPT's) were taken at approximately metre intervals.

The samples obtained during the drilling process were examined, sampled and logged by the JPB engineer to aid in the production of the appended engineer verified borehole logs (see Appendix C). Selected samples were then scheduled and sent for chemical and physical analysis.

Upon completion of the boreholes, combined groundwater/ ground gas monitoring standpipes were installed in all of the boreholes. Details of the installations are included on the logs in Appendix C.

4.7 Machine Excavated Trial Pits

Johnson Poole & Bloomer also supervised the excavation of 14 machine excavated trial pits using a JCB 3CX machine. A breaker attachment was utilised in order to break through surface concrete slabs within the buildings.

Again samples were taken of each horizon encountered during the excavations, sampled and logged by the JPB engineer to aid in the production of the engineer verified trial pit logs (see Appendix D). Selected samples were then scheduled and sent for chemical and physical analysis.



1.8 Monitoring Installations

Monitoring of groundwater levels and ground gases, including methane, carbon dioxide, oxygen, carbon monoxide, hydrogen sulphide and atmospheric pressure, was undertaken by JPB on two occasions, from the standpipes installed on site, using a dipmeter and a GA2000 infra red gas analyser. Gas and groundwater monitoring has been undertaken on two further occasions to date by Waste Management Associates (WMA) and is continuing on a monthly basis. WMA are using a GMH Landsurveyor II, Gas Data GF60, GMH Visa and dipmeter.

The results of all the gas and groundwater observations to date are presented in Appendix G.



5 GROUND CONDITIONS

5.1 Made Ground

Made Ground deposits were identified in all the exploratory holes except TP10 and TP14. The greatest thickness was encountered in BH 23 (at the southern end of the foundry buildings) which proved predominantly foundry sand fill to a depth of 8.80m below existing ground level. The thickness of Made Ground varies across the site, being typically less than 4.0m thick beneath the foundry buildings and greater than 4.0m beneath the former landfill area. The Made Ground is overwhelmingly foundry sand, along with general foundry waste produced on site. This includes clinker, slag, broken refractory bricks and a small amount of tramp metal.

Standard Penetration Tests (SPT's) or Cone Penetration Tests (CPT's) were undertaken in the windowless sampler and cable tool boreholes, typically at 1.0m intervals, to determine the strength of the Made Ground. The penetration test results varied laterally across the site and also with depth, indicating the variable and uncontrolled nature of the deposition of these materials. SPT/CPT 'N' values within the Made Ground varied from 4 to refusal (greater than 50). Typical values were less than 20, which suggests a loose to medium dense consistency.

5.2 Natural Superficial Deposits

Natural superficial deposits were encountered in the majority of exploratory holes and comprised weathered materials derived from the underlying silty sandstone bedrock. The superficial deposits were generally encountered at less than 2.0m depth around the edges of the site. They were identified as stiff to very stiff clays or gravelly clays, the gravel component being of underlying bedrock regolith origin, as the superficiais grade into weak weathered rockhead



5.3 Solid Geology

The anticipated Middle Coal Measures solid geology was proved in all of the rotary open-holes, generally to a depth of 30m around the site (15m in BH19). The strata encountered, which were logged by the driller, consisted of sandstones with mudstone bands. Towards the east and north on the site these sandstones were found to be overlain by mudstone with occasional bands of shale and shaley coal seams.

A 'firm shaley coal' was identified in BH19 (at the NE of the site near the Hough Lane boundary) at 11.5m to 13.0m depth below ground level, and a 0.2m thick coal seam was identified at 3.7m depth in BH12 (a windowless sampler borehole also located in the north-eastern area of the site).

5.4 Groundwater

Groundwater strikes were recorded only in windowless sampler boreholes BH11 at 2.50m and BH14 at 4.40m depth below existing ground-level. The remainder of the windowless sampler boreholes and all of the trial pits were recorded as 'dry'. A slight water entry was recorded in rotary open-hole BH16 which dried out, and a 'medium' water inflow was noted in rotary open-hole BH19. A water seepage was noted in cable percussive BH23 at 8.0m. The remainder of the rotary open-hole and cable percussive boreholes were recorded as dry. The water entries are summarised below in Table 5.4.

Table 5.4: Summary of Groundwater Strikes during Site Investigation

Location	Approx. Surface Level (mAOD) ¹	Strike Level (mbgl) ² [mAOD]	
BH11	73.77	2.5	71.27
BH14	80.97	4.4	76.57
BH16	74.90	24.0	50.90
BH19	80.65	13.8	66.85
BH23	73.65	8.0	65.65

¹ mAOD – Metres Above Ordnance Datum ² mbgl – Metres Below Ground Level



From the results of the investigation there appears to be a large difference in strike water levels, however, the groundwater strikes were slight and generally dried out during the drilling. The groundwater levels recorded during the subsequent monitoring are discussed in Section 6.5.

5.5 Physical Laboratory Testing

Physical laboratory testing was scheduled on a number of disturbed samples to aid classification of the near surface soils. The testing was undertaken to British Standard Methods, BS1377:1990 'Soils for civil engineering purposes', at the UKAS accredited laboratories of Ground Investigation & Piling Limited. (UKAS number 1897).

The tests scheduled and undertaken were;

- 18 moisture content determination tests,
- 3 liquid and plastic limit determination tests,
- 2 particle size distribution,
- 2 particle density tests and
- 2 compaction tests using a 2.5kg rammer in a CBR mould.

A summary of the physical test results is presented in Appendix E.

5.6 Ground Contamination

Chemical Testing: - soil samples taken from the boreholes and trial pits were examined by a JPB engineer, who selectively sub-sampled and dispatched representative samples to the UKAS accredited laboratory Analytical & Environmental Services (AES). A total of 43 soil samples were analysed for the following suite of contaminants:

Arsenic, Cadmium, Chromium, Hexavalent Chromium, Lead, Iron, Mercury, Selenium, Zinc, Copper, Nickel, Sulphate (total), pH, Total cyanide, speciated PAH (Polycyclic Aromatic Hydrocarbons), TPH, Phenol, Sulphide, Thiocyanate, Manganese, Thiocyanate, Nitrate and Chloride.

The results, presented in Appendix F, have been assessed using the Contaminated Land Exposure Assessment (CLEA) Model, published by the Department for the Environment, Food and Rural Affairs (DEFRA) and the Environment Agency (EA) in April 2002. The model estimates contaminant intake and uptake from soil as a function



of contaminant concentration and the potential average daily human exposure to soil contamination. The model derives Soil Guideline Values (SGV) which provide a means of assessing chronic (long-term) risks to human health in accordance with the statutory guidance. The SGV can also be used to inform the selection of remediation standards or target values for individual sites.

Statistical tests have been undertaken on the chemical results in which the SGV is compared with the upper 95th percentile of the mean measured concentration (US95) of the contaminant. At this stage, SGVs are only available for seven contaminants; arsenic, cadmium, chromium, mercury, nickel, selenium and lead. All other contaminants have undergone this same statistical test, but instead have been compared to either;

- The New Dutch List (2000) as set out by the Ministry of Housing, Spatial Planning and Environment in The Netherlands, or;
- Former ICRCI trigger concentrations as set out in Guidance Note 59/83 (2nd edition)¹.

IMPORTANT NOTE On advice from the Environment Agency, and in consultation with other government departments, the ICRCI Guidance Note 59/83 (2nd edition), which contained trigger concentrations for contaminants, was officially withdrawn on 20th December 2002. The DEFRA/Environment Agency CLEA Model and the New Dutch List do not cover all contaminants and, therefore, currently there are no published SGVs for some of the contaminants of concern on this site. In such cases, a risk assessment using site specific criteria has been considered to establish the potential impact of contaminants to human health. Advice has been sought from Contaminated Land Branch Advice Notes (CLAN) 3.0.2 "note on the Withdrawal of ICRCI Trigger Values".

When the 95th percentile of the data set is lower than the SGV or equivalent value, it is unlikely that further action would be required with respect to the risk to human health. However, if the data set fails the tests, the results are further assessed on the basis of professional judgement and quantitative risk assessment. If further assessment identifies a moderate or high risk associated with any contamination, some form of remediation would normally be required.

In addition, a further statistical test known as the "Maximum Value Test" is undertaken to determine whether the recorded concentrations of contaminants fall within the range of values that can be expected to be consistent/representative from the data set. Data points that do not fall within the expected distribution of the data set are termed "outliers" and may be discounted as not being representative of the site as a whole.

The table below compares the statistical results of the investigations with the relevant guidelines. The test results have all been assessed against the latest CLEA and other relevant guidelines.

5.7 Soils Analysis

The site is being considered for a residential development. Therefore, the chemical results for soil have been assessed in relation to residential with plant uptake and use. The results are presented within Appendix F and summarised in Table 5.7 below.

Table 5.7

Soil Contamination Results Compared to CLEA, Dutch & ICRL² Guidance for Residential End Use

Determinant	No Tested	Units	Guidance level	CLEA US95 Value	Exceeds SGV or Eq.
Argent	43	mg/kg	20 ¹	22.69	Yes
Cadmium	43	mg/kg	1 ¹	0.60	No
Chromium	43	mg/kg	130 ¹	137.97	Yes
Chromium VI	43	mg/kg	n/a	1.00	-
Copper	43	mg/kg	190 ²	91.51	No
Mercury	43	mg/kg	8 ¹	0.1	No
Nickel	43	mg/kg	50 ¹	142.71	Yes
Lead	43	mg/kg	450 ¹	241.72	No
Selenium	43	mg/kg	35 ¹	0.47	No
Zinc	43	mg/kg	140 ²	99.08	No
Sulphide	43	mg/kg	250 ³	201.85	No
Thiosyanate	43	mg/kg	20 ²	1.55	No
PAH	43	mg/kg	40 ²	20.09	No
Phenol	43	mg/kg	40 ²	1	No
Sulphate	43	mg/kg	2000 ³	999.29	No
pH	43	units	<5	8.16	No
Cyanide (complex)	43	mg/kg	5	1.14	No
Cyanide	43	mg/kg	1 ²	1.24	Yes
Sulphur	43	mg/kg	5000 ³	1105.64	No
Manganese	43	mg/kg	n/a	1594.38	-
Iron	43	mg/kg	n/a	57923	-
Chloride (BRE)	43	mg/kg	SD1	37.09	-
Nitrate (BRE)	43	mg/kg	SD1	3.17	-

Notes ¹ CLEA SGV (residential with plant uptake)

² Dutch Action level

³ Former ICRL values, as they were withdrawn 20 December 2002.

(BRE) SD1 = Building Research Establishment Special Digest 1.

* All values below Laboratory Detection Limit

US95 = 95th percentile of mean measured concentration



5.8 Groundwater and Leachate Analysis

Twelve samples of leachate, prepared from samples of Made Ground, were analysed for a specific suite of contaminants in order to determine the mobility of determinands encountered in the soils. Two groundwater samples were also taken during the second monitoring visit (only two standpipes contained sufficient water for testing).

The results have been compared with 'Concentration Values' of the 'Water Supply (Water Quality) Regulations 2000'. Where a concentration value is not published under the 2000 Water Supply Regulations, other guidance has been consulted, including the 1989 Water Supply Regulations, as well as 'Action Values' under the Dutch Guidance Values. The laboratory results are presented in Appendix F and summarised in Table 5.8 below.

Table 5.8

Groundwater and Leachate Analysis Results compared to Water Supply (Water Quality) Regulations (WSR) 2000 & 1989 & Dutch Guidance

Determinand	No. Tested	Units	Guidance level	CLEA US95 Value	Exceeds SGV or Eq.
Arsenic	12	mg/l	0.01 ¹	0.003	No
Boron	2	mg/l	1 ¹	n/a	No
Chromium	14*	mg/l	0.05 ¹	0.02	No
Copper	14	mg/l	2 ¹	0.01	No
Iron	14	mg/l	200 ¹	0.77	No
Magnesium	2	mg/l	50 ²	n/a	No
Manganese	14	mg/l	50 ¹	0.81	No
Chloride	14	mg/l	250 ¹	23.23	No
Nickel	14	mg/l	0.02 ¹	0.02	Yes
Lead	14	mg/l	0.025 ¹	0.02	No
Zinc	12	mg/l	5 ²	0.03	No
Sulphate	14	mg/l	250 ¹	100.34	No
Mercury	14*	mg/l	0.001 ¹	0.00008	No
Selenium	14*	mg/l	0.01 ¹	0.0005	No
Total Phenols	14*	mg/l	0.0005 ²	0.02	Yes
Cyanide Total	14	mg/l	0.05 ¹	0.04	No
Cyanide Complex	14*	mg/l	1.5 ²	0.03	No
Nitrate	14*	mg/l	50 ¹	0.5	No
Cadmium	14*	mg/l	0.005 ¹	0.002	No
Ammonia	2	mg/l	0.5 ¹	n/a	No
Nitrite	2*	mg/l	0.5 ¹	n/a	No
BOD	2	mg/l	n/a	n/a	No
Phosphate	2*	mg/l	2.2 ²	n/a	No



- Notes: 1 Water Supply (Water Quality) Guidelines 2000
2 Water Supply (Water Quality) Guidelines 1989
3 Dutch Guidance Value
US95 = 95th percentile of mean measured concentration
* All results below laboratory detection limit

5.9 Ground Gases/Groundwater Levels

Ground gas monitoring of the eighteen standpipes installed within the drill holes and boreholes has been undertaken on four occasions to date. Monitoring continues on a monthly basis in order to determine trends. The standpipes were monitored on the first two occasions by JPB with a Geotechnical Instruments GA2000 infra-red gas analyser, which measures levels of methane, carbon dioxide, carbon monoxide, oxygen, hydrogen sulphide and atmospheric pressure, as well as the flow rate during the monitoring. The standpipes were monitored on the third and subsequent occasions by WMA with a GMI Landsurveyor II, Gas Data GF60 and GMI Visa. The results are attached as Appendix G.

Borehole groundwater levels have been monitored on most occasions after gas readings were taken in standpipes, the bungs were removed and the standpipes were dipped with a dipmeter to record the level of water. The water levels are included on the ground gas monitoring results sheets within Appendix G.



6 DISCUSSION

- 6.1 This report is written on a factual basis for the prospective purchasers to interpret the data. The discussion is based on the site being developed for a residential end-use with parts remaining as open space and green belt. It is for the prospective purchasers to determine the proposed layout and ground levels.

Within the southern part of the site an area remains subject to a Waste Management Licence. As part of this investigation and the ongoing monitoring, information is being compiled for the purpose of surrendering this licence. A separate report will be compiled, and a meeting is proposed with the Environment Agency, for the purpose of surrendering the licence in the early part of 2004.

6.2 Site Conditions

The site currently contains the disused foundry buildings, the demolition of which is proposed to start in the early part of 2004. The buildings are proposed to be demolished to the top of existing ground floor slabs, leaving the site levelled to existing ground level. It is not intended to re-grade the site levels as part of these works. The existing ground levels and extent of the main foundry buildings are shown on JPB Drawing DS074/06.

6.3 Physical Ground Conditions

As detailed in Section 5, Made Ground deposits were identified within all the exploratory holes except TP10 and TP14, to variable depths between 0.50m and 8.80m below existing ground level.

The Made Ground deposits mainly comprised foundry sand, along with general foundry waste produced on site, which included clinker and slag. No signs were found of asbestos-cement sheets or oily wastes of the sort permitted when the Site Licence was first issued. Topsoil was recorded in TP10 towards the east of the site.

Below the Made Ground deposits, natural deposits were encountered comprising clays or gravelly clays. The competence of the clays was proven with SPT/CPT tests and found to be predominantly stiff to very stiff.



Atterberg Limit Determinations were undertaken on three samples of the clay soils. The 'plasticity' of two of the clay samples were 'high' and 'very high', with Plasticity Index results of 30% and 44%. The third sample, taken from a layer in TP2 from 3.2-3.85m, had the general appearance of a compact peat. It had an extremely high Plasticity Index of 131% and Liquid Limit of 239%. The results of these tests are included in Appendix E, along with a summary graph, which show the results against the Atterberg Limit A-Line.

Compaction tests were undertaken on two samples of Made Ground, one from BI122 and a second combined sample from TP20, TP21 and TP26. The compaction tests utilised the 2.5kg rammer in a CBR mould. The Particle Density and Particle Size Distribution were also determined for both of these samples. The results of these tests are included in Appendix E.

The bedrock, comprising weathered sandstones and mudstone bands, was logged by the rotary drillers and described as competent.

6.4 Contamination Results

Soil Results

For residential end use, and in terms of human health the results of the 'total' analysis have been compared to the latest CLEA guidelines, or other appropriate guidance where guideline levels have not yet been produced by CLEA.

For assessment purposes all results below the laboratory detection limit are assumed to have a value at the detection limit. This means that great care must be taken in interpreting the results, so that over-pessimistic conclusions are not reported. Realistically, it is considered highly likely that the majority of those results reported as being at the detection limit are, in practice significantly below the detection limit.

For the 'total' soil results, Arsenic, Chromium, Nickel, and Cyanide were found to be elevated when compared to relevant guideline values. The contamination was found to be distributed around the site, both at near surface and at depth, predominantly within the Made Ground.



The SGV for Arsenic is 20 mg/kg, and the US95 value determined was 22.69 mg/kg. The highest result determined for Arsenic was 70 mg/kg in BH15 at 0.3m to 0.65m depth below existing ground level, within Made Ground towards the Hough Lane site boundary. For the site as a whole, the Arsenic values exceeding the SGV were widely distributed both laterally and with depth.

The SGV for Chromium is 130 mg/kg, and the US95 value determined was 137.97 mg/kg. The highest result determined for Chromium was 620 mg/kg in BH5 at 1.7m to 2.5m depth below ground level, within Made Ground materials in the south of the site. For the site as a whole, the Chromium values exceeding the SGV were located within the southern part of the foundry buildings area and the south of the site.

The SGV for Nickel is 50 mg/kg, and the US95 value determined was 142.71 mg/kg. The highest result determined for Nickel was 1100 mg/kg in TP8 at 0.5m to 0.7m depth below ground level, within Made Ground materials near the southern boundary of the site. For the site as a whole, the Nickel values exceeding the SGV were widely distributed both laterally and with depth.

The appropriate guideline (Dutch Guidance Action Level) for Total Cyanide is 1mg/kg and for Complex Cyanide is 5mg/kg. The US95 value determined for Total Cyanide was 1.24mg/kg, which exceeds the guidance level. The US95 value determined for Complex Cyanide is 1.14mg/kg which does not exceed the guidance levels. Total Cyanide is the combination of Complex Cyanide and Free Cyanide, although values for free cyanide were not obtained it can be assumed that the US95 value would be approximately 0.1mg/kg and therefore does not exceed the Dutch guidance level of 1mg/kg. The highest result determined for Total Cyanide and for Complex Cyanide was 48mg/kg in BH15 at 0.50m depth below ground level, within Made Ground materials towards the Hough Lane site boundary. However, for the whole of the site, the Total and Complex Cyanide values exceeding the Dutch Guidance level were located around the foundry buildings.

The US95 values for Zinc, Copper and Lead did not exceed the SGV or equivalent guideline levels. However some samples showed elevated levels. These were widely distributed both laterally and with depth.



As previously discussed, for calculation purposes all results below the detection limit were given a value the same as the detection limit. The detection limit for four of the PAH components is 1mg/kg and the relevant guideline (USEPA) is 0.6mg/kg. Therefore, the majority of the results were below the detection limit and it is possible that these samples are also below the guidance values. It should be noted that the relevant guidelines are widely considered to be very stringent in this respect. For clarification on the PAH components, the Total PAH US95 value does not exceed the Dutch Guidance value and only two of the Total PAH values exceed the SGV.

Leachate results

To assess the potential implications of any contamination upon the environment, the leachability/mobility of any contaminants present has been assessed. The leachate results have been compared against very stringent guidelines, including the 'Water Supply Regulations 2000'.

As previously discussed, for calculation purposes all results below the detection limit were given a value the same as the detection limit. The detection limit for five of the PAH components is 0.0001mg/kg, and the relevant guidance (Dutch) is 0.00005mg/kg for four of the components and Water Supply Regulations 2000 guidance of 0.0001mg/kg for the fifth. Therefore, the majority of the results were below the detection limit and it is possible that these samples are also below the guidance values. It should be noted that the relevant guidelines are widely considered to be very stringent in this respect.

Elevated levels of Total PAH were also recorded in the leachate analysis. The Water Supply Guideline 2000 threshold for Total PAH is 0.0001mg/kg, which is the laboratory detection limit. The US95 value for the leachate is 0.0007mg/kg, with a maximum value (determined to be an 'outlier') of 0.00253 mg/kg. For the site as a whole, the four highest Total PAH values exceeding the relevant guideline value were widely distributed both laterally and with depth.

One Nickel result exceeded the SGV (Water Supply Guidelines 2000) guidance, but this was assessed as an 'outlier', so the data set as a whole was determined to be below the US95 value.



The two water samples that were taken had Magnesium results of 63 and 68 mg/kg, which were higher than the Water Supply Guideline 1989 threshold of 50 mg/kg.

The two water samples also had Ammonia results of 0.6 and 0.7 mg/kg, which were higher than the Water Supply Guideline 2000 threshold of 0.5 mg/kg.

The conclusion to be drawn from the leachate testing is that the potential contaminants in the Made Ground deposits on this site have only very low water-solubility.

6.5 Groundwater

Monitoring of standpipes installed in eighteen of the twenty eight boreholes has recorded 'standing water' at depths of between 1.2m and 7.5m below existing ground level. In view of the large variation of ground levels across the site, expressing groundwater levels in relation to the depth below ground may be misleading and hence consideration of groundwater levels in terms of mAOD is vital.

The shallowest groundwater was encountered in BH12, towards the north of the site at 1.2m below the surface. When expressed in terms of mAOD the groundwater levels were lower towards the south of the site. A summary of the groundwater levels in depth below existing ground levels and mAOD of the monitored boreholes is provided in Table 6.5 below.



Table 6.5 – Summary of Shallowest Groundwater Levels

Location	Shallowest Reading (mbgl)	Shallowest Reading (mAOD)
BH13	dry to 2.78m	below 71.85
BH16	dry to 5.45m	below 68.32
BH18	dry to 2.44m	below 64.82
BH19	dry to 4.45m	below 66.17
BH12	1.2	76.42
BH16	dry to 10.0m	below 64.9
BH17	5.25	67.89
BH18	2.4	74.38
BH19	4.15	76.5
BH20	6.11	67.75
BH21	4.3	70.16
BH22	7.42	65.91
BH23	7.45	66.20
BH24	dry to 5.00m	69.37
BH25	3.12	71.77
BH26	7.4	66.74
BH27	dry to 4.50m	below 68.17
BH28	dry to 4.50m	below 66.15

mbgl – metres below existing ground level

mAOD – metres Above Ordnance Datum.

6.6

Ground Gases

Ground gas monitoring has been undertaken in eighteen standpipes installed during the investigation. Monitoring has been undertaken on four occasions to date, the results are included within Appendix G.

Methane has been recorded in eight of the installations, with a maximum concentration of 0.5% by volume recorded in BH27 on the third of the monitoring visits. BH27 is within the southern licenced area, at a location not proposed at this stage for housing development. The seven other installations with positive readings recorded methane only on the first visit, at a maximum concentration of 0.2% by volume, and have recorded no methane subsequently. The other ten installations monitored did not record any methane during the monitoring period.



Carbon dioxide was recorded in twelve of the installations at slightly elevated concentrations (above 1.5% volume). The maximum measured carbon dioxide was 5.3% volume within BH17 on the third monitoring visit. BH17 is within the eastern part of the site currently zoned as green belt.

Levels of oxygen remained generally high and near to normal atmospheric concentrations during the monitoring period. A drop in oxygen concentration was typically noted in association with an increase in the carbon dioxide level. The oxygen content was particularly depleted in three of the holes in the southern licenced part of the site, with a Nil reading recorded in BH27 on the second monitoring visit.

Carbon Monoxide was recorded at a maximum level of 3 ppm (parts per million) in BH21 on the first monitoring visit. The levels of carbon monoxide detected have been at consistently low level during the monitoring period, and should have no influence on the proposed development.

No hydrogen sulphide was detected in any of the standpipes on any of the monitoring visits.

None of the holes have recorded significant flow rates either out or in any of the monitoring occasions. That would be consistent with no active generation of landfill gases.

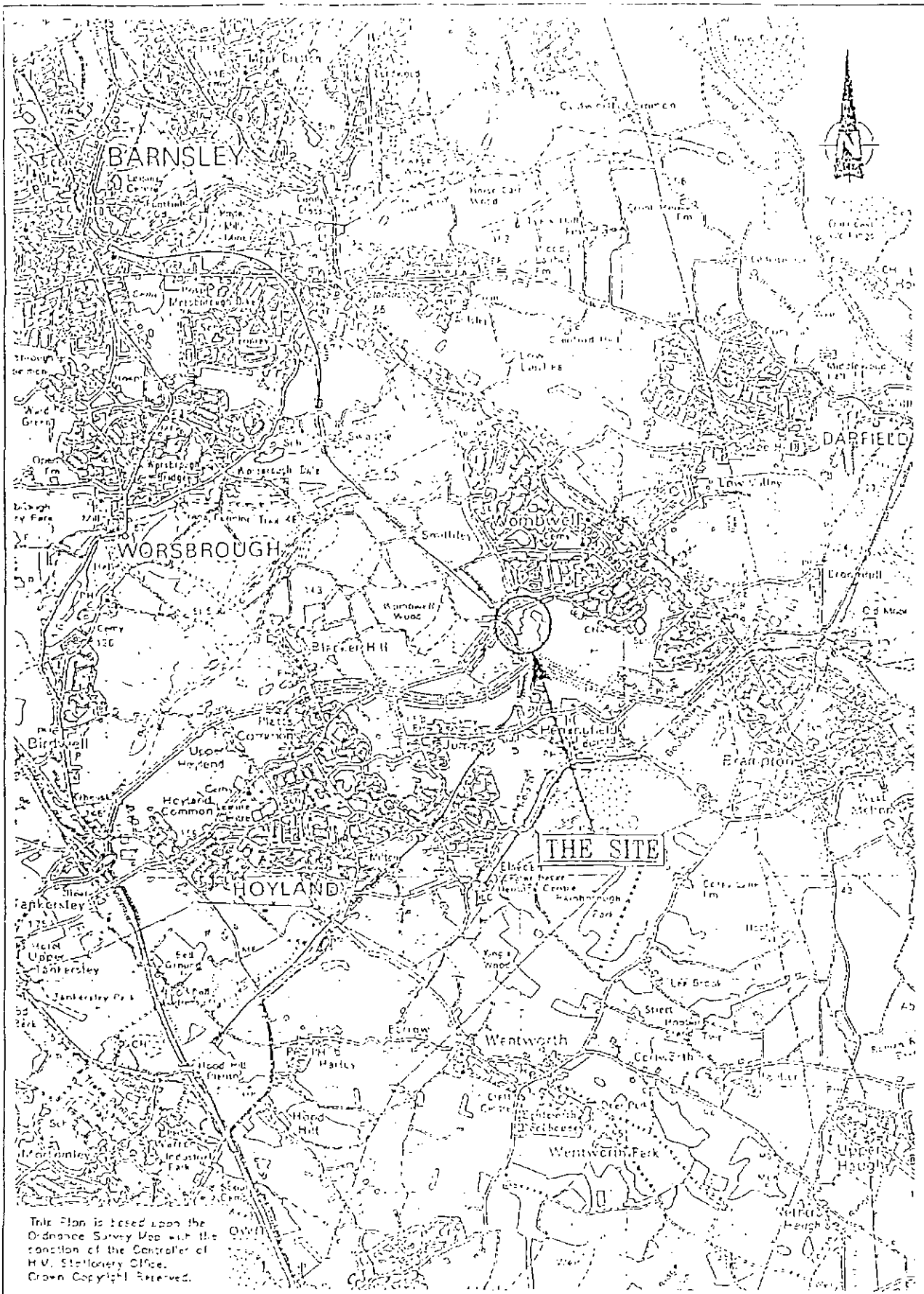


7.0 GENERAL

- 7.1 Whilst confident in the findings of our report we are unable to give an assurance that they will be accepted by other authorities without question. We therefore advise that where appropriate our report and associated matters are submitted to approving bodies and approval obtained or sought before detailed design, site works or other irrevocable action is embarked upon.
- 7.2 The conclusions reached are directly related to the information available. Such conclusions may change in the light of more data or information becoming available. The recommendations contained in this report do not constitute any form of specification for the undertaking of the works required.
- 7.3 We trust that this report fulfils your present requirements, but if there is any matter, about which you require elaboration, do not hesitate to contact the undersigned

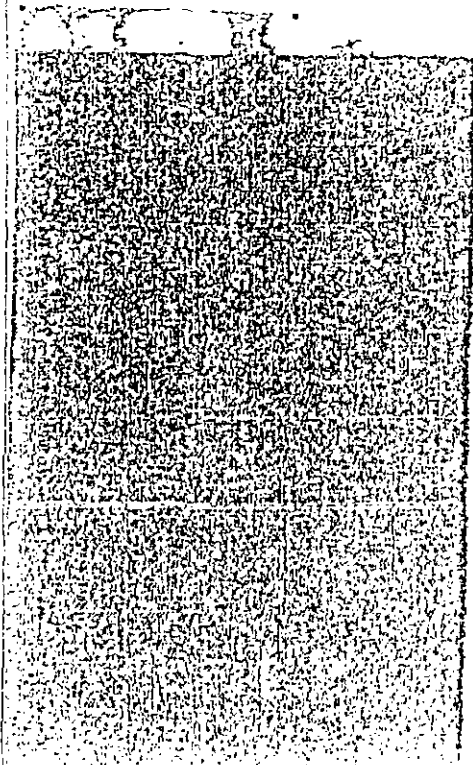
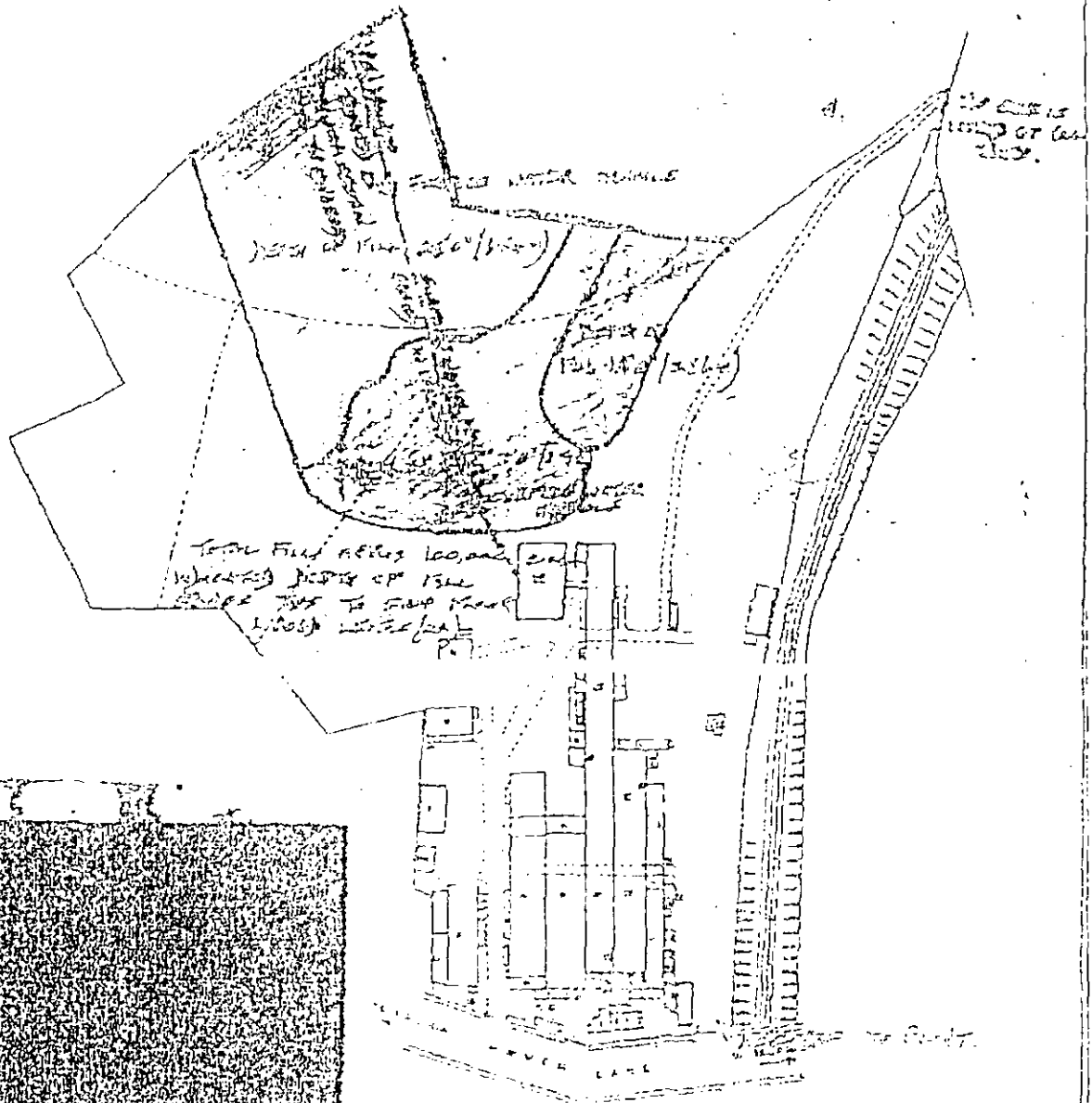
Simon Weatherley BEng FGS
Senior Geotechnical Engineer

Colin Knipe BSc CEng CGeol
Senior Partner



JOHNSON POOLE & BLOOMER LAND CONSULTANTS	Engineer <i>SW</i>	Client HILL AND SMITH HOLDINGS	Title GENERAL SITE LOCATION	
	Dashed <i>M</i>	Notes WOMBWELL FOUNDRY, WOMBWELL		
	Approved <i>[Signature]</i>	Date 30/10/03	Scale 1:50,000	Drawing DS074/C

WOODWELL FOUNDRY & ENGINEERING CO LTD
WOODWELL - N BARKSLEY

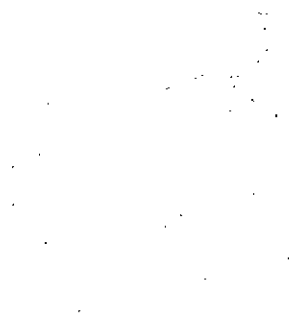


JOHNSON POOLE & BLOOMER LANDSCAPE ARCHT	Engineer C. W. B. Office C. W. B. Surveyor C. W. B.	Client: WOODWELL & SMITH HOLDINGS LIMITED Project: WOODWELL FOUNDRY Date: 05/02/54 Scale: N.T.S.	File: 10074/13 Original License No. 10074/13 Dated: 04/01/77
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THE 11



THE 11





APPENDIX A

Windowless Sampler Borehole Logs.

BOREHOLE LOG

JPR

Client: Bill & Sarah Holdings				Borehole No BH1	
Project: Wombwell Foundry				Full Depth: 4.38m	
Job No: D3071	Date: 26-9-05	Ground Level (m): 78.43	Coordinates (E)		
				Sheet: 1 of 1	

SAMPLES & TESTS			Water	Instrument	Backfill	STRATA			Geology
Depth	Type No	Test Result				Reduced Level	Legend	Depth (Thickness)	
0.00-0.20	D1					78.23		0.20	
0.20-0.45	D2					77.08		0.45	
0.45-0.80	D3					77.62		0.80	
1.00-1.45	CPT	5							
2.00-2.45	CPT	6							
3.00-3.45	CPT	9							
4.00-4.38	CPT	25 blows for 150mm / 50 blows for 225mm				74.05		4.38	
0.00-0.20: Gravel Over MADE GROUND. Brown slightly silty sandy fine to coarse angular to subangular GRAVEL of limestone substrate. 0.20-0.45: MADE GROUND. Black silty slightly gravelly fine to coarse SAND. Gravel is of fine to medium angular clay and brick. 0.45-0.80: MADE GROUND. Light brown slightly sandy SILT. 1.00-1.45: MADE GROUND. No Recovery below 1m although the sampling barrels were dirty when recovered from the borehole indicating made ground. 2.00-2.45: (2.50) 3.00-3.45: (2.50) 4.00-4.38: (2.50)									

Boring Progress and Water Observations						Chiselling			GENERAL REMARKS
Date	Time	Depth	Logging	Strike	Standing	From	To	Hours	Notes and Ground recovered below

All dimensions in metres Scale 1:50	Contractor: HETG	Method: WINDOWLESS SAMPLING Machine: COMPETITOR 150 ERG	Logged By: AL
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BOREHOLE LOG

JPB

Client: Hill & Smith Holdings				Borehole No:
Project: Wentwood Foundry				BH2
Job No: DS074	Date: 29-07-05	Ground Level (m): 74.70	Co-Ord (m S.D):	Total Depth: 2.11m
				Sheet: 1 of 1

SAMPLES & TESTS			Water	Borehole	STRATA			Geology
Depth	Type No	Test Result			Reduced Level	Log No	Depth (m S.D)	
0.30-0.65	B1	4			74.70		0.30	MADE GROUND - Concrete MADE GROUND - Light brown slightly clayey sandy fine to coarse subrounded to rounded GRAVEL of Quaternary and the borehole with some cobbles staining and occasional fine to medium grained gravel of clay. Soft Light brown sandy CLAY (Formerly worked)
0.30-0.65	D1				74.65		0.65	
0.90-1.50	B2	22					(2.07)	Very weak, light brown / grey SILTSTONE Distinctly weathered
0.90-1.50	D2							
1.00-1.45	CPT							
2.00-2.45	CPT	22			74.60		2.70	
2.70-3.00	D3	23 Blows for 30mm 23mm 50 Blows for 35mm			74.50		(0.41) 3.11	
3.00-3.11	CPT							

Boring Progress and Water Observations						Chiselling			GENERAL REMARKS
Time	Time	Depth	Chiselling	Stroke	Sampling	Time	In	Hours	
Additional remarks in notes						Method: WINDROWLESS SAMPLING			Logged By: JL
Scale 1:50						Machine: COMPETITOR 150 KJG			

BOREHOLE LOG

JPB

Client: HBI & Smith Holdings				Borehole No: BH3	
Project: Wombwell Foundry				Full Depth: 2.78m	
Job No: DS974	Date: 12-07-03	Ground Level (m): 71.63	Coordinates (E)		Sheet: 1 of 1

SAMPLES & TESTS			Water	Instrument	Backfill	STRATA			Geology
Depth	Type No	Test Result				Reduced Level	Legend	Depth (Meters)	
0.00-0.30	D1					71.55		0.30	MADE GROUND - White sandy fine to coarse angular GRAVEL of limestone & shale
0.30-0.45	D2					71.48		0.15	MADE GROUND - Black slightly silty sandy fine angular GRAVEL of slag, clinker and occasional sandstone
0.45-1.20	D3								Loose to medium dense Light brown slightly silty slightly sandy fine to coarse angular GRAVEL of silty sandstone
1.00-1.45	CPT	10						(2.05)	
1.20-2.50	B1								Medium dense below 2.0m
2.00-2.45	CPT	26				71.43		2.50	
2.50-2.70	D4					71.35		2.70	Very weak light brown light grey silty SANDSTONE. Distinctly weathered
2.70-2.78	CPT	25 Blows for 30mm / 50 blows for 50mm							

Boring Progress and Water Observations						Casing			GENERAL REMARKS
Date	Time	Depth	Casing	Strike	Standing	From	To	Hours	

All dimensions in metres Scale 1:50	Contractor: HITG	Method: WINDOWLESS SAMPLING Machine: COMPETITOR 1300G	Logged By: JL
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BOREHOLE LOG

JPB

Client: DHE & Smith Holdings							Borehole No:	
Project: Wombey, H.E. Inc.							BUH4	
Job No: D5074		Date: 28.06.96		Current Level on 1: 74.08		Elevation (m):		
						Full Depth: 3.17m		
						Sheet: 1 of 1		

SAMPLES & TESTS			Water	Instrument	Place	STRATA			Locality
Depth	Type	Test				Depth (m)	Depth (m)	DESCRIPTION	
0.00-0.25	D1					74.73	0.25	MADLE GROUND - Brown slightly silty clay fine to coarse angular to subangular GRAVEL of lignite and silty clay.	
0.25-0.50	D2					74.68	0.50	MADLE GROUND - Black slightly silty clay fine to coarse angular to subangular GRAVEL of lignite and silty clay.	
0.50-0.90	D4					74.68	0.90	MADLE GROUND - Brown sandy slightly gravelly CLAYSHALE. Gravel fine to medium subangular to subrounded, silty sandstone (probably reworked).	
0.90-1.15	D3		13						
1.15-1.50	D3						1.50	Light brown slightly silty slightly sandy fine to coarse angular to subangular GRAVEL of silty sandstone (22-structured bedded).	
						72.78	2.25		
2.00-2.45	CPT		59					Very weak light brown light grey silty SANDSTONE. Distinctly weathered.	
2.25-2.70	D5						(0.57)		
3.00-3.17	CPT	25 Blows for 75 cm depth. 25 cm for 10 cm.				71.51	3.17		

Boring Progress and Water Observations						Chiselling			GENERAL REMARKS	
Date	Time	Depth	Core	Scale	Striking	From	To	Hours		

All measurements in metres		Contractor: H.E.G.		Method: WINDOWLESS SAMPLING		Page 1 of 1	
Scale 1:50				Machine: CONQUESTOR 150 EIG			

BOREHOLE LOG

JPB

Client: Hill & Smith Holdings				Borehole No BH5	
Project: Woodswell Foundry				Full Depth: 5.18m	
Job No: DS074	Date: 20.09.03	Ground Level (m): 73.05	Grid Co-ordinates (m)		Sheet: 1 of 1

SAMPLES & TESTS			Water	Instrument Backfill	STRATA			Geology
Depth	Type No	Test Result			Reduced Level	Legend	Depth (Thickness)	
0.00-0.40	D1				73.63		(0.40) 0.40	MADE GROUND: Dark brown slightly gravelly fine to coarse SAND. Gravel is fine to coarse rounded compressed sand. Bunchy. Slight.
0.60-1.00	D2				73.25		(0.40) 1.00	MADE GROUND: Orange slightly gravelly fine to coarse SAND. Gravel is fine to coarse compressed sand. Yellow gravel.
1.00-1.60	D3	18			73.05		(0.60) 1.60	MADE GROUND: Dark mottled grey fine to coarse SAND. Bunchy sand.
1.60-1.45	CPT				72.45		1.45	MADE GROUND: Medium dense brown slightly silty sandy fine to coarse angular GRAVEL of slag and clastic.
1.70-2.50	D4	17			72.25		(0.80) 2.50	MADE GROUND: Orange gravelly fine to coarse SAND. Gravel is of fine to medium angular darker. Yellow gravel.
2.50-3.00	D5							MADE GROUND: Medium dense dark brown slightly silty sandy fine to coarse angular GRAVEL of slag and clastic.
3.00-3.45	CPT	7					(2.65)	Soft light brown orange and white sandy slightly gravelly CLAYSILT. Gravel is fine to medium subrounded to rounded silty sand, trace, rounded silty sandstone.
4.00-4.45	CPT	33						
5.00-5.18	CPT	25 blows for 60mm / 50 blows for 40mm			68.57		5.18	

Boring Progress and Water Observations						Chiselling			GENERAL REMARKS
Date	Time	Depth	Casing	Stroke	Striking	From	To	Hours	
									Poor recovery from 3.50m to 5.00m

All dimensions in metres Scale 1:50	Contractor: BETG	Method: WINDOWLESS SAMPLING Machine: COMPETITOR 12013G	Logged by: J.
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BOREHOLE LOG

JPB

Client: Hill & Smith Holdings				Borehole No BH6	
Project: Woodwell Family				Full Depth: 5.45m	
Job No: DS074	Date: 29-9-03	Ground Level (m): 73.75	Coordinates ()		
				Sheet: 1 of 1	

SAMPLES & TESTS			Water	Instrument	Backfill	STRATA			Geology
Depth	Type No	Test Result				Reduced Level	Topogrd	Depth (m)	
0.15-0.50	D1					73.62		0.15	MADE GROUND - Concrete
0.50-1.10	D2					73.22		0.50	MADE GROUND - White slightly silty slightly sandy fine to coarse angular GRAVEL of choker and concrete
1.00-1.45	CPT	9						1.10	MADE GROUND - Loose black silty SAND GRAVEL Sand is fine to coarse gravel of fine to coarse angular to subrounded slag and choker with a hole by choker at 1.10m
1.45-2.50	D3					72.65		1.45	MADE GROUND - Loose light grey sandy fine to coarse angular to rounded GRAVEL of broken up concrete and in the concrete (from ground)
2.00-2.45	CPT	8				72.55		1.50	MADE GROUND - Loose black silty SAND GRAVEL Sand is fine to coarse gravel of fine to coarse angular to subrounded slag and choker (Wet below around 2.5m)
2.50-3.80	D4	5						2.50	
3.00-3.45	CPT					69.67		3.80	
3.80-4.50	D5	6						4.50	Soft dark grey slightly sandy CLAY
4.00-4.45	CPT							4.45	
5.00-5.45	CPT	12				68.22		5.45	

Boring Progress and Water Observations						Clocking			GENERAL REMARKS
Date	Time	Depth	Casing	Struts	Standing	From	To	Hours	
29-9-03		2.50		1.00					Poor recovery from 3.50m to 4.50m

All dimensions in metres Scale 1:50	Contractor: JTG	Method: WIRELESS SAMPLING Machine: COMPETITOR LOGG	Logged by: H
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BOREHOLE LOG

JPB

Client: Fall & Smith Holdings						Borehole No. BH7				
Project: Woodwell Foundry						Full Depth: 5.37m				
Job No: 119051		Date: 10/09/02		Ground Level (m): 74.42		Co-Ordinate (1)				
						Sheet: 1 of 1				
SAMPLES & TESTS			Water	Instrument (Borehole)	Pressure Level	Pressure Level	Depth (Borehole)	TEST DESCRIPTION	Geology	
Depth	Type	Test Result								
0.16-0.50	BT							MADE GROUND - Long term settlement MADE GROUND - Medium dense dark brown slightly gravelly fine to coarse SAND. Gradual fine to medium regular clay and chert, rubble of chert was also encountered within this strata (foundry sand) Loose from 2.00m to 4.50m		
0.50-1.00	BT									
1.00-1.45	CPT	17								
1.70-2.00	CPT									
2.00-2.45	CPT	6								
3.10-3.45	CPT	8								
3.50-4.00	CPT									
4.00-4.45	CPT	7								
4.80-5.00	CPT									
5.00-5.37	CPT	25 blows for 150mm x 50 blows for 220mm x 50								
Facing Progress and Water Observations						Chiselling			GENERAL REMARKS	
Date	Time	Depth	Coring	Scale	Standing	From	To	Heads		
All dimensions in metres Scale 1:50			Contractor: H.T.G.			Method: WIREWIRELESS SAMPLING Machine: COMPELHOB 120 HOB			Logged By: J.L.	

BOREHOLE LOG

JPB

Client: HICLA Smith Holdings							Borehole No: BH8		
Project: Wombwell Foundry							Full Depth: 2.44m		
Job No: DS074		Date: 30/09/05		Ground Level (mm): 67.26		East Coordinates (m)		Sheet: 1 of 1	

SAMPLES & TESTS			Notes	Instrument Backfill	Reduced Level	Depth (m)	STRATA		Geology
Depth	Type No	Test Result					DESCRIPTION	Depth (m)	
0.00-0.30	D1				66.96	0.30	Gross over FILL. Stiff orange mottled grey CLAY SILT. (physical & chemical)		
0.30-1.10	B1				66.94	0.80	Topsoil Stiff to very stiff orange mottled grey CLAY SILT		
1.10-1.15	CPT				66.93	1.26	Very weak, light brown silty SANDSTONE. Fairly weathered		
1.20-1.50	D2					1.34			
2.00-2.45	CPT	25 blows for 150mm / 50 Pours for 295mm			64.82	2.44			

Boring Progress and Water Observations						Casing Log			GENERAL REMARKS	
Date	Time	Depth	Casing	Soil	Standing	From	To	Hours		

All dimensions in metres Scale 1:50		Contractor: JELG		Method: WITNESSLESS SAMPLING Machine: COMPTON 150 LBS		Logged By: J.L.	
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BOREHOLE LOG

JPB

Client: Hill & Smith Holdings						Borehole No BH9		
Project: Wyndwell Foundry						Full Depth: 4.45m		
Job No: 109071		Date: 30/06/03		Ground Level (m): 79.62		Correlation (m)		Sheet: 1 of 1

SAMPLES & TESTS			Water	In situ	Borehole	STRATA			Geology
Depth	Type No	Test Result				Ref Level	Legend	Depth (Borehole)	
0.30-0.50	PT					79.62	0.20	MADE GROUND - Black line in concrete wall of sandy sand	
						79.62	0.50	Still orange mottled grey CLAY/SILT	
1.00-1.45 1.20-1.30	CP1 D2	20					(1.70)	Very weak light brown sandy SILTSTONE, (partially weathered)	
2.00-2.45	CP1	23				79.42	2.50	Very weak light brown clay SANDSTONE	
3.00-3.45	CP1	31					(3.55)		
4.00-4.45	CP1	34				79.17	4.45		

Boring Progress and Water Observations						Casing			GENERAL REMARKS
Date	Time	Depth	Core	Slide	Sampling	Core	Fe	Reins	
									Hole installed at 2.50m diameter collapse

All Permissions / Permits Scale 1:50	Contractor: DEFG	Method: WINDOWLESS SAMPLING Machine: COLAPTE HGR 150 EHG	Logged By: <u> </u>
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BOREHOLE LOG

JPB

Client: Hill & Smith Holdings				Borehole No BH10	
Project: Wombwell Farm				Full Depth: 5.45m	
Job No: DS071	Date: 26.09.03	Ground Level (m): 74.59	Cellular (S):	Sheet: 1 of 1	

SAMPLES & TESTS			Water	Instrument (Backfill)	STRATA			Geology
Depth	Type No	Test Result			Reduced Level	Log Level	Depth (Thickness)	
0.00-0.30	D1				74.29		0.30	
0.30-0.40	D2				74.40		0.10	
0.40-0.55	D3				74.55		0.15	
1.00-1.45	CPT	6						
2.00-2.20	D4							
2.00-2.45	CPT	5					0.70	
3.00-3.45	CPT	4						
4.00-4.45	CPT	7			74.19		4.40	
4.40-4.60	D5						0.05	
5.00-5.45	CPT	35			69.14		5.45	

Boring Progress and Water Observations						Chisel Log			GENERAL REMARKS
Date	Type	Depth	Casing	Snake	Churning	From	To	Points	
									Poor recovery between 1m and 1m

All dimensions in metres Scale 1:50	Contractor: JTBG	Method: WPSBOWLESS SAMPLING Machine: COMPELHOC 150 RIG	Logged By: JPB
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BOREHOLE LOG

JPB

Client: Hill & Smith Holdings								Borehole No. BH11	
Project: Woodwell Farndis								Total Depth: 4.44m	
Job No: DS074		Date: 20/09/15		Core (H) (m): 25.55		Core (D) (m): 3.11		Sheet: 1 of 1	

SAMPLES & TESTS			Water	Instrument Bathym.	Reduced Level	Legend	Depth (m) (H)	Description	Geology
Depth	Type	Test Results							
0.00-0.50	D1				75.13		0.40 0.20	MADE GROUND: Poor to fair fine to medium silty sandy fine to coarse angular to subangular GRAVEL of chlorite and clay with some bitl.	
0.60-0.80	D2							MADE GROUND: Poor	
1.00-1.45	CPT	16					1.15	MADE GROUND: Medium dense to dense fine to dark brown to black slightly silty sandy fine to coarse angular to subangular GRAVEL of chlorite and clay	
					75.70 75.55		1.15 1.20	MADE GROUND: Poor silty fine to coarse SAND	
2.00-2.45	CPT	15			75.13		0.40 0.20	MADE GROUND: Medium Dense black slightly silty sandy fine to coarse angular to subangular GRAVEL of chlorite and clay	
2.46-2.55	D3				75.73		0.40 0.20	Soft to firm light brown light grey slightly sandy SILT, the sand is from 20% to 30% and is 2.5m	
3.00-3.45	CPT	52						Very weak light brown sandy SANDSTONE Entirely weathered	
3.70-4.00	D4						1.63		
4.00-4.44	CPT	23 Blows for 150mm / 50 Blows for 200mm			75.13		2.42		

Logging Progress and Water Observations						Circelling			GENERAL REMARKS	
Date	Time	Depth	Coring	Stroke	Standing	From	To	Hours		

All dimensions in metres Scale 1:30		Contractor: JTB		Method: JCB-DOWLING SAMPLING Machine: COMPACTOR 1500KG		Logged By: JTB	
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BOREHOLE LOG

JPB

Client: Hill & Smith Holdings				Borehole No. BH12	
Project: Windowless Embassy				Total Depth: 4.15m	
Job No: D9672	Date: 20/06/05	Ground Level (m): 77.61	Contract ref: 43		Sheet: 1 of 1

SAMPLES & TESTS			Water	Instrument	Hard hat	SPT DATA			Description	Geology
Depth	Type	Test Result				Refused Level	Refused	Depth (Blows - m/s)		
0.20-0.25	B1							0.25	MADE GROUND - Fine orange clay	
0.50-0.70	B2							0.25	MADE GROUND - Reddish highly sandy CLAY with occasional fine to medium angular GRAVEL at base of each sub-layer	
0.70-1.00	B3							(1.30)	Fine orange mud, light grey slightly sandy CLAY (becoming stiff below 0.70m)	
1.00-1.45	CP1	6				76.41		1.45		
1.00-1.80	B4								Very weak light brown light grey sandy SILTSTONE. Drastically weathered	
2.00-2.45	CP5	15						(2.20)		
2.00-2.45	CP1	20				73.01		2.50		
2.70-3.00	B5					72.71		3.00	COAL	
4.00-4.15	CP1	25 Blows for 8.0m / 50 Blows for 8.5m				72.25		4.15	Very weak light brown sandy SILTSTONE. Drastically weathered	

Boring Progress and Water Observations						Casing			GENERAL REMARKS	
Date	Time	Depth	Casing	Surface	Standing	From	To	Hours		
All dimensions in metres Scale 1:50						Contractor: RTG		Method: WINDOWLESS SAMPLING Machine: CONCEPTOR 170 RIG		Logged By: JL

BOREHOLE LOG

JPB

Client: Dill & Smith Holdings							Borehole No.		
Project: Woodwell Family							BH13		
Job No: 12974		Date: 26.09.03		Ground Level (m): 79.68		V.O. Coordinates (1)		Borehole Depth: 3.88m	
								Sheet: 1 of 1	

SAMPLES & TESTS			Water	Instrument	SPT			Geology
Depth	Type No	Test Result			Blow Count	Depth (m)	Remarks	
0.00-0.20	D1				76.28	0.20	MADE GROUND - Dark grey slightly crumbly due to coarse angular to subangular fill with of fine grey silty sand	
0.40-0.55	D2				76.72	0.55	50/50 orange mottled grey slightly sandy CLAY	
1.00-1.45	CPT	12					Very weak light brown silty SANDSTONE. Distinctly weathered	
1.20-1.50	D3							
2.00-2.45	CPT	22						
2.50-3.10	D1							
3.00-3.45	CPT	44						
3.50-3.88	CPT	25 blows for 150mm, 50 blows for 220mm			75.80	3.88		

Boring Progress and Water Observations						Circulating			GENERAL REMARKS
Date	Time	Depth	Casing	Strike	Standing	From	To	Hours	

All dimensions in metres Scale 1:50		Contractor: JETG		Method: WINDMILLLESS SAMPLING Machine: COMPELITOP 150 BQ		Logged By: JL	
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Client: BHLA Smith Holdings										Borehole No.	
Project: Wondwan Foundry										BHL4	
Job No: DS-54			Date: March 2007		Ground Level (m): 100.0			Core Orientation: ()			
										Total Depth: 5.17m	
										Sheet: 1 of 1	
SAMPLES & TESTS			Water	In situ	Gravel	STRATA			Geology		
Depth	Type	Test				Interval	Depth	Interval		Description	
0.70-0.90	DI							MADE GROUND - Dark Brown slightly silty sandy fine to coarse irregular to sub angular to sub circular clastic of chert and slag			
1.00-1.45	CPT							Fin orange mottled grey slightly sandy CLAY (becomes soft at approx 1.20m)			
1.00-1.10	DI							Very weak light grey GIBB SLTSTONE (locally weathered)			
2.00-2.45	CPT										
2.50-2.70	DI										
3.00-3.45	CPT										
4.00-4.45	CPT							COAL			
4.40-4.70	DI							Very weak light grey - grey SLTSTONE, locally weathered (4.40)			
5.00-5.17	CPT	21 Blows for 30mm (50 Blows for 45mm)									
Boring Progress and Water Observations						Chiselling			GENERAL REMARKS		
Date	Time	Depth	Casing	Stroke	Penetration	From	To	Hours			
10/3/07		6.40		1.00							
All dimensions in metres						Method: WONDWANLESS SAMPLING			Logged by: []		
Scale 1:10						Machinery: COHEEHOOR 150 RIG					

BOREHOLE LOG

JPEB

Client: Hill & Smith Holdings										Borehole No.																																	
Project: Windowless Foundation										BH15																																	
Job No: DS974		Date: 29.06.07		Ground Level: 10.11		Grid Reference: 10		Total Depth: 0.65m		Sheet: 1 of 1																																	
SAMPLE ANALYSIS			Water	Disturbance	Backfill	STRATA			Depth (m)	Description																																	
Depth	Type	Test Results				Depth (m)	Top	Bottom																																			
0.50-0.65	5a							0.65	MADE GROUND - Fine brown, slightly sandy fine to coarse angular to sub angular GRAVEL at bottom and clay																																		
<table border="1"> <thead> <tr> <th colspan="6">Boring Progress and Water Observations</th> <th colspan="3">Chit Log</th> <th colspan="2">GENERAL REMARKS</th> </tr> <tr> <th>Date</th> <th>Time</th> <th>Depth</th> <th>Coring</th> <th>Spillage</th> <th>Sealing</th> <th>From</th> <th>To</th> <th>Flow</th> <th colspan="2">Bore hole should be fitted with a possible service pipe</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td colspan="2"></td> </tr> </tbody> </table>											Boring Progress and Water Observations						Chit Log			GENERAL REMARKS		Date	Time	Depth	Coring	Spillage	Sealing	From	To	Flow	Bore hole should be fitted with a possible service pipe												
Boring Progress and Water Observations						Chit Log			GENERAL REMARKS																																		
Date	Time	Depth	Coring	Spillage	Sealing	From	To	Flow	Bore hole should be fitted with a possible service pipe																																		
All data as per series				Contractor: JPEB				Method: WINDOWLESS SAMPLING		Page: 1																																	
Scale: 1:10								Machine: CONFUTOR 130 RIG		Page: 1																																	



APPENDIX B
Rotary Open Hole Drillhole Logs

DRILLHOLE LOG

JPB

Client: BBA South Holdings Ltd										DRILLHOLE No.	
Project: Wouda/BF Farm										BH 16	
Job No: Q5071		Date: 1/10/05		Ground Level (m): 74.99		Van Oudekerckhof		Well Depth: 36m		Sheet: 1 of 1	

PUNDITAILS				Test Results Water	Testment Backfill	STRATA			Lithology
True Depth	TCF %	SCF %	RQD %			Reduced Level	Log no	Depth (Meters)	
							0.00	Gravelly SAND **	
							0.50		
							1.00		
							1.50		
							2.00		
							2.50		
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							34.00		
							34.50		
							35.00		
							35.50		
							36.00		

GENERAL REMARKS	Standpipe installed to 10m depth from surface, beneath 10m backfilled with bentonite grout. High groundwater at 24m - closed out. ** Denotes drillers description
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All dimensions in metres Scale 1:50	Contracted: FORLERS Ltd	Method: ROTARY GUIN MOLE, Air Lift Machine: ELEMM	Logged by Driller
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DRILLHOLE LOG

JPRB

[illegible]

Johnson Peole & Bloomer
DRILLHOLE LOG

JPB

Client: Hall & Smith Holmes Ltd										DRILLHOLE No	
Project: Wombwell Foundry										BH 17	
Job No: 18071			Date: 2-12-03		Ground Level (m): 73.11		Core Outcomes ()		Full Depth: 30m		
									Sheet: 1 of 1		

REMARKS				Test Re. log/ Water	Instrument Backfill	Reduced Level	Interval	Depth (Hole - mcs)	STRATA DESCRIPTION	Geology
Date Depth	TCR %	SCR %	BCD %							
						72.61		(0.50)	Mid-stone FILL**	
								(2.20)	Weathered yellow SANDSTONE**	
						70.41		2.20	Yellow / grey MUDSTONE + Sandstone clasts**	
								(7.10)		

GENERAL REMARKS	String installed to 10m depth from surface. Beneath 10m is drilled with bentonite grout. No groundwater encountered. ** denotes drillers description
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All dimensions in metres Scale 1:50	Contractor: FORKERS Ltd	Method: ROTARY OPER BORE, Air-Flushed Machine: KILMM	Driller: [Signature]
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Form QF-SA-173 8-1-01

DRILLHOLE LOG

JPB

Client: Hill & Smith Holdings Ltd										DRILLHOLE No BH 17	
Project: Wombwell Foundry										Full Depth: 30m	
Job No: DS074			Date: 2-10-05		Ground Level (m): 73.11		Co-ordinates (E)			Sheet: 2 of 4	
RUN DETAILS				Test Result/ Water	Instrument Backfill	Reduced Level	Elevation	Depth (Thickness)	STRATA		Geology
Date Depth	TCR %	SCR %	RQD %						DESCRIPTION		
						63.24		0.20	Yellow / grey SANDSTONE - Mudstone beds**		
								(2.70)			
						60.61		12.59	Grey SANDSTONE - Shale bands**		
GENERAL REMARKS Standpipe installed to 10m depth from surface, beneath 10m bore filled with bentonite grout. No groundwater encountered. **denotes drillers description											
All dimensions in metres Scale 1:50				Contractor: FORKERS Ltd				Method: ROTARY OPEN HOLE, Air Flush Machine: KLEMM Logged By: Driller			

DRILLHOLE LOG

JPB

Client: TEL & Smith Holdings Ltd				Drill Hole No	
Project: Wombwell Foundry				BH 17	
Job No: DS071	Date: 2-10-03	Ground Level (m): 73.11	Co-Ordinates ()		Full Depth: 30m
					Shot: 3 of 4

RBN DETAILS				Feet Residual Water	Instrument Backfill	STRATA				Geology
Date Depth	TCR %	SCR %	EQD %			Produced Level	Legends	Depth (Thickness)	DESCRIPTION	
								(17.50)		

GENERAL
REMARKS

Standpipe installed to 10m depth from surface, beneath 10m back filled with bentonite grout.
No groundwater encountered.

**denotes drillers description

All dimensions in inches
Scale 1:50

Contractor:
FORREST Ltd

Method: ROTARY OPEN HOLE, Air Thr.
Machine: EITEMA

Logged
By: Driller

Client: Hall & Smith Holdings Ltd				DPM/BOLE No BH 17
Project: Wombwell Foundry				
Job No: DS074	Date: 2-10-03	Ground Level (m): 73.44	Co-Ordinates (1)	Fall Depth: 30m Sheet: 1 of 4

[illegible]

GENERAL	Standpipe installed to 10m depth from surface, beneath 10m backfilled with bentonite grout.
REMARKS	No groundwater encountered.
	** denotes drillers description

All dimensions in metres Scale 1:50	Contractor: EGRJ RS Ltd	Method: ROTARY OPEN HOLE, Air Drive Machine: KITEM	Logged By: Driller
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DRILLHOLE LOG

JPB

Client: Hill & Smith Holdings Ltd				DRILLHOLE No	
Project: Wombwell Farmdy				BH 18	
Job No: DS074	Date: 2-10-03	Ground Level (m): 76.78	Co-Ordinate: (1)		Full Depth: 30m
					Sheet: 1 of 4

ROCKET FAULTS				Test Result/ Water	Instrument Backfill	STRATA				Geology
Date Depth	TCR %	SCR %	RQD %			Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
								(5.00)	Yellow / grey MUDSTONE**	
						74.78		5.00	Grey MUDSTONE - Sandstone bands**	
								(3.50)		

GENERAL
REMARKS

Standpipe installed to 10m depth from surface, beneath 10m backfilled with bentonite grout.
No groundwater encountered.

** denotes drillers description

All dimensions in metres Scale 1:50	Contractor: FORBES LTD	Method: ROTARY OPEN HOLE, Air Blast Machine: ELEMM	Logged By: Miller
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DRILLHOLE LOG

JPB

Client: Hill & Smith Holdings Ltd				DRILLHOLE No BH 18	
Project: Worlwell Foundry				Full Depth: 30m	
Job No: DS074	Date: 2-10-03	Ground Level (m): 76.78	Co Ordinates ()		Sheet: 2 of 4

RIG DETAILS				Test Result/ Water	Instrument/ Backfill	STRATA				Geology
Date Depth	ICR %	SCR %	ROD %			Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
						68.78		8.40	Grey SANDSTONE - Mudstone bands**	
								(4.00)		
						64.78		12.40	Thin COAL**	
						64.75		12.55	Grey SHALE - Sandstone Bands**	
								(6.35)		

GENERAL
REMARKS

Standpipe installed to 10m depth from surface, beneath 10m backfilled with bentonite grout.
No groundwater encountered.

** denotes drillers description

All dimensions in metres Scale 1:50	Contractor: FORKERS Ltd	Method: ROTARY OPEN HOLE, Air Flush Machining: KLEMM	Logged By: Diller
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DRILLHOLE LOG

JPRB

Client: <i>Ind & Smith Holdings Ltd</i>										Borehole No BH 18	
Project: <i>Wombwell Foundry</i>										Full Depth: 30m	
Job No: <i>DE071</i>			Date: <i>2-10-03</i>		Ground Level (m): <i>76.78</i>		City Coordinates (Y)			Sheet: 2 of 4	
ROUNDTAILS				Test Result Water	Instrument Backfill	STRATA					Geology
Date Depth	FOR %	SCR %	PCD %			Reduced Level	Logical	Depth (Meters)	DESCRIPTION		
						57.58		18.20	Grey SANDSTONE**		
GENERAL REMARKS		Standpipe installed to 10m depth from surface, beneath 10m backfilled with Vermiculite grout. No groundwater encountered. ** See driller's description									
All dimensions in metres Scale 1:50				Contractor: FORKERS LTD			Method: ROTARY OPEN HOLE, A's Hole Machine: ELEMM			Logged By: Driller	

DRILLHOLE LOG

JPB

Client: H&S Smith Holdings Ltd										DRILLHOLE NO.	
Project: Wombwell Foundry										BH 13	
Job No: 105071			Date: 2-10-03		Ground Level (m): 76.78		Co-Ordinates ()		Full Depth: 30m		
										Sheet: 4 of 4	
RUN DETAILS				Test Results Water	Instrument Backfill	STRATA			Geology		
Date Depth	TCR %	SCR %	RQD %			Estimated Level	Legend	Depth (Thickness) (m)		DESCRIPTION	
								(11.76)			
						76.78		30.00			
GENERAL REMARKS											
Standpipe installed to 10m depth from surface, beneath 19m backfilled with bentonite grout. No groundwater encountered. * denotes drillers description											
All dimensions in metres Scale 1:50				Contractor: FORMERS Ltd				Method: ROTARY OPEN HOLE, Air Flow Machine: KLEMM		Logged By: Driller	

DRILLHOLE LOG

JJPB

Client: Hill & Smith Holdings Ltd										DRILLHOLE No	
Project: Wombwell Foundry										BH 19	
Job No: DS074			Date: 2-10-03		Ground Level (m): 30.65		Co-Ordinates (E)		Full Depth: 15m		
										Sheet: 1 of 2	
RDR DETAILS				Test Result / Water	Instrument	Backfill	STRATA			Geology	
Down Depth	TCR %	SCR %	RQD %				Refused Level	Log no	Depth (Thickness)		DESCRIPTION
							30.15	(0.50)	Mudstone FILL**		
								(1.00)	Yellow MUDSTONE - Clay bands**		
							29.15	1.50			
								(2.00)	Yellow / grey MUDSTONE - Dark bands**		
							26.75	3.00			
							26.75	3.00	Thin bedded COAL**		
									Grey MUDSTONE**		
								(6.00)			
GENERAL REMARKS		Standpipe installed to 10m depth from surface, to nearly 10m backfilled with bentonite grout. Pump at 12.60m, medium groundwater inflow at 12.80m. ** denotes drillers description									
All dimensions in metres Scale 1:50		Contractor: FORKERS Ltd		Method: ROTARY OPEN HOLE, Air Flow Machine: KLEMM		Logged By Driller					

Johnson Poole & Bloomer
DRILLHOLE LOG

JPB

Client: IBI & Smith Holdings Ltd				DRILLHOLE ID:	
Project: Woolwell Farm				BH 19	
Job No: 05071	Date: 2-10-03	Ground Level (m): 70.65	Co-Ordinate (1)	Full Depth: 15m	
				Sheet: 2 of 2	

RUBBLES				Test Result/ Water	Instrument Backfill	STRATA			Geology
Date Depth	LCR %	SCR %	RDP %			Reduced Level	Logcode	Depth (Thickness)	
						70.65		15.00	
						70.55		14.15	Fire CLAY **
						70.55		10.30	Grey MUDSTONE **
									Black SHALE **
								(1.20)	
						69.15		11.50	Thin clayey COAL - Shale bands **
								(1.50)	
						67.65		13.00	Black SHALE **
								(0.80)	
						66.85		12.80	Grey SANDSTONE **
								(1.20)	
						65.65		15.00	

GLS - RML
 REMARKS: Stand pipe installed to 10m depth from surface, bench 10m back filled with bentonite grout.
 Pumped 12.00m, medium groundwater inflow at 12.80m.

** denotes different description

All dimensions in metres Scale 1:50	Contractor: FORKERS Ltd	Method: ROTARY OPEN HOLE, Air Flush Machine: ELEM	Logged By: Miller
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APPENDIX C

Light Cable Percussive Borehole Logs

BOREHOLE LOG

JPB

Client: John A. Smith Hospital							Well Log No: BH 20		
Project: Woodloch Land							Well Depth: 6.5m		
Job No: DS074		Date: 12/10/03		Contract Loc: 7126		Contract No: 1384		Sheet: 1 of 1	

SAMPLES & TESTS				STRATA				Geology
Depth	Test No.	Test Name	Notes	Interval	Interval	Interval	Interval	
0.00-0.60	B1							STABLE GROUND - Medium dense to hard brown slightly silty gravelly fine to coarse SAND. Gravel is of fairly coarse, regular to sub-angular and well-sorted.
1.00-1.00	B2							
1.00-1.15	CP1	5						
2.00-2.20	B3	See Test Log						
2.00-2.00	CP7							
3.00-3.00	B4							
3.00-3.15	CP4	12						CLAY
4.00-4.00	B5							
4.00-4.25		17						
5.00-5.00	B6							
5.00-5.45		19						
6.00-6.00	B7							Very well-sorted brown to grey SANDSTONE. Disconformity present.
6.00-6.55		217 tests for 17.5m 190 tests for 17.5m						

Boring Progress and Water Characteristics						Classifying			GENERAL REMARKS
Date	Time	Depth	Coring	Sample	Flowing	From	To	Hours	
12/10/03		6.50	6.00			6.00	6.50	1.00	Boring installed from 0.00 to 6.55 to provide information.

All data shown in meters		Contractor: A.C. MOLES		Method: UNIFIED PERCUSSIVE DRILLING		Log: J	
Scale: 1:50				Machine: DM-700 300-105		By: JPB	

BOREHOLE LOG

JPB

Client: Hill & Smith Holdings Ltd				Borehole No: BH 21	
Project: Woodwell Foundry				Full Depth: 5.5m	
Job No: DS071	Date: 11-10-03	Ground Level (m): 71.26	Grid coordinates (m)		Sheet: 1 of 1

SAMPLES & TESTS			Water	Instrument	Backfill	STRATA			Geology
Depth	Sample No	Test Result				Reduced Level	Legend	Depth (Blows per 300mm)	
1.00-1.00 1.00-1.45	81	18							
2.00-2.00 2.00-2.45	82	11							
3.00-3.00 3.00-3.45	83	20 Blows for test progress							
4.00-4.00 4.00-4.45	84	27							
5.00-5.00 5.00-5.50	85	7 Blows for 150mm / 20 Blows for 150mm				69.26 68.96		5.20 5.40	
MADE GROUND: Medium dense black/brown slightly silty gravelly fine to coarse SAND Gravel of fine to coarse angular to subangular Chert and flint (foundry sand)									
Soft light brown mottled grey slightly sandy CLAY									

Boring Progress and Water Observations						Chiselling			GENERAL REMARKS
Date	Time	Depth	Casing	Slide	Striking	From	To	Hours	
11/10/03		5.50	5.25			5.20	5.50	1.00	Standpipe installed from 0.00m to 5.50m No groundwater encountered

All dimensions in metres Scale 1:50	Contractor: A.C. SOLES	Method: CABLE PERCUSSIVE BORING Machine: DANDO 150 R95	Logged By: J.B.
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BOREHOLE LOG

JPB

Client: JHA Sea Holdings Ltd							Borehole No:		
Project: Windward Ferries							BH 22		
Job No: 05974		Date: 16/06/03		Original Log No: 7333		Core No: 830		Total Depth: 9m	
								Sheet: 1 of 2	

SAMPLE RESULTS			Wave	In situ	Core Depth	Interval	Depth of Core (m)	Lithology
Interval	Test No.	Test Result						
0.00-0.05	01							MADE GROUND: Loose to medium sand, dark brown slightly silty, generally fine to coarse. SAND: Grains of fine to coarse irregular, not much flatter and sharp if angular, no 1. Very fine grained, light color. (7.50)
1.00-1.05	02							
1.05-1.15	03	9						
2.00-2.05	04							
2.05-2.15	05	10						
3.00-3.05	06							
3.05-3.15	07	12						
4.00-4.05	08							
4.05-4.15	09	8						
5.00-5.05	10							
5.05-5.15	11	25						
6.00-6.05	12							
6.05-6.15	13	4						
7.00-7.05	14							
7.05-7.15	15	7						
7.50-7.55	16					68.52	7.5	Soft yellow brown marl grey slightly sandy CLAY
						69.32	8.6	

Boring Progress and Water Observations						Casing Log			GENERAL REMARKS	
Date	Time	Depth	Core Log	Notes	Sampling	From	To	Depth	Remarks	
									Standard and Red for sea bottom station. No ground water observed during drilling.	

All dimensions in metres		Contractor:		Method: CAPLIF PLACERSSIVE LOGGING		Log No:	
Scale 1:50		J.C. SLOES		Machine: DANDY LOGGING		170	

BOREHOLE LOG

JPR

Client: JPB & Smith Holdings Ltd						Borehole No	
Project: Wombwell Laundry						BH 22	
Job No: DS073		Date: 10/10/03		Ground Level (m): 75.52		Full Depth: 0m	
						Sheet: 2 of 2	

SAMPLES & TESTS			Water	Borehole	STRATA			Geology
Depth	Type No	Test Results			Reduced Level	Legend	Depth (Meters)	
8.00-8.01	B10	34				8.00	Dense Light brown slightly silty slightly sandy fine to coarse angular GRAVEL of silty sandstone	
8.01-8.45	CPT					8.45		
						8.45		
9.00-9.50	B11	25blows for 25mm 50 blows for 50mm				9.00	Yellow grey brown SANDSTONE	
9.50-9.07	CPT							

Boring Progress and Water Observations						Casing			GENERAL REMARKS	
Date	Time	Depth	Casing	Strike	Standing	From	To	Hours		
11/10/03		9.00	9.00			8.80	9.00	1.00	Standpipe installed from 9.1m to 9.0m No groundwater encountered during drilling	

All dimensions in metres Scale 1:50		Contractor: A.C. SOILS		Method: CABLE PERCUSSIVE DRILLING Machine: DAVIS 150 RRG		Logged By: JH	
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Client: Delta-Sun Holdings Ltd										Borehole No	
Project: Woodwell Complex										BH 23	
Job No: 09024			Date: 3/06/03		Client Location: 13/03		Grid Ref: 2640		Borehole Depth: 9m		
									Sheet: 1 of 2		
SAMPLES & TESTS			NOTES								
Depth	Type No	Test	Water	Instrument	Backfill	Penetration (kg/cm ²)	Resistance (kg/cm ²)	Depth (m)	Description		Remarks
0.00-0.05	PT					55.0	55.0	0.05	FILLING		
0.05-0.10	PT					55.0	55.0	0.10	MADE GROUND - Wholesome fine to coarse sand (GRAVEL) of high water content		
1.00-1.45	CP7	41							MADE GROUND - Medium dense fine to medium to coarse gravelly fine to coarse sand (GRAVEL) of fine to coarse angular to sub angular and fine with some brickbats (approximately 10%)		
1.45-1.60	PT										
2.00-2.35	CP1	42									
2.35-2.40	PT										
3.00-3.45	CP7	43									
3.45-3.60	PT										
4.00-4.45	CP7	44									
4.45-4.60	PT										
5.00-5.45	CP1	45									
5.45-5.60	PT										
6.00-6.45	CP7	46									
6.45-6.60	PT										
7.00-7.45	CP1	47									
7.45-7.60	PT										
Boring Progress and Water Observations						Casing			GENERAL REMARKS		
Date	Time	Depth	Charge	State	Standing	From	To	Flow	Sample in all 2 m of bore 9" in diameter, for 10 m of bore		
3/16/03		7.60	7.60								
3/16/03		7.60	7.60								
All data are in meters						Contractor: A.C. Smith			Method: C-PT & C-PT & C-PT & C-PT		
Scale 1:50						Method: C-PT & C-PT & C-PT & C-PT			Notes: 1. All data are in meters		

BOREHOLE LOG

JPB

Client: H.H. & Smith Holdings Ltd				Borehole No BHE 23	
Project: Wombwell Foundry				Full Depth: 9m	
Job No: DS071	Date: 8.10.95	Ground Level (m): 55.65	Coordinates (1)		Sheet: 1 of 2

SAMPLES & TESTS			Water	Instrument (Borehole)	STRATA			Geology	
Depth	Type No.	Test Result			Tested Level	Legend	Depth (to Next Level)		
8.00-8.45 8.00-8.60	CPT B7	11					0.50	Coarse angular choker (flinty sand)	
8.80-9.00	B10				62.85		0.50	Very fine light brown mottled grey slightly sandy CLAY.	
9.00-9.18 9.00-9.60	SPT B11	25 Blows for 75mm / 50 blows for 100mm			62.20		0.65 0.42		

Poring Progress and Water Observations						Chiselling			GENERAL REMARKS
Date	Time	Depth	Coring	Index	Standing	From	To	Hours	
									5m pipe installed from 0.0m to 9.6m No ground water encountered

All dimensions in metres Scale 1:50	Contractor: A.C. STUBBS	Method: CABLE PERCUSSIVE BORING Machine: DARTON 150 R07	Logged By: H.
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BOREHOLE LOG

JPB

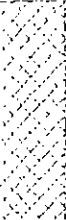
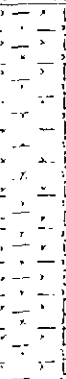
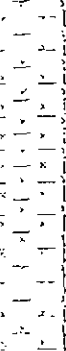
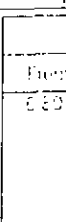
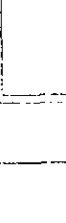
Client: Hill & Smith Holdings Ltd				Borehole No:	
Project: Wombach Farm				BH 24	
Job No: D5074		Date: 07-10-03	Ground Level (m): 74.27	Elev Depth: 5m	
				Sheet: 1 of 1	

SAMPLES & TESTS			Water	Instrument	SPT DATA			Description	Geology
Depth	Type No	Test Result			Reduced Level	Legend	Depth (Thick-ness)		
0.00-0.00	B1						(1.50)	MADE GROUND. Firm to soft yellow brown slightly sandy gravelly CLAY. Gravel is fine to coarse angular ash, concrete and slag.	
1.00-1.45 1.00-1.00	SPT B2	13			72.87		1.50		
2.00-2.45 2.00-2.00	SPT B3	11					(3.00)	Firm grey slightly sandy CLAY. becoming very stiff towards base.	
3.00-3.45 3.00-3.00	SPT B4	19							
4.00-4.45 4.00-4.00	SPT B5	52			70.97		4.50		
5.00-5.14 5.00-5.00	SPT B6	25 blows for 75mm / 50 blows for 65mm			70.97		5.00	Very weak light brown / grey SLTSTONE. Discontinuously weathered.	

Boring Progression & Water Observations						Clocking			GENERAL REMARKS
Date	Time	Depth	Casing	Strike	Heading	From	To	Hours	
07/10/03 03:10:03		0.00 3.00	3m 2.00			4.00	5.00	1.00	Casing pipe installed from 0.00m to 5.00m. No groundwater encountered.

All dimensions in metres Scale 1:1	Contractor: VC BOLS	Method: CABLE PERCUSSIVE DRILLING Machine: DANDO 150 RIG	Logged By: JL
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Client: Hill & Smith Holdings Ltd				Batch No
Project: Wombwell Foundry				BH 25
				Full Depth: 7m
Job No: DS074	Date: 7-10-02	Ground Level (m): 71.83	Co-ordinates (y)	Sheet: 1 of 1

SAMPLES & TESTS			Water	Instrument	Backfill	STRATA			Geology
Depth	Type No.	Test Result				Reduced Level	Legend	Depth (Thickness)	
0.00-0.06	B1						(1.50)	MAD E GROUND - Topsoil over 10cm thick light grey sandy fine to coarse GRAVELL at old beach concrete and stone	
1.00-1.45 1.00-1.08 1.50-1.50	SPT B2 B3	9			03.37		1.50	Firm light brown mottled grey slightly sandy CLAY	
2.00-2.45 2.00-2.00	SPT B4	12						Becomes very stiff by 3.00m	
3.00-3.45 3.00-3.00	SPT B5	36					(4.50)		
4.00-4.45 4.00-4.00	SPT B6	47							
5.00-5.45 5.00-5.00	SPT B7	20							
6.00-6.68 6.00-6.60	SPT B8	SP blows for 75mm			06.42		6.45	Very weak light brown / grey SANDSTONE Discontinuously weathered	
					07.97		(0.50) 7.00		

Boring Progress and Water Observations						Chiselling			GENERAL REMARKS
Date	Time	Depth	Casing	Strike	Stratig.	From	To	Hours	
7/10/63		7.55	1.50			6.30	7.00	1.05	Stand pipe installed from 6.00 to 7.00 in No groundwater encountered

All dimensions in inches Scale 1/8" = 1'	Contractor: A. C. SCOTT	Method: CABLE PERCUSSIVE DRIVING Machine: DARTCO 150 RIG	Logged By: J. H.
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BOREHOLE LOG

JPRB

Client: H&S Holdings Ltd										Borehole No	
Project: Wombwell Quarry										BH 26	
Job No: DS071			Date: 6.10.03		Ground Level: 4.14		Grid Reference:		Bore Depth: 8.2m		
									Sheet: 1 of 2		
SAMPLES & TESTS					STRATA						
Depth	Type	Test Result	Water	Instrument	Reduced Level	Core No	Depth (m)	Description			Geology
0.00-0.00	B1							MADE GROUND: Mainly dense bl. Flint and some slightly silty sand due to covering in GRAVEL. It is solid to middle and base, sandy top.			
1.00-1.25 1.00-1.00	CU1 22	25 blows for 150mm x 50 blows for 100mm									
2.00-2.43 2.00-2.00	S27 95	16									
3.00-3.43 3.00-3.00	S27 82	14									
4.00-4.43 4.00-4.00	S27 93	8									
5.00-5.43 5.00-5.00 5.50-5.50	S27 83 87	7			0.64		5.40	Soft to firm light brown to red grey silty clay. CLAY/SILT			
6.00-6.00	B8							Interests very stiff to 6.50m			
7.50-8.03 6.50-6.50	CU1 90	25					7.60				
Boring Progress and Water Observations						Chiselling			GENERAL REMARKS		
Time	Time	Depth	Casing	Stroke	Penetration	From	To	Hours	Sample point 1st from 0.00 to 0.20m No groundwater encountered during drilling		
All dimensions in metres				Contractor: S.C. GILES		Method: CABLE PERCUSSIVE BORING				Signed: [Signature]	
S.C.P. LTD						Machine: E-MDD0156130				Date: [Date]	

BOREHOLE LOG

JPB

Client: H&A Smith HoCorgs Ltd					Borehole ID:	
Project: Wind well Foundations					BH 27	
Job No: 158074		Date: 10.10.05	Ground Level (m): 72.67	Core Log (m):		
					Full Depth: 4.5m	
					Sheet: 1 of 1	

SAMPLES & TESTS			Water	Instrument	Backfill	Planned Level	Log no.	Depth (m, 1m = 1m)	STRA	Description	Core Log
Depth	Type No.	Test Result									
0.00-0.60	IS1									MADE GROUND - Medium dense silty clay brown slightly silty gravelly fine to coarse SAND Gravel is of fine to coarse angular to subangular doler and the sand some fine sand (foundry sand)	
1.00-1.45	CP1	16									
1.00-1.60	IS2										
2.00-2.45	CP2	15									
2.00-2.60	IS3										
3.00-3.45	CP3	16									
3.00-3.60	IS4										
4.00-4.45	CP4	27									
4.00-4.50	IS5										

Piling Progress and Water Observations						Core Log			GENERAL REMARKS	
Date	Time	Depth	Coring	Soils	Sampling	From	To	Time		
10.10.05		4.50	4.50			4.50	4.55	1.00		Sample collected from 4.50m to 4.55m No groundwater encountered No piling noise at 4.5m

All dimensions in metres		Contractor:	Method:	Machine:	Logged by:
Scale 1:50		A. C. SOLES	CABLE PERCUSSIVE PILING	DM DO 150 PPG	IL

Form JPB 2 8.1.02

BOREHOLE LOG

JPB

Client: Hall & Smith Holdings Ltd				Borehole No:	
Project: Wootwell Foundry				BH 28	
Job No: US074	Date: 02/06/07	Location: Exch Road Wootton Bassett	Grid Reference: 10		Full Depth: 4.5m
					Sheet: 1 of 1

SAMPLES & TESTS			Water	Instrument	Depth (m)	STRATA			Depth (m)
Depth	Type No	Test Result				Reduced Level	Level 2	Depth (m)	
0.00-0.00	B1								
1.00-1.45 1.00-1.00	CP1 B2	10							
2.00-2.45 2.00-2.00	CP1 B3	9						(2.50)	
3.00-3.45 3.00-3.00	CP1 B4	10							
4.00-4.45 4.00-4.00 4.50-4.50	CP1 B5 B6	51				26.15		2.50	

Boring Progress and Water Observations						Chiselling			GENERAL REMARKS	
Date	Time	Depth	Logging	Stroke	Standing	From	To	Hours		
04/06/07		4.50	4.50			4.50	4.50	2.00	Start pipe installed from bottom at 2.0m No groundwater encountered No progress possible past 2.0m	

All dimensions in metres

Scale 1:50

Contractor:

A C SOULS

Method: CABLE PERCUSSIVE EQUIPMENT

Machine: DANLO 150 FBS

Logged

By: H.

Form JPB/S&L 2 & 1-01



APPENDIX D

Machine Excavated Trial Pit Logs

Client: Hill & Smith Holdings Ltd							Trial No			
Project: Wombwell Primary							TPI			
Job No: DS074		Date: 7-10-03	Ground Level (m): 74.50		Confidence (+)		Full Depth: 3.3m			
							Sheet: 1 of 1			
SAMPLES & TESTS			Water	Reduced Level	Legend	Depth (m) (to base)	STRATA			
Depth	Type No	In situ S&W result					DESCRIPTION			
0.00-0.20	B1								MADE GROUND - Limestone subgrade	
0.20-1.00	B2								MADE GROUND - Dark brown - black slightly silty slightly sandy gravelly angular COBBLES & sandstone with occasional boulder of sandstone. Gravel is fine to coarse angular to sub angular sandstone	
1.00-2.20	B3									
2.20-3.30	B4									
A B D C Orientation SKETCH OF FACES (as required)										
PLAN			Subsoil: <i>variable</i> Excavation: Groundwater & Remarks: <i>No groundwater encountered</i>							
All dimensions in metres Scale 1:50			Contractor: Broadbent & Sons Ltd			Plant: JCB JCC		Logged by [Signature]		

TRIAL PIT LOG

JPB

Client: JPB & South Holdings Ltd							Inch 1: 100	
Project: Wembley Family							TP2	
Job No: 15873		Date: 5/10/03		Class of Excavation: 2: SS		Excavation No: 1		
						Fall Depth: 4.6m		
						Sheet: 1 of 1		

SAMPLES & TESTS			Water	STRATA				
Depth	Type	Approximate		Referred To	Legend	Depth (Thickness)	DESCRIPTION	Notes
0.00 - 0.10	01			0.10		0.10	Concrete	
1.00 - 1.40	02					(3.40)	GRADE GROUND. Dark brown to grey silty to sandy gravelly to calcareous COARSE to medium gravel of fine to coarse regular to sub-angular and sandstone	
3.70 - 3.82	03					3.70	Dark brown, medium to fine sandstone	
4.40 - 4.60	04					4.40	Soft grey to very sandy CLAY	

SKETCH OF LATERALS (if required)

	Shallow Scale Enlargement 1:1 No ground water encountered
	Orientation

All measurements in metres Scale 1:50	Contractor: Pritchard & Sons Ltd	Plant: JCB 3CX	Drawn: JPB
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Client: Hill & Smith Holdings Ltd				Trial Pit No		
Project: Wombwell Quarry				TP3		
Job No: 08071		Date: 7-10-05	Geotechnical No: 7773	Cutting No: 10		
				Full Depth: 1.5m		
				Sheet: 1 of 1		
SAMPLES & TESTS			Water	STRATA		
Depth	Top No	Bottom Test result		Reduced Level	Depth (m)	Strata Description
0.20-0.50	B1			76.25	0.30	Concrete
0.50-1.20	B2			76.68	0.60	MADE GROUND: Faint brownish clay with fine to coarse angular GRAVEL (10mm) and random size of occasional cobble of subangular
				76.73	0.70	light brown orange mottled grey CLAY
				76.75	1.50	
SECTION OF FACES (as required)						
PLAN				Solidity Spade Excavation Groundwater & Remarks No groundwater encountered		
				Orientation 		
All dimensions in metres Scale 1:50				Contractor: Frost Bred & Sons Ltd		Plant: JCB 3CX Logged By: RL

TRIAL PIT LOG

JPB

Client: H-E & Smith Holdings Ltd				Trial Pit No.	
Project: Windsw. P.F. study				TP4	
Job No: DS074	Date: 2-10-03	Ground Level (m): 7.110	Contour (meters):	Fall Depth: 4.2m	
				Sheet: 1 of 1	

SAMPLES & TESTS			Notes	STRATA				
Depth	Type No	In situ BSF result		Reduced Level	Legend	Depth (meters)	DESCRIPTION	Σ
0.25-0.60	1.1					0.25	Concrete	
1.00-1.35	32					(5.15)	STABLE GROUND. Dark brown silty sticky sandy fine to coarse angular GRAVEL, of broken cinders, with occasional cobbles of angle brick.	
2.55-4.20	33			7.110		3.40	Fine light grey mottled orange very fine CLAY	
				70.60		4.20		

SECTION OF FACE S (as required)

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PLAN		Subtype: Stable	
		Elevation:	
Orientation		Groundwater & Remarks	
		No groundwater encountered	
All dimensions in metres Scale: 1:50		Contractor: Broadhead & Sons Ltd	
		Plotted: R.B. JCN	
		Logged by: JL	

TRIAL PIT LOG

JPB

Client: JPB & Smith Holdings Ltd				Trial Pit No	
Project: Woodwell Foundry				TP5	
Job No: JBS074	Date: 24/05	Ground Level (m): 72.29	To Ordnance (m):		Full Depth: 4m
					Sheet: 1 of 1

SAMPLES & TESTS			Water	STRATA			
Depth	Type No	In situ BSF result		Reduced Level	Depth (m)	DESCRIPTION	Notes
0.40-0.70	B1					MADE GROUND - Dark brown silty sandy loam to coarse angular GRAVEL of choker, hard and sub-angular	
2.20-2.50	B2				(3.20)		
3.50-3.70	B3			72.29	3.20	Firm grey becoming light brown slight sandy CLAY	
				71.29	4.00		

SELECTED FACES (as required)

D	C	B	A

PLAN 	Orientation 	Stability: Stable Excavation: Groundwater & P. Control: No groundwater encountered
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All dimensions in metres Scale 1:50	Contractor: Broadland & Sons Ltd	Plan: JCB 2CX	Logged by: JPB
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TRIAL PIT LOG

JPB

Client: Hill & Smith Holdings Ltd				Trial Pit No. TP6	
Project: Wombwell Foundry				Full Depth: 4.2m	
Job No: DS074	Date: 7-10-13	Ground Lev. (m A)	Coordinates (E)		Sheet: 1 of 1

SAMPLES & TESTS			Water	STRATA				S
Depth	Type No	In situ BSX result		Referred Level	Legend	Depth (Thick in m)	DESCRIPTION	
0.50-0.50	B1			73.46		0.50	MADE GROUND Ash and sub-base core	
1.20-1.40	B2						MADE GROUND Dark brown slightly gravelly SAND with some cobbles. Gravel of fine to coarse angular brick and clinker cobbles are of the same (Foundry sand)	
3.00-3.50	B3					(3.90)		
				80.56		4.20		

SKETCH OF FACES (if required)

PLAN		Sketchy		Scale	
		Excavation			
Orientation		Ground water & Percolation		No groundwater encountered	

All dimensions in metres Scale 1:50		Contractor: Broadley J & Sons Ltd		Plotted J.P.B. JCN	
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TRIAL PIT LOG

JPB

Client: Hill & Smith Holdings Ltd				Trial Pit No	
Project: Wombwell Foundry				TP7	
Job No: DS974	Date: 8/1/02	Ground Level (m): 72.96	Coordinates (E)		Full Depth: 3.2m
					Sheet: 1 of 1

SAMPLES & TESTS			Water	STRATA			
Depth	Type	In situ Test result		Relative Level	Legend	Depth (m)	DESCRIPTION
0.50-1.00	B1			72.96		1.10	MADE GROUND: Black, slightly silty sandy slightly gravelly CORBELLES of fused lumpy sandstone. Fric and clinker. Gravel is fine to coarse angular to subangular of the same. Clay plastic bag present.
1.66-2.00	B2			70.50		3.20	Light orange slightly gravelly CLAY. Gravel is of fine to coarse angular to subangular sandstone. By 3.20m brecciating sandstone bedrock.

SECTION OF FACES (as required)

	Stability: Stable Excavation: Groundwater & Remarks: No groundwater encountered
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PLAN	Stability: Stable Excavation: Groundwater & Remarks: No groundwater encountered
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All dimensions in metres
Scale 1:20

Contractor:
Frost, Peard & Sons Ltd

Plant: JCB 3CX

Logged
by: JL

JPRB

1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 26

TP8

Full Copy: 2011

John S. G. ... 1942

11

1996

$$C_0 = \{x \in C : x_i = 0 \text{ for } i=1, \dots, n\}$$

4672

THE UNIVERSITY OF CHICAGO

strongly Gaussian, and the distribution of the sample covariance matrix is approximately Gaussian. In fact, under the Gaussian factor loading model, a solution of the likelihood equations is unique and

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1. $\{a, b, c, d\}$

1. *Suppose that the number of people who visit the museum each day is a random variable with a mean of 100 and a standard deviation of 10. What is the probability that the number of people who visit the museum on a given day is between 80 and 120?*

Introduction

1994-1995

[illegible]

* *Indica*, *variegata*, *imbricata*.

6. 12. 1991

1. $\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$

^a Values are means ± SD.

$$|Y_n| \leq \frac{1}{2} \text{ if } \frac{1}{2} \leq Y_n \leq \frac{3}{2}$$

—

1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100. 101. 102. 103. 104. 105. 106. 107. 108. 109. 110. 111. 112. 113. 114. 115. 116. 117. 118. 119. 120. 121. 122. 123. 124. 125. 126. 127. 128. 129. 130. 131. 132. 133. 134. 135. 136. 137. 138. 139. 140. 141. 142. 143. 144. 145. 146. 147. 148. 149. 150. 151. 152. 153. 154. 155. 156. 157. 158. 159. 160. 161. 162. 163. 164. 165. 166. 167. 168. 169. 170. 171. 172. 173. 174. 175. 176. 177. 178. 179. 180. 181. 182. 183. 184. 185. 186. 187. 188. 189. 190. 191. 192. 193. 194. 195. 196. 197. 198. 199. 200. 201. 202. 203. 204. 205. 206. 207. 208. 209. 210. 211. 212. 213. 214. 215. 216. 217. 218. 219. 220. 221. 222. 223. 224. 225. 226. 227. 228. 229. 230. 231. 232. 233. 234. 235. 236. 237. 238. 239. 240. 241. 242. 243. 244. 245. 246. 247. 248. 249. 250. 251. 252. 253. 254. 255. 256. 257. 258. 259. 260. 261. 262. 263. 264. 265. 266. 267. 268. 269. 270. 271. 272. 273. 274. 275. 276. 277. 278. 279. 280. 281. 282. 283. 284. 285. 286. 287. 288. 289. 290. 291. 292. 293. 294. 295. 296. 297. 298. 299. 300. 301. 302. 303. 304. 305. 306. 307. 308. 309. 310. 311. 312. 313. 314. 315. 316. 317. 318. 319. 320. 321. 322. 323. 324. 325. 326. 327. 328. 329. 330. 331. 332. 333. 334. 335. 336. 337. 338. 339. 340. 341. 342. 343. 344. 345. 346. 347. 348. 349. 350. 351. 352. 353. 354. 355. 356. 357. 358. 359. 360. 361. 362. 363. 364. 365. 366. 367. 368. 369. 370. 371. 372. 373. 374. 375. 376. 377. 378. 379. 380. 381. 382. 383. 384. 385. 386. 387. 388. 389. 390. 391. 392. 393. 394. 395. 396. 397. 398. 399. 400. 401. 402. 403. 404. 405. 406. 407. 408. 409. 410. 411. 412. 413. 414. 415. 416. 417. 418. 419. 420. 421. 422. 423. 424. 425. 426. 427. 428. 429. 430. 431. 432. 433. 434. 435. 436. 437. 438. 439. 440. 441. 442. 443. 444. 445. 446. 447. 448. 449. 450. 451. 452. 453. 454. 455. 456. 457. 458. 459. 460. 461. 462. 463. 464. 465. 466. 467. 468. 469. 470. 471. 472. 473. 474. 475. 476. 477. 478. 479. 480. 481. 482. 483. 484. 485. 486. 487. 488. 489. 490. 491. 492. 493. 494. 495. 496. 497. 498. 499. 500. 501. 502. 503. 504. 505. 506. 507. 508. 509. 510. 511. 512. 513. 514. 515. 516. 517. 518. 519. 520. 521. 522. 523. 524. 525. 526. 527. 528. 529. 530. 531. 532. 533. 534. 535. 536. 537. 538. 539. 540. 541. 542. 543. 544. 545. 546. 547. 548. 549. 550. 551. 552. 553. 554. 555. 556. 557. 558. 559. 560. 561. 562. 563. 564. 565. 566. 567. 568. 569. 570. 571. 572. 573. 574. 575. 576. 577. 578. 579. 580. 581. 582. 583. 584. 585. 586. 587. 588. 589. 590. 591. 592. 593. 594. 595. 596. 597. 598. 599. 600. 601. 602. 603. 604. 605. 606. 607. 608. 609. 610. 611. 612. 613. 614. 615. 616. 617. 618. 619. 620. 621. 622. 623. 624. 625. 626. 627. 628. 629. 630. 631. 632. 633. 634. 635. 636. 637. 638. 639. 640. 641. 642. 643. 644. 645. 646. 647. 648. 649. 650. 651. 652. 653. 654. 655. 656. 657. 658. 659. 660. 661. 662. 663. 664. 665. 666. 667. 668. 669. 670. 671. 672. 673. 674. 675. 676. 677. 678. 679. 680. 681. 682. 683. 684. 685. 686. 687. 688. 689. 690. 691. 692. 693. 694. 695. 696. 697. 698. 699. 700. 701. 702. 703. 704. 705. 706. 707. 708. 709. 710. 711. 712. 713. 714. 715. 716. 717. 718. 719. 720. 721. 722. 723. 724. 725. 726. 727. 728. 729. 730. 731. 732. 733. 734. 735. 736. 737. 738. 739. 740. 741. 742. 743. 744. 745. 746. 747. 748. 749. 750. 751. 752. 753. 754. 755. 756. 757. 758. 759. 760. 761. 762. 763. 764. 765. 766. 767. 768. 769. 770. 771. 772. 773. 774. 775. 776. 777. 778. 779. 780. 781. 782. 783. 784. 785. 786. 787. 788. 789. 790. 791. 792. 793. 794. 795. 796. 797. 798. 799. 800. 801. 802. 803. 804. 805. 806. 807. 808. 809. 810. 811. 812. 813. 814. 815. 816. 817. 818. 819. 820. 821. 822. 823. 824. 825. 826. 827. 828. 829. 830. 831. 832. 833. 834. 835. 836. 837. 838. 839. 840. 84

$\left[\frac{1}{\rho} \frac{\partial}{\partial r} \left(\rho \frac{\partial u}{\partial r} \right) + \frac{1}{r^2} \frac{\partial}{\partial \theta} \left(r^2 \frac{\partial u}{\partial \theta} \right) + \frac{\partial^2 u}{\partial z^2} \right] = 0$

TRIAL PIT LOG

JPB

| | | | | | |
|----------------------------------|---------------|-------------------------|----------------|----------------------------|---------------|
| Client: HBL & Smith Holdings Ltd | | | | Trial Pit No
TP9 | |
| Project: Walsall Foundry | | | | Pit Depth: 4m | |
| Job No: DS071 | Date: 8-10-95 | Ground Level (m): 72.11 | Assessment to: | | Sheet: 1 of 1 |

| SAMPLES & TESTS | | | | STRATA | | | |
|-----------------|---------|----------------------------------|-------|--------------|--------|-----------|--|
| Depth | Type No | In situ TPV (g/cm ³) | Water | Revised L.L. | Ground | Depth (m) | DESCRIPTION |
| 0.00-0.20 | B1 | | | 72.02 | | 0.20 | MADE GROUND - Very silty slightly fine to coarse regular to subrounded GRAVEL of brick, cone and mortar fragments, etc. |
| 0.00-0.35 | B2 | | | 71.14 | | 0.35 | MADE GROUND - Orange sandy fine to coarse angular to subangular GRAVEL of clink and slag with occasional angular cobbles of clink. |
| 1.20-2.00 | B3 | | | 69.84 | | 2.00 | MADE GROUND - Soft to firm grey well sorted but patches of black sand. Sandy CLAY (Blanded) normally. |
| 3.00-3.20 | B4 | | | 68.44 | | 3.20 | Firm to stiff orange to red grey slightly moist CLAY. |

SKETCH OF FACES (as required)

| | |
|--|--|
| | Sub-Soil: Soil:
Excavator:
Groundwater & Remarks:
No groundwater encountered |
|--|--|

| | |
|----------|--|
| PLAN
 | Sub-Soil: Soil:
Excavator:
Groundwater & Remarks:
No groundwater encountered |
|----------|--|

| | | | |
|--|-----------------------------------|------------------|------------------|
| All dimensions in metres
Scale 1:50 | Contractor:
Boulton & Sons Ltd | Plot:
FCB PCN | Legend
By: JL |
|--|-----------------------------------|------------------|------------------|

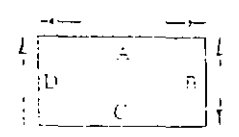
TRIAL PIT LOG

JPB

| | | | | | | | |
|--------------------------------|--|----------------|-------------------------|----------------------|--|------------------|--|
| Client: H&A South Holdings Ltd | | | | | | TLL Pit No | |
| Project: Woodwell Laundry | | | | | | TP10 | |
| Job No: DS074 | | Date: 20/06/03 | Ground Level (m): 76.10 | Core Coordinates (m) | | Full Depth: 2.8m | |
| | | | | | | Sheet: 1 of 1 | |

| SAMPLES & TESTS | | | | STRATA | | | |
|-----------------|---------|--------------------|-------|---------------|--------|----------------------|--|
| Depth | Type No | In situ MSV result | Water | Reduced Level | Legend | Depth (Total - mass) | DESCRIPTION |
| 0.00-0.50 | B1 | | | | (0.50) | 0.50 | Long grass sward - Topsoil |
| | | | | | | (2.10) | From becoming full after 0.40m depth orange mottled grey slightly sandy CLAY |
| 2.00-2.60 | B2 | | | 75.80 | | 2.50 | |
| | | | | 75.50 | | 0.50 | Grey slightly clayey slightly sandy fine to coarse angular GRAVEL or siltstone, with occasional rubble of concrete |
| | | | | 75.50 | | 2.80 | |

| | | | |
|--------------------------------|---|---|---|
| SECTION OF SACES (as required) | | | |
| D | C | B | A |
| | | | |

| | |
|---|--|
| PLAN
 | Stability: Stable |
| | Excavation: |
| | Groundwater & Remarks:
No groundwater encountered |

| | | | |
|--|-------------------------------------|-------------------|-------------------|
| All dimensions in metres
Scale 1:50 | Contractor:
Broadhead & Sons Ltd | Plant:
JCB 3CX | Logged by:
JPB |
|--|-------------------------------------|-------------------|-------------------|

Form OF-55-1 (1-8-1-64)

TRIAL PIT LOG

JPB

| | | | | | |
|----------------------------------|---------------|-------------------------|--------------|---------------|------------------|
| Client: The & Smith Holdings Ltd | | | | Trial Pit No. | |
| Project: Wombwell Country | | | | TPL2 | |
| Job No: D2973 | Date: 9/10/03 | Ground Level (m): 81.86 | Easting (m): | | Full Depth: 1.6m |
| | | | | Sheet: 1 of 1 | |

| SAMPLES & TESTS | | | Water | NOTES | | | |
|-----------------|---------|-----------------|-------|---------------|--------|-----------|---|
| Depth | Sp. No. | In situ DSW (m) | | Refined Level | Legend | Depth (m) | DESCRIPTION |
| 1.00-1.40 | B | | | | | 0.20 | Grass over MADE GROUND. Black silty slightly gravelly SAND. Gravel is of fine to medium angularity. (Sample sent) |
| | | | | | | 1.40 | Light grey brown silty fine to coarse angular to subangular GRAVEL of very weak strong bedrock (regolith) |
| | | | | 81.26 | | 1.60 | |

SKETCH OF FACES (as required)

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| | | | | | | | | | |

| | |
|-----------------|----------------------------|
| PLAN
 | Subsoil: Sub A |
| | Elevation: |
| | Groundwater & Remarks: |
| | No groundwater encountered |

| | | | |
|--|-------------------------------------|-------------------|------------------|
| All dimensions in metres
Scale 1:50 | Contractor:
Broadhead & Sons Ltd | Plant:
UCB 50X | Logged
By: JL |
|--|-------------------------------------|-------------------|------------------|

[illegible]

TRIAL PIT LOG

JPB

| | | | | | | |
|----------------------------------|---------------|-------------------------|-------------|--|---------------------------|--|
| Client: JPB & Smith Holdings Ltd | | | | | Tribute No
TP14 | |
| Project: Wombwell Foundry | | | | | Field Depth: 2.7m | |
| Job No: DS074 | Date: 1/10/03 | Ground Level (m): 55.12 | Code (m/s): | | Sheet: 1 of 1 | |

| SAMPLES & TESTS | | | | STRATA | | | |
|----------------------------------|---------|--------------------|-------|---------------|----------|-----------------|--|
| Depth | Type No | In situ HSV result | Water | Revised Level | Original | Depth (m) (m/s) | DESCRIPTION |
| 0.50-0.70 | B1 | | | | | 12.70 | Grays over browned gritty silty sandy fine to coarse angular to subangular GRAVEL of Siltstone |
| 2.60-2.70 | B2 | | | 74.42 | | 2.70 | By 2.10m becoming very weak orange rusted grey SILTSTONE. Highly weathered in cracks |
| SKETCH OF FEATURES (if required) | | | | | | | |
| | | | | | | | |

| | |
|-----------------|--|
| PLAN
 | Stability: Stable |
| | Excavation: |
| | Groundwater & Remarks:
No groundwater encountered |

| | | | |
|--|--------------------------------------|-------------------|------------------|
| All dimensions in metres
Scale 1:50 | Contractor:
Broadhead & Jones Ltd | Plant:
JCB 3CX | Logged By:
JL |
|--|--------------------------------------|-------------------|------------------|



APPENDIX E

Physical Laboratory Test Results

| CONTRACT Wombwell Foundry | | | | CLIENT Johnson Poole & Bloomer
Capthall House,
New Road,
Stourbridge,
West Midlands
DY8 1PH | | | | | | | | | | 
GIP
Geotechnical Inspection & Performance
Devonshire House, Ellingshall Road
Wolverhampton, WV6 0JT
Phone 01902 450350 Fax 01902 450355 | | | | | | | |
|--|------------|-----------------------|---|---|------|------|--|-------------------------|-----------------------------|----------|---|-------|------|---|---|--------------------|--|--|--|--|--|
| REF: L5150 | | PAGE NO: 1 of 2 | | | | | | | | | | | | | | | | | | | |
| DATE RECEIVED: 21.10.03 | | DATE ISSUED: 11.11.03 | | | | | | | | | | | | | | | | | | | |
| SAMPLE DETAILS | | | TEST DATE | INDEX PROPERTIES | | | | CHEMICAL | | | | | | % PASSING BS SIEVE SIZE | | SAMPLE DESCRIPTION | REMARKS | | | | |
| TP No | DEPTH m | SAMPLE TYPE | | W % | WL % | WP % | Ip | TOTAL SO ₂ % | Soluble SO ₂ g/L | pH Value | LOI % | ORG % | Cl % | 250 mm | 63 mm | | | | | | |
| 1 | 0.40-1.00m | B | 24.10.03 | 16 | | | | | | | | | | | | | MADE GROUND: Dark brown slightly silty slightly gravelly SAND. Gravel is clinker.

MADE GROUND: Grey slightly clayey gravelly SAND. Gravel is siltstone with occasional glass.

MADE GROUND: Dark brown slightly silty slightly gravelly SAND. Gravel is clinker with occasional glass and brick.

MADE GROUND: Brown silty slightly sandy GRAVEL. Gravel is flag, clinker and occasionally concrete.

57 MADE GROUND: Dark brown clayey SAND with occasional roots and rootlets and firm clay pockets.

Soft light brown/grey and occasionally light grey sandy CLAY.

55 Firm to stiff light brown/orange and occasionally light grey CLAY.

Firm orange brown and occasionally light grey and dark grey CLAY. | | | | |
| 1 | 1.60-2.20m | B | 24.10.03 | # 13 | | | | | | | | | | | | | | | | | |
| 2 | 0.40-0.60m | B | 24.10.03 | 0.7 | | | | | | | | | | | | | | | | | |
| 2 | 1.60-1.40m | B | 24.10.03 | # 11 | | | | | | | | | | | | | | | | | |
| 2 | 3.20-3.85m | B | 24.10.03 | 105 | 235 | 108 | 131 | | | | | | | 57 | | | | | | | |
| 2 | 4.40-4.60m | B | 24.10.03 | 30 | | | | | | | | | | | | | | | | | |
| 3 | 0.80-1.20m | B | 24.10.03 | 31 | 71 | 27 | 64 | | | | | | | 55 | | | | | | | |
| 4 | 1.00-1.20m | B | 24.10.03 | 34 | | | | | | | | | | | | | | | | | |
| Sample type
D Disturbed
B Bulk disturbed
U Undisturbed
S SPT split spoon
W Ground water | | | Test abbreviations
W Moisture Content
WL Liquid limit
WP Plastic limit
Ip Index property
L.O.I. Loss on ignition
ORG Organic content
Cl Soluble chloride | | | | Test methods - Unless otherwise stated
W% BS1377 PART2:1990.3
WL BS1377 PART2:1990.4 2M 4
WP BS1377 PART2:1990.5.3
Ip BS1377 PART2:1990.5.4
L.O.I. BS1377 PART3:1990.4
ORG BS1377 PART3:1990.3
Cl BS1377 PART3:1990.7.2/3 | | | | Feat SO ₂ BS1377 PART3:1990.5.5
Soluble SO ₂ BS1377 PART3:1990.5.5
pH Value BS1377 PART3:1990.3 | | | | 
1557
Tests marked * are not UKAS accredited
The reported results relate only to samples received
* = Sample mass smaller than BS1377 requirements | | | | | | |
| Comments and interpretations are outside the scope of UKAS accreditation | | | | | | | | | | | Approved Signatories: | | | | | | | | | | |
| This test report shall not be reproduced except in full without written approval by the laboratory | | | | | | | | | | | A.L. Pearce, Laboratory director | | | | | | | | | | |
| | | | | | | | | | | | P.H. Lewis, Laboratory manager | | | | | | | | | | |

GROUND INVESTIGATION & PILING LIMITED

COMPACTION TEST REPORT

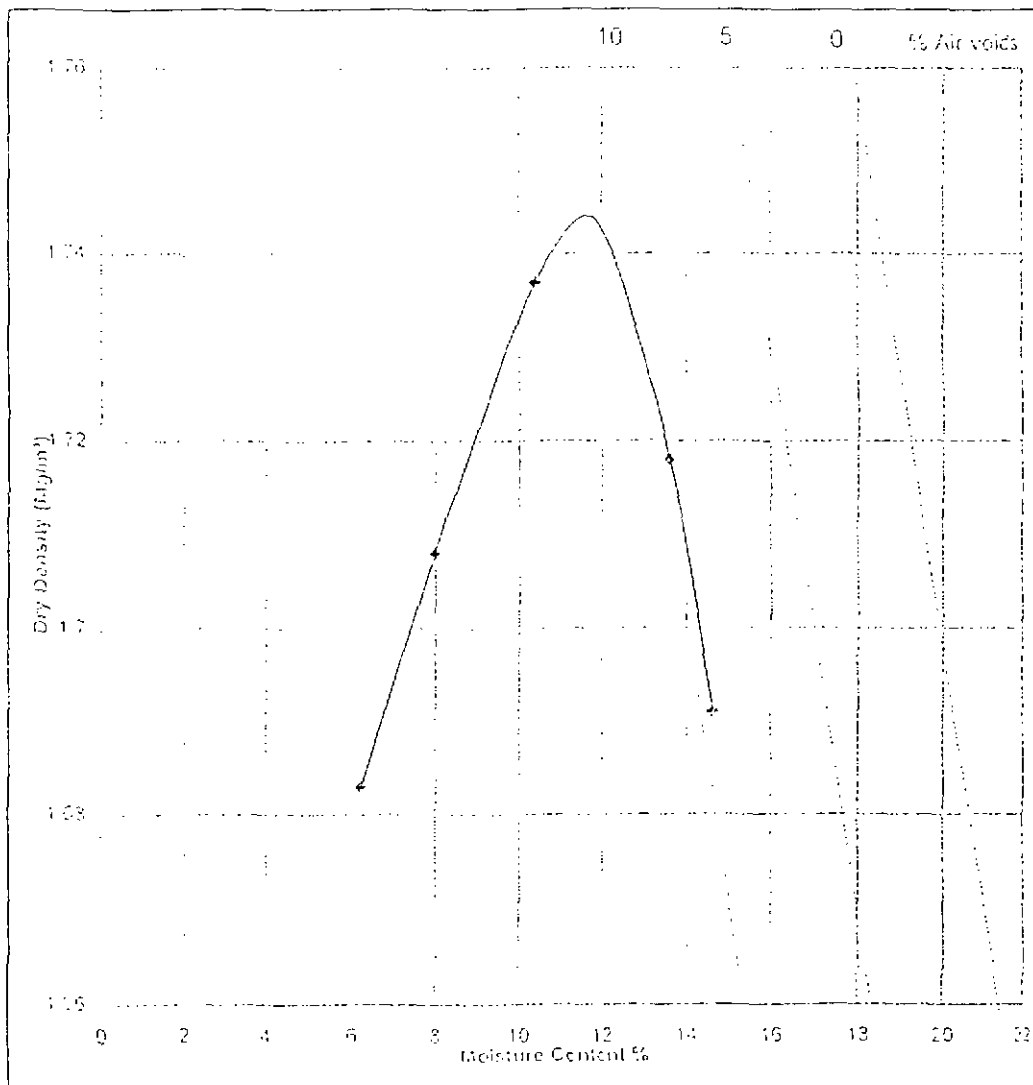
Job No - L5350 Location - Wombwell Foundry
 Received - 21.10.03 Client - Johnson Poole & Bloomer
 Tested - 31.10.03 Copthall House, New Road,
 Report - 05.11.03 Stourbridge, West Midlands DY8 1PH.

BH 22
 Depth - 1.0, 2.0, 4.0m



Page 1 of 2

| | | |
|---|--|---|
| TEST METHOD:-
Compaction
BS1377 Part 1:1990
Clause 3.4 | Optimum Moisture Content:
Maximum Dry Density:
Natural Moisture Content:
Measured Particle Density:
Material > 20 Grmm:
Material > 37.5mm:
If material is cohesive then broken down to pass sieve size:
Type of Compaction Rammer | 12 %
1.74 Mg/m ³
15 %
2.57 Mg/m ³
23 %
20 %
20 mm
2.5 kg |
| Particle Density
BS1377 Part 2:1990
Clause 5.2 | Sample Description: LEA-DE GROUND. Brown slightly oily slightly gravelly SAND with occasional cobbles. Gravel is sandstone with occasional ash and clinker. Cobbles are sandstone. | Authorized by E Leving
Laboratory Manager |
| Sample Preparation
BS1377 Part 1:1990
Clause 7.6 | | |



Initial sample mass < BS1377 requirements



1897

GROUND INVESTIGATION & PILING LIMITED

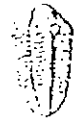
COMPACTION TEST REPORT

Job No - I/5150
Received - 21 10 03
Tested - 31 10 03
Report - 05 11 03

Location - Wombwell Foundry.
Client - Johnson Poole & Bloomer
Cophall House, New Road,
Stourbridge, West Midlands. DYS 1PH

TP 21, 20, 26

Depth - 0.0+1.0m



Page 2 of 2

TEST METHODS -

Compaction:
BS1377 Part 1:1990
Clause 3.4

Particle Density
BS1377 Part 2:1990,
Clause 3.2

Sample Preparation
BS1377 Part 1:1990
Clause 7.5

Optimum Moisture Content:

Maximum Dry Density:

Natural Moisture Content:

Measured Particle Density

Material > 20.0mm:

Material > 37.5mm:

If material is cohesive then lick on down to pass sieve size:

Type of Compaction Rammer:

11 %

1.24 Mg/m³

9.6 %

2.63 Mg/m³

9 %

5 %

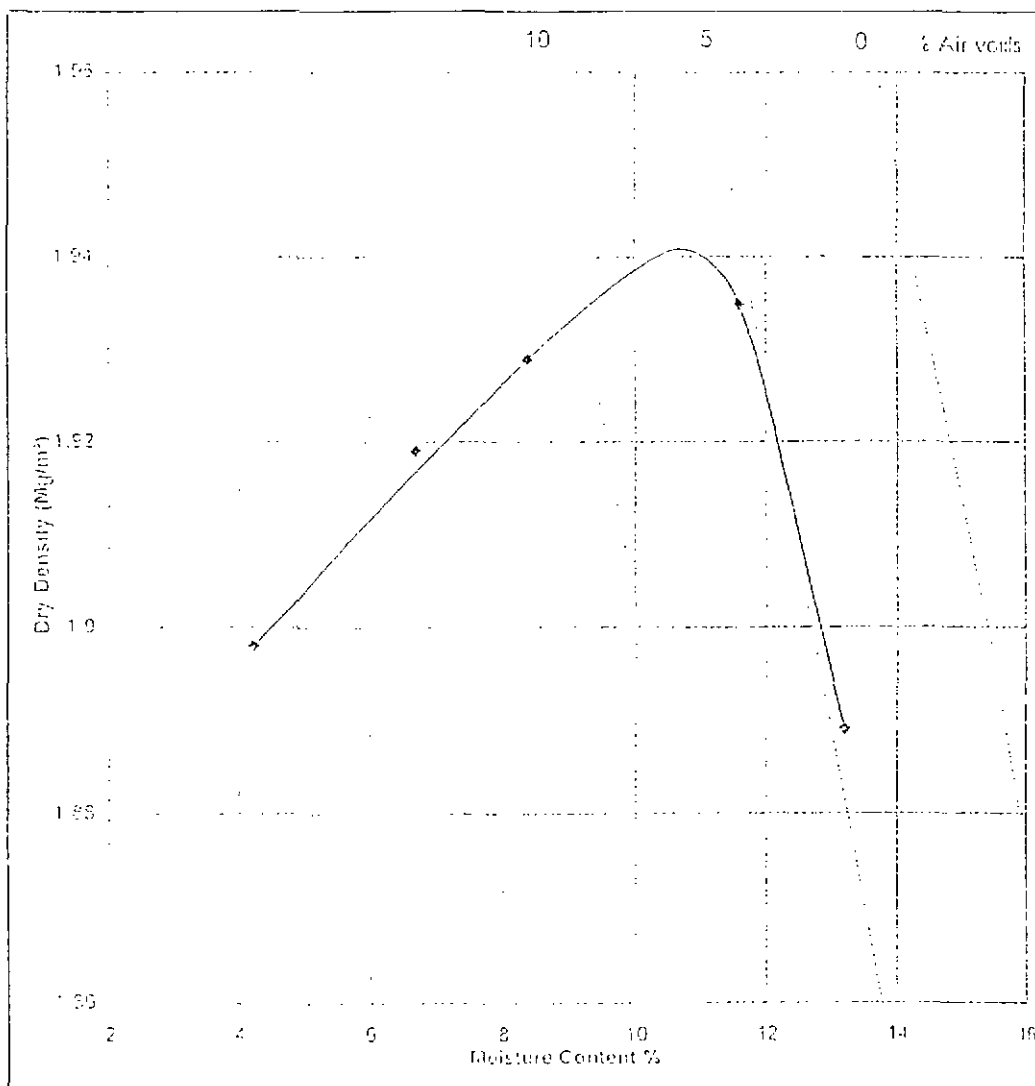
20 mm

2.5 kg

Sample Description: MADE GROUND. Dark brown slightly silty slightly
gravelly SAND. Gravel is clinker with occasional ash
and sandstone

Authorised By E. Leving
Laboratory Manager

[Signature]



Initial sample mass < BS1377 requirements



1397

GROUND INVESTIGATION & PILING LIMITED

TEST REPORT FOR PARTICLE SIZE DISTRIBUTION

Job No:- L75159 Site:- *Wombwell Foundry,*
 Received:- 21.10.03 Client:- Johnson Poole & Bloomer
 Tested:- 28.10.03 Copthall House, New Road,
 Report:- 04.11.03 Stourbridge, West Midlands DY8 1PH

EH 22
 Depth:- 1.0, 2.0, 4.0m



Page 1 of 2

TEST METHODS -
 Particle Size Distribution -
 BS 1377 Part 2: 1990
 Clause 9.2 & 9.3

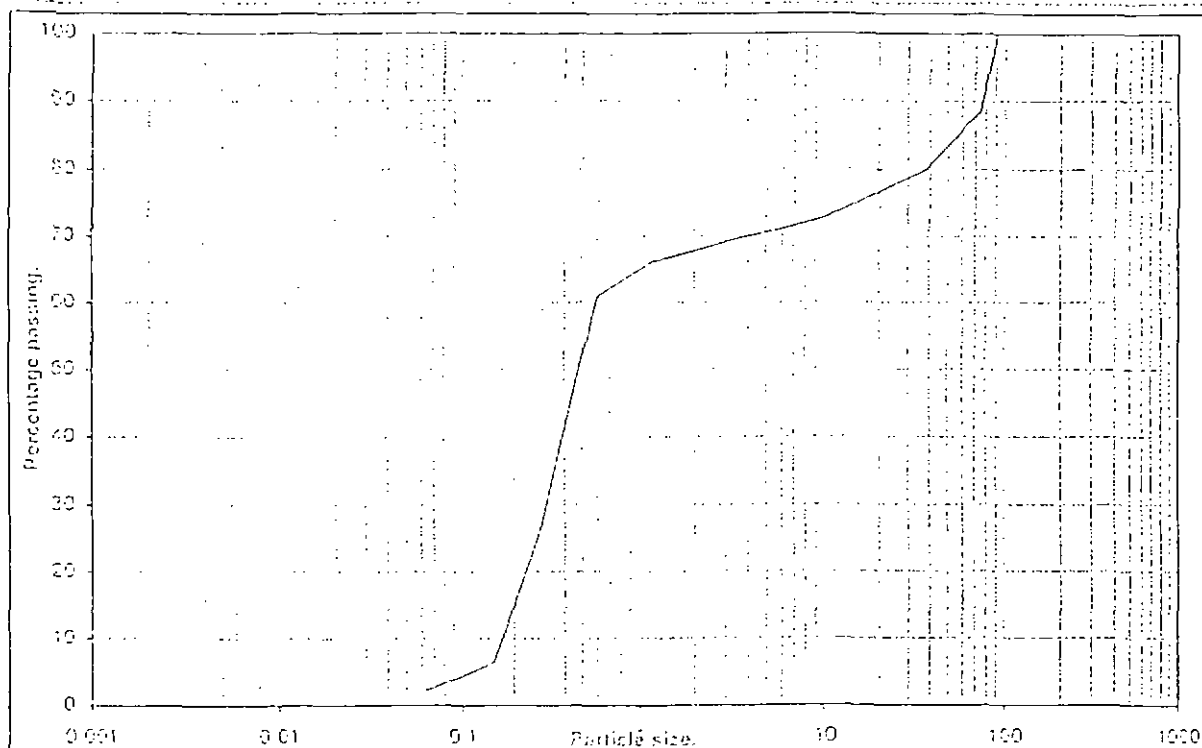
Seal description -
 BS 1377 Part 2: 1990
 Clause 9.4

Sample Description: *IN DE GROUND. Brown slightly silty slightly
 gravelly SAND with occasional cobbles.
 Gravel is sandstone with occasional ash and
 darker. Cobbles are sandstone.*

TEST METHODS -
 Sample Preparation:
 BS 1377 Part 1: 1990
 Clause 7.9 & 7.4.5

Authorised by E. Leving
 Laboratory Manager

[Signature]



| | FINE | MEDIUM | COARSE | FINE | MEDIUM | COARSE | FINE | MEDIUM | COARSE | | |
|----|------|--------|--------|------|--------|--------|--------|--------|--------|---------|---------|
| mm | SILT | | | SAND | | | GRAVEL | | | COBBLES | BOULDER |

| Slave Size | % | Slave Size | % |
|------------|---------|------------|---------|
| mm | Passing | mm | Passing |
| 150 | 100 | 3.35 | 69 |
| 125 | 100 | 2 | 66 |
| 90 | 100 | 1.18 | 65 |
| 75 | 89 | 0.6 | 61 |
| 63 | 87 | 0.3 | 28 |
| 37.5 | 80 | 0.15 | 6 |
| 20 | 77 | 0.063 | 2 |
| 10 | 73 | | |
| 6.3 | 71 | | |

% Clay & Silt 2
 % Sand 65
 % Gravel 19
 % Cobbles 13



1897

GROUND INVESTIGATION & PILING LIMITED

TEST REPORT FOR PARTICLE SIZE DISTRIBUTION

Job No:- 175150
 Received:- 21.10.03
 Tested:- 28.10.03
 Report:- 04.11.03

Site:- Wombwell Foundry
 Client:- Johnson Poole & Bloomer
 Copthall House, New Road,
 Stourbridge, West Midlands. DY8 1PH.

BH 21, 20, 26

Depth:- 0.0 to 1.0m



Page 2 of 2

TEST METHODS -
 Particle Size Distribution -
 BS 1277 Part 2: 1990
 Clause 9.2.3.9.2

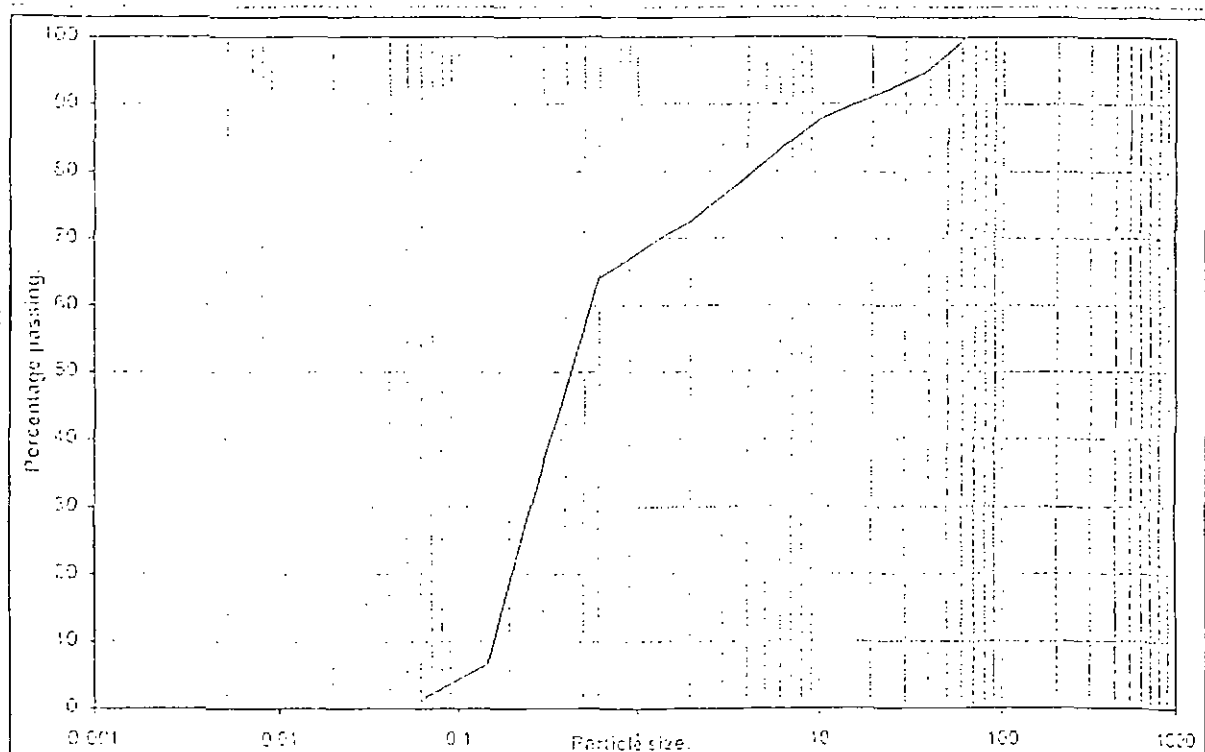
Settlement -
 BS 1277 Part 2: 1990
 Clause 9.4

Sample Description: MADE GROUND. Dark brown slightly silty slightly gravelly SAND. Gravel is clinker with occasional ash and sandstone.

TEST METHODS -
 Sample Preparation
 BS1277, Part 1: 1990.
 Clause 7.9 & 7.4.5

Authorised by E. Leeming
 Laboratory Manager

[Signature]



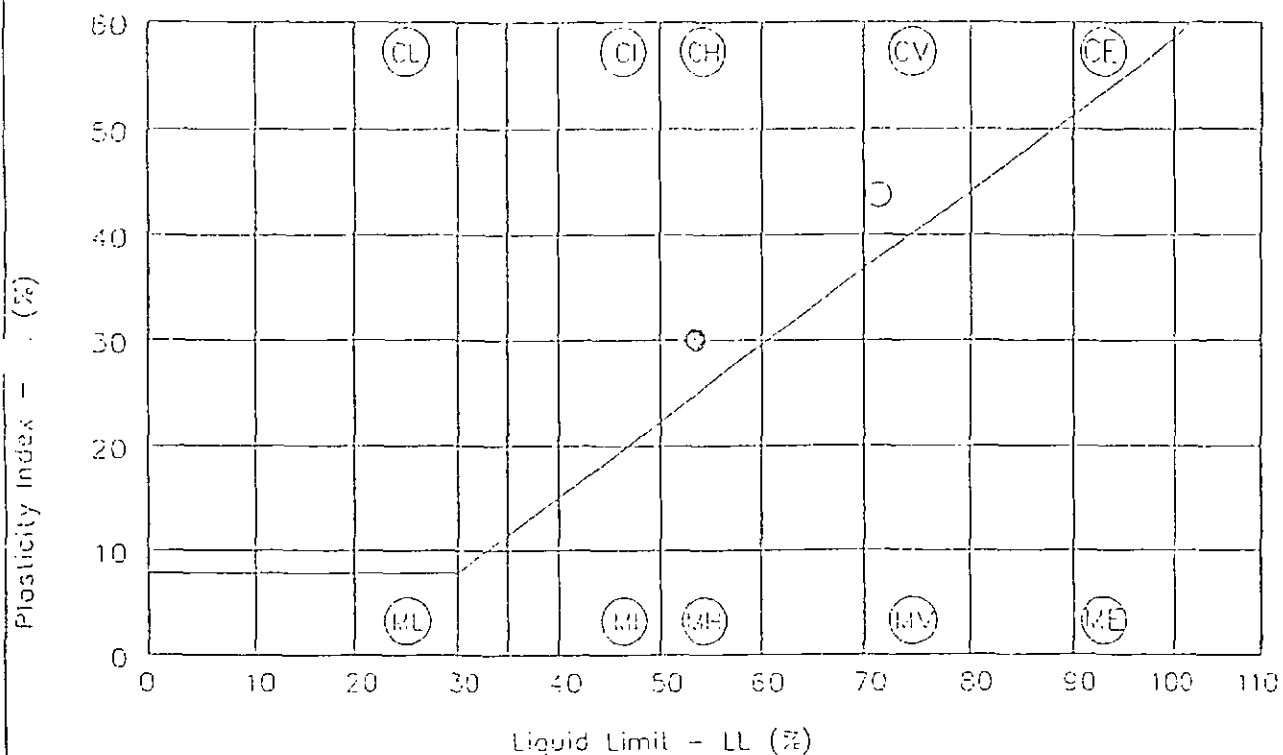
| | FINE | MEDIUM | COARSE | FINE | MEDIUM | COARSE | FINE | MEDIUM | COARSE | | |
|----|------|--------|--------|------|--------|--------|--------|--------|--------|---------|----------|
| mm | SILT | | | SAND | | | GRAVEL | | | COBBLES | BOULDERS |

| Sieve Size | mm | Passing | Sieve Size | mm | Passing |
|------------|------|---------|------------|-------|---------|
| 150 | 150 | 100 | 3.35 | 3.35 | 78 |
| 125 | 125 | 100 | 2 | 2 | 73 |
| 90 | 90 | 100 | 1.18 | 1.18 | 69 |
| 75 | 75 | 100 | 0.6 | 0.6 | 64 |
| 63 | 63 | 100 | 0.3 | 0.3 | 36 |
| 37.5 | 37.5 | 95 | 0.15 | 0.15 | 7 |
| 20 | 20 | 91 | 0.063 | 0.063 | 2 |
| 10 | 10 | 88 | | | |
| 6.3 | 6.3 | 84 | | | |

% Clay & Silt 2
 % Sand 71
 % Gravel 27
 % Cobbles 0

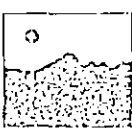


1597



| BH/TP No. depth (m) | LL | PL | PI | Remarks |
|---------------------|-----|-----|-----|---|
| ○ BH03 @ 0.80-1.20 | 71 | 27 | 44 | |
| ⊙ BH11 @ 1.20-1.50 | 54 | 24 | 30 | |
| ⊕ BH02 @ 3.20-3.85 | 239 | 108 | 131 | PSEUDO PEAT
LOSS ON IGNITION 51 %
PLOTS OFF THE ABOVE SCALE |
| | | | | |

JOHNSON
POLE &
BLOOMER
LAND CONSULTANTS



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Engineer

Client

HILL & SMITH
HOLDINGS PLC.

Title

"ATTERBERG LIMIT A - USE"

Checked

Project

WOMBWELL FOUNDRY,
WOMBWELL

Approved

Date

14/01/04

Scale

N.T.S

Drawing

APPENDIX E



APPENDIX F

Contamination Analysis Test Results and Statistical Analysis



APPENDIX G

Gas and Groundwater Monitoring Results

| JUR | Client: | HPA & Smith Holdings plc | Equipment: | GA 2030 | Reference: | DS074 | | | | | | Title: | Summary Sheet Earthlog - Monitor no. |
|--------------|---------------------------|--------------------------|------------|----------|----------------------|---------|--|--|--|--|--|--------|--------------------------------------|
| | Project: | Woodwell Country | | Dipmeter | Manufactured by: 1.1 | | | | | | | | |
| | | | | | Sheet No: | 1 of 6 | | | | | | | |
| BOREHOLE NO. | 1651 | 1501001 | 0501001 | 1001201 | 2701001 | | | | | | | | |
| 3 | CH % LEL | 2 | 0 | 0 | 0 | | | | | | | | |
| | CH % VOL | 0.1 | 0 | 0 | 0 | | | | | | | | |
| | CO % | 0 | 0.4 | 0.9 | 1.2 | | | | | | | | |
| | O2 % | 19.7 | 20 | 19.2 | 19.8 | | | | | | | | |
| | H2S PPM | 0 | 0 | 0 | 0 | | | | | | | | |
| | CO PPM | 0 | 0 | 0 | 0 | | | | | | | | |
| | BOREHOLE PRESSURE (mb) | 0.7 | -0.23 | n/a | 0 | | | | | | | | |
| | TEMPERATURE °C m/sat | n/a | n/a | n/a | n/a | | | | | | | | |
| | WATER LEVEL (mhigh) | dry | dry | n/a | n/a | | | | | | | | |
| | AVERAGE FLOW (l/hr) | 0 | 0.3 | 0 | 0 | | | | | | | | |
| | ATMOSPHERIC PRESSURE (mm) | 1024 | 1013 | 1001 | 992 | | | | | | | | |
| | BOREHOLE NO. | 1651 | 1501001 | 0501001 | 1001201 | 2701001 | | | | | | | |
| 6 | CH % LEL | 0 | 0 | 0 | n/a | | | | | | | | |
| | CH % VOL | 0 | 0 | 0 | n/a | | | | | | | | |
| | CO % | 2.0 | 0 | 1.5 | n/a | | | | | | | | |
| | O2 % | 20.0 | 20.1 | 19.6 | n/a | | | | | | | | |
| | H2S PPM | 0 | 0 | 0 | n/a | | | | | | | | |
| | CO PPM | 0 | 0 | 2 | n/a | | | | | | | | |
| | BOREHOLE PRESSURE (mb) | -0.15 | -0.37 | | n/a | | | | | | | | |
| | TEMPERATURE °C m/sat | n/a | n/a | n/a | n/a | | | | | | | | |
| | WATER LEVEL (mhigh) | dry | dry | | n/a | | | | | | | | |
| | AVERAGE FLOW (l/hr) | 0 | 0 | 4 | n/a | | | | | | | | |
| | ATMOSPHERIC PRESSURE (mm) | 1024 | 1013 | 1003 | 992 | | | | | | | | |
| | BOREHOLE NO. | 1651 | 1501001 | 0501001 | 1001201 | 2701001 | | | | | | | |
| 3 | CH % LEL | 2 | 0 | 0 | 0 | | | | | | | | |
| | CH % VOL | 0.1 | 0 | 0 | 0 | | | | | | | | |
| | CO % | 2.8 | 2.7 | 2.6 | 0 | | | | | | | | |
| | O2 % | 19.6 | 17.2 | 14.2 | 20.9 | | | | | | | | |
| | H2S PPM | 0 | 0 | 0 | 0 | | | | | | | | |
| | CO PPM | 0 | 0 | 1 | 1 | | | | | | | | |
| | BOREHOLE PRESSURE (mb) | -0.14 | 0.3 | n/a | 0 | | | | | | | | |
| | TEMPERATURE °C m/sat | n/a | n/a | n/a | n/a | | | | | | | | |
| | WATER LEVEL (mhigh) | dry | dry | n/a | n/a | | | | | | | | |
| | AVERAGE FLOW (l/hr) | 0 | 0 | 4 | 0 | | | | | | | | |
| | ATMOSPHERIC PRESSURE (mm) | 1024 | 1003 | 1000 | 992 | | | | | | | | |

| BOREHOLE NO. | TEST | 15/10/03 | 05/11/03 | 09/12/03 | 27/01/04 | | | | | | | | |
|--------------|---------------------------|----------|----------|----------|----------|--|--|--|--|--|--|--|--|
| 9 | CH4 % VOL | 0 | 0 | 0.5 | 0 | | | | | | | | |
| | CH4 % VOL | 0.1 | 0 | 0.5 | 0 | | | | | | | | |
| | CO2 % | 3.2 | 2.6 | 0.5 | 0 | | | | | | | | |
| | O2 % | 15.6 | 16.7 | 0.5 | 20.0 | | | | | | | | |
| | H2S PPM | 0 | 0 | 0.5 | 0 | | | | | | | | |
| | CO PPM | 0 | 0 | 0.5 | 0 | | | | | | | | |
| | BOREHOLE PRESSURE (mb) | -0.06 | -0.07 | 0.5 | 0 | | | | | | | | |
| | TEMPERATURE °C (mud) | 0.5 | 0.5 | 0.5 | 0.5 | | | | | | | | |
| | WATER LEVEL (mwp) | dry | dry | 0.5 | 0.5 | | | | | | | | |
| | AVERAGE FLOW (m3) | 0.1 | 0 | 0.5 | 0 | | | | | | | | |
| | ATMOSPHERIC PRESSURE (mb) | 1023 | 1013 | 1003 | 992 | | | | | | | | |
| BOREHOLE NO. | TEST | 15/10/03 | 05/11/03 | 09/12/03 | 27/01/04 | | | | | | | | |
| 12 | CH4 % VOL | - | 0 | 0 | logged | | | | | | | | |
| | CH4 % VOL | - | 0 | 0 | | | | | | | | | |
| | CO2 % | - | 0.3 | 0.5 | | | | | | | | | |
| | O2 % | - | 19.4 | 17.8 | | | | | | | | | |
| | H2S PPM | - | 0 | 0 | | | | | | | | | |
| | CO PPM | - | 0 | 0 | | | | | | | | | |
| | BOREHOLE PRESSURE (mb) | - | -1.25 | 0.5 | | | | | | | | | |
| | TEMPERATURE °C (mud) | - | 0.5 | 0.5 | | | | | | | | | |
| | WATER LEVEL (mwp) | - | 1.2 | 0.5 | | | | | | | | | |
| | AVERAGE FLOW (m3) | - | 0 | 1 | | | | | | | | | |
| | ATMOSPHERIC PRESSURE (mb) | - | 1013 | 1010 | 992 | | | | | | | | |
| BOREHOLE NO. | TEST | 15/10/03 | 05/11/03 | 09/12/03 | 27/01/04 | | | | | | | | |
| 10 | CH4 % VOL | 0 | 0 | 0 | 0 | | | | | | | | |
| | CH4 % VOL | 0 | 0 | 0 | 0 | | | | | | | | |
| | CO2 % | 2.6 | 2.9 | 4.1 | 2.5 | | | | | | | | |
| | O2 % | 17.6 | 16.4 | 12 | 17.3 | | | | | | | | |
| | H2S PPM | 0 | 0 | 0 | 0 | | | | | | | | |
| | CO PPM | 0 | 0 | 0 | 0 | | | | | | | | |
| | BOREHOLE PRESSURE (mb) | -0.27 | -0.33 | 0.5 | 2 | | | | | | | | |
| | TEMPERATURE °C (mud) | 0.5 | 0.5 | 0.5 | 0.5 | | | | | | | | |
| | WATER LEVEL (mwp) | dry | dry | 0.5 | 0.5 | | | | | | | | |
| | AVERAGE FLOW (m3) | 0 | 0 | 1 | 1 | | | | | | | | |
| | ATMOSPHERIC PRESSURE (mb) | 1024 | 1013 | 1003 | 992 | | | | | | | | |

| BOREHOLE NO | TEST | 15/10/03 | 05/11/03 | 10/11/03 | 22/11/03 | | | | | | | | |
|-------------|---------------------------|----------|----------|----------|----------|--|--|--|--|--|--|--|--|
| 17 | CH4 % LEL | 0 | 0 | 0 | 0 | | | | | | | | |
| | CH4 % VOL | 0 | 0 | 0 | 0 | | | | | | | | |
| | CO2 % | 2.7 | 6.1 | 5.3 | 0 | | | | | | | | |
| | O2 % | 17.4 | 15.4 | 12 | 20.6 | | | | | | | | |
| | H2S PPM | 0 | 0 | 0 | 0 | | | | | | | | |
| | CO PPM | 0 | 0 | 0 | 0 | | | | | | | | |
| | BOREHOLE PRESSURE (mm) | 0.02 | 0.02 | 0.5 | 0 | | | | | | | | |
| | TEMPERATURE (C mboul) | 0.5 | 0.5 | 0.5 | 0.5 | | | | | | | | |
| | WATER LEVEL (mgh) | 5.25 | 5.25 | 0.0 | 0.5 | | | | | | | | |
| | AVERAGE FLOW (mm) | 0 | 0 | 0 | 0 | | | | | | | | |
| | ATMOSPHERIC PRESSURE (mm) | 1020 | 1013 | 1001 | 992 | | | | | | | | |
| BOREHOLE NO | TEST | 15/10/03 | 05/11/03 | 10/11/03 | 22/11/03 | | | | | | | | |
| 18 | CH4 % LEL | 0 | 0 | 0 | 0 | | | | | | | | |
| | CH4 % VOL | 0 | 0 | 0 | 0 | | | | | | | | |
| | CO2 % | 3 | 0 | 1.1 | 0.5 | | | | | | | | |
| | O2 % | 19 | 20 | 14.8 | 19.1 | | | | | | | | |
| | H2S PPM | 0 | 0 | 0 | 0 | | | | | | | | |
| | CO PPM | 0 | 0 | 1 | 0 | | | | | | | | |
| | BOREHOLE PRESSURE (mm) | 0.02 | 0 | 0.5 | 0 | | | | | | | | |
| | TEMPERATURE (C mboul) | 0.5 | 0.5 | 0.5 | 0.5 | | | | | | | | |
| | WATER LEVEL (mgh) | 2.5 | 2.1 | 0.5 | 0.1 | | | | | | | | |
| | AVERAGE FLOW (mm) | 0.1 | 0 | 1 | 0 | | | | | | | | |
| | ATMOSPHERIC PRESSURE (mm) | 1021 | 1011 | 1001 | 982 | | | | | | | | |
| BOREHOLE NO | TEST | 15/10/03 | 05/11/03 | 10/11/03 | 22/11/03 | | | | | | | | |
| 19 | CH4 % LEL | 0 | 0 | 0 | 0 | | | | | | | | |
| | CH4 % VOL | 0 | 0 | 0 | 0 | | | | | | | | |
| | CO2 % | 1 | 0.7 | 2.1 | 1.9 | | | | | | | | |
| | O2 % | 17.8 | 17.0 | 10.1 | 13.5 | | | | | | | | |
| | H2S PPM | 0 | 0 | 0 | 0 | | | | | | | | |
| | CO PPM | 0 | 0 | 0 | 0 | | | | | | | | |
| | BOREHOLE PRESSURE (mm) | -0.12 | -0.1 | 0.5 | -2 | | | | | | | | |
| | TEMPERATURE (C mboul) | 0.5 | 0.5 | 0.5 | 0.5 | | | | | | | | |
| | WATER LEVEL (mgh) | 9.15 | 9.15 | 0.5 | 0.5 | | | | | | | | |
| | AVERAGE FLOW (mm) | 0 | 0.1 | 2 | 0 | | | | | | | | |
| | ATMOSPHERIC PRESSURE (mm) | 1021 | 1012 | 1001 | 982 | | | | | | | | |

| | | | | | |
|-------------|------|----------|----------|----------|----------|
| BOROHOLE NO | TEST | 10/10/93 | 07/11/93 | 10/12/93 | 27/01/94 | |
|-------------|------|----------|----------|----------|----------|

| BOROHOLE NO. | TEST | 10/10/93 | 09/11/93 | 10/12/93 | 27/01/94 | | | | | | | | | | | | | | |
|---------------------------|------------------------|----------|----------|----------|----------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| 23 | CH ₄ % LEL | 0 | 0 | 0 | Not detectable | | | | | | | | | | | | | | |
| | CH ₄ % VOL | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| | CO ₂ % | 0 | 0 | 1.0 | | | | | | | | | | | | | | | |
| | O ₂ % | 20 | 20.1 | 20.8 | | | | | | | | | | | | | | | |
| | H ₂ S PPM | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| | CO PPM | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| | BOREHOLE PRESSURE (mb) | 0.21 | 0.2 | | | | | | | | | | | | | | | | |
| | TEMPERATURE °C inlet | n/a | n/a | n/a | | | | | | | | | | | | | | | |
| | WATER LEVEL (mbsg) | - | 7.45 | | | | | | | | | | | | | | | | |
| | AVERAGE FLOW (lpm) | 0.2 | 0.1 | 3 | | | | | | | | | | | | | | | |
| ATMOSPHERIC PRESSURE (mb) | 1024 | 1013 | 1003 | 982 | | | | | | | | | | | | | | | |
| BOROHOLE NO. | TEST | 10/10/93 | 09/11/93 | 10/12/93 | 27/01/94 | | | | | | | | | | | | | | |
| 24 | CH ₄ % LEL | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | |
| | CH ₄ % VOL | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | |
| | CO ₂ % | 1.0 | 1.2 | 1.3 | 0.6 | | | | | | | | | | | | | | |
| | O ₂ % | 18.8 | 18.6 | 17.4 | 1.7 | | | | | | | | | | | | | | |
| | H ₂ S PPM | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | |
| | CO PPM | 0 | 0 | 2 | 1 | | | | | | | | | | | | | | |
| | BOREHOLE PRESSURE (mb) | 0 | <0.05 | n/a | 2 | | | | | | | | | | | | | | |
| | TEMPERATURE °C inlet | n/a | n/a | n/a | n/a | | | | | | | | | | | | | | |
| | WATER LEVEL (mbsg) | n/a | n/a | n/a | n/a | | | | | | | | | | | | | | |
| | AVERAGE FLOW (lpm) | 0.2 | 0.1 | 0 | 0 | | | | | | | | | | | | | | |
| ATMOSPHERIC PRESSURE (mb) | 1024 | 1012 | 1003 | 982 | | | | | | | | | | | | | | | |
| BOROHOLE NO. | TEST | 10/10/93 | 09/11/93 | 10/12/93 | 27/01/94 | | | | | | | | | | | | | | |
| 25 | CH ₄ % LEL | 2 | 0 | 0 | Gooden | | | | | | | | | | | | | | |
| | CH ₄ % VOL | 0.1 | 0 | 0 | | | | | | | | | | | | | | | |
| | CO ₂ % | 1.7 | 1.3 | 2.1 | | | | | | | | | | | | | | | |
| | O ₂ % | 18.3 | 17.7 | 12.5 | | | | | | | | | | | | | | | |
| | H ₂ S PPM | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| | CO PPM | 0 | 0 | 2 | | | | | | | | | | | | | | | |
| | BOREHOLE PRESSURE (mb) | 0.7 | 0.02 | | | | | | | | | | | | | | | | |
| | TEMPERATURE °C inlet | n/a | n/a | n/a | | | | | | | | | | | | | | | |
| | WATER LEVEL (mbsg) | 3.1 | 2.12 | | | | | | | | | | | | | | | | |
| | AVERAGE FLOW (lpm) | 0.2 | 0.1 | 1 | | | | | | | | | | | | | | | |
| ATMOSPHERIC PRESSURE (mb) | 1024 | 1012 | 1003 | 982 | | | | | | | | | | | | | | | |

| SOMEHOLE NO. | TEST | 15/09/03 | 05/11/03 | 10/12/03 | 27/01/04 |
|--------------|---------------------------|----------|----------|----------|----------|
| 26 | CHEM LCL | 0 | 0 | 0 | 0 |
| | CHEM SOL | 0 | 0 | 0 | 0 |
| | CO ₂ % | 2.4 | 2.2 | 2.4 | 2.0 |
| | O ₂ % | 5.1 | 7.9 | 0.0 | 19.1 |
| | H ₂ S ppm | 0 | 0 | 0 | 0 |
| | CO ppm | 0 | 0 | 0 | 0 |
| | BOROHOLE PRESSURE (mm) | -0.03 | -0.1 | 0.0 | 0 |
| | TEMPERATURE °C (mud) | 65 | 65 | 65 | 65 |
| 27 | WATER LEVEL (mm) | 7.4 | 6.17 | 0.4 | 0.0 |
| | AVERAGE FLOW (mm) | 0 | 0 | 0 | 0 |
| | ATMOSPHERIC PRESSURE (mm) | 1024 | 1013 | 1003 | 997 |
| | TEST | 15/09/03 | 05/11/03 | 10/12/03 | 27/01/04 |
| | CHEM LCL | 0 | 0 | 0 | 0 |
| | CHEM SOL | 0.2 | 0.1 | 0.4 | 0.1 |
| | CO ₂ % | 0.7 | 0.7 | 0.2 | 0.1 |
| | O ₂ % | 1.5 | 0 | 0.2 | 0.7 |
| 28 | H ₂ S ppm | 0 | 0 | 0 | 0 |
| | CO ppm | 0 | 0 | 2 | 0 |
| | BOROHOLE PRESSURE (mm) | 0.03 | 0 | 0.0 | 0 |
| | TEMPERATURE °C (mud) | 65 | 65 | 65 | 65 |
| | WATER LEVEL (mm) | 0.9 | 0.8 | 0.9 | 0.5 |
| | AVERAGE FLOW (mm) | 0 | 0.2 | 2 | 2 |
| | ATMOSPHERIC PRESSURE (mm) | 1024 | 1013 | 1003 | 997 |
| | TEST | 15/09/03 | 05/11/03 | 10/12/03 | 27/01/04 |
| 29 | CHEM LCL | 0 | 0 | 0 | 0 |
| | CHEM SOL | 0.2 | 0 | 0 | 0 |
| | CO ₂ % | 0.9 | 3.5 | 1 | 3.1 |
| | O ₂ % | 0.7 | 1.1 | 2.6 | 2.7 |
| | H ₂ S ppm | 0 | 0 | 0 | 0 |
| | CO ppm | 0 | 0 | 1 | 1 |
| | BOROHOLE PRESSURE (mm) | -0.03 | -0.24 | 0.0 | 0 |
| | TEMPERATURE °C (mud) | 65 | 65 | 65 | 65 |
| 30 | WATER LEVEL (mm) | 0.9 | 0.9 | 0.9 | 0.9 |
| | AVERAGE FLOW (mm) | 0.1 | 0.1 | 1 | 2 |
| | ATMOSPHERIC PRESSURE (mm) | 1024 | 1013 | 1003 | 997 |



APPENDIX II

Envirocheck Report
Referenced 36993 and dated 12th October 2001

Envirocheck Report On :

Wombwell Foundry Ltd.
Hough Lane
Wombwell
Barnsley
South Yorkshire
S73 0LT

National Grid Reference :

439063, 402325

Prepared For :

Your Reference :

32993

Prepared By :

Martha McEwen

Summary

Details

Useful Contacts

EGS Borehole Order Form

Introduction

The Environment Act 1995 has made site suitability a key issue in the legislation says as much effort will be the pathways by which contamination could spread, and to the vulnerable targets of contamination, as it does to the potential sources of contamination. For this reason, Landmark's Site Sensitivity Data Check places great emphasis on statutory data provided by the Environment Agency and the Scottish Environment Protection Agency, it also incorporates data from English Nature (and the Scottish and Welsh equivalents), the Environment Agency (and the Scottish equivalent) and Local Authorities and highlights any missing data features required by environmental and geotechnical consultants. The data sheet is produced by querying the legend database to fit 100m from the site polygon provided by the client.

It is attached to the Site Sensitivity Data Check report (SSDC) and is added to the report 100m in accordance with the client's agreement with a number of Data Suppliers.

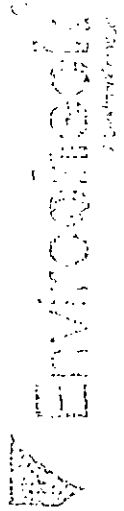
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| | 50m | 250m | 500m | 1000m |
|--|------------|-------------|-------------|--------------|
| Agency & Hydrological | | | | |
| Air Pollution Controls ("APC") | 1 | | | |
| Discharge Consents to Controlled Waters | | | | 2 |
| Enforcement and Prohibition Notices | | | | |
| Integrated Pollution Controls ("IPC") | | | | |
| Nearest Surface Water Feature | Yes | | | |
| Pollution Incidents to Controlled Waters | | | | 2 |
| Prosecutions relating to Authorised Processes | | | | |
| Prosecutions to Controlled Waters | | | | |
| Red List Discharge Consents | | | | |
| Radioactive Substance Authorisations ("RSA") | | | | 1 |
| River Quality Data | | | | |
| Water Abstractions | | | | |
| Groundwater Vulnerability | 2 | | | |
| Drift Deposits | | | | |
| Fluvial Indicative Flood Plain | 1 | | | |
| Tidal Indicative Flood Plain | 1 | | | |
| Source Protection Zones | | | | |
| Waste | 50m | 250m | 500m | 1000m |
| BGS Recorded Landfill Sites | | | | 1 |
| Integrated Pollution Control registered Waste Sites | | | | |
| Registered Waste Transfer Sites | | | 1 | |
| Registered Waste Treatment or Disposal Sites | | | | 2 |
| Registered Landfill Sites | 2 | | | |
| Hazardous Substances | 50m | 250m | 500m | 1000m |
| COMAH Sites | | | | |
| Explosive Sites | | | | |
| NIHHS Sites | | | | |
| Planning Hazardous Substance Consents | | | | |
| Planning Hazardous Substance Enforcements | | | | |
| Geological | 50m | 250m | 500m | 1000m |
| BGS Boreholes | | | | 24 |
| BGS Recorded Mineral Sites | | | | |
| BGS 1:625 000 Surface Geology | 1 | | | |
| Coal Mining Affected Areas | 1 | | | |
| Shallow Mining Hazards | 1 | | | |
| Natural Subsidence Hazard | 1 | | | |
| Radon Affected Area | 1 | | | |
| Radon Protection Measures | 1 | | | |
| Industrial Land Use | 50m | 250m | 500m | 1000m |
| Contemporary Trade Directory Entries (of possible contaminative use) | 2 | 1 | 1 | 13 |
| Fuel Station Entries | | | | |
| Post 1995 Planning Applications (of possible contaminative use) | | 2 | | |
| Potentially Contaminative Uses (Past Use) | 2 | | | 12 |
| Potentially Contaminative Uses (Non-Water Related) | 1 | | | 2 |
| Potentially Contaminative Uses (Water Related) | | 1 | | 2 |
| Nearest Overhead Transmission Line | | | Yes | |
| Sensitive Land Use | 50m | 250m | 500m | 1000m |
| Adopted Green Belt | | | | |
| Unadopted Green Belt | 1 | | | |
| Areas of Outstanding Natural Beauty | | | | |
| Environmentally Sensitive Areas | | | | |
| Forest Parks | | | | |
| Local Nature Reserves | | | | |
| Marine Nature Reserves | | | | |
| National Nature Reserves | | | | |
| National Parks | | | | |
| National Scenic Areas | | | | |

Nitrate Sensitive Areas
Nitrate Vulnerable Zones
RAMSAR Sites
Sites of Special Scientific Interest ("SSSI")
Special Areas of Conservation
Special Protection Areas

Water Abstractions identified, whose centres are more than 1000 meters (but less than 2000 meters) from the centre of the site.
Please refer to Contacts section of report for information on data currency



05592

Wombwell Farm, UK

Easting 420063
Northing 420025
1:10000 approx.

High Lane
Wombwell
Barnsley
South Yorkshire
S73 6L



Casting Technology

Centre of Search Registered radioactive substances

Water Abstractions BGS boreholes

Pollution Incidents
Relating to Controlled
Waters

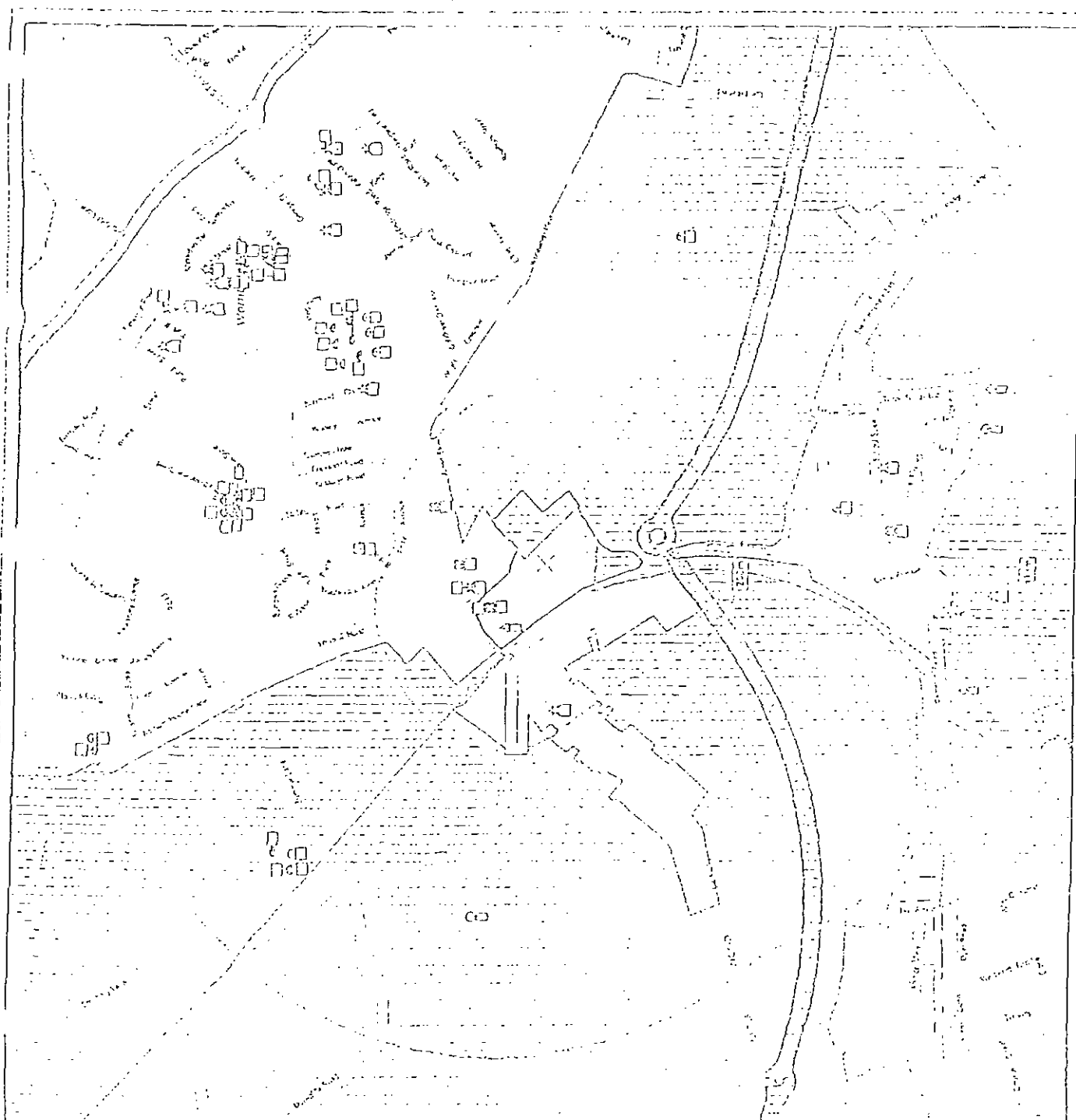
Potentially
Contaminative
Industrial Land Use

Post 1985 Planning
Applications Registered Waste
Treatment or Disposal
Site

Discharge Consents Undeveloped Green
Belts

Air Pollution Controls

Value Added Regions



| Map ID | Details | Compass Direction | Estimated Distance from site | Source | NGR |
|---|---|-------------------|------------------------------|--------|------------------|
| APC | | | | | |
| 1 | Name Wombwell Foundry Ltd
Location Roughton, Wombwell, BARNSLEY, South Yorkshire, S73 6LT
Authority Barnsley Metropolitan Borough Council
Permit Reference Not Given
Dated 6 Apr 1993
Process Type Local Authority Air Pollution Control
Description FGD/Furnaces for the extraction of acid-fumes metal from scrap
Status Application has been authorised and any conditions apply to the operator
Positional Quality Automatically located to the address | - | 0 | 1 | On Site |
| Discharge Consent to Controlled Waters | | | | | |
| 2 | Operator P Hepworth
Property Type Mixed Farming
Location Low Farm, Off Cemetery Road, HELMINGFIELD, South Yorkshire
Authority North East Region - Environment Agency
Catchment Area Drainage
Discharge Reference C5307
Permit Version Not given
Effective Date Not given
Issued Not given
Revocation Date Not given
Discharge Type Sewage Effluent
Discharge Environment Specified Underground
Receiving Water Underground Waters/Land
Status Not given
Positional Quality Located by supplier to within 100 m | S | 594 | 2 | 435750
431250 |
| Discharge Consent to Controlled Waters | | | | | |
| 2 | Operator Yorkshire Water Services Ltd
Property Type Pumping Station
Location Tinglebridge Lane Pk Near, Hayland Nether, South Yorkshire
Authority North East Region - Environment Agency
Catchment Area Drainage
Discharge Reference W450427
Permit Version Not given
Effective Date Not given
Issued Not given
Revocation Date Not given
Discharge Type Storm sewage overflow discharge
Discharge Environment Freshwater Stream/River
Receiving Water Nail Beck
Status Not given
Positional Quality Located by supplier to within 100 m | S | 558 | 2 | 435300
431150 |

| | | | | | | |
|--|----------------------|--|----|-----|---|------------------|
| Pollution Incident to Controlled Waters | | | | | | |
| 4 | Property Type | Water Company Sewage - Storm Overflow | SE | 947 | 2 | 433400
431200 |
| | Location | Elbowe Canal At, HEMMINGFIELD | | | | |
| | Authority | North East Region - Environment Agency | | | | |
| | Pollutant | Sewage - Storm Overflow | | | | |
| | Note | No Fish Killed | | | | |
| | Incident Date | 27 Sep 1997 | | | | |
| | Incident Reference | SH970505 | | | | |
| | Catchment Area | Drainage Tributaries | | | | |
| | Receiving Water | Freshwater Stream/Trip | | | | |
| | Cause of Incident | Not Given | | | | |
| | Severity of Incident | Category 3 - Major Incident | | | | |
| | Positional Quality | Located by supplier to within 100 m | | | | |

| | | | | | | |
|--|----------------------|--|----|-----|---|------------------|
| Pollution Incident to Controlled Waters | | | | | | |
| 5 | Property Type | Miscellaneous Premises - Unknown | WM | 005 | 2 | 433700
432500 |
| | Location | Garfield/Southern Drive (S) Jct | | | | |
| | Authority | North East Region - Environment Agency | | | | |
| | Pollutant | Oils - Unknown | | | | |
| | Note | Not given | | | | |
| | Incident Date | 21 Dec 1991 | | | | |
| | Incident Reference | 129331 | | | | |
| | Catchment Area | Not Given | | | | |
| | Receiving Water | Embsaywater Stream/Run | | | | |
| | Cause of Incident | Not Given | | | | |
| | Severity of Incident | Category 3 - Minor Incident | | | | |
| | Positional Quality | Located by supplier to within 100 m | | | | |

| | | | | | | |
|------------|--------------------|--|----|-----|---|------------------|
| RSA | | | | | | |
| 6 | Name | Medcrest Radiographic Services Ltd | NE | 995 | 2 | 433100
433540 |
| | Location | McVitts Street, BARNESLEY, South Yorkshire, S72 6NJ | | | | |
| | Authority | North East Region - Environment Agency | | | | |
| | Permit Reference | 823517 | | | | |
| | Dated | 8 Jan 1999 | | | | |
| | Process Type | Registration under S10 RSA for the keeping and use of mobile Radiographic sources (was RSA60 S3) | | | | |
| | Description | Minor variation to a registration under the Act for 1 or more mobile sources other than a tracer test source | | | | |
| | Status | Application has been authorised and any conditions apply to the operator | | | | |
| | Positional Quality | Automatically located to estate within address | | | | |

| | | | | | | |
|------------|------------------|--|----|-----|---|------------------|
| RSA | | | | | | |
| 7 | Name | Medcrest Radiographic Services Ltd | NE | 997 | 2 | 433100
433030 |
| | Location | Medcrest House, McVitts Street, Wombwell, BARNESLEY, South Yorkshire, S72 6NJ | | | | |
| | Authority | North East Region - Environment Agency | | | | |
| | Permit Reference | A17607 | | | | |
| | Dated | 23 Jun 1992 | | | | |
| | Process Type | Registration under S10 RSA for the keeping and use of mobile Radiographic sources (was RSA60 S3) | | | | |
| | Description | Minor variation to a registration under the Act for 1 or more mobile sources other than a tracer test source | | | | |
| | Status | Authorisation superseded by a substantial or non substantial variation | | | | |

| Project Name | Project ID | Project Type | Project Status | Project Address | Project Description | Project Details | Project Location | Project Date | Project Reference | Project Authority | Project Agency | Project Contact | Project Email | Project Phone | Project Fax | Project Website | Project Notes |
|--------------|------------|--------------|----------------|-----------------|---------------------|-----------------|------------------|--------------|-------------------|-------------------|----------------|-----------------|---------------|---------------|-------------|-----------------|---------------|
| RSA | 11 | Industrial | Completed | 11/11/2011 | 11/11/2011 | 11/11/2011 | 11/11/2011 | 11/11/2011 | 11/11/2011 | 11/11/2011 | 11/11/2011 | 11/11/2011 | 11/11/2011 | 11/11/2011 | 11/11/2011 | 11/11/2011 | 11/11/2011 |
| RSA | 10 | Industrial | Completed | 10/10/2010 | 10/10/2010 | 10/10/2010 | 10/10/2010 | 10/10/2010 | 10/10/2010 | 10/10/2010 | 10/10/2010 | 10/10/2010 | 10/10/2010 | 10/10/2010 | 10/10/2010 | 10/10/2010 | 10/10/2010 |
| RSA | 9 | Industrial | Completed | 09/09/2009 | 09/09/2009 | 09/09/2009 | 09/09/2009 | 09/09/2009 | 09/09/2009 | 09/09/2009 | 09/09/2009 | 09/09/2009 | 09/09/2009 | 09/09/2009 | 09/09/2009 | 09/09/2009 | 09/09/2009 |
| RSA | 8 | Industrial | Completed | 08/08/2008 | 08/08/2008 | 08/08/2008 | 08/08/2008 | 08/08/2008 | 08/08/2008 | 08/08/2008 | 08/08/2008 | 08/08/2008 | 08/08/2008 | 08/08/2008 | 08/08/2008 | 08/08/2008 | 08/08/2008 |

| RSA | | | | | | |
|-----|------------------|---|----|-----|---|------------------|
| 12 | Name | Medicost Inspection Services Ltd | NE | 457 | 2 | 438020
405040 |
| | Location | Medicost House, Mill Hill Street, Wetherby, E.A. Yorks, S73 8JU | | | | |
| | Authority | North East Region - Environment Agency | | | | |
| | Form Reference | AT4574 | | | | |
| | Dated | 4 Oct 1995 | | | | |
| | Process Type | Registration under C7 RCA for the keeping and use of radioactive materials (was RS460 S1) | | | | |
| | Description | Registration under S7 or S10 RCA for 1 or more sealed sources < 4 TBq/eq/eq/s also for storage in transit | | | | |
| | Status | Authorisation either revoked or cancelled | | | | |
| | Provisional Only | Unknown | | | | |

| RSA | | | | | | |
|-----|------------------|---|----|-----|---|------------------|
| 13 | Name | Medicost Ltd Ltd | NE | 922 | 2 | 438020
407110 |
| | Location | Medicost House, Mill Hill Street, Wetherby, E.A. Yorks, S73 8JU | | | | |
| | Authority | North East Region - Environment Agency | | | | |
| | Form Reference | S46347 | | | | |
| | Dated | Not given | | | | |
| | Process Type | Registration under S10 RCA for the keeping and use of mobile radioactive sources (was RS460 S3) | | | | |
| | Description | Registration under the Act for 1 or more mobile sources other than a radioactive source | | | | |
| | Status | Application has met the requirements for authorisation (but not yet authorised) | | | | |
| | Provisional Only | Automatically located in the records | | | | |

| Water Abstraction | | | | | | |
|-------------------|-----------------------|--|----|------|---|------------------|
| 1 | Operator | British Coal | GB | 1004 | 2 | 400700
400700 |
| | License Number | 010001040 | | | | |
| | Location | Largest European steel works | | | | |
| | Authority | North East Region - Environment Agency | | | | |
| | Abstraction | General Industrial | | | | |
| | Source | Surface | | | | |
| | Daily rate | 1000 cubic metres | | | | |
| | Yearly rate | 300000 cubic metres | | | | |
| | Details | License Revoked | | | | |
| | Environmental Quality | Located by supply to within 100 m | | | | |
| Water Abstraction | | | | | | |
| 2 | Operator | British & Nottingham and Llandud | GB | 1004 | 2 | 400700
400700 |
| | License Number | 010001009 | | | | |
| | Location | Largest European steel works | | | | |
| | Authority | North East Region - Environment Agency | | | | |
| | Abstraction | Unspecified Combination | | | | |
| | Source | Surface | | | | |
| | Daily rate | 115 cubic metres | | | | |
| | Yearly rate | 20000 cubic metres | | | | |
| | Details | License Revoked | | | | |
| | Environmental Quality | Located by supply to within 100 m | | | | |
| Water Abstraction | | | | | | |
| 3 | Operator | British Coal Board | GB | 1004 | 2 | 400700
400700 |
| | License Number | 010001007 | | | | |
| | Location | Largest European steel works | | | | |
| | Authority | North East Region - Environment Agency | | | | |
| | Abstraction | General Industrial | | | | |
| | Source | Surface | | | | |
| | Daily rate | 1050 cubic metres | | | | |
| | Yearly rate | 400000 cubic metres | | | | |
| | Details | License Revoked | | | | |
| | Environmental Quality | Located by supply to within 100 m | | | | |
| Water Abstraction | | | | | | |
| 4 | Operator | British Coal Board | GB | 1004 | 2 | 400000
400000 |
| | License Number | 010001009 | | | | |
| | Location | Largest European steel works | | | | |
| | Authority | North East Region - Environment Agency | | | | |
| | Abstraction | General Industrial | | | | |
| | Source | Surface | | | | |
| | Daily rate | 1000 cubic metres | | | | |
| | Yearly rate | 300000 cubic metres | | | | |
| | Details | License Revoked | | | | |
| | Environmental Quality | Located by supply to within 100 m | | | | |


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| | |
|--------------------------------|----------------------|
| Age | 17.6.1915 |
| First name(s) and
last name | John Charles |
| Current address | 12, St. John's |
| City | |
| Postcode | |
| Telephone Country | Country of residence |
| Mobile telephone | |
| Home address | |
| City | |
| Postcode | |
| Telephone Country | |
| Mobile telephone | |

Register for Fall 2011

[illegible]

Registered L-44 Size

[illegible]

| | |
|---------------------|--|
| Facional Quality | Approximate location provided by supplier |
| Boundary Quality | Not Applicable |
| Waste Types on Site | |
| Authorised Waste | Boiler Sludge
Ind. Non-Haz. Waste Including
Refractory Bricks
Sand
General Foundry Debris
Misc. Waste Formed By Linnies
Foundry Slag |
| Permitted Waste | Lign Slurry In Drum/Cont. Res > 4.5 Cap/L
Waste H.O.S |

Registered Landfill Site

| | | | | | |
|---------------------------|--|----|-----|---|------------------|
| License Holder | J.L.R. Civil Engineering Ltd | NE | 408 | 5 | 439670
439670 |
| License Reference | WD20 B 608 (WD2 B17) | | | | |
| Site Location | C/O Canal Station Road, Linsfield Lane, Wombwell, BARNLEY, South Yorkshire | | | | |
| License Holder Address | Granney Mill Road, Little Granney, CHESTER, Cheshire CH2 4HX | | | | |
| Authority | Fidings Area - Environment Agency - North East Region | | | | |
| Site Category | Landfill | | | | |
| Maximum Input Rate | Undefined | | | | |
| Waste Source Restrictions | Waste production controlled by license holder | | | | |
| License Status | License issued/renewed/terminated/not applied/not surrendered | | | | |
| Date | 1 Mar 1998 | | | | |
| Preceded By License | Not Given | | | | |
| Superseded By License | Not Given | | | | |
| Facional Quality | Approximate location provided by supplier | | | | |
| Boundary Quality | Not Applicable | | | | |
| Waste Types on Site | | | | | |
| Authorised Waste | Clash Excavation Spoil Ex B/L Embank | | | | |

Registered Landfill Site

| | | | | | |
|---------------------------|---|----|-----|---|------------------|
| License Holder | Barnley M.B.C | NE | 607 | 1 | 439670
439670 |
| License Reference | WD 2 B17 | | | | |
| Site Location | Wombwell Canal & Altonam Embankment, Wombwell, BARNLEY, South Yorkshire | | | | |
| License Holder Address | Central Offices, Kenney Street, BARNLEY, South Yorkshire | | | | |
| Authority | Fidings Area - Environment Agency - North East Region | | | | |
| Site Category | Landfill | | | | |
| Maximum Input Rate | Undefined | | | | |
| Waste Source Restrictions | No known restriction in source of waste | | | | |
| License Status | License issued/renewed/terminated/not applicable/not surrendered | | | | |
| Date | 1 Mar 1998 | | | | |
| Preceded By License | Not Given | | | | |
| Superseded By License | Not Given | | | | |
| Facional Quality | Manually located to road within address | | | | |
| Boundary Quality | Not Applicable | | | | |
| Waste Types on Site | | | | | |
| Authorised Waste | Clash Excav Spoil Ex Altonam Embankment | | | | |

Registered Landfill Site

| | | | | | |
|---------------------------|--|----|-----|---|------------------|
| License Holder | P. Rando | SE | 701 | 2 | 408650
401610 |
| License Reference | WV020 B 05 | | | | |
| Site Location | Landfill Road, Wheaton II, BARNESVILLE, South Yorkshire | | | | |
| License Holder Address | 14A Woodhead Road, Dimpley, SHEFFIELD, South Yorkshire, S19 5TA | | | | |
| Authority | Durings Area - Environment Agency - North East Region | | | | |
| Site Category | Landfill | | | | |
| Maximum Input Rate | Medium (< 75,000 tonnes/year) | | | | |
| Waste Source Restrictions | No known restriction on types of waste | | | | |
| License Status | License lapsed/cancelled/terminated/suspended/withdrawn | | | | |
| Date | 1 Nov 1977 | | | | |
| Preceded By License | Not Given | | | | |
| Superseded By License | Not Given | | | | |
| Regional Quota | Approximate location provided by supplier | | | | |
| Boundary Quota | Not Applicable | | | | |
| Waste Types on Site | | | | | |
| Authorized Waste | Excavation Waste, Soil, Subsoil
Construction And Demolition Waste
Ind. Non-Haz. Inert, Non-Flammable
Ind. Non-Haz. Potentially Compressible
House - > Gen. Unhazardous Waste | | | | |
| Prohibited Waste | Asbestos
Liquids In Containers Over 4" Dia
Slurry In Containers Over 4" Dia | | | | |

| | | | | | | |
|--------------|----------------|------------------------|----|-----|---|------------------|
| BGS Borehole | | | | | | |
| 15 | BGS Reference | Se0000103 | N | 896 | 5 | 408520
408450 |
| | Drilled Length | 3 metres | | | | |
| | Borehole Name | Wombwell J1 Sch. Bn 3 | | | | |
| BGS Borehole | | | | | | |
| 16 | BGS Reference | Se0000154 | NE | 898 | 5 | 408560
408510 |
| | Drilled Length | 3 metres | | | | |
| | Borehole Name | Kings Road School Bn 4 | | | | |
| BGS Borehole | | | | | | |
| 17 | BGS Reference | Se0000231 | N | 899 | 5 | 408610
408520 |
| | Drilled Length | 3 metres | | | | |
| | Borehole Name | Wombwell Home Bn 2 | | | | |
| BGS Borehole | | | | | | |
| 18 | BGS Reference | Se0000270 | NW | 793 | 5 | 408750
408600 |
| | Drilled Length | 22 metres | | | | |
| | Borehole Name | Wombwell 2 | | | | |
| BGS Borehole | | | | | | |
| 19 | BGS Reference | Se0000355 | N | 840 | 5 | 408180
408110 |
| | Drilled Length | 3 metres | | | | |
| | Borehole Name | Wombwell Home Bn 7 | | | | |
| BGS Borehole | | | | | | |
| 20 | BGS Reference | Se0000473 | NE | 882 | 5 | 408840
408790 |
| | Drilled Length | 3 metres | | | | |
| | Borehole Name | Kings Road School Bn 6 | | | | |
| BGS Borehole | | | | | | |
| 21 | BGS Reference | Se0000521 | NE | 832 | 5 | 408900
408850 |
| | Drilled Length | 3 metres | | | | |
| | Borehole Name | Kings Road School Bn 1 | | | | |
| BGS Borehole | | | | | | |
| 22 | BGS Reference | Se0000603 | E | 881 | 5 | 408980
408910 |
| | Drilled Length | 105 metres | | | | |
| | Borehole Name | Lundfall Colliery | | | | |
| BGS Borehole | | | | | | |
| 23 | BGS Reference | Se0000632 | N | 878 | 5 | 409000
408910 |
| | Drilled Length | 3 metres | | | | |
| | Borehole Name | Wombwell Home Bn 3 | | | | |

| | | | | | | | |
|--------------|----------------|-----------------------------|----|-----|---|--------|--------|
| BGS Borehole | | | | | | | |
| 17 | BGS Reference | Gr301009 | RF | 100 | 5 | 409010 | 409010 |
| | Drilled Length | 2 metres | | | | | |
| | Borehole Name | Kings Road Drilling Site 3 | | | | | |
| BGS Borehole | | | | | | | |
| 18 | BGS Reference | Gr301010 | RF | 100 | 5 | 409010 | 409010 |
| | Drilled Length | 2.5 metres | | | | | |
| | Borehole Name | Wombah Hill Drilling Site 3 | | | | | |
| BGS Borehole | | | | | | | |
| 19 | BGS Reference | Gr301011 | RF | 100 | 5 | 409010 | 409010 |
| | Drilled Length | 2 metres | | | | | |
| | Borehole Name | Kings Road Drilling Site 3 | | | | | |
| BGS Borehole | | | | | | | |
| 20 | BGS Reference | Gr301012 | RF | 100 | 5 | 409010 | 409010 |
| | Drilled Length | 2 metres | | | | | |
| | Borehole Name | Kings Road Drilling Site 3 | | | | | |
| BGS Borehole | | | | | | | |
| 21 | BGS Reference | Gr301013 | RF | 100 | 5 | 409010 | 409010 |
| | Drilled Length | 2 metres | | | | | |
| | Borehole Name | Wombah Hill Drilling Site 3 | | | | | |
| BGS Borehole | | | | | | | |
| 22 | BGS Reference | Gr301014 | RF | 100 | 5 | 409010 | 409010 |
| | Drilled Length | 2 metres | | | | | |
| | Borehole Name | Wombah Hill | | | | | |
| BGS Borehole | | | | | | | |
| 23 | BGS Reference | Gr301015 | RF | 100 | 5 | 409010 | 409010 |
| | Drilled Length | 2 metres | | | | | |
| | Borehole Name | Wombah Hill Drilling Site 3 | | | | | |

| | | | | | | |
|--------------------------------------|----------------|---|----|-----|---|------------------|
| 33 | BGS Reference | Se20sc53 | NE | 625 | 3 | 433500
402350 |
| | Drilled Length | 3 metres | | | | |
| | Borehole Name | Kings Road School Bh 3 | | | | |
| BGS Borehole | | | | | | |
| 34 | BGS Reference | Se20sc50 | N | 691 | 5 | 433300
403150 |
| | Drilled Length | 2 metres | | | | |
| | Borehole Name | Wombwell Home Bh 1 | | | | |
| BGS Borehole | | | | | | |
| 35 | BGS Reference | Se20sc129 | S | 504 | 3 | 433200
401500 |
| | Drilled Length | 7 metres | | | | |
| | Borehole Name | Deane Valley Highway Sh 3 | | | | |
| BGS Borehole | | | | | | |
| 36 | BGS Reference | Se30sc55 | N | 605 | 5 | 433100
402100 |
| | Drilled Length | 2 metres | | | | |
| | Borehole Name | Wombwell Home Bh 5 | | | | |
| BGS Borehole | | | | | | |
| 37 | BGS Reference | Se30sc57 | NE | 513 | 3 | 433000
402700 |
| | Drilled Length | 3 metres | | | | |
| | Borehole Name | Kings Road School Bh 7 | | | | |
| BGS Borehole | | | | | | |
| 38 | BGS Reference | Se30sc54 | N | 554 | 5 | 433100
403150 |
| | Drilled Length | 2 metres | | | | |
| | Borehole Name | Wombwell Home Bh 6 | | | | |
| BGS 1:625 000 Surface Geology | | | | | | |
| - | Geology | Lower Westphalian (mainly Productive Coal Measures) | - | 0 | 5 | 0 |
| Coal Mining Affected Area | | | | | | |
| - | | In an area which may be affected by coal mining activity. It is recommended that a confirming report is obtained from the Coal Authority. Contact details are included in the Useful Contacts section of this report. | - | 0 | 5 | On Site |
| Shallow Mining Hazard | | | | | | |
| - | Risk | Moderate | - | 0 | 5 | On Site |
| | Source | Information Services Group - British Geological Survey | | | | |
| Natural Subsidence Hazard | | | | | | |
| - | Risk | Low | - | 0 | 5 | On Site |

Radon Affected Area

| | | | | | |
|---|--|---|---|---|---------|
| - | Less than 1% of homes are above the Action Level | - | 0 | £ | On Site |
|---|--|---|---|---|---------|

Radon Protection Measures

| | | | | | | |
|---|--------|--|---|---|---|---------|
| - | Type | Basic radon protective measures should be installed | - | 0 | £ | On Site |
| | Source | Information Services Group - British Geological Survey | | | | |

Contemporary Trade Directory Entry (of possible contaminative use)

| | | | | | | |
|----|--------------------|---|---|----|----|------------------|
| 39 | Name | Galpbus Industrial | N | 41 | 10 | 400000
400000 |
| | Location | 321 Hough Lane, Wombwell, BARNSELEY, South Yorkshire, S72 0LR | | | | |
| | Classification | Tank and Vat Manufacture & Installation | | | | |
| | Premises Type | Single Site | | | | |
| | Status | Active | | | | |
| | Positional Quality | Automatically located to the address | | | | |

Contemporary Trade Directory Entry (of possible contaminative use)

| | | | | | | |
|----|--------------------|--|----|-----|----|------------------|
| 40 | Name | Lamy's Tyres & Exhaust Centre | NE | 372 | 10 | 400000
400000 |
| | Location | Letchfield Lane, Wombwell, BARNSELEY, South Yorkshire, S72 5DR | | | | |
| | Classification | Exhaust Replacement | | | | |
| | Premises Type | Single Site | | | | |
| | Status | Active | | | | |
| | Positional Quality | Automatically located to road within address | | | | |

Contemporary Trade Directory Entry (of possible contaminative use)

| | | | | | | |
|----|--------------------|---|----|-----|----|------------------|
| 41 | Name | Mion Electronics | NE | 474 | 10 | 439500
439800 |
| | Location | Waterside Park, Valley Way, Wombwell, BARNSELEY, South Yorkshire, S73 8BB | | | | |
| | Classification | Electronic Component Manufacture | | | | |
| | Premises Type | Single Site | | | | |
| | Status | Active | | | | |
| | Positional Quality | Automatically located to postcode unit | | | | |

Contemporary Trade Directory Entry (of possible contaminative use)

| | | | | | | |
|----|--------------------|--|---|-----|----|------------------|
| 42 | Name | Chris Bell Haulage | S | 514 | 10 | 439500
439800 |
| | Location | Primrose House Farm, New Street, BARNSELEY, South Yorkshire, S73 0DE | | | | |
| | Classification | Haulage Contractors | | | | |
| | Premises Type | Branch Office | | | | |
| | Status | Active | | | | |
| | Positional Quality | Unknown | | | | |

Contemporary Trade Directory Entry (of possible contaminative use)

| | | | | | | |
|----|--------------------|---|----|-----|----|------------------|
| 43 | Name | Morco Service Station | NE | 542 | 10 | 440000
439500 |
| | Location | 51 Park Street, Wombwell, BARNSELEY, South Yorkshire, S73 0HS | | | | |
| | Classification | Petrol Filling Stations | | | | |
| | Premises Type | Franchise | | | | |
| | Status | Active | | | | |
| | Positional Quality | Automatically located to road within address | | | | |

Contemporary Trade Directory Entry (of possible contaminative use)

| | | | | | | |
|----|--------------------|--|----|-----|----|------------------|
| 44 | Name | Dps Auto Safety Centre | NE | 510 | 10 | 439700
439200 |
| | Location | Ford House, Barnsley Road, Wombwell, BARNSELEY, South Yorkshire, S73 5DD | | | | |
| | Classification | Exhaust Replacement | | | | |
| | Premises Type | Single Site | | | | |
| | Status | Active | | | | |
| | Positional Quality | Automatically located to road within address | | | | |

Contemporary Trade Directory Entry (of possible contaminative use)

| | | | | | | |
|----|--------------------|--|---|-----|----|------------------|
| 45 | Name | Wombwell Clinic | N | 555 | 10 | 439200
439100 |
| | Location | Summer Lane, Wombwell, BARNSELEY, South Yorkshire, S73 2QH | | | | |
| | Classification | Medical Clinics & Centres | | | | |
| | Premises Type | Single Site | | | | |
| | Status | Active | | | | |
| | Positional Quality | Automatically located to the address | | | | |

Contemporary Trade Directory Entry (of possible contaminative use)

| | | | | | | |
|----|--------------------|---|---|-----|----|------------------|
| 46 | Name | C Hague & Son | S | 645 | 10 | 439300
439450 |
| | Location | 27 School Street, Hemmingfield, BARNSELEY, South Yorkshire, S73 9PS | | | | |
| | Classification | Coal Merchants | | | | |
| | Premises Type | Single Site | | | | |
| | Status | Active | | | | |
| | Positional Quality | Automatically located to the address | | | | |

Contemporary Trade Directory Entry (of possible contaminative use)

| | | | | | | |
|----|--------------------|--|----|-----|----|------------------|
| 47 | Name | Rinneys Dry Cleaners | NE | 812 | 12 | 440000
402900 |
| | Location | 7 High Street, Wombwell, BARNSELEY, South Yorkshire, S73 0D4 | | | | |
| | Classification | Dry Cleaning - Retail | | | | |
| | Premises Type | Head Office | | | | |
| | Status | Active | | | | |
| | Positional Quality | Automatically located to the address | | | | |

Contemporary Trade Directory Entry (of possible contaminative use)

| | | | | | | |
|----|--------------------|---|----|-----|----|------------------|
| 48 | Name | R F Shipping & Transport Services | NE | 842 | 12 | 440000
402900 |
| | Location | Unit 2, Low Valley Industrial Estate, Krummolt, BARNSELEY, South Yorkshire, S73 6AG | | | | |
| | Classification | Haillage Contractors | | | | |
| | Premises Type | Head Office | | | | |
| | Status | Active | | | | |
| | Positional Quality | Automatically located to postcode unit | | | | |

Contemporary Trade Directory Entry (of possible contaminative use)

| | | | | | | |
|----|--------------------|--|----|-----|----|------------------|
| 49 | Name | Ascon Concrete Products | NE | 898 | 12 | 402000
402100 |
| | Location | Ascon House, Mitchell's Industrial Park, Wombwell, BARNSELEY, South Yorkshire, S73 6HR | | | | |
| | Classification | Concrete Precast Manufactory | | | | |
| | Premises Type | Single Site | | | | |
| | Status | Active | | | | |
| | Positional Quality | Automatically located to postcode unit | | | | |

Contemporary Trade Directory Entry (of possible contaminative use)

| | | | | | | |
|----|--------------------|---|----|-----|----|------------------|
| 50 | Name | Thornby Printers | NE | 905 | 12 | 440100
402900 |
| | Location | Central Printing Works, Prospect Terrace, Wombwell, BARNSELEY, South Yorkshire, S73 0AR | | | | |
| | Classification | Lithographic Printers | | | | |
| | Premises Type | Single Site | | | | |
| | Status | Active | | | | |
| | Positional Quality | Unknown | | | | |

Contemporary Trade Directory Entry (of possible contaminative use)

| | | | | | | |
|----|--------------------|---|----|-----|----|------------------|
| 51 | Name | Colin Bell | NE | 923 | 12 | 435700
402300 |
| | Location | Rimington Garage, Rimington Road, BARNSELEY, South Yorkshire, S73 0DQ | | | | |
| | Classification | Car Servicing & Repair | | | | |
| | Premises Type | Single Site | | | | |
| | Status | Active | | | | |
| | Positional Quality | Automatically located to road within address | | | | |

Contemporary Trade Directory Entry (of possible contaminative use)

| | | | | | | |
|----|----------------|--|---|----|----|------------------|
| 52 | Name | Golglass | N | 41 | 12 | 435000
402500 |
| | Location | 321 Hough Lane, Wombwell, Barnsley, South Yorkshire, S73 0LR | | | | |
| | Classification | Tank and Vat Manufacture & Installation | | | | |
| | Premises Type | Single Site | | | | |
| | Status | Active | | | | |

Positional Quality Automatically located to the address

Contemporary Trade Directory Entry (of possible contaminative use)

| | | | | | | |
|----|--------------------|--|----|-----|----|------------------|
| 53 | Name | Prestige Bodycare | NE | 943 | 12 | 439500
439500 |
| | Location | Little Field Lane, Wombwell, BARNSELEY, South Yorkshire, S73 8D3 | | | | |
| | Classification | Car Body Repairs | | | | |
| | Premises Type | Single Site | | | | |
| | Status | Active | | | | |
| | Positional Quality | Automatically located to road within address | | | | |

Contemporary Trade Directory Entry (of possible contaminative use)

| | | | | | | |
|----|--------------------|---|----|-----|----|------------------|
| 54 | Name | Superior Interiors | WV | 205 | 12 | 439700
439700 |
| | Location | The Hut, Wood Walk, BARNSELEY, South Yorkshire, S73 8NG | | | | |
| | Classification | Furniture Equipment Manufacture | | | | |
| | Premises Type | Single Site | | | | |
| | Status | Active | | | | |
| | Positional Quality | Automatically located to road within address | | | | |

Contemporary Trade Directory Entry (of possible contaminative use)

| | | | | | | |
|----|--------------------|---|----|-----|----|------------------|
| 55 | Name | T M Thornaby & Son | NE | 945 | 12 | 440100
440100 |
| | Location | Central Printing Works, Wombwell, BARNSELEY, South Yorkshire, S73 8AR | | | | |
| | Classification | Printers - General | | | | |
| | Premises Type | Single Site | | | | |
| | Status | Active | | | | |
| | Positional Quality | Automatically located to postcode unit | | | | |

Contemporary Trade Directory Entry (of possible contaminative use)

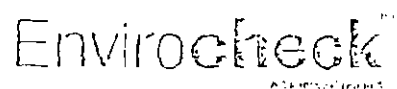
| | | | | | | |
|----|--------------------|--|----|-----|----|------------------|
| 56 | Name | Smith P Commercials | NE | 941 | 12 | 439700
439700 |
| | Location | 7 Cemetery Road, Wombwell, BARNSELEY, South Yorkshire, S73 8AZ | | | | |
| | Classification | Commercial Vehicle Servicing & Repair | | | | |
| | Premises Type | Single Site | | | | |
| | Status | Active | | | | |
| | Positional Quality | Automatically located to the address | | | | |

Contemporary Trade Directory Entry (of possible contaminative use)

| | | | | | | |
|----|--------------------|--|----|-----|----|------------------|
| 57 | Name | Wombwell Medical Centre | NE | 930 | 10 | 439900
439900 |
| | Location | George Street, Wombwell, BARNSELEY, South Yorkshire, S73 8DD | | | | |
| | Classification | Medical Clinics & Centres | | | | |
| | Premises Type | Single Site | | | | |
| | Status | Active | | | | |
| | Positional Quality | Automatically located to road within address | | | | |

Contemporary Trade Directory Entry (of possible contaminative use)

| | | | | | | |
|----|----------------|--|----|-----|----|------------------|
| 58 | Name | Thornhill Silicons | NE | 898 | 10 | 439800
439800 |
| | Location | Mitchells Industrial Park, Bradbury Balk Lane, Wombwell, BARNSELEY, South Yorkshire, S73 8NR | | | | |
| | Classification | Rubber Manufacture | | | | |
| | Premises Type | Single Site | | | | |



| Status | Action |
|----------------|------------------------------------|
| Personal Query | Assign to the best file number and |

Post 1225 Planning Application (of possible contaminative use)

| | | | | | | |
|----|-----------------------|---|----|-----|---|------------------|
| 15 | Name | Industrial (Entrance) | NE | 150 | 1 | 400200
400210 |
| | Location | Complex Industrial H24, High Line, Stamford, CT 06402, US - South
Yorkshire, ST3 0 | | | | |
| | Authority | Essex City Metropolitan Strategic Council | | | | |
| | Description | Light Industrial | | | | |
| | Application Reference | B/D/00700/0000 | | | | |
| | Dated | 22 Jun 2000 | | | | |
| | Status | Detailed Plans Submitted | | | | |
| | Site Area | Not given | | | | |
| | Positional Query | Manually located to road with address | | | | |

Post 1995 Planning Application (of possible contaminative use)

| | | | | | | |
|----|-----------------------|---|---|---|---|---------|
| 60 | Name | Foundry (Alterations) | - | 0 | 1 | On Site |
| | Location | Hough Lane, Wombwell, BARNSELEY, South Yorkshire, S73 0LT | | | | |
| | Authority | Barnsley Metropolitan Borough Council | | | | |
| | Description | Heavy Industrial Projects | | | | |
| | Application Reference | 955 | | | | |
| | Dated | 19 Jul 1995 | | | | |
| | Status | Detailed Plans Submitted | | | | |
| | Site Area | 9.00 hectares | | | | |
| | Positional Quality | Unknown | | | | |

Post 1995 Planning Application (of possible contaminative use)

| | | | | | | |
|----|-----------------------|---|---|-----|---|------------------|
| 61 | Name | Vehicle Workshop (Conversion) | S | 573 | 1 | 439140
401450 |
| | Location | 18 Cemetery Road, Hinningfield, BARNSELEY, South Yorkshire, S73 0PU | | | | |
| | Authority | Barnsley Metropolitan Borough Council | | | | |
| | Description | Vehicle Maintenance | | | | |
| | Application Reference | S/00/0004/M/V | | | | |
| | Dated | 5 Jan 2000 | | | | |
| | Status | Detailed Plans Submitted | | | | |
| | Site Area | Not given | | | | |
| | Positional Quality | Automatically located to the address | | | | |

Post 1995 Planning Application (of possible contaminative use)

| | | | | | | |
|----|-----------------------|---|---|---|---|---------|
| 62 | Name | Galvanizing Works/Offices | - | 0 | 1 | On Site |
| | Location | Hough Lane, Wombwell, BARNSELEY, South Yorkshire, S73 0DP | | | | |
| | Authority | Barnsley Metropolitan Borough Council | | | | |
| | Description | Heavy Industrial Projects | | | | |
| | Application Reference | 98/165 | | | | |
| | Dated | 13 Feb 1998 | | | | |
| | Status | Detailed Plans Submitted | | | | |
| | Site Area | 1.00 hectares | | | | |
| | Positional Quality | Unknown | | | | |

Post 1995 Planning Application (of possible contaminative use)

| | | | | | | |
|----|-----------------------|--|----|-----|---|------------------|
| 63 | Name | Security Fence | NE | 957 | 1 | 439140
401450 |
| | Location | Barnsley Road, Wombwell, BARNSELEY, South Yorkshire, S73 | | | | |
| | Authority | Barnsley Metropolitan Borough Council | | | | |
| | Description | Light Industrial | | | | |
| | Application Reference | 1127 | | | | |
| | Dated | 2 Oct 1998 | | | | |
| | Status | Detailed Plans Submitted | | | | |
| | Site Area | Not given | | | | |
| | Positional Quality | Manually located to estate within address | | | | |

Post 1995 Planning Application (of possible contaminative use)

| | | | | | | |
|----|-----------------------|---|---|-----|---|------------------|
| 64 | Name | Manufacturing (cnp) | N | 101 | 1 | 439260
402540 |
| | Location | 307 Hough Lane, Wombwell, BARNSELEY, South Yorkshire, S73 0LR | | | | |
| | Authority | Barnsley Metropolitan Borough Council | | | | |
| | Description | Light Industrial | | | | |
| | Application Reference | 1403 | | | | |
| | Dated | 25 Nov 1999 | | | | |

Status: Detailed Plans Submitted
 Site Area: Not given
 Positional Quality: Automatically located to the address

Potentially Contaminative Use (Past Use)

General quarrying

NE

954

11

439950

439950

Mapping Date(s): 1855

Potentially Contaminative Use (Past Use)

Mineral railway

E

703

11

439950

439950

Mapping Date(s): 1883

Potentially Contaminative Use (Past Use)

General quarrying

S

455

11

439920

439920

Mapping Date(s): 1905

Potentially Contaminative Use (Past Use)

Railways

W

2

11

439850

439850

Mapping Date(s): 1905, 1935, 1956, 1959

Potentially Contaminative Use (Past Use)

Sewage

HW

454

11

439550

439550

Mapping Date(s): 1938, 1959

Potentially Contaminative Use (Past Use)

General quarrying

W

725

11

439150

439150

Mapping Date(s): 1855, 1883

Potentially Contaminative Use (Past Use)

Mineral railway

HW

980

11

439230

439230

Mapping Date(s): 1907, 1938

Potentially Contaminative Use (Past Use)

Railways

HW

814

11

439150

439030

Mapping Date(s): 1907, 1938, 1956, 1959

Potentially Contaminative Use (Past Use)

Heap, unknown constituents

SE

715

11

439550

439510

Mapping Date(s): 1905

Potentially Contaminative Use (Past Use)

Factory or works - use not specified

SW

20

11

439300

439150

Mapping Date(s): 1908

| | | | | | |
|--|------------------------------|-----|----|------------------|--|
| Potentially Contaminative Use (Past Use) | | | | | |
| Cemetery or Graveyard | SW | 821 | 11 | 433510
401250 | |
| Mapping Date(s) | 1925, 1926, 1958, 1959 | | | | |
| Potentially Contaminative Use (Past Use) | | | | | |
| Uesp, unknown constituents | W | 534 | 11 | 433540
402540 | |
| Mapping Date(s) | 1933 | | | | |
| Potentially Contaminative Use (Past Use) | | | | | |
| Mining of coal & lignite | NW | 325 | 11 | 433510
402550 | |
| Mapping Date(s) | 1935, 1934, 1937, 1938, 1939 | | | | |
| Potentially Contaminative Use (Past Use) | | | | | |
| General quarrying | SE | 803 | 11 | 433540
401440 | |
| Mapping Date(s) | 1935, 1935 | | | | |
| Potentially Contaminative Use (Past Use) | | | | | |
| Metal casting/foundries | - | 3 | 11 | On Site | |
| Mapping Date(s) | 1935, 1935 | | | | |
| Potentially Contaminative Use (Past Use) | | | | | |
| General quarrying | NW | 573 | 11 | 433540
402720 | |
| Mapping Date(s) | 1935, 1935, 1935, 1935 | | | | |
| Potentially Contaminative Use (Past Use) | | | | | |
| General quarrying | N | 343 | 11 | 433550
402830 | |
| Mapping Date(s) | 1935 | | | | |
| Potentially Contaminative Use (Past Use) | | | | | |
| Railways | - | 9 | 11 | On Site | |
| Mapping Date(s) | 1935, 1935, 1935 | | | | |
| Potentially Contaminative Use (Past Use) | | | | | |
| Clay bricks & tiles (manufacture) | NW | 452 | 11 | 433540
402950 | |
| Mapping Date(s) | 1933 | | | | |
| Potentially Contaminative Use (Past Use) | | | | | |
| Mineral railway | NW | 785 | 11 | 433540
402540 | |
| Mapping Date(s) | 1934, 1934, 1937, 1935, 1935 | | | | |
| Potentially Contaminative Use (Past Use) | | | | | |
| Mineral railway | NW | 591 | 11 | 433530
402530 | |
| Mapping Date(s) | 1935, 1935, 1935, 1935 | | | | |

Potentially Contaminative Use (Past Use)

Mining of coal & lignite

E

499

11

478050

472950

Mapping Date(s) 1983

Potentially Contaminative Use (Past Use)

Factory or works - use not specified

-

0

11

On Site

Mapping Date(s) 1983

Potentially Contaminative Use (Past Use)

General quarrying

W

555

11

478050

472950

Mapping Date(s) 1983

Potentially Contaminative Use (Past Use)

Cemetery or Graveyard

H

521

11

478050

472950

Mapping Date(s) 1954, 1967, 1983, 1985, 1989

UP/L/Enviro 30073
Date: 12th October 2001

Product Version: 1.0 (05/01)
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Page 15

Potentially Contaminative Use (Non-Water Related)

Unknown Filled Ground (Ft, quarry etc)

E

455

11

433530

433530

Mapping Dates(s) 1999

Potentially Contaminative Use (Non-Water Related)

Unknown Filled Ground (Ft, quarry etc)

NW

325

11

433510

433510

Mapping Dates(s) 1999

Potentially Contaminative Use (Non-Water Related)

Unknown Filled Ground (Ft, quarry etc)

N

342

11

433160

433160

Mapping Dates(s) 1999

Potentially Contaminative Use (Non-Water Related)

Unknown Filled Ground (Ft, quarry etc)

NE

954

11

437777

437777

Mapping Dates(s) 1999

Potentially Contaminative Use (Non-Water Related)

Unknown Filled Ground (Ft, quarry etc)

S

455

11

433520

433520

Mapping Dates(s) 1999

Potentially Contaminative Use (Non-Water Related)

Unknown Filled Ground (Ft, quarry etc)

NW

452

11

433540

433540

Mapping Dates(s) 1999

Potentially Contaminative Use (Non-Water Related)

Unknown Filled Ground (Ft, quarry etc)

SE

903

11

433740

433740

Mapping Dates(s) 1999

Potentially Contaminative Use (Non-Water Related)

Unknown Filled Ground (Ft, quarry etc)

W

555

11

433590

433590

Mapping Dates(s) 1999

Potentially Contaminative Use (Water Related)

Unknown Filled Ground (Flood, marsh, river, stream, dock etc)

SE

494

11

433540

433540

Mapping Dates(s) 1995

| | | | | | |
|---|---|--|-----|----|------------------|
| Potentially Contaminative Use (Water Related) | | | | | |
| - | Unknown Filled Ground (Pond, marsh, river, stream, dock, etc) | SE | 552 | 11 | 449020
401250 |
| Mapping Date(s) | 1995 | | | | |
| Potentially Contaminative Use (Water Related) | | | | | |
| - | Unknown Filled Ground (Pond, marsh, river, stream, dock, etc) | W | 570 | 11 | 438020
402150 |
| Mapping Date(s) | 1995 | | | | |
| Potentially Contaminative Use (Water Related) | | | | | |
| - | Unknown Filled Ground (Pond, marsh, river, stream, dock, etc) | SE | 506 | 11 | 435730
401950 |
| Mapping Date(s) | 1995 | | | | |
| Potentially Contaminative Use (Water Related) | | | | | |
| - | Unknown Filled Ground (Pond, marsh, river, stream, dock, etc) | SE | 551 | 11 | 439530
402050 |
| Mapping Date(s) | 1995 | | | | |
| Potentially Contaminative Use (Water Related) | | | | | |
| - | Unknown Filled Ground (Pond, marsh, river, stream, dock, etc) | N | 751 | 11 | 435530
402700 |
| Mapping Date(s) | 1995 | | | | |
| Unadopted Green Belt | | | | | |
| - | Plan name | Barnsley Metropolitan Borough Council Unitary Development Plan | - | 0 | 1 On Site |
| | Status | Deposit Draft | | | |
| | Plan Date | 22 Nov 1994 | | | |

Some of the organisations who provide data which is used within the report



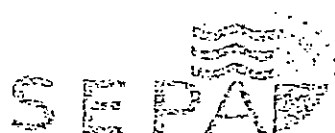
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Ordnance Survey



ENVIRONMENT
AGENCY

Environment Agency



Scottish Environment Protection
Agency



Centre for
Ecology & Hydrology

NATURAL ENVIRONMENT RESEARCH COUNCIL

Centre for Ecology and Hydrology
(Natural Environment Research
Council)



British
Geological
Survey

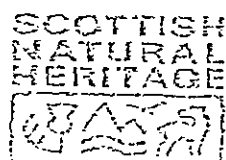
British Geological Survey

Value Added Reseller

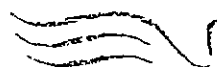


CYNGOR CEFN GWLAD CYMRU
COUNTRYSIDE COUNCIL FOR WALES

Countryside Council For Wales



Scottish Natural Heritage



ENGLISH
NATURE

English Nature

Site of Special Scientific Interest, National Nature Reserve, RAMSAR, Special Protection Area, Special Conservation Area, Marine Nature Reserve data (derived from Ordnance Survey 1:10000 raster) is provided by, and used with the permission of, English Nature who retain the copyright and Intellectual Property Rights for the data



The Coal Authority



National Radiological Protection
Board

Contact Name and Address

- 1 **Barnsley Metropolitan Borough Council**
Central Offices, Kendray Street, Barnsley, South Yorkshire, S70 2TN
Air Pollution Controls ("APC")
Post 1995 Planning Applications (of possible contaminative use)
Undeveloped Green Belt
Telephone 01223 772000
Fax 01223 772590
Website www.barnsley.gov.uk
Last Update 1 Mar 2000
Last Update 28 Feb 2001
Last Update 1 Nov 1999
- 2 **Environment Agency - North East Region**
Rivers House, 21 Park Square South, Leeds, West Yorkshire, LS1 2QG
Pollution Incidents to Controlled Waters
Radioactive Substance Authorisations ("RSA")
Water Abstractions
Discharge Consents to Controlled Waters
Telephone 0113 244 0191
Fax 0113 231 2375
Last Update 31 Dec 1999
Last Update 22 Mar 2001
Last Update 6 Apr 2000
Last Update 31 Dec 2000
- 3 **Environment Agency - Head Office**
Rio House, Waterside Drive, Aztec West, Almondbury, Bristol, Avon, BS12 4UD
Groundwater Vulnerability
Telephone 01454 62 0000
Fax 01454 624409
Last Update 31 Jan 1999
- 4 **British Geological Survey - Information Services Group**
Kingsley Dunham Centre, Keyworth, Nottingham, Nottinghamshire, NG12 5GG
BGS Recorded Landfill Sites
BGS 1:625 000 Surface Geology
Radon Protection Measures
Shallow Mining Hazards
Telephone 0115 936 3100
Fax 0115 936 3200
Website www.bgs.ac.uk
Last Update 17 Jun 1995
Last Update 31 Aug 1995
Last Update 11 Dec 2000
Last Update 2 Oct 2000
- 5 **Environment Agency - North East Region - Ridings Area**
Phoenix House, Global Avenue, Leeds, West Yorkshire, LS11 3PG
Registered Waste Treatment or Disposal Sites
Registered Landfill Sites
Telephone 0113 244 0191
Fax 0113 245 1899
Last Update 31 Mar 2001
Last Update 31 Mar 2001
- 6 **British Geological Survey - National Geological Records Centre**
Keyworth, Nottingham, Nottinghamshire, NG12 5GG
BGS Boreholes
Telephone 0115 936 3109
Fax 0115 936 3076
Website www.bgs.ac.uk
Email ngis@bgs.ac.uk
Last Update 3 Jan 2001
- 7 **The Coal Authority - Mining Report Service**
200 Lichfield Lane, Mansfield, Nottinghamshire, NG13 4RG
Coal Mining Affected Areas
Telephone 0845 7626843
DX 715176 Mansfield 5
Last Update 23 May 2001
- 8 **British Geological Survey - Information Services Group**
Kingsley Dunham Centre, Keyworth, Nottingham, Notts, NG12 5GG
Telephone 0115 936 3100
Fax 0115 936 3200
- 9 **National Radiological Protection Board**
Chilton, Didcot, Oxfordshire, OX11 0RO
Radon Affected Area
Telephone 01235 831600
Fax 01235 833891
Last Update 16 Sep 1999
- 10 **Red Volcano**
Contemporary Trade Directory Entries (of possible contaminative use)
Last Update 17 Nov 2000
- 11 **Landmark Information Group Limited**

Potentially Contaminative Uses (Pest Use)

Last Update 1 Sep 2000

Potentially Contaminative Uses (Waste Related)

Last Update 1 Sep 2000

Potentially Contaminative Uses (Non-Water Related)

Last Update 1 Sep 2000

Please note that the Environment Agency/SEPA have a charging policy in place for enquiries.



Envirocheck[®]
A Landmark Information Group Product

Other Contacts

Contact Name and Address

Ordnance Survey

Romsey Road, Southampton, Hampshire, SO16 4GU

Telephone 023 8079 2001

Fax 023 8079 2511

Website www.ordnancy.gov.uk

Landmark Information Group Limited

7 Abbey Court, Eagle Way, Sowton, Exeter, Devon, EX2 7HY

Telephone 01392 441702

Fax 01392 441709

Website www.landmark-information.co.uk

Email mailbox@landmark-information.co.uk

Envirocheck[®] Report On:

Report on:
Wombwell Foundry Ltd.
Hough Lane
Wombwell
Barnsley
South Yorkshire
S73 0LT

National Grid Reference :

439050, 402300

Prepared For :

Historical Maps from CD Products

Your Reference

Martha McEamon, 56993

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Ordnance Survey County Series Published 1892

| County | Mapsheet | Scale | Year |
|-----------|----------|---------|------|
| Yorkshire | 283_01 | 1:2,500 | 1892 |

Ordnance Survey County Series Published 1903

| County | Mapsheet | Scale | Year |
|-----------|----------|---------|------|
| Yorkshire | 283_01 | 1:2,500 | 1903 |

Ordnance Survey County Series Published 1930

| County | Mapsheet | Scale | Year |
|-----------|----------|---------|------|
| Yorkshire | 283_01 | 1:2,500 | 1930 |

Ordnance Survey Plan Published 1952

| National Grid Series | Mapsheet | Scale | Year |
|----------------------|----------|---------|------|
| Ordnance Survey Plan | SE3801 | 1:2,500 | 1952 |
| Ordnance Survey Plan | SE3802 | 1:2,500 | 1952 |
| Ordnance Survey Plan | SE3901 | 1:2,500 | 1952 |
| Ordnance Survey Plan | SE3902 | 1:2,500 | 1952 |

Ordnance Survey Plan Published 1982

| National Grid Series | Mapsheet | Scale | Year |
|----------------------|----------|---------|------|
| Ordnance Survey Plan | SE3802NE | 1:1,250 | 1982 |
| Ordnance Survey Plan | SE3902NW | 1:1,250 | 1982 |

Ordnance Survey County Series Published 1854 to 1855

| County | Mapsheet | Scale | Year |
|-----------|----------|----------|------|
| Yorkshire | 275_00 | 1:10,560 | 1854 |
| Yorkshire | 233_00 | 1:10,560 | 1855 |

Ordnance Survey County Series Published 1893 to 1894

| County | Mapsheet | Scale | Year |
|-----------|----------|----------|------|
| Yorkshire | 275_SW | 1:10,560 | 1894 |
| Yorkshire | 283_NW | 1:10,560 | 1893 |

Ordnance Survey County Series Published 1905 to 1907

| County | Mapsheet | Scale | Year |
|-----------|----------|----------|------|
| Yorkshire | 275_SW | 1:10,560 | 1907 |
| Yorkshire | 283_NW | 1:10,560 | 1905 |

Ordnance Survey County Series Published 1938

| County | Mapsheet | Scale | Year |
|-----------|----------|----------|------|
| Yorkshire | 275_SW | 1:10,560 | 1938 |
| Yorkshire | 283_NW | 1:10,560 | 1938 |

Ordnance Survey Plan Published 1955

| National Grid Series | Mapsheet | Scale | Year |
|----------------------|----------|----------|------|
| Ordnance Survey Plan | SE30SE | 1:10,560 | 1955 |
| Ordnance Survey Plan | SE40SW | 1:10,560 | 1955 |

Ordnance Survey Plan Published 1965 to 1967

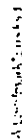
| National Grid Series | Mapsheet | Scale | Year |
|----------------------|----------|----------|------|
| Ordnance Survey Plan | SE30SE | 1:10,560 | 1965 |
| Ordnance Survey Plan | SE40SW | 1:10,560 | 1967 |

Ordnance Survey Plan Published 1980

| National Grid Series | Mapsheet | Scale | Year |
|----------------------|----------|----------|------|
| Ordnance Survey Plan | SE30SE | 1:10,000 | 1980 |
| Ordnance Survey Plan | SE40SW | 1:10,000 | 1980 |

Ordnance Survey Plan Published 1999

| National Grid Series | Mapsheet | Scale | Year |
|----------------------|----------|----------|------|
| Ordnance Survey Plan | SE30SE | 1:10,000 | 1999 |
| Ordnance Survey Plan | SE40SW | 1:10,000 | 1999 |



CLUB DETAILS

1. **Order No. ECCC**

Exhibit A

SITE GET;IL5

[illegible][illegible]

11:00 AM - 12:00 PM

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1992

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Level Crossing

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City

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Σύμφωνα με τον Νόμο 2190/1994, η διαδικασία της έγκρισης των προτάσεων για την ίδρυση νέων σχολείων διενεργείται ως εξής:

David Todd

— a little dirty, big, old

Hyattsville Co.

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History of Publication

THE UNIVERSITY OF CHICAGO

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התאחדות המורים



התאריך: 10.10.2018

CLIENT DETAILS

Ernst & Young LLP

Journal of the American Medical Association, Vol. 60, No. 17, May 19, 1918, p. 1304.

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1. Introduction

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1. **Introduction**

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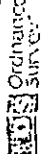
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Page 12 of 12

1990-1991



Ordnance Survey



LANDMARKS

מחברת: ד"ר אסתר גורן

Envirocheck

Environmental Consultants Ltd.

CLIENT DETAILS

Client Name: **Envirocheck**
 Project Name: **Envirocheck**
 Address: **Envirocheck**

SITE DETAILS

Site Name: **Envirocheck**
 Site Address: **Envirocheck**
 Site Coordinates: **Envirocheck**

| Symbol | Description | Symbol | Description | Symbol | Description |
|--------|-------------|--------|-------------|--------|-------------|
| | Building | | Road | | Water |
| | Fenced Area | | Railway | | Wetland |
| | Tree | | Boundary | | Contour |
| | Pond | | Drainage | | Elevation |
| | Power Line | | Filling | | Other |

PERMITS AND APPROVALS

The following permits have been obtained for this project:
 - Planning Permission
 - Environmental Impact Assessment
 - Water Resources Act
 - Planning and Compulsory Purchase Act
 - Planning and Compulsory Purchase Act
 - Planning and Compulsory Purchase Act

APPENDIX

Appendix A: **Map of Site**

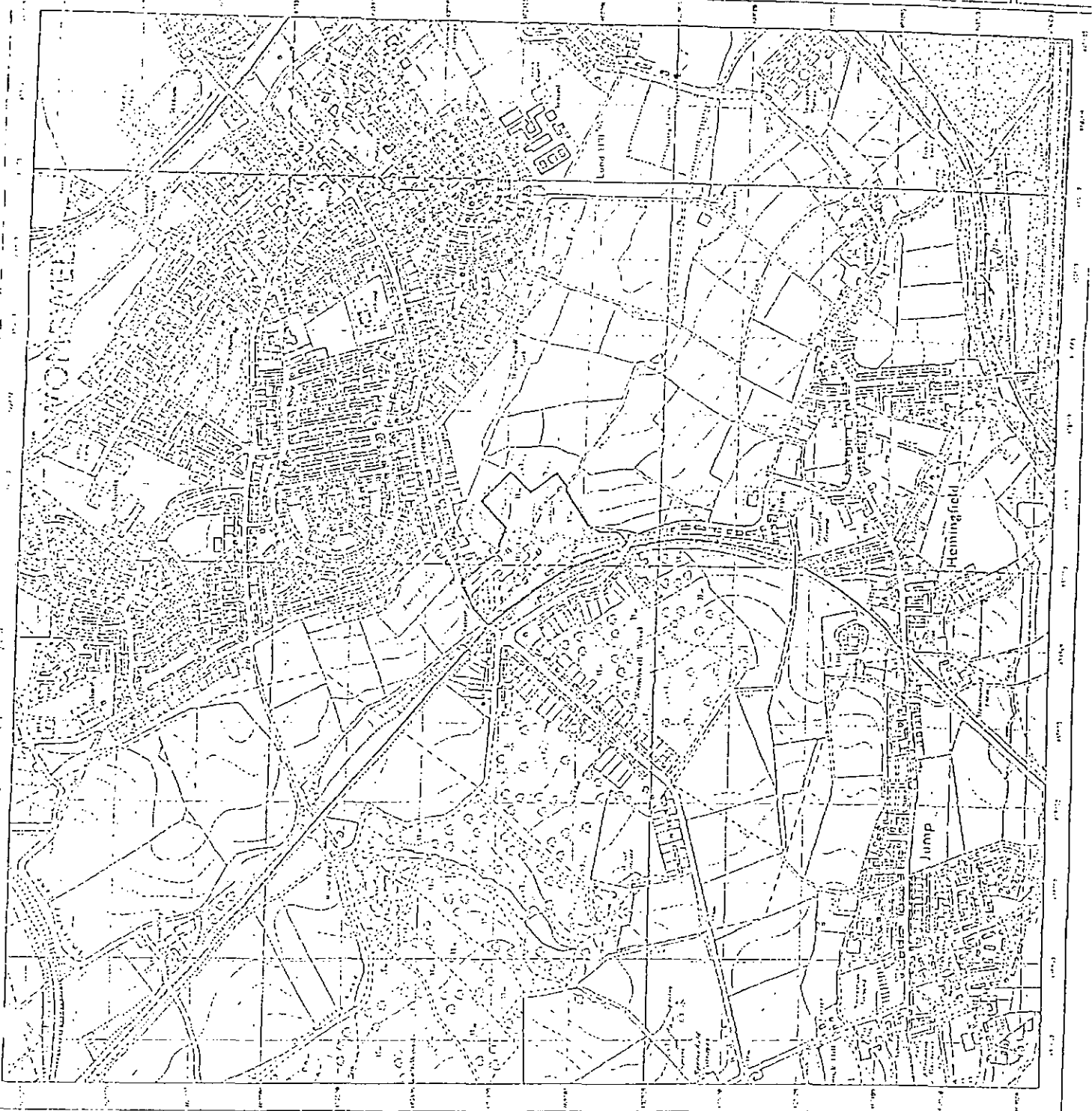
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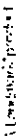
Scale

Scale: **1:1000**

LANDMARK

Information Group





Enriquez, M. 1993. *Enriquez*. New York: Basic Books.

Summary of work done

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Riverside Drive
Barnsley
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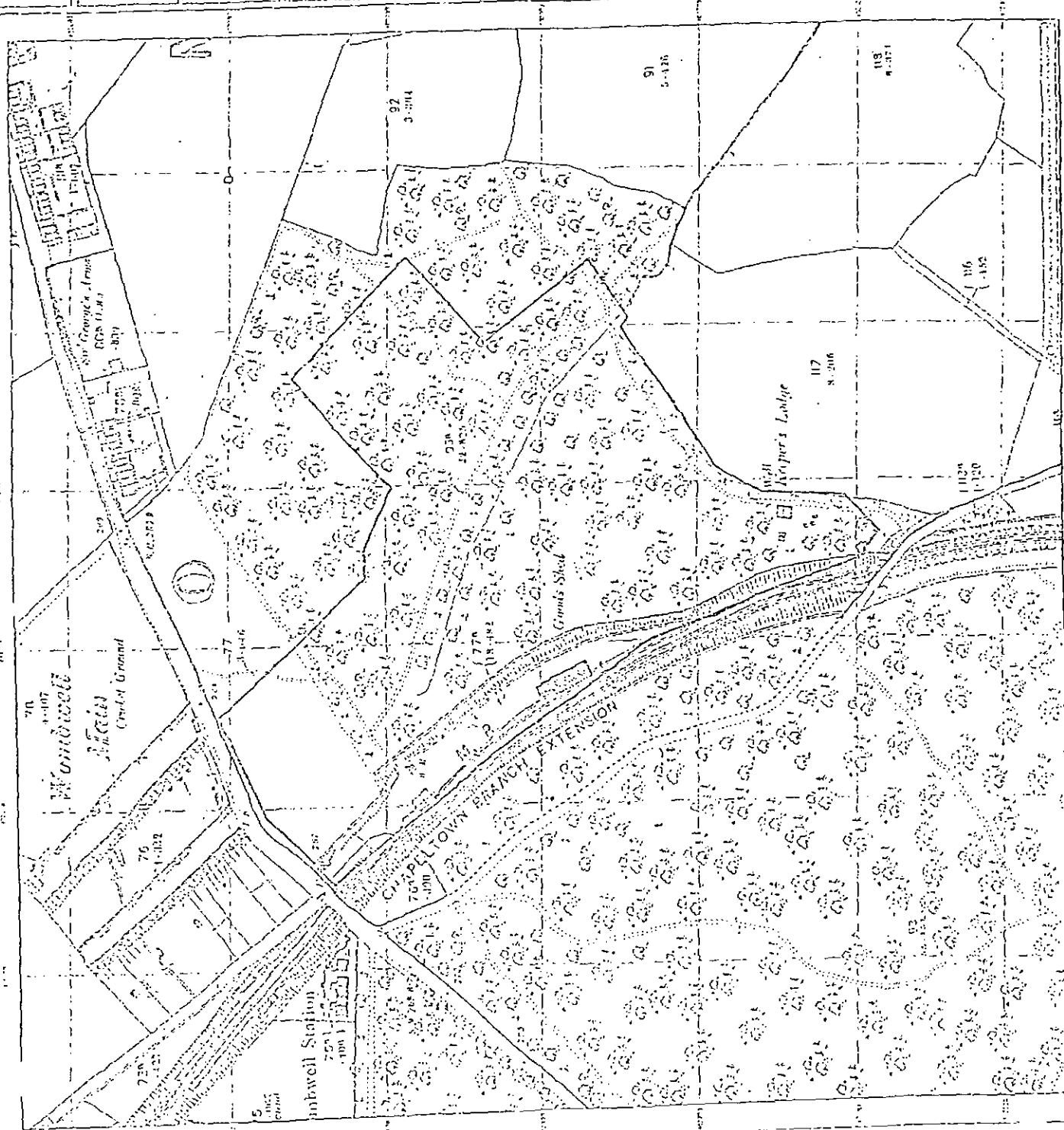
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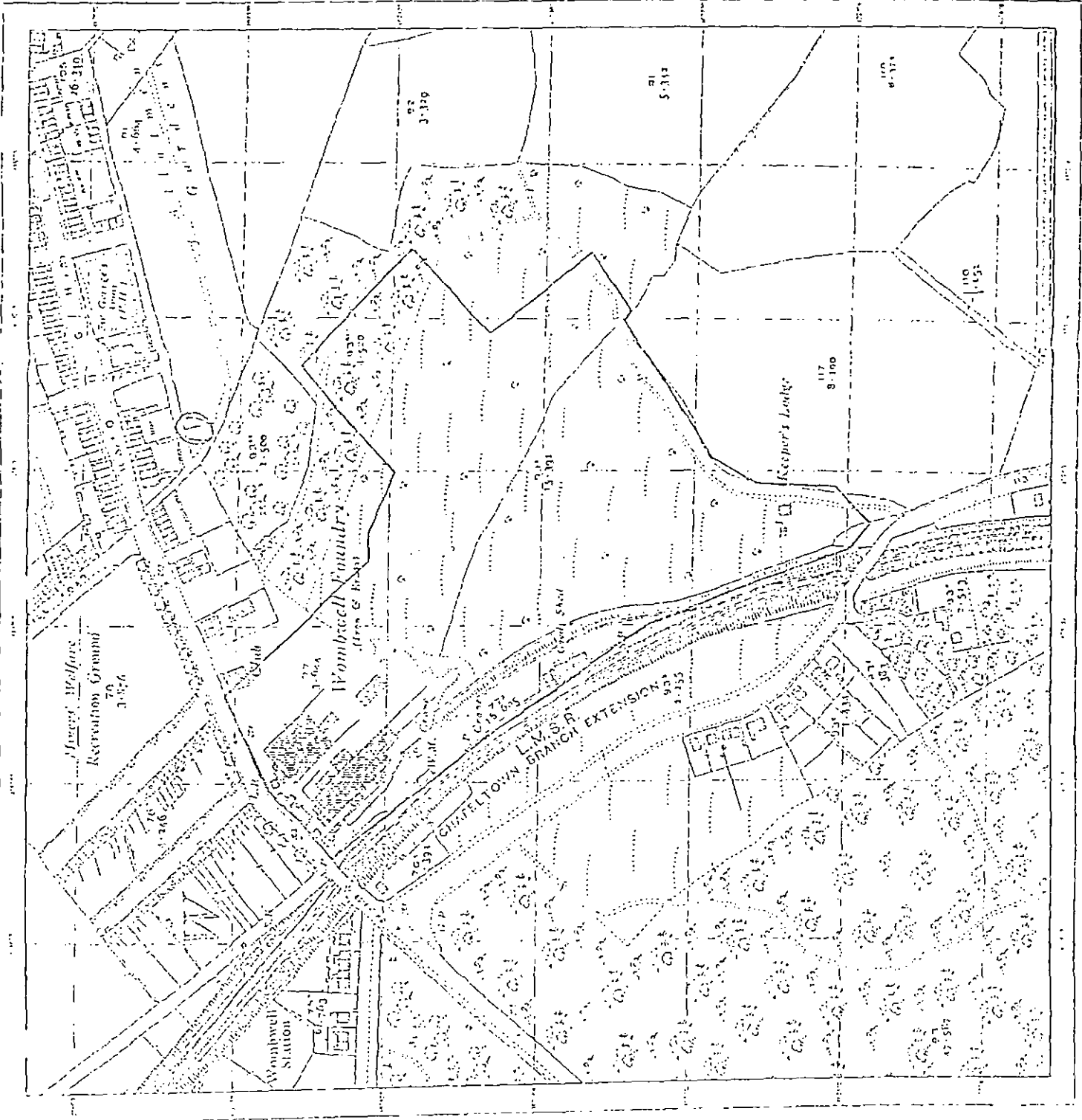
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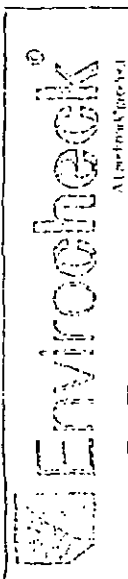
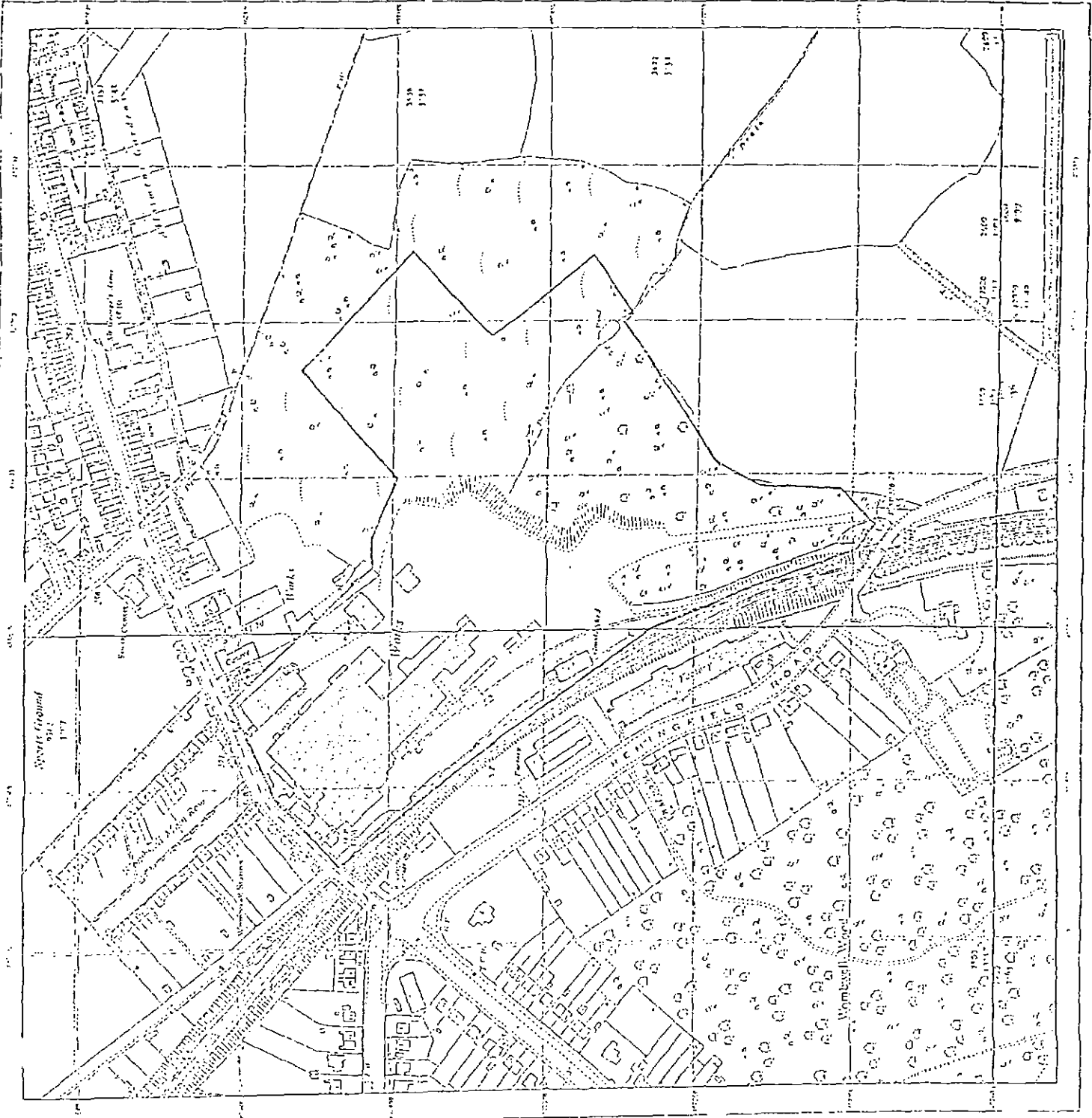
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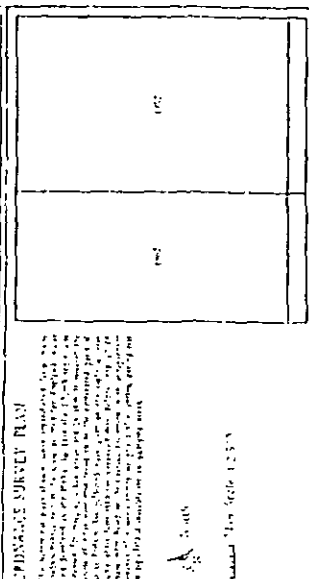




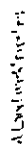
CLIENT DETAILS
 Envirocheck Order No. EC0000111
 Client: Mr. Smith, 100 Main St, London, UK
 Project: New Development at Main St

SITE DETAILS
 Site Name: New Development at Main St
 Location: Main St, London, UK
 Scale: 1:1000

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| | Building | | Fence |
| | Other | | Other |



LANDMARK
 Information: 020 1234 5678
 Website: www.landmark.co.uk



CLIENT REF ID: A66266 Order No. 66666

1. The first step is to identify the problem or question that needs to be answered. This involves understanding the context and the specific information required.

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Contest

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1. The first step is to identify the problem or question that needs to be answered. This involves understanding the context and the specific requirements of the task.

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the fact that the Government has been unable to secure the necessary funds to carry out its policy of non-interference in the internal affairs of the country. The Government has been unable to secure the necessary funds to carry out its policy of non-interference in the internal affairs of the country.

4-11

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Orderance

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References



APPENDIX I

Coal Authority Mining Report

The Coal Authority,
Mining Papers Office,
266 LICHFIELD LANE,
NERRY HILL,
MANSFIELD,
NOTTINGHAMSHIRE,
NG18 4RG
Telephone: 0543 762 6000
DX 716176 MANSFIELD 5
On-Line Service: www.coalauthority.gov.uk

The
COAL
AUTHORITY

01/03/2001

| | |
|--------------------|-------------|
| The Coal Authority | |
| Cost | £28.94 |
| Plus V.A.T. | £5.66 |
| Total Received | £34.60 |
| V.A.T. Reg Number | 398 5550 68 |

CASTINGS TECHNOLOGY INTERNATIONAL,
7 EAST BANK ROAD,
SHEFFIELD,
SOUTH YORKSHIRE,
S2 3PT

This matter is being dealt with by Darren Moody

Our Ref: 369985-01

Your Ref: 65603

Date: 22 October 2001

Dear Sir,

Coal Mining Report
SITE OFF, HEMINGFIELD ROAD, WOMBWELL, BARNESLEY, SOUTH
YORKSHIRE

I refer to the enquiry dated 11th October 2001, received 19th October 2001, in connection with the above.

This report is based on and limited to the records in the possession of The Coal Authority at the time the search is answered.

Past Underground Mining

The property is within the likely zone of influence on the surface from workings in 14 seams of coal at 90m to 550m depth, the last date of working being 1939.

Ground movement from the above mentioned past coal workings should by now have ceased.

In addition you may wish to know that the property is in an area where coal is believed to exist at or close to the surface that may have been worked at some time in the past.

Present Underground Mining

The property is not within the zone of likely physical influence on the surface from any present underground coal workings.

Future Underground Mining

The property is not within a geographical area for which a licence to extract coal by underground methods is awaiting determination by the Coal Authority.

The property is not within a geographical area for which a licence to extract coal by underground methods has been granted.

The property is not within the zone of likely physical influence at the surface from plans of future workings in our possession.

However reserves of coal exist in the locality which could be worked at some time in the future subject to feasibility, licences, and planning consents.

We have no record of any notice of the risk of the land being affected by subsidence being given under S.46 of the Coal Mining Subsidence Act 1991.

Shafts and Adits

We have no knowledge of any mine entries within, or within 20 metres of, the boundary of the property.

The records held by the Coal Authority may be incomplete. Consequently, there may exist in this locality mine entries of which we have no knowledge.

Surface Geology

Records in our possession do not disclose any fault or other line of weakness at the surface as having affected the stability of the property.

Past Opencast Mining

The property is not located within the geographical boundary of an opencast site from which coal has been extracted by opencast methods.

Present Opencast Mining

The property does not lie within 200 metres of the geographical boundary of an opencast site within which coal is being extracted by opencast methods.

Future Opencast Mining

The property is not within 800 metres of the geographical boundary of an opencast site for which a licence to extract coal by opencast methods is awaiting determination.

The property is not within 800 metres of the geographical site boundary of an opencast site for which a licence to extract coal by opencast methods has been granted.

Subsidence

The records in our possession do not disclose any damage notice or claim having been given, made or pursued in respect of the property since 1 January 1984.

The records in our possession do not disclose any current "Stop Notice" affecting the property.

The records in our possession do not show any request having been made to execute preventative works under S.33 of the Coal Mining Subsidence Act 1991.

Withdrawal of Support

The property lies within a geographical area in respect of which a notice of entitlement to withdraw support was published in 1983.

The property does not lie within a geographical area in respect of which a notice has been given under S.41 of the Coal Industry Act 1994, revoking the entitlement to withdraw support.

Working Facilities Orders

The property is not within a geographical area that is the subject of an Order made under the provisions of the Mines (Working Facilities and Support) Acts 1923 and 1966 or any statutory modification or amendment thereof.

Payments to Owners of Former Copyhold Land

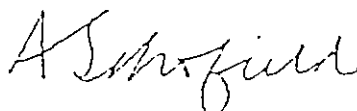
The property is not within an area where a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

Additional Remarks

In view of the mining circumstances a prudent developer would seek appropriate technical advice before works are undertaken on site. All proposals should have regard to good engineering practice in mining areas as identified in authoritative publications on mining stability problems. In any event, no activities should be undertaken that intersect, disturb, or interfere with any coal or mines of coal without permission of the Coal Authority.

We acknowledge the receipt of your remittance in payment of our fee.

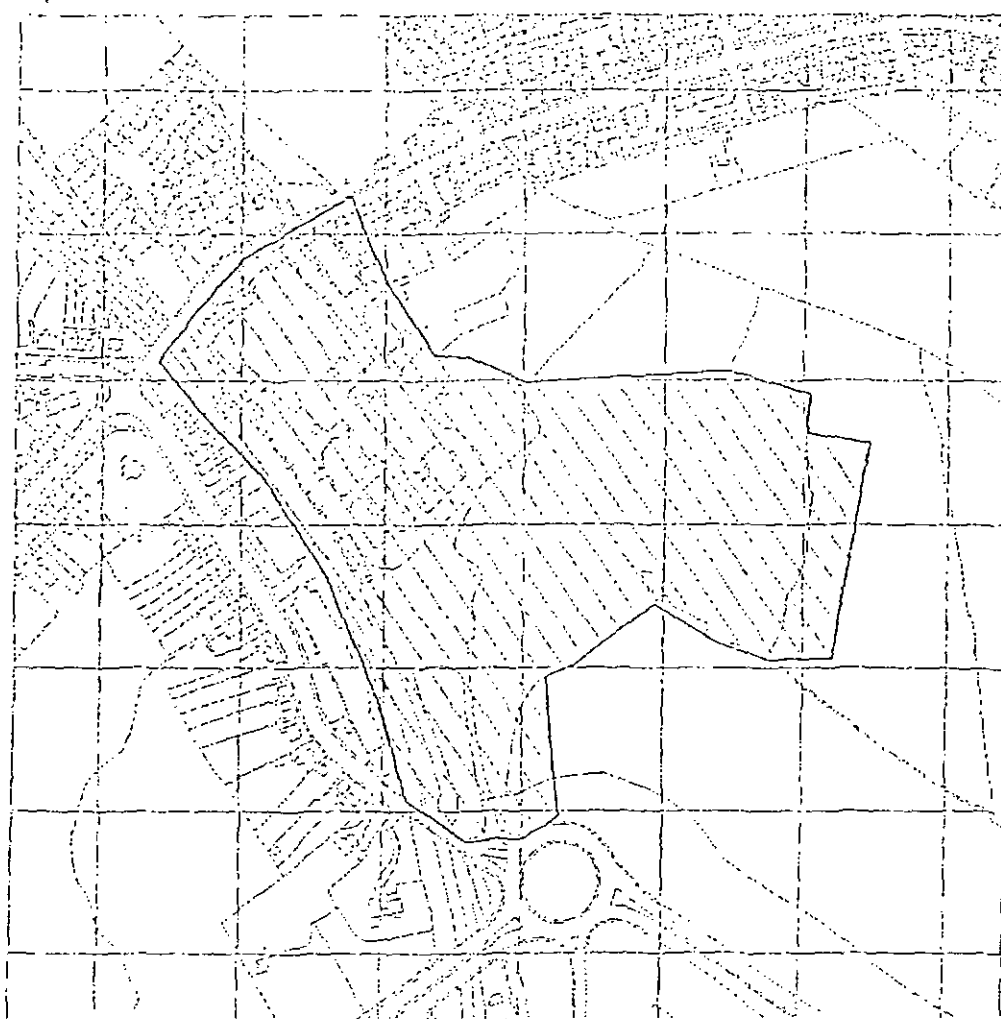
Yours faithfully



Albert Schofield

Director of Operations

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Crown Copyright. Quoted scale is approximate.

SCALE: 1:5000

This map is reproduced from the Ordnance Survey material by The Coal Authority (or division thereof) with the permission of the Controller of Her Majesty's Stationery Office. Crown Copyright. Unauthorised reproduction infringes Crown Copyright and may lead to prosecution or civil proceedings. Licence Number: AL50627001.

This is a plan of the boundaries of the property in respect of which this report has been prepared. It is the responsibility of the user to ensure that the boundaries shown correspond with those of the property.

APPROXIMATE POSITION OF ENQUIRY BOUNDARY SHOWN

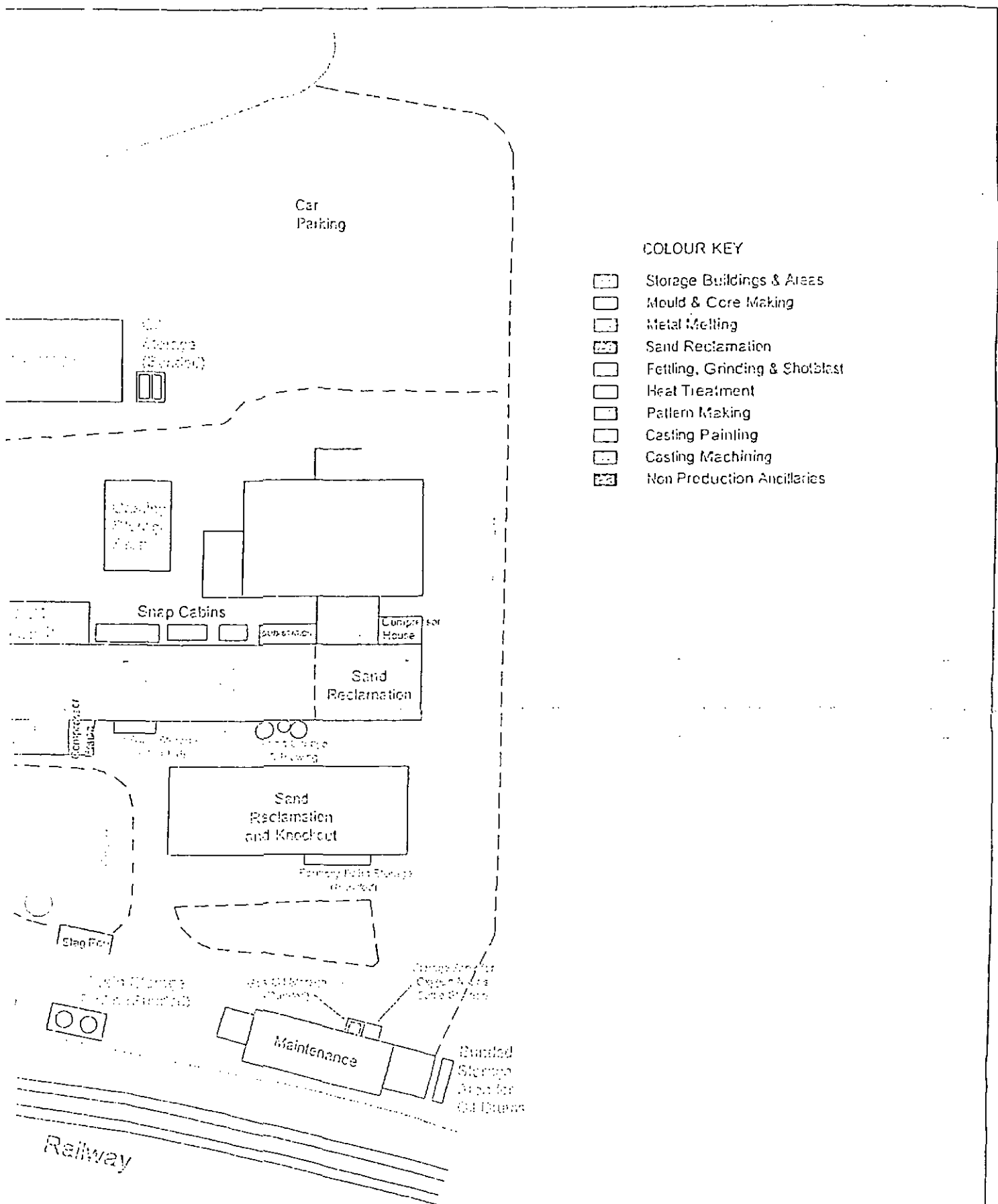


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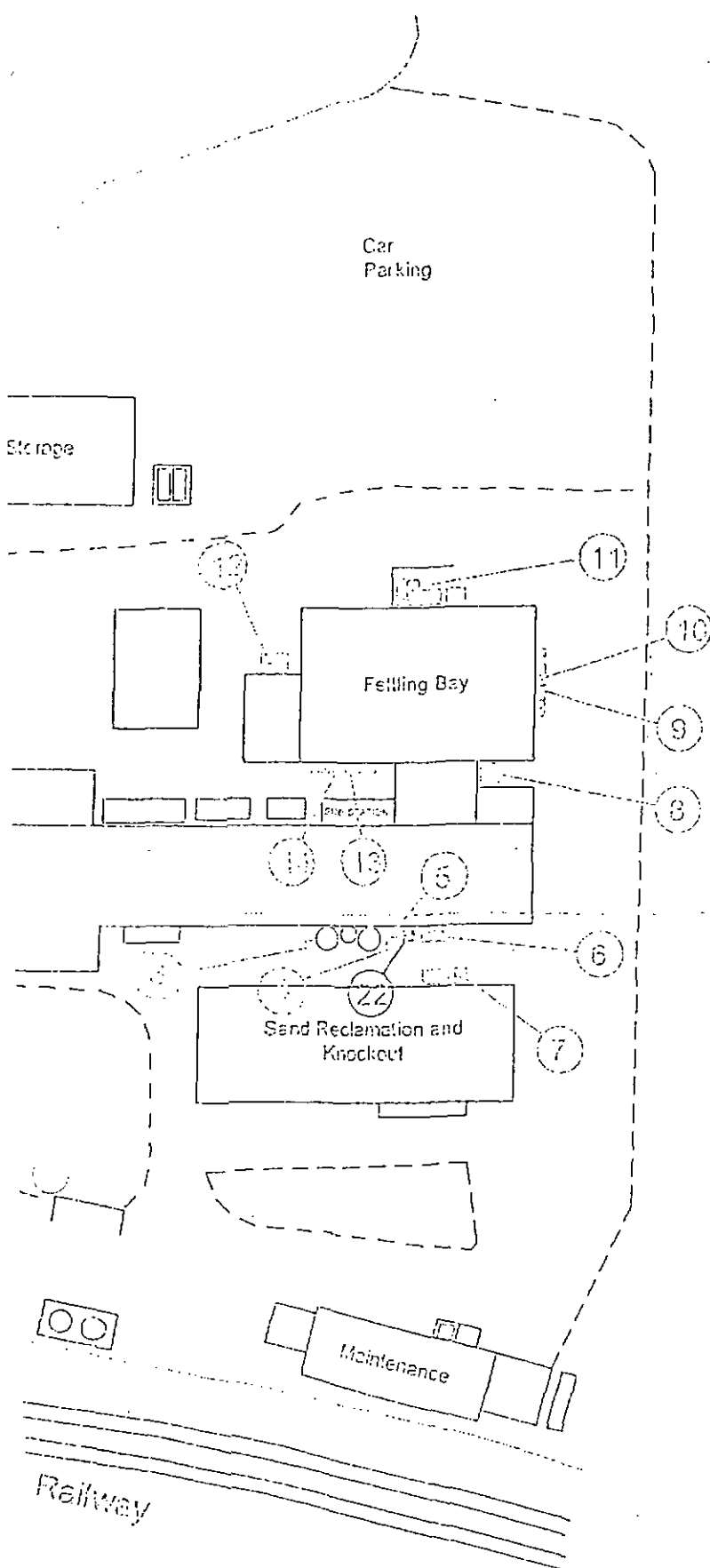


APPENDIX J

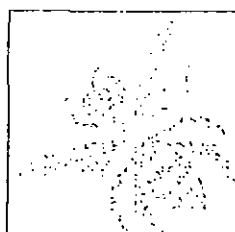
Historical Site Use Plans



| | | | | |
|---|---|--------|--|----------|
|  | Burdett Engineering and Environmental Services Ltd.
1, Richard Close
140, Main Road
B40 1JN
Tel: 0121 712 1754 | | Customer: WOMIEWELL FOUNDRY LTD
Title: Layout of works showing production areas | |
| | Drawn by | R.F.B. | Scale | (as is) |
| | | | Drawing Number | DL 04010 |



| No. | Type | Discharge Point |
|-----|----------------|----------------------------|
| 1 | Dry Bag Filter | Cupola Gas Discharge Point |
| 2 | Dry Bag Filter | Sand Storage Discharge |
| 3 | Dry Bag Filter | Sand Storage Discharge |
| 4 | Dry Bag Filter | Sand Storage Discharge |
| 5 | Dry Bag Filter | Sand Storage Discharge |
| 6 | Dry Bag Filter | Sand Storage Discharge |
| 7 | Dry Bag Filter | Sand Storage Discharge |
| 8 | Dry Bag Filter | Sand Storage Discharge |
| 9 | Dry Bag Filter | Felling Bay |
| 10 | Dry Bag Filter | Felling Bay |
| 11 | Dry Bag Filter | Felling Bay |
| 12 | Dry Bag Filter | Felling Bay |
| 13 | Dry Bag Filter | Felling Bay |
| 14 | Dry Bag Filter | Felling Bay |
| 15 | Vent | Paint Spray |
| 16 | Vent | Paint Spray |
| 17 | Vent | Fit Room Exhaust |
| 18 | Vent | Machine Room |
| 19 | Vent | Machine Room |
| 20 | Dry Bag Filter | Machine Room |
| 21 | Vent | Cooling Tower |
| 22 | Vent | Cooling Tower |



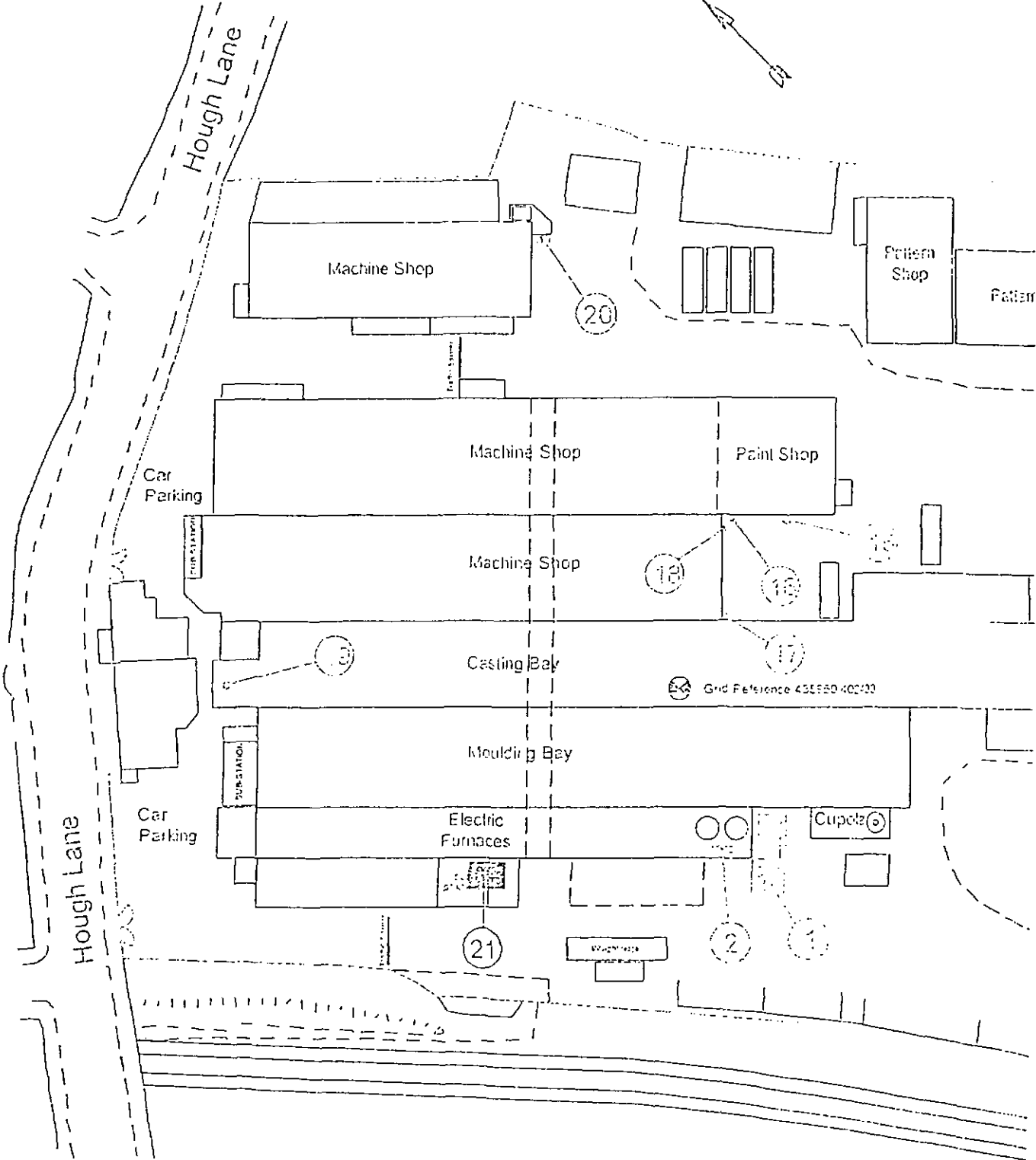
**Burdon
Engineering and
Environmental
Services Ltd.**

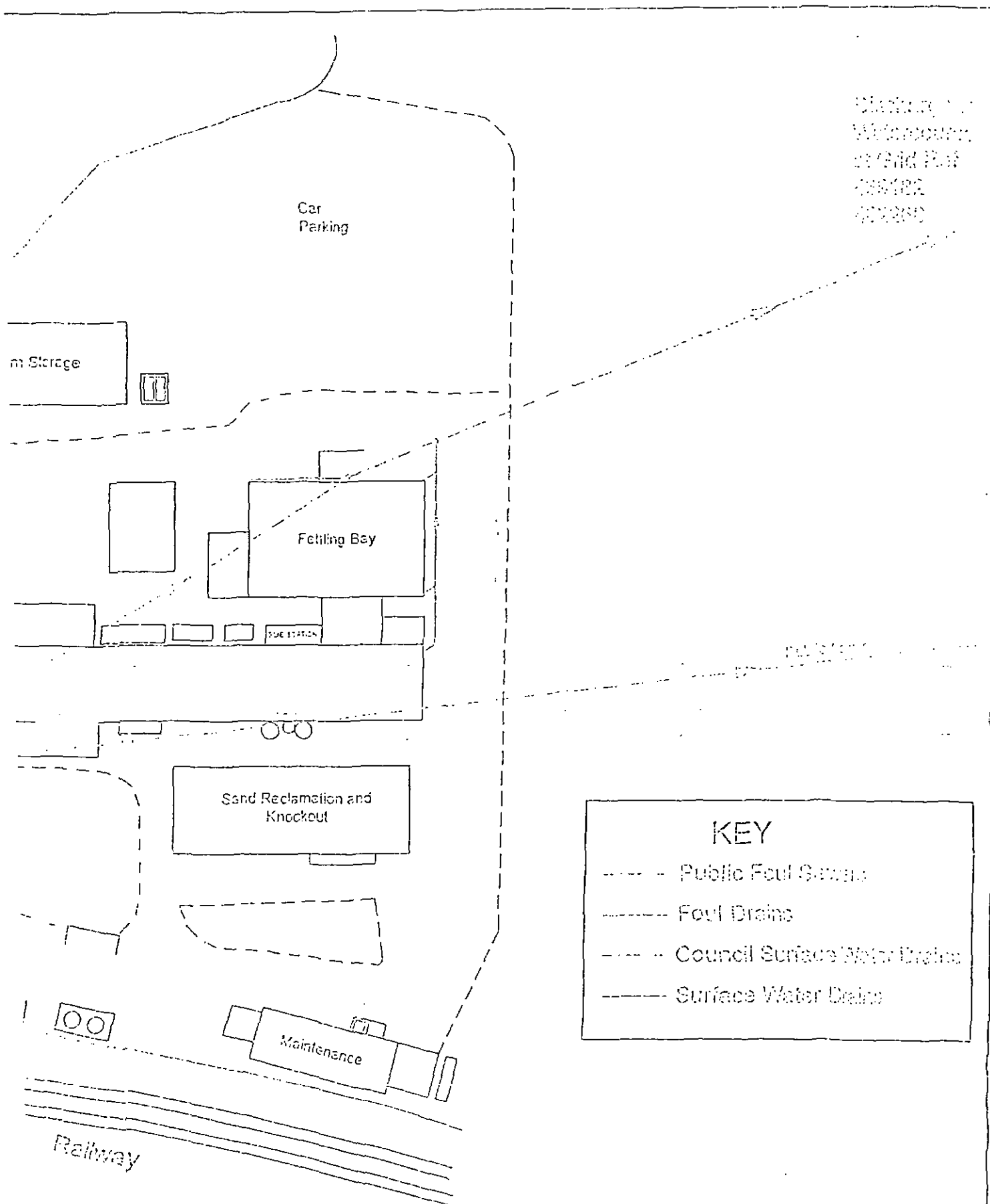
1, Oxford Close
Middx
Bucks
MK45 1JH
Tel: 0494 211111

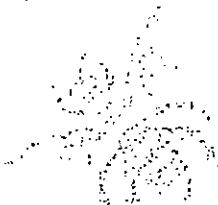
Customer: **WOODWELL FOUNDRY LTD**

Title: **Layout of works showing
discharge points to atmosphere**

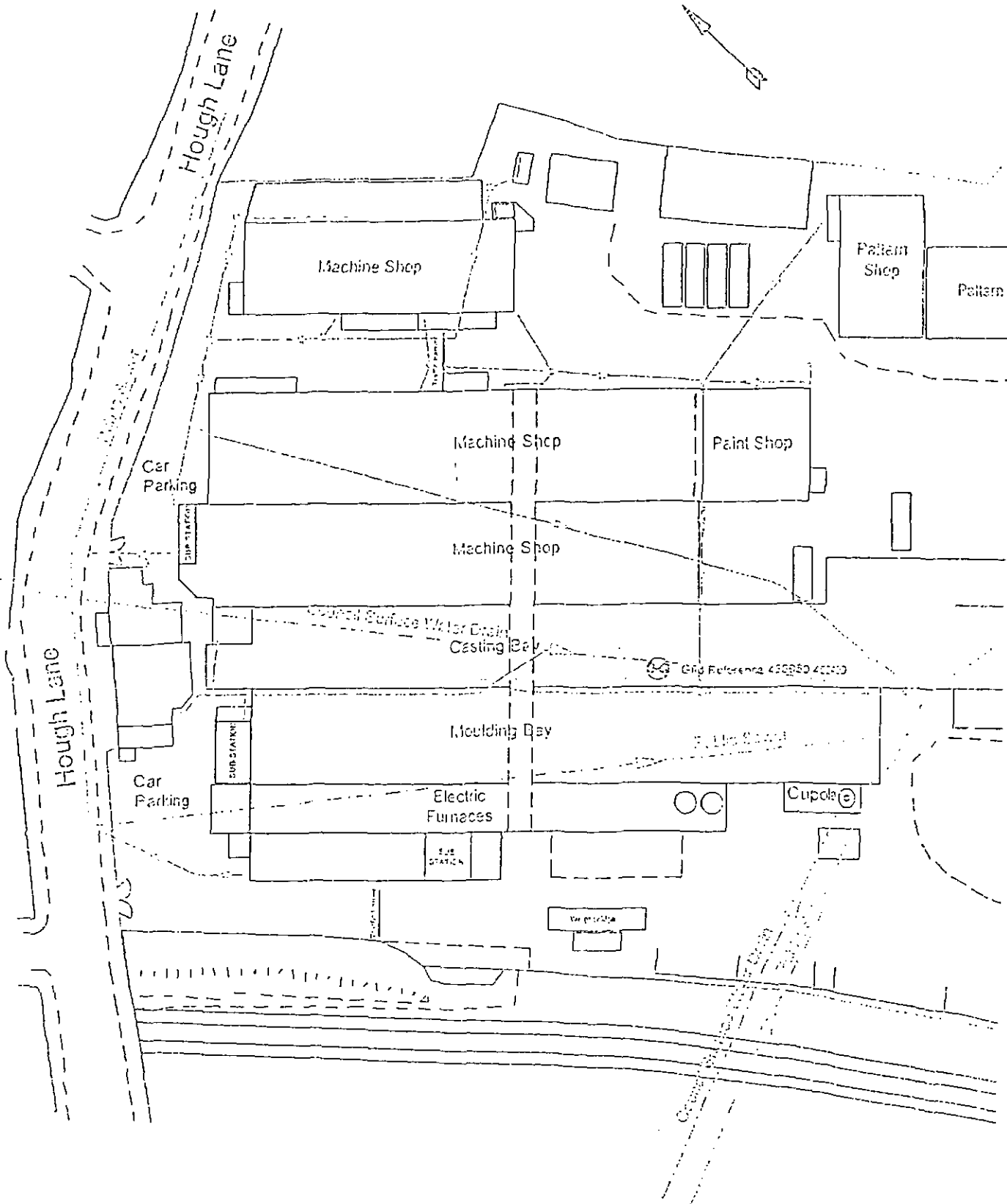
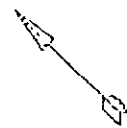
Drawn by: **R.F.B.** Scales: **(on A4)** Drawing Number: **BL 04074**





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|---|---|---------------------|--------------------------------------|--|
|  | Burdett Engineering and Environmental Services Ltd.
111, 113, 115, 117, 119, 121, 123, 125, 127, 129, 131, 133, 135, 137, 139, 141, 143, 145, 147, 149, 151, 153, 155, 157, 159, 161, 163, 165, 167, 169, 171, 173, 175, 177, 179, 181, 183, 185, 187, 189, 191, 193, 195, 197, 199, 201, 203, 205, 207, 209, 211, 213, 215, 217, 219, 221, 223, 225, 227, 229, 231, 233, 235, 237, 239, 241, 243, 245, 247, 249, 251, 253, 255, 257, 259, 261, 263, 265, 267, 269, 271, 273, 275, 277, 279, 281, 283, 285, 287, 289, 291, 293, 295, 297, 299, 301, 303, 305, 307, 309, 311, 313, 315, 317, 319, 321, 323, 325, 327, 329, 331, 333, 335, 337, 339, 341, 343, 345, 347, 349, 351, 353, 355, 357, 359, 361, 363, 365, 367, 369, 371, 373, 375, 377, 379, 381, 383, 385, 387, 389, 391, 393, 395, 397, 399, 401, 403, 405, 407, 409, 411, 413, 415, 417, 419, 421, 423, 425, 427, 429, 431, 433, 435, 437, 439, 441, 443, 445, 447, 449, 451, 453, 455, 457, 459, 461, 463, 465, 467, 469, 471, 473, 475, 477, 479, 481, 483, 485, 487, 489, 491, 493, 495, 497, 499, 501, 503, 505, 507, 509, 511, 513, 515, 517, 519, 521, 523, 525, 527, 529, 531, 533, 535, 537, 539, 541, 543, 545, 547, 549, 551, 553, 555, 557, 559, 561, 563, 565, 567, 569, 571, 573, 575, 577, 579, 581, 583, 585, 587, 589, 591, 593, 595, 597, 599, 601, 603, 605, 607, 609, 611, 613, 615, 617, 619, 621, 623, 625, 627, 629, 631, 633, 635, 637, 639, 641, 643, 645, 647, 649, 651, 653, 655, 657, 659, 661, 663, 665, 667, 669, 671, 673, 675, 677, 679, 681, 683, 685, 687, 689, 691, 693, 695, 697, 699, 701, 703, 705, 707, 709, 711, 713, 715, 717, 719, 721, 723, 725, 727, 729, 731, 733, 735, 737, 739, 741, 743, 745, 747, 749, 751, 753, 755, 757, 759, 761, 763, 765, 767, 769, 771, 773, 775, 777, 779, 781, 783, 785, 787, 789, 791, 793, 795, 797, 799, 801, 803, 805, 807, 809, 811, 813, 815, 817, 819, 821, 823, 825, 827, 829, 831, 833, 835, 837, 839, 841, 843, 845, 847, 849, 851, 853, 855, 857, 859, 861, 863, 865, 867, 869, 871, 873, 875, 877, 879, 881, 883, 885, 887, 889, 891, 893, 895, 897, 899, 901, 903, 905, 907, 909, 911, 913, 915, 917, 919, 921, 923, 925, 927, 929, 931, 933, 935, 937, 939, 941, 943, 945, 947, 949, 951, 953, 955, 957, 959, 961, 963, 965, 967, 969, 971, 973, 975, 977, 979, 981, 983, 985, 987, 989, 991, 993, 995, 997, 999 | | Customer WOMEWELL FOUNDRY LTD | |
| | Title Layout of works showing foul and surface water drainage | | | |
| | Drawn by R.F.B. | Scale (1:50) | Drawing Number BJ 912/15 | |
| | Date 10/10/15 | | | |

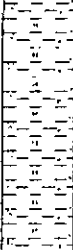
North



APPENDIX B

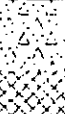
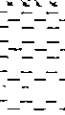
Trial Pit Logs

| | | | | | | | | |
|---|--|---|--------------|--|---|---------------------------|--------------|---|
| Trial
Pit ID

TP1A | | Client
Ben Bailey Homes Limited. | | | | Sheet
Sheet 1 of 1 | | 
www.joynespike.co.uk |
| Job No
232095 | | Site
Land at Wombwell Foundry, off Hough Lane,
Wombwell | | | | Date
24/11/2005 | | |
| Excavation Equipment
360 degree excavator | | Co-ords
Ground Level | | | | Field Records
DRS05/03 | | |
| Strata Description | | Depth
(m) | Level
(m) | Legend | Sample
Type | Logged
DRS | Chkd.
Drs | Appr.
 |
| MADE GROUND: Reinforced concrete. | | 0.20 | |  | | | | |
| MADE GROUND: Firm orange brown silty clay. | | 0.40 | | | | | | |
| MADE GROUND: Medium dense black sandy gravel of ash, clinker, slag and brick fragments. | | | | | | | | |
| Firm to stiff orange brown mottled silty CLAY becoming increasingly stiff with depth. | | 1.20 | |  | | | | |
| End of Trial Pit at 2.30 m | | 2.30 | | | | | | |
| Remarks
1. Excavated through concrete base.
2. No groundwater encountered.
3. Sides remained stable throughout excavation.
4. Pit terminated at 2.30m (begl). | | | | | Sample Type Key
D - Disturbed Representative
B - Bulk Representative
S - Spot Non-Representative
W - Water
PID - PID Reading | | | |

| | | | | | | | | |
|---|--|---|-----------|--|---|------------------|---|---------------------|
| Trial
Pit ID

TP2A | | Client
Ben Bailey Homes Limited. | | | Sheet
Sheet 1 of 1 | | 
www.joynespike.co.uk | |
| Job No
232095 | | Site
Land at Wombwell Foundry, off Hough Lane, Wombwell | | | Date
24/11/2005 | | | |
| Excavation Equipment
360 degree excavator | | Co-ords
Ground Level | | | Field Records
DRS05/03 | | | |
| Strata Description | | Depth (m) | Level (m) | Legend | Sample Type | Sample Depth (m) | Test Results | Groundwater Records |
| MADE GROUND: Tarmac. | | 0.05 | |  | | | | |
| MADE GROUND: Medium dense dark brown sand with gravel of clinker, slag and brick becoming dense with depth. | | | | | | | | |
| MADE GROUND: Medium dense to dense black ash. | | 0.60 | | | | | | |
| MADE GROUND: Dense orange brown gravelly sandstone up to 0.2m in size. | | 0.85 | | | | | | |
| MADE GROUND: Firm to stiff orange brown sandy gravelly clay. Gravel is of sandstone. | | 1.35 | | | | | | |
| Firm to orange brown slightly mottled grey silty CLAY. | | 1.80 | | | | | | |
| End of Trial Pit at 2.35 m | | 2.35 | | | | | | |
| Remarks
1. Excavation down the edge of the weighbridge.
2. No groundwater encountered.
3. Sides remained stable throughout excavation.
4. Pit terminated at 2.35m (begl). | | | | | Sample Type Key
D - Disturbed Representative
B - Bulk Representative
S - Spot Non-Representative
W - Water
PID - PID Reading | | | |

| | | | | | | | | |
|---|--|---|--------------|---|----------------|---|------------------------|---|
| Trial
Pit ID
TP3A | | Client
Ben Bailey Homes Limited. | | | | Sheet
Sheet 1 of 1 | | 
www.joynespike.co.uk |
| Job No
232095 | | Site
Land at Wombwell Foundry, off Hough Lane, Wombwell | | | | Date
24/11/2005 | | |
| Excavation Equipment
360 degree excavator | | Co-ords
Ground Level | | | | Field Records
DRS05/03 | | |
| Strata Description | | Depth
(m) | Level
(m) | Legend | Sample
Type | Logged
DRS | Chkd
() DRS | Aspr.
 |
| MADE GROUND: Concrete with reinforcement | | 0.30 | |  | | | | |
| MADE GROUND: Medium dense black gravelly sand. Gravel is of ash and clinker. | | | | | | | | |
| MADE GROUND: Firm orange brown slightly sandy gravelly clay. Gravel is of angular sandstone. | | 1.30 | | | | | | |
| Firm to stiff orange brown mottled silty CLAY becoming gravelly with angular mudstone with depth | | 2.30 | |  | | | | |
| End of Trial Pit at 3.50 m | | 3.50 | | | | | | |
| Remarks
1. Excavation carried out adjacent to the stantions to determine foundations.
2. No groundwater encountered.
3. Sides remained stable throughout excavation.
4. Pit terminated at 3.5m (begl) due to concrete base. | | | | | | Sample Type Key
D - Disturbed Representative
B - Bulk Representative
S - Spot Non-Representative
W - Water
PID - PID Reading | | |

| | | | | | | | | |
|--|--|---|-----------|--|---|------------------|---|---------------------|
| Trial Pit ID
TP4A | | Client
Ben Bailey Homes Limited. | | | Sheet
Sheet 1 of 1 | |  | |
| Job No
232095 | | Site
Land at Wombwell Foundry, off Hough Lane, Wombwell | | | Date
24/11/2005 | | www.joynespike.co.uk | |
| Excavation Equipment
360 degree excavator | | Co-ords
Ground Level | | | Field Records
DRS05/03 | | | |
| | | Logged
DRS | | | Chkd
DRS | | Appr
 | |
| Strata Description | | Depth (m) | Level (m) | Legend | Sample Type | Sample Depth (m) | Test Results | Groundwater Records |
| MADE GROUND Concrete. | | 0.25 | |  | | | | |
| MADE GROUND Medium dense cream limestone gravel | | | | | | | | |
| MADE GROUND Medium dense black red gravelly sand
Gravel is of ash, clinker and brick. | | 0.80 | | | | | | |
| End of Trial Pit at 4.00 m | | 4.00 | | | | | | |
| Remarks
1. Excavation down the edge of the concrete base.
2. No groundwater encountered.
3. Sides remained stable throughout excavation.
4. Pit terminated at 4.0m (begl). | | | | | Sample Type Key
D - Disturbed Representative
B - Bulk Representative
S - Spot Non-Representative
W - Water
PID - PID Reading | | | |

| | | | | | | | | |
|--|--|---|--------------|--|---|---------------|---|---|
| Trial
Pit ID

TP5A | | Client
Ben Bailey Homes Limited. | | | Sheet
Sheet 1 of 1 | |  JPA
JOYNES PIKE
& ASSOCIATES LTD

www.joynespike.co.uk | |
| Job No
232095 | | Site
Land at Wombwell Foundry, off Hough Lane,
Wombwell | | | Date
23/11/2005 | | | |
| Excavation Equipment
360 degree excavator | | Co-ords
Ground Level | | | Field Records
DRS05/03 | | | |
| Strata Description | | Depth
(m) | Level
(m) | Legend | Sample
Type | Logged
DRS | Chkd
DRS | Appr
 |
| MADE GROUND. Dense black sand with occasional brick | | 1.00 | |  | | | | |
| MADE GROUND. Medium dense red crushed brick and sand with very frequent slag and clinker | | | | | | | | |
| End of Trial Pit at 3.50 m | | 3.50 | | | | | | |
| Remarks
1. Pit excavated down the side of the railtrack base
2. No groundwater encountered.
3. Sides slightly unstable during excavation.
4. Pit terminated at 3.5m (begl) due to concrete base. | | | | | Sample Type Key
D - Disturbed Representative
B - Bulk Representative
S - Spot Non-Representative
W - Water
PID - PID Reading | | | |

| | | | | | | | | | | |
|---|--|---|--|--------------------------|---------------------------|---------------|---|------------------------|--------------|------------------------|
| Trial
Pit ID | | Client
Ben Bailey Homes Limited. | | | Sheet
Sheet 1 of 1 | | JPA
JOYNES PIKE
& ASSOCIATES LTD

www.joynespike.co.uk | | | |
| TP6A | | Site
Land at Wombwell Foundry, off Hough Lane,
Wombwell | | | Date
23/11/2005 | | | | | |
| Job No
232095 | | | | | Field Records
DRS05/03 | | | | | |
| Excavation Equipment
360 degree excavator | | | | Contours
Ground Level | | Logged
DRS | | Chwd
27.5 | Acpr
 | |
| Strata Description | | | | Depth
(m) | Level
(m) | Legend | Sample
Type | Sample
Depth
(m) | Test Results | Groundwater
Records |
| MADE GROUND Medium dense white limestone gravel. | | | | 0.10 | | | | | | |
| MADE GROUND Medium dense black sand with very occasional clay inclusions | | | | | | | | | | |
| End of Trial Pit at 3.80 m | | | | 3.80 | | | | | | |
| Remarks | | | | | | | Sample Type Key | | | |
| 1 Excavation carried out down the side of the concrete base with the concrete locally deepened to 2.0m on the gable end | | | | | | | D - Disturbed Representative | | | |
| 2 No groundwater encountered | | | | | | | B - Bulk Representative | | | |
| 3 Sides remained stable throughout excavation. | | | | | | | S - Spot Non Representative | | | |
| 4 Pit terminated at 3.8m (begl) | | | | | | | W - Water | | | |
| | | | | | | | PID - PID Reading | | | |

| | | | |
|---|---|---|-------------------------|
| Title
TP7A
Ref No
232095 | Client
Ben Bailey Homes Limited.
Site
Land at Wombwell Foundry, off Hough Lane, Wombwell | Sheet
Sheet 1 of 1
Date
24/11/2005
Field Records
DRE05/03 |
www.joynepike.co.uk |
|---|---|---|-------------------------|

| Excavation Equipment | Coordinates | Location | Depth (m) | Test | Ground | Sample Type | DRS | Test Results | Groundwater Records |
|--|-------------|----------|-----------|------|--------|-------------|-----|--------------|---------------------|
| 360 degree excavator | | | | | | | | | |
| MADE GROUND Concrete | | | 0.25 | | | | | | |
| MADE GROUND Very dense red brick | | | 0.30 | | | | | | |
| MADE GROUND Dense red brick | | | | | | | | | |
| Firm orange brown friable sand gravelly clay Gravel is of angular mudstone | | | 0.60 | | | | | | |
| Firm grey brown friable laminated silty CLAY becoming stiff with depth | | | 1.10 | | | | | | |
| Stiff grey brown friable gravelly CLAY Gravel is of mudstone | | | 2.20 | | | | | | |
| Weak grey MUDSTONE becoming moderately strong | | | 2.80 | | | | | | |
| End of Trial Pit at 3.00 m | | | 3.00 | | | | | | |

Remarks
 1. No groundwater encountered
 2. Sides slightly unstable during excavation
 3. Pit terminated at 3.0m (top)

Sample Type Key
 D Disturbed Representative
 B Bulk Representative
 S Split Hole Representative
 W. View
 FID FID Reviewing

| | | | |
|---|--|---|---|
| Trial
Pit ID
TP8A
Job No
232095 | Client
Ben Bailey Homes Limited
Site
Land at Wombwell Foundry, off Hough Lane,
Wombwell | Sheet
Sheet 1 of 1
Date
24/11/2005 | 
www.joynespike.co.uk |
| Excavation Equipment
360 degree excavator | | Records
Ground Level | Field Records
DRS05#03 |
| Sample Description
MADE GROUND Loose to medium dense red brown
gravelly sand with ash, clinker and brick | Depth
(m) | Level
(m) | Legend
 |
| Sample Type
DRS | Sample
Depth
(m) | Test Results
0.25 | Groundwater
Records
 |
| End of Trial Pit at 4.00 m | 4.00 | | |
| Remarks
1. Excavation to determine the concrete base around pits
2. No groundwater encountered.
3. Sides unstable during excavation
4. Pit terminated at 4.0m (begl). | | Sample Type Key
D - Disturbed Representative
D - Bulk Representative
S - Spot Non Representative
W - Viber
PID - PID Reading | |

| | | | | | | | | |
|--|--|---|-----------|--------|--|------------------|---|---------------------|
| Trial
Pit ID
TP9A | | Client
Ben Bailey Homes Limited | | | Sheet
Sheet 1 of 1 | |  | |
| JIC No
232095 | | Site
Land at Wombwell Foundry, off Hough Lane, Wombwell | | | Date
24/11/2005 | | www.joyneSPIKE.co.uk | |
| Excavation Equipment
360 degree excavator | | Corros
Ground Level | | | Field Records
DRS05/03 | | | |
| Site Description | | Depth (m) | Level (m) | Legend | Sample Type | Sample Depth (m) | Test Results | Groundwater Records |
| MADE GROUND Concrete | | 0.30 | | | | | | |
| MADE GROUND Medium dense black red gravelly sand
Gravel is of ash, clinker and brick
End of Trial Pit at 0.50 m | | 0.50 | | | | | | |
| Remarks
1 Shallow excavation to determine thickness of adjacent concrete
2 No groundwater encountered.
3 Sides remained stable throughout excavation
4 Pit terminated at 0.5m (begl) | | | | | Sample Type Key
D - Disturbed Representative
B - Bulk Representative
S - Spot Non Representative
W - Water
FID - FID Re. 1319 | | | |

Tax
No.

Client

Ben Bailey Homes Limited

Sheet

Sheet 1 of 1

TP10A

Site

Land at Wombwell Foundry, off Hough Lane,
Wombwell

Date

24/11/2005

JPA
JOYNES PIKE
& ASSOCIATES LTD

www.joyespike.co.uk

Job No

232095

Excavation Equipment

360 degree excavator

Contents

Find Records

DRS05/03

Soil Description

Ground Level

Ground

DRS

Class

0.25

As per

7

Depth

(m)

Level

(m)

Legend

Sample

Type

Sample

Depth

(m)

Test Results

Geotechnical

Parameters

MADE GROUND Concrete

0.20

MADE GROUND Very dense black brown red gravelly
sand with ash, clinker and brick

0.60

End of Trial Pit at 0.60 m

Remarks

- 1 Concrete base stands 0.3m above ground level, base is 0.5m thick in total
- 2 No groundwater encountered
- 3 Sides remained stable throughout excavation
- 4 Pit terminated at 0.6m (Leg) due to dense ground

Sample Type Key

- D Disturbed Representative
- B Bulk Representative
- S Spill in Pit, for analysis
- W Waste
- PO Pit Refilling

| | | | | | | | | | |
|---|--|---|--------------|--|--|--|--------------|---|--|
| Trial
Pit ID

TP11A
J.A.115
232095 | | Client
Ben Bailey Homes Limited.
Site
Land at Wombwell Foundry, off Hough Lane,
Wombwell | | | | Sheet
Sheet 1 of 1
Date
24/11/2005
Field Records
DRS05'03 | | 
www.joynespike.co.uk | |
| Excavation Equipment
300 degree excavator | | Co-ords
Ground Level | | | | Logged
DRS | | Cored
QLS | |
| Grade Description | | Depth
(m) | Level
(m) | Logging | Sample
Type | Sample
Depth
(m) | Test Results | Groundwater
Readings | |
| MADE GROUND: Loose to medium dense orange sand | | | |  | | | | | |
| MADE GROUND: Loose to medium dense gravelly sand
with gsh. clinker and brick | | 0.50 | | | | | | | |
| End of Trial Pit at 3.00 m | | 3.00 | | | | | | | |
| Remarks
1 No groundwater encountered
2 Sides remained stable throughout excavation
3 Pit terminated at 3.0m (begl)
4 Adjacent concrete base is 0.2m thick | | | | | Sample Type- Key
D - Disturbed Representative
B - Bulk Representative
S - Spoon Run Representative
W - Vane
RID - RID Reading | | | | |

| | | | | | | | |
|---|--|---|--|--|--|---|--|
| Trial
File No
TP12A
232095
Excavation Equipment
300 degree excavator | | Client
Ben Bailey Homes Limited
Site
Land at Wombwell Foundry, off Hough Lane,
Wombwell | | Sheet
Sheet 1 of 1
Date
24/11/2005
Field Records
NLM0503
www.joynepike.co.uk | | JPA
JOYNES PIKE
& ASSOCIATES LTD | |
| Soils Description
MADE GROUND Sandy topsoil with whole brick and
brick fragments

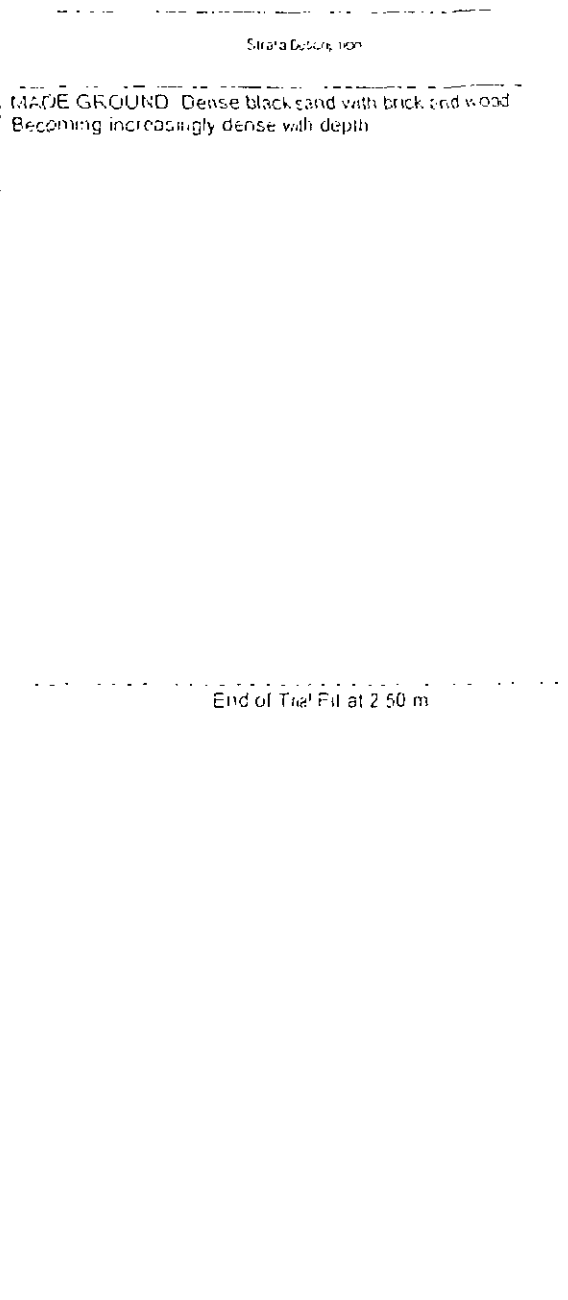
Firm orange brown CLAY with rootlets

End of Trial Pit at 1.90 m | | Ground Level
1.80

1.90 | | Loggers
NLMCC
Sample
Depth
(m) | | Grid
005
Test Results | |
| | | Legend
 | | Sample
Type | | Groundwater
Records | |
| Remarks
1 No groundwater encountered
2 Sides remained stable throughout excavation
3 Pit terminated at 1.90m (beg!) due to base of concrete. | | | | Sample Type Key
D - Disturbed Representative
B - Bulk Representative
S - Spot / Pin Representative
W - Water
FID - FID Reading | | | |

| | | | |
|---|--|--|---|
| Trial ID
TP13A
Job No
232095
Excavation Equipment
360 degree excavator | Client
Ben Bailey Homes Limited
Site
Land at Wombwell Foundry, off Hough Lane, Wombwell | Sheet 1 of 1
Date
24/11/2005
Test Records
FLM0504
www.joyespike.co.uk |  |
| Soil Description
MADE GROUND: Medium dense black ashy sand with whole brick and brick fragments, scrap metal, plastic and metal pipes, plastic and metal sheeting, corrugated plastic, wood and occasional boulders of foundary sand, concrete and clinker boulders | Depth (m)
4.50
End of Trial Pit at 4.50 m | Legend
FLM0C
Sample Depth (m) | Grid
023
Test Results
Groundwater Records |
| Sample Type Key
D - Disturbed Representative
B - Bulk Representative
S - Spot Non-Representative
W - Water
FID - FID Reading | | | |

| Trial
Pit ID | Client
Ben Bailey Homes Limited. | Sheet 1 of 1 | JPA
JOYNES PIKE
& ASSOCIATES LTD | | | | | |
|---|---|--------------------------|---|----------------|------|--------------|------------------------|--|
| TP14A | Site
Land at Wombwell Foundry, off Hough Lane,
Wombwell | Date
24/11/2005 | www.joynespike.co.uk | | | | | |
| JEP No
232095 | | Field Records
NLMU505 | | | | | | |
| Excavation Equipment
360 degree excavator | Corrosion | Ground Level | Legend | Chd | Appr | | | |
| Sinca Description | Depth
(m) | Level
(m) | Logging | Sample
Type | NIMC | Test Results | Groundwater
Records | |
| MADE GROUND Black ashy sand with very frequent concrete and clinker boulders, metal, whole brick and brick fragments and occasional metal pipe wood and mesh. | | | | | | | | |
| End of Trial Pit at 2.00 m | 2.00 | | | | | | | |
| Remarks | | | | | | | | |
| 1 Groundwater encountered at 2.0m (begl).
2 Sides slightly unstable in excavation.
3 Pit terminated at 2.0m (begl) due to large obstructions. | | | | | | | | |
| Sample Type Key | | | | | | | | |
| D - Disturbed Representative | | | | | | | | |
| B - Bulk Representative | | | | | | | | |
| S - Spot Non-Representative | | | | | | | | |
| W - Water | | | | | | | | |
| RID - RID Reading | | | | | | | | |

| | | | | | | | |
|---|---|---|---|---|------------------|--------------|---------------------|
| Title
TPE | Client
Ben Bailey Homes Limited. | Sheet
Sheet 1 of 1 |  | | | | |
| Job ID
232095 | Site
Land at Wombwell Foundry, off Hough Lane, Wombwell | Date
23/11/2005 | | | | | |
| Excavation Equipment
300 degree excavator | | Field Records
DRS05/03 | | | | | |
| Ground Level
 | | Logged
DRS | Check
DRS | Appr
 | | | |
| Strata Description
MADE GROUND Dense black sand with brick and wood
Becoming increasingly dense with depth | Depth (m)
2.50 | Level (m) | Legend | Sample Type | Sample Depth (m) | Test Results | Groundwater Records |
| Remarks
1. Excavation carried out within the pit
2. Groundwater encountered at 1.1m (begl)
3. Sides remained stable throughout excavation
4. Pit terminated at 2.5m (begl) due to concrete base | | Sample Type Key
D - Disturbed Representative
B - Bulk Representative
S - Spot Non Representative
W - Water
PID - PID Reading | | | | | |

| | | | | | | | |
|--|--|---|--|---|--|--|--|
| Total
PA ID
TPF
Job No
232095 | | Client
Ben Bailey Homes Limited.
Site
Land at Wombwell Foundry, off Hough Lane, Wombwell | | Sheet
Sheet 1 of 1
Date
23/11/2005 | | 
www.joyespike.co.uk | |
| Excavation Equipment
360 degree excavator | | Contents
Ground Level | | Field Records
DRS05/03 | | Logged
DRS | |
| Strata Description
MADE GROUND Medium dense dark reddish black brown sand with brick and concrete blocks up to 0.4m in size and occasional sandstone | | Depth (m)
Level (m)
Legend
Sample Type | | Sample Depth (m)
Test Results
Groundwater Records | | Appd
 | |
| End of Trial Pit at 3.80 m | | 3.80 | | | | | |
| Remarks
1 Excavation carried out within the pit
2 No groundwater encountered
3 Sides slightly unstable during excavation.
4 Pit terminated at 3.8m (begt) due to difficult digging | | Sample Type Key
D - Disturbed Representative
B - Bulk Representative
S - Spot Non-Representative
W - Water
PID - PID Reading | | | | | |

| | | | | | | | | |
|---|--|--|--------------|--|--|---|---|---|
| Title:
File ID: | | Client:
Ben Bailey Homes Limited | | | Sheet:
Sheet 1 of 1 | |  | |
| TPG
JX 143
232095 | | Site:
Land at Wombwell Foundry, off Hough Lane,
Wombwell | | | Date:
23/11/2005 | | www.joynepike.co.uk | |
| Excavation Equipment:
360 degree excavator | | Corings:
Ground Level | | | Field Records:
DRS05/03 | | | |
| Site Description:
MADE GROUND Medium dense to dense black sand | | Depth
(m) | Level
(m) | Legend | Sample
Type | Logged
DRS
Sample
Depth
(m) | Check
DRS
Test Results | Appl

Groundwater
Records |
| End of Trial Pit at 2.00 m | | 2.00 | |  | | | | |
| Remarks:
1. Excavation carried out within the pit
2. Groundwater encountered at 0.9m (beg'l)
3. Sides remained stable throughout excavation
4. Pit terminated at 2.0m (beg'l) due to concrete base. | | | | | Sample Type Key:
D - Disturbed Representative
B - Bulk Representative
S - Spot Non-Representative
W - Water
FID - FID Reading | | | |

232095

Cheng

Ben Bailey Homes Limited.

SEP

Land at Wombwell Foundry, off Hough Lane,
Wombwell

$$! \sum_{k=1}^n$$

Sheet 1 of 1

 $\dot{Q}_{se}$

23/11/2005

Field Records

DF.S05/03

JPA
JOYNES PIKE
& ASSOCIATES LTD

W. A. JOYNESPRICE CO. LTD.

Ի ԿԵՆՏՐՈՆԻ ԵՎ ՈՒՍՏՈՒՆԻ

360 degree excavator

Ceas

Grand Total

1000

CRS

Clad

0128

$$\left[\frac{\partial}{\partial t} + \frac{\partial}{\partial x} \right]$$

✓

Spillover effects

MADE GROUND Loose red buck.

(17)

$$\{v \in V : \pi(v) = 0\}$$

14, 1973

Sample
Type

Sample
Depth
(m)

Test Results

Grandfather
Records

End of Tr. Pit at 0.50 m

0 50

Results

1. Excavation carried out within the pit
2. No groundwater encountered
3. Sides remained stable during excavation.
4. Pit terminated at 0.5 m (beg) due to concrete base

Sample Type Key

D - Display Representation

E - Bill Representative

၆ - ရှေးဦးစွာ ပြောရမည့် အရာ

 $V_V = V_{V, \text{max}}$

FID - FID Reading

| | | | |
|---|---|---|---|
| Trial
Field ID
TPK | Client
Ben Bailey Homes Limited. | Sheet
Sheet 1 of 1 |  |
| Job no
232095 | Site
Land at Wombwell Foundry, off Hough Lane, Wombwell | Date
24/11/2005 | |
| Excavation Equipment
360 degree excavator | Corros
 | Field Records
DRS05/03 | www.joyespike.co.uk |
| Sample Description
MADE GROUND Brick, wood, metal and plastic with a loose red brown sandy matrix | Ground Level
 | Longitudinal
DRS | Check
OK |
| Depth (m)
 | Depth (m)
 | Sample Type
 | Test Results
 |
| End of Trial Pit at 0.90 m | 0.90 | | |
| Remarks
1. Excavation carried out within the pit
2. No groundwater encountered
3. Sides remained stable throughout excavation.
4. Pit terminated at 0.90m (begl) due to concrete base | | Sample Type key
D - Disturbed Representative
B - Bulk Representative
S - Spot Non-Representative
W - Water
PID - FID Reading | |

| | | | | | | | | |
|---|--|---|--------------|---|--|-------------------------------|---|---|
| Title
Pile ID
TPL
J&P
232095 | | Client
Ben Bailey Homes Limited
Site
Land at Wombwell Foundry, off Hough Lane
Wombwell | | | Sheet
Sheet 1 of 1
Date
23/11/2005 | | 
www.joynespike.co.uk | |
| Excavation Equipment
300 degree excavator | | Core ID
Ground Level | | | Field Records
DRS05/03 | | | |
| Strata Description
MADE GROUND Loose to medium dense red and black
brick, metal and occasional wood with a slight sand
matrix | | Depth
(m) | Level
(m) | Legend
 | Sample
Type | DRS
Sample
Depth
(m) | DLS
Test Results | Appr

Groundwater
Records |
| End of Trial Pit at 0.60 m | | 0.60 | | | | | | |
| Results
1. Excavation carried out within the pit
2. No groundwater encountered.
3. Sides remained stable throughout excavation
4. Pit terminated at 0.6m (begl) due to concrete base. | | | | | Sample Type Key
D - Disturbed Representative
B - Bulk Representative
S - Spot Non Representative
W - Viscer
FID - FID Reading | | | |

| | | | | | | | | |
|---|--|---|--------------|--------|------------------------------|------------------------|---|------------------------|
| Trial
Field ID | | Client
Ben Bailey Homes Limited | | | Sheet
Sheet 1 of 1 | | <div>JPA</div> <div>JOYNES PIKE
& ASSOCIATES LTD</div> <div>www.joynepike.co.uk</div> | |
| TPM | | Site
Land at Wombwell Foundry, off Hough Lane,
Wombwell | | | Date
23/11/2005 | | | |
| PT. No
232095 | | | | | Field Records
DRS05/03 | | | |
| Excavation Equipment
360 degree excavator | | Corings | | | Logged | | Chkd | Appr |
| | | Ground Level | | | DRS | | DRS | 7 |
| Strata Description | | Depth
(m) | Level
(m) | Legend | Sample
Type | Sample
Depth
(m) | Test Results | Groundwater
Records |
| MADE GROUND. Loose red brick with breeze blocks and metal | | | | | | | | |
| End of Trial Pit at 1.60 m | | 1.60 | | | | | | |
| Remarks | | | | | Sample Type Key | | | |
| 1 Excavation carried out within the pit | | | | | D - Disturbed Representative | | | |
| 2 Groundwater encountered at 0.1m (begl) | | | | | B - Bulk Representative | | | |
| 3 Sides remained stable throughout excavation | | | | | S - Spot Nvsn Representative | | | |
| 4 Pit terminated at 1.8m (begl) due to concrete base | | | | | W - Water | | | |
| | | | | | PID - PID Reading | | | |

| | | | | | | | | | |
|---|--|---|--------------|--------------|----------------|------------------------------|--------------|---|--|
| Trial
Pit ID | | Client
Ben Bailey Homes Limited. | | | | Sheet 1 of 1 | |  | |
| TPN | | Site
Land at Wombwell Foundry, off Hough Lane,
Wombwell | | | | Date
24/11/2005 | | www.joyespike.co.uk | |
| J.C.H. | | 232095 | | | | Field Records
DRS05/03 | | | |
| Excavation Equipment
360 degree excavator | | C.G.G.S | | | | C.G.G.S | | C.G.G.S | |
| | | Ground Level | | | | Ground | | Ground | |
| Soils Description | | Depth
(m) | Level
(m) | Level
(m) | Sample
Type | Sample
Depth
(m) | Test Results | Groundwater
Records | |
| MADE GROUND Brick and concrete with a medium dense
grey sandy matrix | | | | | | | | | |
| MADE GROUND Soft red, very sandy clay | | 0.40 | | | | | | | |
| MADE GROUND Dark grey black shale | | 1.50 | | | | | | | |
| Dark grey brown CLAY | | 2.50 | | | | | | | |
| | | 2.80 | | | | | | | |
| Strong grey MUDSTONE | | 3.20 | | | | | | | |
| End of Trial Pit at 3.20 m | | | | | | | | | |
| Remarks | | | | | | Sample Type key | | | |
| 1. Excavation carried out within the pit | | | | | | D - Disturbed Representative | | | |
| 2. Groundwater encountered at 1.5m (begl) | | | | | | B - Bulk Representative | | | |
| 3. Sides unstable throughout made ground. | | | | | | S - Spot Non Representative | | | |
| 4. Pit terminated at 3.2m (begl) due to solid rock | | | | | | W - Water | | | |
| | | | | | | PID - PIC Reading | | | |

| | | | | | | | |
|--|---|---------------------------------|---|-------------|---|----------------------|---|
| Title
TPJ | Client
Ben Bailey Homes Limited | Sheet 1 of 1 |  | | | | |
| Job No
232095 | Site
Land at Wombwell Foundry, off Hough Lane, Wombwell | Date
24/11/2005 | | | | | |
| Excavation Equipment
360 degree excavator | Corings
Ground Level | Field Records
NLM0502 | www.joyneSPIKE.co.uk | | | | |
| State Description | Depth (m) | Layer (m) | Legend | Sample Type | Logged
NMcC | Class
0125 | Appr
 |
| MADE GROUND: Topsoil with frequent whole bricks and brick fragments, metal and rope | 0.30 | | | | | | |
| Weathered grey brown MUDSTONE excavated as gravel. Gravel is coarse of angular tabular grey mudstone. Becoming coarser with depth. | | | | | | | |
| End of Trial Pit at 3.10 m | 3.10 | | | | | | |
| Remarks
1. No groundwater encountered
2. Sides remained stable throughout excavation
3. Pit terminated at 3.10m (begl) | | | | | Sample Type Key
D - Disturbed Representative
B - Bulk Representative
S - Spot Non Representative
W - Water
PID - PID Reading | | |

Trial
Pit ID

Client

Ben Bailey Homes Limited

Site

Land at Wombwell Foundry, off Hough Lane,
Wombwell

Sheet

Sheet 1 of 1

Date

24/11/2005

JPA
JOYNES PIKE
& ASSOCIATES LTD

www.joyespike.co.uk

TPJA

Job No

232095

Excavation Equipment

360 degree excavator

Corers

Field Records

NLM0501

Strata Description

MADE GROUND Very frequent whole brick and brick
fragments, wood debris and occasional metal

End of Trial Pit at 0.50 m

Ground Level

Depth
(m)

Level
(m)

Legend

Sample
Type

Logged

NLMC

Core

0.25

Key

Sample
Depth
(m)

Test Results

Groundwater
Records

Remarks

1. Pit flooded
2. Sides remained stable throughout excavation
3. Pit terminated at 0.50m (bagl) due to concrete base

Sample Type Key

- D - Disturbed Representative
- B - Bulk Representative
- S - Spot Non-Representative
- W - Water
- PID - PID Reading

| | | | |
|--|---|---|---|
| Trial
No

TPO
232095
Excavation Equipment
360 degree excavator | Client
Ben Bailey Homes Limited.
Site
Land at Wombwell Foundry, off Hough Lane,
Wombwell | Sheet
Sheet 1 of 1
Date
24/11/2005
Field Records
DRS05/03
Logged
DRS
Sample
Depth
(m) | JPA
JOYNES PIKE
& ASSOCIATES LTD
www.joyneSPIKE.co.uk
Grid
DRS
Test Results
Groundwater
Records |
| Location Description
MADE GROUND Brown black sandy clay
End of Trial Pit at 0.10 m | | Coordinates
Grid Reference
Depth
(m)
0.10 | Sample Type
Type |
| Remarks
1. Excavation carried out within the pit
2. No groundwater encountered
3. Sides remained stable throughout excavation
4. Pit terminated at 0.10m (begl) due to concrete base | | Sample Type Key
D - Described Representative
B - Bulk Representative
S - Spot Non Representative
W - Water
R/D - R/D Reading | |

| | | | |
|---|--|---|---|
| Trial
Field

TPO
J.A. P20
232095
Excavated by Equipment | Client
Ben Bailey Homes Limited
Site
Land at Wombwell Foundry, off Hough Lane,
Wombwell | Sheet 1 of 1
Date
24/11/2005
Field Protocol
DRS05/03 | 
JPA
JOYNES PIKE
& ASSOCIATES LTD
www.joyespike.co.uk |
| Corings
Coring Level | | Requested
DRS | Used
DRS |
| Sample Description
End of Trial Pit at 0.10 m | Depth
(m) | Level
(m) | Legend |
| | | | Sample
Type |
| | | | Sample
Depth
(m) |
| | | | Test Results |
| | | | Groundwater
Reserve |
| Remarks
1 Excavation carried out within the pit
2 No groundwater encountered.
3 Sides remained stable throughout excavation.
4 Pit terminated at 0.10m (begl) due to concrete base. | | Sample Type key
D - Disturbed Representative
B - Bulk Representative
S - Spot Non Representative
W - Water
PID - PID Reading | |

APPENDIX C

Borehole Logs

| Borehole ID
BH1A | Client
Ben Bailey Homes Limited. | Start Date
24/11/2005 |
www.joynespike.co.uk | | | | | |
|---|--|--------------------------|--------------------------|-------------|---|-------|---------------------|------------------|
| Site
Land at Wombwell Foundry, off Hough Lane,
Wombwell | End Date
24/11/2005 | | | | | | | |
| JOB No.
232095 | Cdr Date
24/11/2005 | | | | | | | |
| Drilling Equipment
SOIL MECH 405 AND COMP | Field Records
DRILLERS | | | | | | | |
| | | Logged
DRILLERS | Checked
DJS | Asm
Z | | | | |
| Strata Description | Depth (m) | Level (m) | Legend | Sample Type | Sample Depth (m) | Tests | Groundwater Records | Backfill Details |
| MADE GROUND Concrete | 0.10 | | | | | | | |
| Mudstone | | | | | | | | |
| Sandstone | 4.00 | | | | | | | |
| Dark mudstone | 10.60 | | | | | | | |
| Coal | 12.00 | | | | | | | |
| Sandstone | 13.40 | | | | | | | |
| End of Borehole at 20.00 m | 20.00 | | | | | | | |
| Remarks
1 - Hole terminated at 20.00m (begl) | | | | | Sample Type Key
D - Disturbed Representative
B - Bulk Representative
S - Spot Non Representative
W - Water
U - Undisturbed Representative
J - Jar Sample
(C) - Cone SPT
(S) - Spoon SPT | | | |
| Sheet: | | | | | Sheet 1 of 1 | | | |

Sheet 1 of 1

Borehole ID

BH3A

Client

Ben Bailey Homes Limited.

Site

Land at Wombwell Foundry, off Hough Lane,
Wombwell

JPA No

232095

Drilling Equipment

SOIL MECH 405 AND CCLAP

Start Date

24/11/2005

End Date

24/11/2005

Borehole Date

24/11/2005

Field Records

DRILLERS

JPA
JOYNES PIKE
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Loggers

DRILLERS

Class

P2S

Scale

Z

Strata Description

Depth
(m)Level
(m)

Legend

Sample
TypeSample
Depth
(m)

Tests

Groundwater
PressureBorehole
Details

MADE GROUND Concrete

0.10

Clay

1.30

Mudstone

Sandstone

4.00

Dark mudstone

10.50

Coal

12.00

Sandstone

13.00

End of Borehole at 14.00 m

14.00

Remarks

1. Hole terminated at 14.00m (begl).

Sample Type Key

D - Disturbed Representative

B - Bulk Representative

S - Spot Non-Representative

W - Water

U - Undisturbed Representative

J - Jar Sample

(C) - Cone SPT

(SI) - Spoon SPT

Sheet

Sheet 1 of 1

| | | | | | | | | | |
|---|--|---|--------------|-------------------------------------|----------------|---|-------|------------------------|---------------------|
| Borehole ID
BH4A | | Client
Ben Bailey Homes Limited | | Start Date
24/11/2005 | | <div>JPA
JOYNES PIKE
& ASSOCIATES LTD
www.joynespike.co.uk</div> | | | |
| Site
Land at Wombwell Foundry, off Hough Lane,
Wombwell | | End Date
24/11/2005 | | End Drill Date
24/11/2005 | | | | | |
| JLS No
232095 | | Field Records
DRILLERS | | Logged
DRILLERS | | | | | |
| Drilling Equipment
SOIL MECH 405 AND COMP | | Coring
DRILLERS | | Coring
DRILLERS | | | | | |
| Drill Description | | Depth
(m) | Level
(m) | Ground | Sample
Type | Sample
Depth
(m) | Tests | Groundwater
Records | Backfill
Details |
| MADE GROUND Concrete | | 0.10 | | | | | | | |
| Clay | | | | | | | | | |
| Sandstone | | 4.20 | | | | | | | |
| Dark mudstone | | 10.30 | | | | | | | |
| Sandstone | | 13.00 | | | | | | | |
| End of Borehole at 14.00 m | | 14.00 | | | | | | | |
| Remarks
1. Hole terminated at 14.00m (bogl) | | | | | | Sample Type Key
D - Disturbed Representative
B - Bulk Representative
S - Spot Non-Representative
W - Water
U - Undisturbed Representative
J - Jir Sample
(C) - Cone SPT
(S) - Seson SPT | | | |
| Sheet | | | | | | Sheet 1 of 1 | | | |

| | | | | | | | | |
|---|---|---------------------------|---|----------------|---|-------|------------------------|------------------|
| Invoice ID
3H5A | Client
Ben Bailey Homes Limited. | Start Date
24/11/2005 | 
www.joynespike.co.uk | | | | | |
| Site Ref
232095 | Site
Land at Wombwell Foundry, off Hough Lane,
Wombwell | End Date
24/11/2005 | | | | | | |
| Drilling Equipment
SOIL MECH 405 AND COMP | Records | Field Records
DRILLERS | | | | | | |
| Ground Level | | Drillers
DRILLERS | Class
012 S | | | | | |
| Strata Description | Depth
(m) | Level
(m) | Legend | Sample
Type | Sample
Depth
(m) | Tests | Core Number
Records | Drill
Details |
| Clay | | | | | | | | |
| Mudstone | 2.00 | | | | | | | |
| Sandstone | 3.50 | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| Dark mudstone | 10.30 | | | | | | | |
| | | | | | | | | |
| Mudstone | 12.60 | | | | | | | |
| End of Borehole at 13.60 m | 13.50 | | | | | | | |
| Remarks
1. Hole terminated at 13.60m (begl). | | | | | Sample Type Key
D - Disturbed Representative
B - Bulk Representative
S - Spot Non-Representative
W - Water
U - Undisturbed Representative
J - Jar Sample
(C) - Core SPT
(S) - Spoon SPT | | | |
| Sheet | | | | | Sheet 1 of 1 | | | |

| | | | | | | | |
|---|---|----------------------------------|---|---|-------|----------------------|------------------|
| Borehole ID
BH6A | Client
Ben Bailey Homes Limited. | Start Date
24/11/2005 |  JPA
JOYNES PIKE
& ASSOCIATES LTD
www.joynespake.co.uk | | | | |
| JPA No
232095 | Site
Land at Wombwell Foundry, off Hough Lane, Wombwell | End Date
24/11/2005 | | | | | |
| Drilling Equipment
SOIL MECH 405 AND COMP | | Field Date
24/11/2005 | | | | | |
| Log Level
DRILLERS | | Field Records
DRILLERS | | | | | |
| Log Level
DRILLERS | | Log Level
DRILLERS | Log Level
DRILLERS | Log Level
DRILLERS | | | |
| Strata Description | Depth (m) | Log Level | Sample Type | Sample Depth (m) | Tests | Geotechnical Records | Backfill Details |
| Clay | | | | | | | |
| Sandstone | 2.00 | | | | | | |
| Dark mudstone | 7.00 | | | | | | |
| Sandstone | 9.30 | | | | | | |
| End of Borehole at 14.00 m | 14.00 | | | | | | |
| Remarks
1. Hole terminated at 14.00m (bgs) | | | | Sample Type Key
D - Disturbed Representative
B - Bulk Representative
S - Spot Non-Representative
W - Water
U - Undisturbed Representative
J - Jar Sample
(C) - Cone SPT
(S) - Spoon SPT | | | |
| Sheet | | | | Sheet 1 of 1 | | | |

Borehole ID

BH7A

Client

Ben Bailey Homes Limited.

Site

Land at Wombwell Foundry, off Hough Lane
Wombwell

JCB No

232095

Logging Equipment

SOIL MECH 405 AND COMP

Start Date

24/11/2005

End Date

24/11/2005

Insertion Date

24/11/2005

Field Records

DRS05/03

JPA
JOYNES PIKE
& ASSOCIATES LTD

www.joynespike.co.uk

Logged

DRS

Checked

17/12/05

As per



Strata Description

Depth
(m)Level
(m)

Legend

Sample
TypeSample
Depth
(m)

Tests

Groundwater
RecordsRemarks
Details

MADE GROUND Concrete

0.20

MADE GROUND Dark grey sand with occasional
firing

Grey brown MUDSTONE

3.00

Light grey very hard SILTSTONE

12.50

Orange brown SANDSTONE

15.30

Strong light grey MUDSTONE

15.50

End of Borehole at 20.00 m

20.00

Remarks

1. Hole terminated at 20.0m (bgl)

Sample Type Key

D - Disturbed Representative

B - Bulk Representative

S - Spot Non-Representative

W - Water

U - Undisturbed Representative

J - Jar Sample

(C) - Cone SPT

(S) - Spoon SPT

Sheet

Sheet 1 of 1

Reference ID

BH8A

Client

Ben Bailey Homes Limited.

Site

Land at Wombwell Foundry, off Hough Lane
Wombwell

Job No.

232095

Labelling Equipment

SOIL MECH 405 AND COMP

Test Date

24/11/2005

Test Time

24/11/2005

Printed Date

24/11/2005

Printed By

DRS05/03

JPA
JOYNES PIKE
& ASSOCIATES LTD

www.joyespike.co.uk

Location

Access Point

Project

DPS

Used

As

Soil Description

MALE GROUND Brick, wood, metal and plastic
with a loose red blown sandy matrix.

MALE GROUND Concrete

Depth
(m)

0.00

Depth
(m)

12.00

Soil Type

Sample
Depth
(m)

Notes

Groundwater
Level (m)

Remarks

End of Borehole at 12.0 m

Remarks

1. Hole terminated at 12.0m (bgl)

Sample Type Key

D - Disturbed Representative

B - Bulk Representative

S - Split Horizontal Sample

W - Water

U - Undisturbed Representative

J - Jet Sample

(C) - Core SFT

(S) - Split SFT

Sheet

Sheet 1 of 1

| | | | | |
|---|---|-------------------------------|--|---|
| Borehole ID
BH9A | Client
Ben Bailey Homes Limited | Start Date
24/11/2005 | 
www.joyespike.co.uk | |
| Job No.
232095 | Site
Land at Wombwell Foundry, off Hough Lane,
Wombwell | End Date
24/11/2005 | | |
| | | End of Job Date
24/11/2005 | | |
| Datalog Equipment
SOIL MECH 405 AND COMP | | Field Recorder
DRS05/03 | | |
| | Ground Level | Logged
DRS | Checked
CJ/23 | As per
 |

| Coring Direction | Depth (m) | Depth (m) | Legend | Sample Type | Sample Depth (m) | Tests | Groundwater Records | Soil Fill Details |
|---------------------------|-----------|-----------|--------|-------------|------------------|-------|---------------------|-------------------|
| MADE GROUND Soft drilling | | | | | | | | |
| MADE GROUND Concrete | 1.00 | | | | | | | |
| MADE GROUND No returns | 1.20 | | | | | | | |
| End of Borehole at 1.40 m | 1.40 | | | | | | | |

| | |
|---|---|
| Remarks
1 Drilled to determine thickness of concrete
2 Hole terminated at 1.4m (begl) | Sample Type Key
D - Disturbed Representative
B - Bulk Representative
S - Spot Non Representative
W - Water
U - Undisturbed Representative
J - Jar Sample
(C) - Cone SPT
(S) - Spoon SPT |
| Sheet
Sheet 1 of 1 | |

| | | | | | | | | |
|---|--|----------------------------------|---|-------------|--------------------------------|-------|---------------------|------------------|
| Borehole ID
BH10A | Client
Ben Bailey Homes Limited. | Start Date
24/11/2005 | 
www.joynespike.co.uk | | | | | |
| Site No
232095 | Site
Land at Wombwell Foundry, off Hough Lane Wombwell | End Date
24/11/2005 | | | | | | |
| Contract Description
SOIL MECH 405 AND COMP | Contract No
 | Field Records
DRS05/03 | | | | | | |
| | | Log No
DRS | | | | | | |
| | | Unit
DRS | App
 | | | | | |
| Soils (Description) | Depth (m) | Level (m) | Legend | Sample Type | Sample Depth (m) | Tests | Groundwater Records | Backfill Details |
| MADE GROUND Concrete | 0.30 | | | | | | | |
| MADE GROUND Orange sandy clay | | | | | | | | |
| Black Coal | 2.00 | | | | | | | |
| Moderately strong brown MUDSTONE | 2.50 | | | | | | | |
| End of Borehole at 3.00 m | 3.00 | | | | | | | |
| Remarks | | | | | Sample Type Key | | | |
| 1 Drilled to determine thickness of concrete | | | | | D - Disturbed Representative | | | |
| 2 Hole terminated at 3.0m (begl) | | | | | B - Bulk Representative | | | |
| | | | | | S - Spot Non-Representative | | | |
| | | | | | W - Water | | | |
| | | | | | U - Undisturbed Representative | | | |
| | | | | | J - Jar Sample | | | |
| | | | | | (C) - Cone SPT | | | |
| | | | | | (S) - Spdm SPT | | | |
| | | | | | Sheet | | | |
| | | | | | Sheet 1 of 1 | | | |

Borehole ID
BH11A

Client
Ben Bailey Homes Limited.

Start Date
24/11/2005

End Date
24/11/2005

Borehole Date
24/11/2005

Field Reference
GRS05/03

Log No
DRS

Core ID
D723

Site

Drilling Equipment
SOIL MECH 405 AND COMP

Ground Level

Soil Description

Depth (m)

Level (m)

Legend

Sample Type

Sample Depth (m)

Tests

Groundwater Pressure

Earthquake Details

Remarks

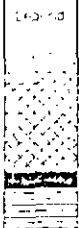
1 Hole terminated at 3.3m (begl)

Sample Type Key
D - Disturbed Representative
B - Bulk Representative
S - Spot Non-Representative
W - Water
U - Undisturbed Representative
J - Jar Sample
IC - Cone SPT
IS - Spoon SPT

Sheet 1 of 1

| | | | | | | | | |
|---|---|-----------------------------------|--|-------------|------------------|-------|---------------------|------------------|
| Reference ID
BH12A | Client
Ben Bailey Homes Limited. | Start Date
24/11/2005 |  JPA
JOYNES PIKE
& ASSOCIATES LTD
www.joynepike.co.uk | | | | | |
| Job No
232095 | Site
Land at Wombwell Foundry, off Hough Lane, Wombwell | End Date
24/11/2005 | | | | | | |
| Ordering Equipment
SOIL MECH 405 AND COMP | Driller
DRS | Driller Date
24/11/2005 | | | | | | |
| | Field No
DRS05/03 | Field Date
24/11/2005 | | | | | | |
| Ground Level | | Log No
DRS | Core No
DRS | | | | | |
| Sample Description | Depth (m) | Level (m) | Legend | Sample Type | Sample Depth (m) | Tests | Groundwater Records | Borehole Details |
| MADE GROUND Concrete | 0.05 | | | | | | | |
| MADE GROUND Black dense sand. | 1.00 | | | | | | | |
| MADE GROUND Orange brown clay with poor returns. | 2.00 | | | | | | | |
| Black Coal | 2.50 | | | | | | | |
| Moderately strong grey brown MUDSTONE | 3.00 | | | | | | | |
| End of Borehole at 3.30 m | | | | | | | | |
| Remarks
1. Hole terminated at 3.0m (bcgl) | | | | | | | | |
| Sample Type Key
D - Disturbed Representative
B - Bulk Representative
S - Spot Non-Representative
W - Water
U - Undisturbed Representative
J - Jar Sample
(C) - Cone SPT
(S) - Spoon SPT | | | | | | | | |
| Sheet
Sheet 1 of 1 | | | | | | | | |

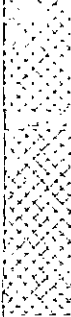
| | | | | |
|---|---|-----------------------------------|---|---|
| Borehole ID
BH13A | Client
Ben Bailey Homes Limited. | Start Date
24/11/2005 | 
www.joynespike.co.uk | |
| Job No.
232095 | Site
Land at Wombwell Foundry, off Hough Lane, Wombwell | End Date
24/11/2005 | | |
| Drilling Equipment
SOIL MECH 405 AND COMP | Field Records
DRS05/03 | Rad Int Date
24/11/2005 | | |
| | | | | |
| | Ground Level | Urgency
DRS | Chief
DRS | Appr
 |

| Strata Description | Depth (m) | Level (m) | Legend | Sample Type | Sample Depth (m) | Tests | Groundwater Results | Drill Details |
|---|-----------|-----------|---|-------------|------------------|-------|---------------------|---------------|
| MADE GROUND Concrete | 0.30 | |  | | | | | |
| MADE GROUND Black dense sand | 0.50 | | | | | | | |
| MADE GROUND Orange brown clay with poor returns | 2.00 | | | | | | | |
| Black Coal | 2.30 | | | | | | | |
| Moderately strong grey brown MUDSTONE | 3.00 | | | | | | | |
| End of Borehole at 3.00 m | | | | | | | | |

Remarks
 1. Hole terminated at 3.0m (bogl).

Sample Type Key
 D - Disturbed Representative
 B - Bulk Representative
 S - Spot Non-Representative
 W - Wire
 U - Undisturbed Representative
 J - Jar Sample
 (C) - Cone SPT
 (S) - Spoon SPT

Sheet
 Sheet 1 of 1

| | | | | | | | | |
|--|--|--------------------------|---|-------------|------------------|-------|----------------------|------------------|
| Borehole ID
BH14A | Client
Ben Bailey Homes Limited. | Start Date
24/11/2005 | 
www.joynespike.co.uk | | | | | |
| Site
Land at Wombwell Foundry, off Hough Lane,
Wombwell | End Date
24/11/2005 | | | | | | | |
| Job No
232095 | Field Protocol
DR505/03 | | | | | | | |
| Drilling Equipment
SOIL MECH 405 AND COMP | Logged
DRS | | | | | | | |
| | Grid Level | Grid | As per | | | | | |
| Strat Description | Depth (m) | Layer (m) | Legend | Sample Type | Sample Depth (m) | Tests | Gravel, etc. Returns | Backfill Details |
| MADE GROUND Black ash/sand with very frequent concrete and clinker boulders, metal, whole brick and brick fragments and occasional metal pipe, wood and mesh | | |  | | | | | |
| MADE GROUND Concrete | 2.00 | | | | | | | |
| MADE GROUND No returns | 2.30 | | | | | | | |
| End of Borehole at 5.50 m | 5.50 | | | | | | | |
| <div>Remarks
1. Hole terminated at 5.5m (begl)</div> <div>Sample Type Key
D - Disturbed Representative
B - Bulk Representative
S - Spoon Non Representative
W - Water
U - Undisturbed Representative
J - Jar Sample
(C) - Cone SPT
(S) - Spoon SPT</div> <div>Sheet
Sheet 1 of 1</div> | | | | | | | | |

APPENDIX D

JPA Contamination Assessment Criteria

Methodology for the Screening of Soils in Terms of the Risk to Human Health (Including the JPA Methodology for Calculating Tier 1 Screening Values)

The legislative framework for the regulation of contaminated land is contained in Part IIA of the Environmental Protection Act 1990, which was implemented in the Contaminated Land (England) Regulations 2000. This legislation allows for the identification and remediation of land where contamination is causing unacceptable risks to human health or the wider environment. The basis of the UK contaminated land policy is the 'Suitable for Use' approach, which states that land should be suitable for its current use and made suitable for any new use as official permission (through the planning process) is given for that use.

Under Part IIA of the Environmental Protection Act 1990, contaminated land is defined as land where significant harm is being caused or there is a significant possibility of such harm being caused or where pollution of controlled waters is being, or is likely to be caused. For significant harm to occur, a pollutant linkage must exist i.e. there must be a contamination source, a relevant receptor and a plausible migration pathway by which the contaminant can cause significant harm to the receptor.

As part of the regulatory framework discussed above, the UK Government published, on 14th March 2002, the Contaminated Land Exposure Assessment model (CLEA). This presents Soil Guideline Values, which are "generic" values for assessing the risks to human health from chronic exposure to contaminated soils. The Soil Guideline Values represent 'intervention values' above which the levels of soil contamination may represent an unacceptable risk to the health of site-users such that further investigation and/or remediation is required. The Soil Guideline Values are not intended to represent binding standards or statutory objectives.

The Soil Guideline Values have been derived bearing in mind particular proposed land uses. Currently, three types of 'standard' land use have been considered, namely residential; allotments; and commercial / industrial. For each standard land use there are a number of different exposure routes which may or may not be active depending on the site-specific scenario. The Soil Guideline Values generally utilised in this report (unless otherwise specifically stated) represent worst case exposure scenarios with all exposure routes active for residential with plant uptake.

Currently, Soil Guideline Values have only been prepared for arsenic, cadmium, chromium, inorganic mercury, nickel, selenium, lead, toluene and ethylbenzene. The Soil Guideline Values have replaced the trigger concentrations formerly prescribed by ICRCL document 59/83, which has been withdrawn. In the absence of existing United Kingdom guidelines for certain contaminants (i.e. where UK Soil Guideline Values have not been published), Joynes Pike & Associates have calculated of Tier 1 screening values for various contaminants, currently utilising version 5 dated September 2005.

The methodology employed to calculate these values is as follows:

Where available, United Kingdom based toxicological data, presented in the appropriate Environment Agency CLR TOX series of reports has been used. When new TOX reports are issued, the Tier 1 values are updated accordingly.

However, where a TOX report is not available, reference has again been made to the Risk Assessment Information System (RAIS) database (<http://rais.onrn.gov>) for

toxicological information, with the exception of banded TPH where reference is made to the Total Petroleum Hydrocarbon Criteria Working Group (TPHCWG) documents, which contain both toxicological information and physio-chemical properties. These documents are utilised for "threshold" (i.e. non-carcinogenic) contaminants only, with the toxicological data adjusted for average UK bodyweight (70kg). This exercise generates a Tolerable Daily Intake (TDI).

It is noted that the Environment Agency publication P5-080/TR3 (The UK Approach for Evaluating Human Health Risks from Petroleum Hydrocarbons in Soils), identifies three carbon bands at the "heavy" end of the spectrum, which would be characterised by immobile highly unreactive compounds. However, since no toxicological data exists currently for these additional bands, Joynes Pike & Associates have continued to utilise the data contained within the TPHCWG publications until such time that new data is released.

To model the Tier 1 values, JPA have used a variety of appropriate software models including SNIFFER, CLEA 2002 and RISC 4.0. The CLEA 2002 software has been utilised to model benzo (a) pyrene since this is an original contaminant within the model and is also noted to be a non volatile compound. The SNIFFER model (LQM01) has been used for non-organic contaminants, whilst the RISC 4.0 model has been utilised for the remaining organic contaminants. RISC 4.0 uses the Johnson & Ettinger model with respect to the volatilisation of compounds from soil.

The default parameters are accepted when running the model at a Tier 1 level to give the most conservative model except that the SOM is calculated with a range from adjusted to 1.0% to 5% (to be inline with the SOM values utilised in the recently published Toluene SGV report).

APPENDIX E

BGS Radon Report

Radon (RPM) Report - Standard

Report prepared for:

Jeremy Powell
Joynes Pike & Associates
1-2 Aire House
Richmond Business Park
Sidings Court
Doncaster
DN4 5 NL

Radon Protective Measures Site Report – Standard

Advisory report on the requirement for radon protective measures in new dwellings and extensions including a BR211 (1999) Stage 2 Geological Assessment

Client's Reference:

232095

| | | | |
|------------------------|----|--|-----|
| JPA - Doncaster | | | |
| Project Number: 232095 | | | |
| Review: MTM/Grj | | | |
| 17 JAN 2006 | | | |
| JSP | JP | | |
| RMB | MB | | |
| File: | | | Ref |

Radon (RPM) Report - Standard

Section 1: Location and extent of report area

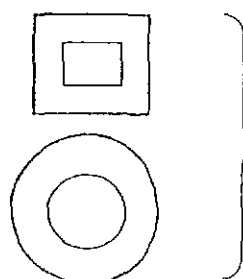
Area centred at: 439032,402342

Radius of site area: 200 metres



Scale: 1:25000 (1cm = 250m)

KEY:

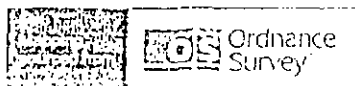


INNER RECTANGLE or CIRCLE defines site area (details provided by client).

OUTER LINE shows extent of TOTAL SEARCH AREA comprising the site area and automatically generated buffer zone. The requirement for radon protective measures indicated in Section 2 is based on a geological assessment of the Total Search Area.

Please see Section 4 for details of how the search is carried out

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Radon (RPM) Report - Standard

Section 2: Requirement for radon protective measures

The determination below follows the two stages described in *BR211 Radon: Guidance on protective measures for new dwellings (1999 edition)*, which also provides guidance on what to do if the result indicates that protective measures are required.

Stage 1

Stage 1 (Annex A) of the BR211 (1999) procedure indicates that the minimum level of protection for the report area is NO radon protective measures.

Stage 2

The Stage 2 geological assessment carried out for this report indicates BASIC radon protective measures are required for the report area. This assessment was derived automatically from the EGS Radon Protective Measures GIS (RPM-GIS) from 1:250,000 scale digital data. Results of the geological search are described in Section 3, and more detail on the assessment procedure is outlined in Section 4.

Result

The BR211 (1999) two-stage procedure indicates that BASIC protective measures are required for the site. This is the higher of the two levels of protection indicated by Stage 1 and Stage 2.

The BGS is not able to provide advice on the technical specifications of 'basic' and 'full' radon protective measures. This information is detailed in BRE Report BR211 :Radon: Protective measures for new dwellings which may be purchased from brebookshop.com. BR211 offers guidance on the technical solutions that are required to satisfy Building Regulations requirements. Summary guidance is available on the web at:
<http://www.bre.co.uk/radon/protect.html>.

If you require further information or guidance, you should contact your local authority building control officer or approved inspector.

Contact 020 7944 5745 or Email: partscdgh.br@odpm.gsi.gov.uk for advice on the interpretation of guidance contained in BRE Report BR211.

Radon (RPM) Report - Standard

Section 3: Geological units within the search area

Below is a listing, if available, of the possible combinations of Bedrock (Solid) Geology units and overlying Superficial (Drift) Geology units within the total search area derived automatically by the RPM-GIS.

These have been derived (as indicated) from searches of either:

- a) Combined 1:250,000 Bedrock (Solid) and 1:625,000 Superficial (Drift) geology maps
- b) 1:50,000 Bedrock (Solid), Superficial (Drift) and Artificial geology maps

1:250,000 data

- 1. MIDDLE COAL MEASURES (FORMATION)(SANDSTONE 3D00); No drift
- 2. MIDDLE COAL MEASURES (FORMATION)(ARGILLACEOUS ROCKS, UNDIFFERENTIATED); No drift

Radon (RPM) Report - Standard

Section 4: Determining the level of radon protection.

BR 211 (1999) sets out a two-stage procedure to help determine the level of radon protection required in new dwellings and extensions.

In Stage 1 of the procedure, the 5 km grid square radon potential maps (Annex A, BR211, 1999) produced by the National Radiological Protection Board (NRPB) are used to make the primary determination of the level of radon protection needed. The NRPB maps are based on the average estimated proportion of homes exceeding the radon Action Level for each 5 km square of the Ordnance Survey National Grid.

In Stage 2, a second series of maps produced by the BGS (Annex B, BR211, 1999) is used to decide whether it is necessary to consider upgrading the requirement for protection indicated by Stage 1. This procedure has the objective of avoiding cases of underprotection that might occur had the guidance depended solely on the average radon level in the 5 km grid square indicated by the NRPB maps. The BGS maps in Annex B (BR211, 1999) show those 5 km grid squares that are underlain, completely or in part, by geological units that require either basic or full protection to be installed in new dwellings.

A geological assessment may need to be carried out where the site falls within a shaded grid square on the BGS map in Annex B of BR211 (1999). The geological assessment checks whether a site is on or close to a geological unit which potentially exceeds the action levels for either basic or full radon protection. Consideration must be given to installing basic or full radon protection if the geological assessment shows that this is indicated. If a site falls within one of the shaded squares, it does not necessarily mean that it must have radon protection. This is because some of the grid squares contain bed rocks and unconsolidated (drift) deposits with lower radon potential than the maximum levels shown on the 5 km grid maps in Annex B (BR211, 1999).

In many cases the geological radon potential varies considerably within a grid square. In other cases, only a very small area (sometimes only a few hundred square metres) with a radon potential exceeding the thresholds for basic or full protection occurs within the shaded grid square. The level of protection that might be required is thus site specific, and can be determined by reference to the relevant radon potential map in BR211 (1999) followed by a geological assessment of the site.

(Please note, the NRPB is now the Radiation Protection Division of the Health Protection Agency)

Radon (RPM) Report - Standard

The geological assessment in this report is produced by the BGS Radon Protective Measures Geographical Information System (RPM GIS), which has been developed to provide Stage 2 Geological Assessments (RPM Site Reports). The assessment is derived from a geologically based interpretation of radon measurements in dwellings which were provided to the BGS by the NRPB without prejudicing confidentiality undertakings to householders and the Department of the Environment, Food and Rural Affairs (DEFRA). The reliability of a geological radon potential assessment is approximately proportional to the number of radon measurements available and the scale of the geological maps.

The RPM GIS currently comprises 1:250,000 scale data with more detailed information for twenty 1:50,000 scale geological map sheets covering the most radon-prone parts of Derbyshire, Northamptonshire, Nottinghamshire, Leicestershire, Lincolnshire, Oxfordshire, Shropshire, Somerset and Yorkshire. The RPM-GIS is being upgraded to 1:50,000 scale as new digital maps become available through the BGS DiGMapGB programme.

The search area (circle or rectangle) for a site is increased by a buffer zone of 50 m in areas with 1:50,000 scale data and 500m in areas with 1:250,000 scale data. This is to allow for potential inaccuracies in the position of the geological boundaries. In many cases a number of combinations of bed rock and drift with differing geological radon potentials will occur within the total search area. Following the precautionary principle, the requirement for protective measures is derived from the highest geological radon potential encountered within the total search area.

Radon (RPM) Report - Standard

Section 5: Follow-up Detailed Radon Protective Measures site report

For most parts of the UK, a higher resolution assessment of radon protective measures requirements can also be provided by BGS. This will comprise:

- i. Assessment by a qualified geologist of the relevant 10,000, 1:10,560 or 1:50,000 scale geological map(s) covering the total search area from BGS archives.
- ii. Identification of the level of radon protective measures indicated for all geological units encountered within the site and the immediately surrounding area.

The basic charge for a Detailed Radon Protective Measures Report is £210 (incl. VAT & Delivery). Reports for very large or geologically complex sites may, however, have to be supplemented with additional charge – in such cases, enquiry staff will confirm the charge with the client before proceeding.

The Radon follow-up reports can be ordered from:-

Geological Enquiries, British Geological Survey, Keyworth, Nottingham NG12 5GG; Tel: 0115-9363192;
Fax: 0115-936-3192; e-mail: geohelp@bgs.ac.uk. An on-line ordering facility is available on the BGS
Website: www.bgs.ac.uk/georeports.

Section 6: What is radon ?

Radon is a naturally occurring radioactive gas, which is produced by the radioactive decay of radium which, in turn, is derived from the radioactive decay of uranium. Uranium is found in small quantities in all soils and rocks, although the amount varies from place to place. Radon released from rocks and soils is quickly diluted in the atmosphere. Concentrations in the open air are normally very low and do not present a hazard. Radon that enters poorly ventilated enclosed spaces such as some basements, buildings, caves, mines, and tunnels may reach high concentrations in some circumstances. The construction method and degree of ventilation will influence radon levels in individual buildings. A person's exposure to radon will also vary according to how particular buildings and spaces are used.

Inhalation of the radioactive decay products of radon gas increases the chance of developing lung cancer. If individuals are exposed to high concentrations for significant periods of time, there may be cause for concern. In order to limit the risk to individuals, the Government has adopted an Action Level for radon in homes of 200 becquerels per cubic metre (Bq m⁻³). The Government advises householders that, where the radon level exceeds the Action Level, measures should be taken to reduce the concentration.

Radon (RPM) Report - Standard

Section 7: Radon in workplaces

The Ionising Radiation Regulations, 1999, require employers to take action when radon is present above a defined level in the workplace. Advice may be obtained from your local Health and Safety Executive Area Office or the Environmental Health Department of your local authority. The BRE publishes a guide (BR293): Radon in the workplace.

BRE publications may be obtained from The BRE Bookshop, I H S Technical Indexes Ltd., Willoughby Road, Bracknell, Berkshire RG12 8DW. Tel: 01344 404407, Fax: 01344 714440, website: www.brebookshop.com

Section 8: Radon in existing dwellings

Useful information is given in the following free publications which can be obtained by writing to: Radon Studies, Radiation Protection Division, Health Protection Agency, Chilton, Didcot, Oxfordshire OX11 0RQ

Radon - A Householder's Guide

Radon - You Can Test for it

Radon - A Guide for Homebuyers and Sellers

Radon - A Guide to Reducing Levels in Your Home

Information in the booklets is also available on the DEFRA website at:

<http://www.defra.gov.uk/environment/radioactivity/radon/index.htm>

Householders are recommended to follow advice in Radon - a householder's guide. The guide outlines simple solutions for dealing with the radon problem depending on whether or not the home has been tested for radon. In radon affected homes, the problem of radon can usually be tackled with simple, effective and relatively inexpensive measures. These measures are comparable in cost to work such as damp-proofing and timber treatment. You can get practical advice about construction work to reduce radon levels from the Building Control Officer at your local council.

Advice about radon, its health risks and details of how to order the radon test may be obtained from the Radon Freephone on 0800 614529 or Tel: 01235 822622, website: www.hpa.org.uk or by writing to Radon Studies at the Health Protection Agency, address above.

Radon (RPM) Report - Standard

Section 9: Terms & Conditions

General

This report is supplied in accordance with the GeoReports Terms & Conditions available on the BGS website at www.bgs.ac.uk/georeports and also available from the BGS Central Enquiries Desk at the below address.

Important notes about this report

- The data, information and related records supplied in this report by BGS can only be indicative and should not be taken as a substitute for specialist interpretations, professional advice and/or detailed site investigations. You must seek professional advice before making technical interpretations on the basis of the materials provided.
- Geological observations and interpretations are made according to the prevailing understanding of the subject at the time. The quality of such observations and interpretations may be affected by the availability of new data, by subsequent advances in knowledge, improved methods of interpretation, and better access to sampling locations.
- Raw data may have been transcribed from analogue to digital format, or may have been acquired by means of automated measuring techniques. Although such processes are subjected to quality control to ensure reliability where possible, some raw data may have been processed without human intervention and may in consequence contain undetected errors.
- Detail, which is clearly defined and accurately depicted on large-scale maps, may be lost when small-scale maps are derived from them.
- Although samples and records are maintained with all reasonable care, there may be some deterioration in the long term.
- The most appropriate techniques for copying original records are used, but there may be some loss of detail and dimensional distortion when such records are copied.
- Data may be compiled from the disparate sources of information at BGS's disposal, including material donated to BGS by third parties, and may not originally have been subject to any verification or other quality control process.
- Data, information and related records, which have been donated to BGS, have been produced for a specific purpose, and that may affect the type and completeness of the data recorded and any interpretation. The nature and purpose of data collection, and the age of the resultant material may render it unsuitable for certain applications/uses. You must verify the suitability of the material for your intended usage.
- If a report or other output is produced for you on the basis of data you have provided to BGS, or your own data input into a BGS system, please do not rely on it as a source of information about other areas or geological features, as the report may omit important details.
- The topography shown on any map extracts is based on the latest OS mapping and is not necessarily the same as that used in the original compilation of the BGS geological map, and to which the geological framework available at that time was fitted.

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Report issued by: BGS Enquiries Service

For further information, please contact:

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British Geological Survey
Kingsley Dunham Centre
Keyworth
Nottingham
NG12 5GG
Tel: 0115 936 3143
Fax: 0115 936 3276
Email: enquiries@bgs.ac.uk

APPENDIX C
NHBC Conditions

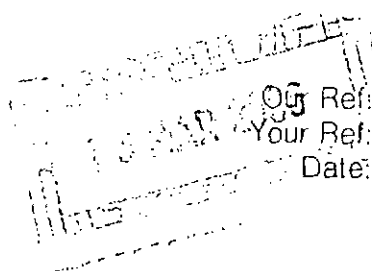


NHBC Services

NHBC House, Davy Avenue, Knowlhill, Milton Keynes, Bucks MK5 8FP

Tel: 0870 241 4302 Fax: 0870 241 4759 www.nhbcbuilder.co.uk

Ben Bailey Homes Ltd
Elizabeth House
Cliff Street
Mexborough
South Yorkshire, S64 9HQ



ENGPROJ/121299

9th March 2006

| | | | |
|------------------------|-----|--|-----|
| JPA - Doncaster | | | |
| Project Number: 232095 | | | |
| Review: MTM dmm | | | |
| 20 MAR 2006 | | | |
| DRS | DR1 | | |
| JRF | | | |
| File: | | | MTM |

Dear Sirs

Site address: Wombwell Foundry Hough Lane Wombwell S73 0

Site ref. no:

Builder: Ben Bailey Homes Ltd

Thank you for the following information received in relation to your application for Buildmark Warranty on this project:

- Joynes Pike Associates letter dated 15 February 2006
- site investigation report

NHBC Engineering have assessed these documents against the requirements of our Standards and the additional information shown in the table below will be required to enable us to complete our appraisal of the site.

In view of the above, we confirm that conditions have been applied to the project and those identified as **RED will prevent NHBC from finalling properties** thereby delaying the availability of mortgage funds in accordance with the Council of Mortgage Lenders (CML) rules. NHBC Engineering have set the conditions listed in the table below which identify the outstanding information required in relation to land quality (contamination) and/or warranty (foundation/structural) issues related to the site.

Please note that where NHBC is aware of contamination issues on site, a copy of the planning conditions and your correspondence with the local Environmental Health Officer and/or Environment Agency detailing your proposals to manage contamination will be required. You will be aware that Approved Document C requires the discovery of possible contamination to be reported to the local Environmental Health Officer.

We would be grateful for your continued assistance in ensuring that all requested information is sent in good time and **before construction** to allow sufficient time for the necessary assessment and clearance of conditions that would prevent the finalling of properties and issue of the Buildmark Warranty cover note.

Copy to
Tim Major (JPA)
16/3/06

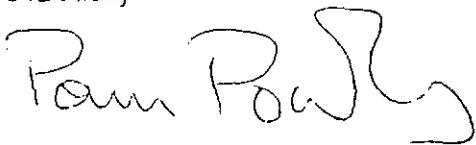


INVESTOR IN PEOPLE

To help us to keep our response times to a minimum **please quote our Engineering Project reference ENGPJ/121299 in all correspondence** to enable faster processing of your submissions.

We look forward to receiving your prompt response.

Yours faithfully

pp 

D Travis
Senior Engineer

Direct line number: 01756 795819
Fax number: 0870 241 3889

Copies to: -B Moffatt -Building Inspector

7 Copy of the Local Authority's or Contaminated Y All
Land Officer's correspondence required
confirming acceptance of remediation
proposals

NHBC Engineer: D Travis
Direct line Number: 01756 795819
Engineering Project No: ENGPJ/121299
NHBC Building Inspector: B Moffatt

Note: These conditions represent those set by NHBC Engineering in relation to land quality and warranty issues.
Where NHBC are providing Building Control please make reference to your Technical Approval notification sent
by NHBC Building Control to establish whether further conditions apply.