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JPA
JOYNES PIKE
& ASSOCIATES LTD

CONSULTING ENGINEERS

1-2 Aire House
Richmond Business Park
Sidings Court
Doncaster DN4 5NL

Tel: +44(0)1302 322295

Fax: +44(0)1302 322296

info@joynespike.co.uk

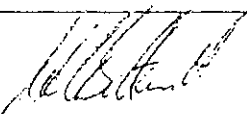
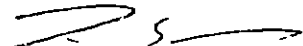
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CONSOLIDATED
GEO-ENVIRONMENTAL INVESTIGATION
REPORT
For
BEN BAILEY HOMES LIMITED
On a Site at
FORMER WOMBWELL FOUNDRY, HOUGH LANE,
WOMBWELL, BARNSELY, SOUTH YORKSHIRE



BEN BAILEY HOMES LIMITED

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

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	D R Sykes BSc (Hons) MSc FGS Geo-Environmental Engineer	R M Butterworth BSc (Hons) GradIMMM FGS Senior Geotechnical Engineer	J M Saunders BSc(Hons) MSc(Eng) CEng MIMMM FGS Director	

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DRAWINGS

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

APPENDICES

APPENDIX A	Johnson Poole and Bloomer Ground Report
APPENDIX B	Trial Pit Logs
APPENDIX C	Borehole Logs
APPENDIX D	JPA Contamination Assessment Criteria
APPENDIX E	BGS Radon Report

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.

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Please refer to Joynes Pike and Associates Limited Drawing No. 232095/02 Rev A whilst reading the following section.

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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 87 '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 <i>Inhalation (outdoor air)</i>	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 fitted 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 (begl) 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 US₉₅ 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 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

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 inceptor 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

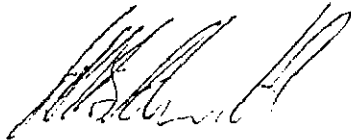
11.1 The following further works have been recommended prior to the development of the site:

- (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



D R Sykes BSc (Hons) MSc FGS
Geo-Environmental Engineer
dsykes@joynespikes.co.uk



R M Butterworth BSc (Hons) GradIMMM FGS
Senior Geotechnical Engineer
rbutterworth@joynespikes.co.uk



J M Saunders BSc (Hons) MSc (Eng) CEng MIMMM FGS
Director
jsaunders@joynespikes.co.uk

DRAWINGS



NOTES

- DO NOT SCALE
- This drawing is to be read in conjunction with all other relevant drawings.
- Should there be any conflict between the details indicated on this drawing and those indicated on other drawings the Engineer should be informed PRIOR to construction on site.
- Until technical approval has been obtained from the relevant Authority, it should be understood that all drawings and details issued are PRELIMINARY and NOT FOR CONSTRUCTION. Should the contractor commence site work prior to approval being given, it is entirely at his own risk.
- All dimensions are in millimetres unless otherwise stated.

JPA
JOYNES PIKE
& ASSOCIATES LTD
CONTRACTORS

CIVIL, STRUCTURAL, GEOTECHNICAL,
ENVIRONMENTAL, TRANSPORTATION,
LAND SURVEYING, HEALTH & SAFETY

1-2 Ave House
Richmond Business Park
Sutton Court
Doncaster
S16 5SL
TEL (01302) 322295
FAX (01302) 322296
www.joynepike.co.uk
doncaster@joynepike.co.uk

DRAWING STATUS

INFORMATION

CLIENT

BEN BAILEY HOMES LIMITED

PROJECT TITLE

WOMBWELL FOUNDRY,
HOUGH LANE, WOMBWELL

DRAWING DETAIL

SITE LOCATION PLAN

DRAWN	JSP	DATE	FEBRUARY 2006
PROJECT ENGINEER	DRS	SCALE	1:25000
CHECKED	MS		
APPROVED			

DRAWING NUMBER
232095-07

REVISION

A4

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REV DATE CHK APP

APPENDIX A

Johnson Poole and Bloomer Ground Report

[illegible]

1. *Chlorophyll *a** and total chlorophyll
 were determined using a Shimadzu
 1601 spectrophotometer. Chlorophyll
a was extracted from 100 mg of
 leaves using 10 ml of 80% acetone
 and 20% methanol. The extract was
 then centrifuged at 1000 g for 5 min.

For the attention of Mr D Grove

5 February 2004

JOHNSON POOLE & BLOOMER
LAND CONSULTANTS



GROUND INVESTIGATION
at
WOMBWELL FOUNDRY, WOMBWELL
SOUTH YORKSHIRE

23/6/85

J.P.B.

W.P.B.



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- 2 The Site
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- 4 Ground Investigation Works
- 5 Ground Conditions
- 6 Discussion
- 7 General

Drawings

- DS074/01 General Site Location
DS074/06 Ground Level Survey and Exploratory Hole Location Plan
DS074/08 Copy of Original Licence Area dated 24.11.77

Appendices

- A Windowless Sampler Borehole Logs
- B Rotary Open Hole Drillhole Logs
- C Light Cable Percussive Borehole Logs
- D Machine Excavated Trial Pit Logs
- E Physical Laboratory Test Results
- F Contamination Analysis Test Results and Statistical Analysis
- G Gas and Groundwater Monitoring Results
- H Envirocheck Report referenced 36993 dated 12th October 2001
- I Coal Authority Mining Report
- J Historical Site Use Plans



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 DS074/01.
- 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) IPPC 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 at 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 licenced 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 H, contains historical maps which show the progress of development of the site. Historical Site Use Maps are also included in Appendix J.

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.	Adjacent 20	On boundary SE	A boiler house and various other buildings are associated Both are sandstone quarries
		The Wombwell Main Colliery is shown Two quarries are marked within the woods.	750 1000/ 800	NW 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 lodge 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.	10 500	N SE	Terraced housing
		Five reservoirs are shown nearby. Wombwell Main Colliery has expanded to include coke ovens, a brickyard as well as a school.	100, 250, 400, 500 and 600m 750	N, SE and SW NW	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	0-5m	W	A new station has been built 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	500 1100 m	SE SE	Colliery buildings have been removed.
1930 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 County Series Plan Yorkshire 1:10,560	On	There has been no significant change since the last plan.	-	-	Goods shed and keepers lodge are still shown.
	Off	Allotment gardens are now located behind the Pub on Hough Lane	30	NE	The pub is the Sir 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 last 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 shown as bare fields.
		The terraced houses across the road from the foundry, known as Wombwell Main Row have been demolished	15	N	
1989 Ordnance Survey Plan 1:10,000		The Wombwell Main Colliery has been completely removed along with its associated rail tracks.	700	NW	The spoil heaps are no longer marked on the plan.
	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 propping 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. New houses, 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 ¹	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 river. 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-adsorbed 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 11 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 Dearne 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 (1998) 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 licenced 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 maybe 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. (BII28A 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.



4.8 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 GMI Landsurveyor II, Gas Data GF60, GMI 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 BH 11 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 BH 16 which dried out, and a 'medium' water inflow was noted in rotary open-hole BH 19. A water seepage was noted in cable percussive BH 23 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 ICRL concentrations as set out in Guidance Note 59/83 (2nd edition)¹.

¹IMPORTANT NOTE: On advice from the Environment Agency, and in consultation with other government department, the ICRL 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 SGV's 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) 3/02 "note on the Withdrawal of ICRL 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 end 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 & ICRCL³ Guidance for Residential End Use

Determinant	No Tested	Units	Guidance level	CLEA US95 Value	Exceeds SGV or Eq.
Arsenic	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
Thiocyanate	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	1.34	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 ICRCL 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	14	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 BH22 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 determine 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)
BH3	dry to 2.78m	below 71.85
BH6	dry to 5.45m	below 68.32
BH8	dry to 2.44m	below 64.82
BH9	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.

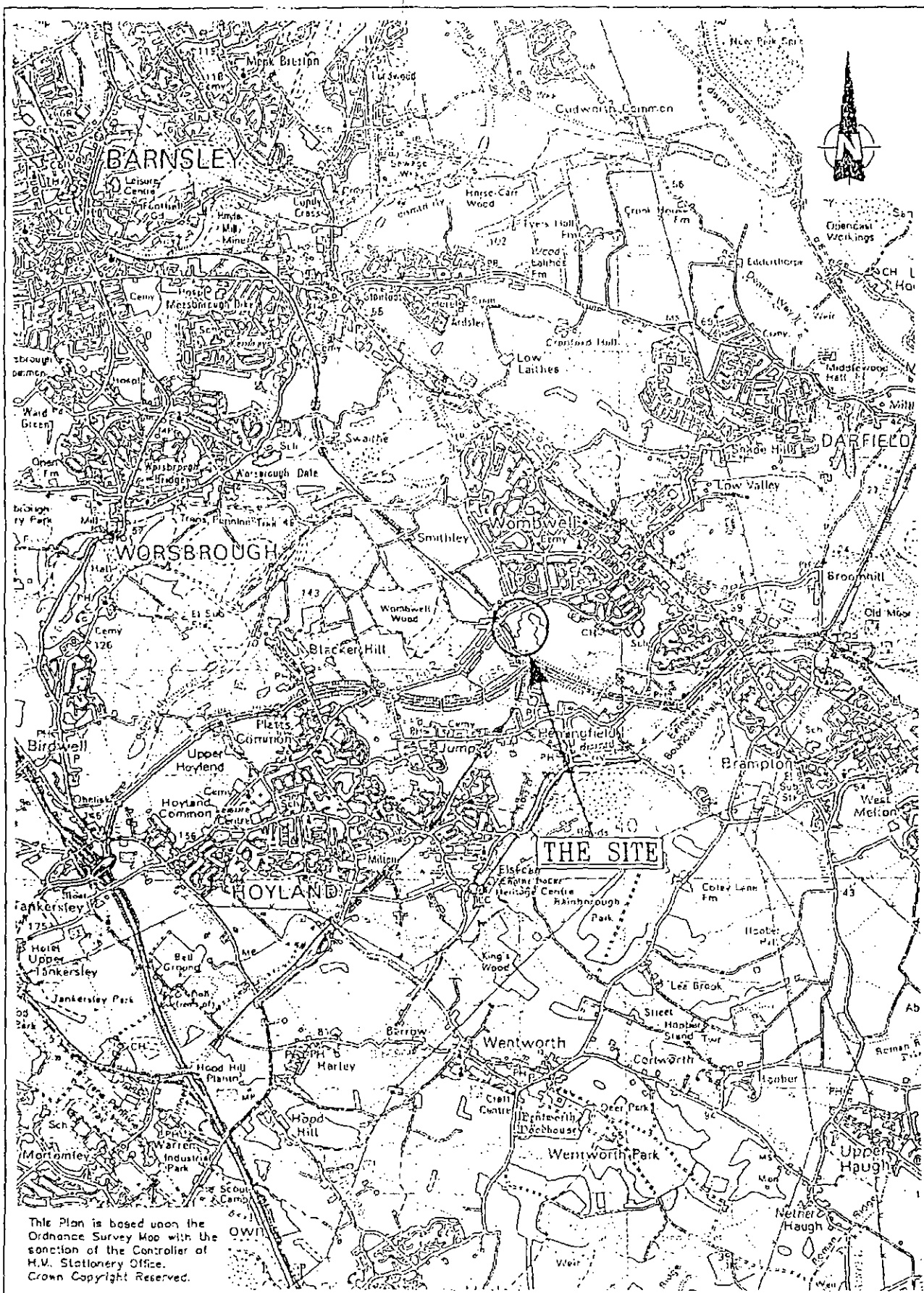


7.0 GENERAL

- 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

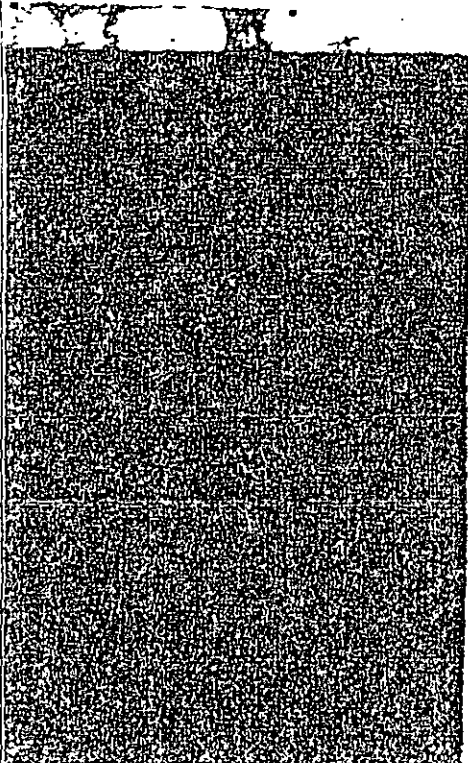
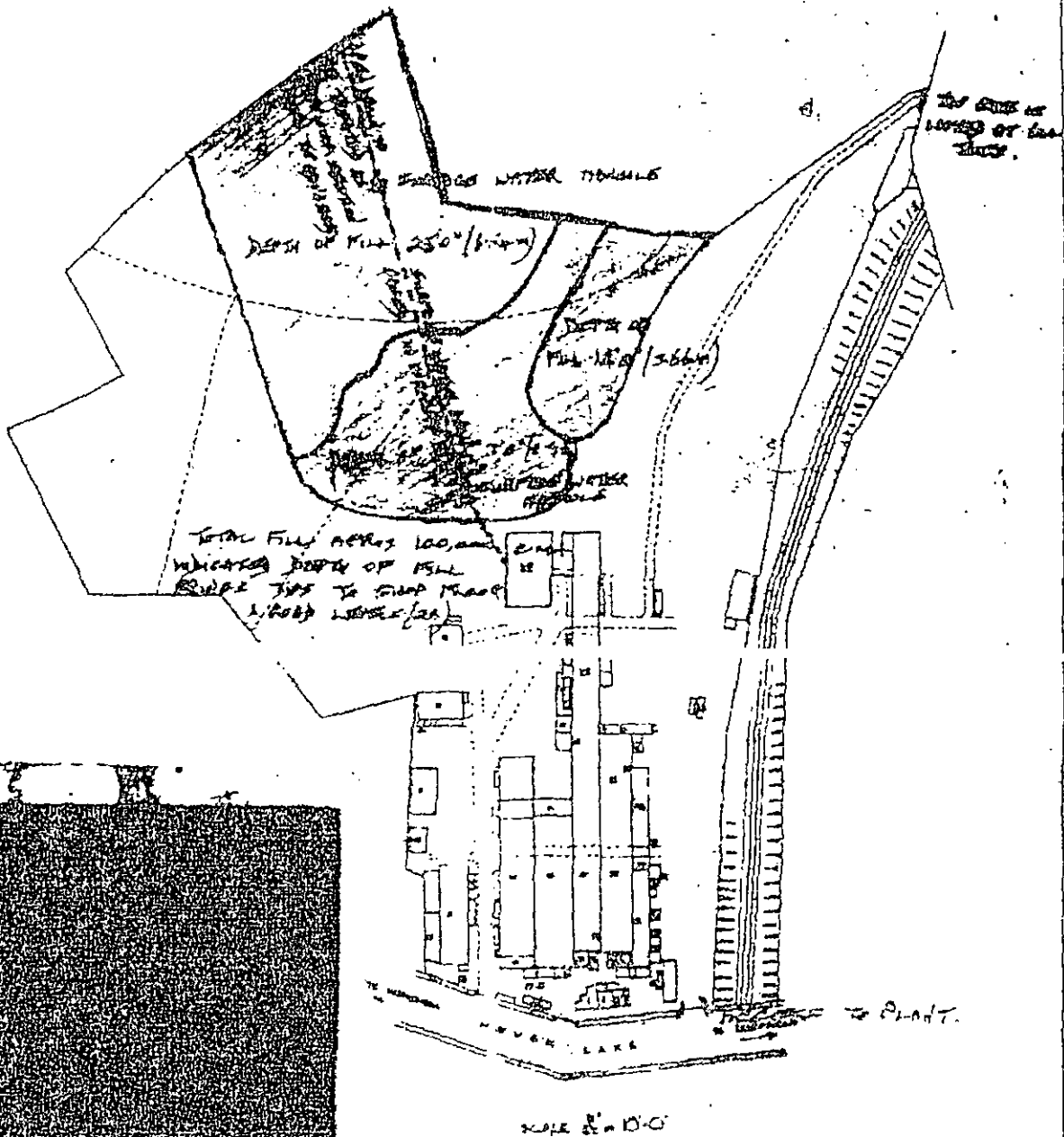
Colin Knipe BSc CEng CGeol
Senior Partner



JOHNSON POOLE & BLOOMER LAND CONSULTANTS 	Engineer <i>SW</i>	Client HILL AND SMITH HOLDINGS	Title GENERAL SITE LOCATION	
	Checked <i>MM</i>	Project WOMBWELL FOUNDRY, WOMBWELL		
	Approved <i>JD</i>	Date 30/10/03	Scale 1:50,000	Drawing DS074/01

WOMBWELL FOUNDRY & ENGINEERING CO LTD

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WD 20 8142

JOHNSON
POOLE &
BLOOMER
LAND CONSULTANTS



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Engineer

J.C.

Checked

C.R.

Approved

J.C.

Client

HILL & SMITH HOLDINGS
LIMITED

Project

WOMBWELL FOUNDRY

Date

05/02/04

Scale

N.T.S.
@ A4

Title

COPY OF
ORIGINAL LICENCE AREA
DATED 24/11/77

Drawing

DS074/02

1811

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APPENDIX A

Windowless Sampler Borehole Logs.

BOREHOLE LOG

JPB

Client: Hill & Smith Holdings				Borehole No BH1	
Project: Wombwell Laundry				Full Depth: 4.38m	
Job No: DS074	Date: 29-9-03	Ground Level (m): 78.43	Co-Ordinates: 01		
				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	Grass Over MADE GROUND. Brown slightly silty sandy fine to coarse angular to subangular
0.20-0.45	D2				77.98		0.45	GRAVEL of limestone sub-base
0.45-0.80	D3				77.63		0.80	MADE GROUND: Black silty slightly gravelly fine to coarse SAND. Gravel is of fine to medium angular slag and brick.
1.00-1.45	CPT	5						MADE GROUND: Light brown slightly sandy SILT
2.00-2.45	CPT	6					(2.59)	MADE GROUND: No Recovery below 1m although the sampling barrels were dirty when recovered from the borehole indicating made ground
3.00-3.45	CPT	9						
4.00-4.39	CPT	25 blows for 150mm / 50 blows for 235mm			74.05		4.39	

Boring Progress and Water Observations						Chiselling			GENERAL REMARKS
Date	Time	Depth	Casing	Strike	Standing	From	To	Hours	Post until 1m and no recovery below

All Dimensions in metres Scale 1:50	Contractor: IETG	Method: WINDOWLESS SAMPLING Machine: COMPETITOR 150 RIG	Logged By: JL
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BOREHOLE LOG

JPB

Client: Hill & Smith Holdings				Borehole No BH3	
Project: Wombwell Foundry				Full Depth: 2.78m	
Job No: DS074	Date: 29-09-03	Ground Level (m): 74.63	Co-Ordinates ()		
				Sheet: 1 of 1	

SAMPLES & TESTS			Water	Instrument / Thick Lift	STRATA			Geology
Depth	Type No	Test Result			Reduced Level	Legend	Depth (Thickness)	
0.00-0.30	D1				74.33		0.30	MADE GROUND : White sandy fine to coarse angular GRAVEL of limestone sub-base
0.30-0.45	D2				74.18		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 2.60m
2.00-2.45	CPT	26			72.13		2.50	
2.50-2.70	D4				71.85		2.78	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						Chiselling			GENERAL REMARKS
Date	Time	Depth	Casing	Strike	Standing	From	To	Hours	

All dimensions in metres Scale 1:50	Contractor: IETG	Method: WINDOWLESS SAMPLING Machine: COMPETITOR 130 RIG	Logged By: JL
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Client: Hill & Smith Holdings							Borehole No		
Project: Wombwell Foundry							BH4		
Job No: DS074		Date: 29-09-03		Ground Level (m): 74.98		Co-Ordinates (i)		Full Depth: 3.17m	
							Sheet: 1 of 1		
SAMPLES & TESTS			Water	Instrument / Thick (ft)	STRATA			Geology	
Depth	Type No	Test Result			Reduced Level	Legend	Depth (Thickness)		DESCRIPTION
0.00-0.25	D1				74.73		0.25	MADE GROUND: Brown slightly silty sandy fine to coarse angular to subangular GRAVEL of limestone sub-base and clinker	
0.25-0.50	D2				74.48		0.50		
0.50-0.90	B1				74.08		(0.40) 0.90	MADE GROUND: Black slightly silty sandy fine to coarse angular to subangular GRAVEL of clinker, coke, coal and mudstone	
0.50-0.90	D3								
1.00-1.45	CPT	15				(1.50)	Brown sandy slightly gravelly CLAY/SILT. Gravel is fine to medium subangular to subrounded silty sandstone (probably reworked)		
1.20-1.80	D4								
2.00-2.45	CPT	30				72.28	2.20	Very weak light brown light grey silty SANDSTONE. Distinctly weathered.	
2.20-2.70	D5								
3.00-3.17	CPT	25 Blows for 75mm / 50 blows for 95mm							
Boring Progress and Water Observations						Chiselling			GENERAL REMARKS
Date	Time	Depth	Casing	Strike	Standing	From	To	Hours	
All dimensions in metres Scale 1:50			Contractor: JETG			Method: WINDOWLESS SAMPLING Machine: COMPETTOR (30 FIG			Logged By: J.L.

BOREHOLE LOG

JPB

Client: Hill & Smith Holdings				Borehole No BH5	
Project: Wombwell Foundry				Full Depth: 5.18m	
Job No: DS074	Date: 29-09-03	Ground Level (m): 74.05	Co-ordinates ()		
				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	18			73.65		(0.40)	MADE GROUND : Dark brown slightly gravelly fine to coarse SAND. Gravel is fine to coarse rounded compressed sand (Foundry Sand)
0.40-0.60	D2				73.45		0.60	MADE GROUND : Orange slightly gravelly fine to coarse SAND. Gravel is fine to coarse compressed sand (clean sand)
0.60-1.00	D3				73.05		(0.40)	MADE GROUND : Dark metallic grey fine to coarse SAND (Foundry sand)
1.00-1.60	CPT	17			72.45		1.60	MADE GROUND : Medium dense brown slightly silty sandy fine to coarse angular GRAVEL of slag and clinker
1.60-2.50	D4				72.55		(0.80)	MADE GROUND : Orange gravelly fine to coarse SAND. Gravel is of fine to medium angular clinker (clean sand)
2.50-2.45	CPT				71.55		2.50	MADE GROUND : Medium dense dark brown slightly silty sandy fine to coarse angular GRAVEL of slag and clinker
2.50-3.00	D5	7						Soft light brown orange and white sandy slightly gravelly CLAY/SILT. Gravel is fine to medium subrounded to rounded silty sandstone. (residual silty sandstone)
3.00-3.45	B1							
3.45-4.45	CPT						(2.68)	
4.45-5.18	CPT	25 blows for 60mm / 50 blows for 40mm			68.87		5.18	

Boring Progress and Water Observations						Chiselling			GENERAL REMARKS	
Date	Time	Depth	Casing	Strike	Scanning	From	To	Hours	Poor recovery from 3.50m to 5.00m	
All dimensions in metres Scale 1:50			Contractor: ETG			Method: WINDOWLESS SAMPLING Machine: COMPETITOR 150 RIG			Logged By: JL	

BOREHOLE LOG

JPR

Client: Hill & Smith Holdings				Borehole No BH6	
Project: Woodwell Foundry				Full Depth: 5.45m	
Job No: DS074	Date: 29-9-03	Ground Level (m): 73.77	Co-Ordinates (i)		
				Sheet: 1 of 1	

SAMPLES & TESTS			Water	Instrument Backfill	STRATA			Geology
Depth	Type No	Test Result			Reduced Level	Legend	Depth (Thickness)	
0.15-0.50	D1				73.68		0.15	MADE GROUND: Concrete
					73.27		0.50	MADE GROUND: White slightly silty slightly sandy fine to coarse angular GRAVEL of clinker and concrete
0.50-1.10	D2						(0.60)	MADE GROUND: Loose black silty SAND/GRAVEL. Sand is fine to coarse, gravel is of fine to coarse angular to subrounded slag and clinker with a slight hydrocarbon odour
1.00-1.45	CPT	9			72.67		1.10	
					72.27		(0.40)	MADE GROUND: Loose light grey sandy fine to coarse angular to rounded GRAVEL of broken up concrete and marlyite aggregate (clay material)
1.50-2.50	D3							MADE GROUND: Loose black silty SAND / GRAVEL. Sand is fine to coarse, gravel is fine to coarse angular to subrounded slag and clinker. (Wet below around 2.5m)
2.00-2.45	CPT	8					(2.30)	
					69.97		3.80	Soft dark grey slightly sandy CLAY
2.50-3.80	D4							
3.00-3.45	CPT	8						
							(1.65)	
3.80-4.50	D5							
4.00-4.45	CPT	6						
5.00-5.45	CPT	12			68.32		5.45	

Boring Progress and Water Observations						Chiselling			GENERAL REMARKS
Date	Time	Depth	Casing	Strike	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: HEIG	Method: WINDOWLESS SAMPLING Machine: COMPETITOR 130 RIG	Logged By: JL
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BOREHOLE LOG

JPB

Client: Hill & Smith Holdings				Borehole No BH7	
Project: Wombwell Foundry				Full Depth: 5.37m	
Job No: DS074	Date: 29-09-03	Ground Level (m): 74.12	Co-Ordinates (i)		Sheet: 1 of 1

SAMPLES & TESTS			Water	Instrument/ Backfill	STRATA			Geology
Depth	Type No	Test Result			Reduced Level	Legend	Depth (Thickness)	
0.10-0.50	D1				74.02		0.10	MADE GROUND: Limestone sub-base
0.50-1.00	B1							MADE GROUND: Medium dense dark brown slightly gravelly fine to coarse SAND. Gravel is of fine to medium angular slag and clinker, a cobble of clinker was also encountered within this strata. (Foundry sand)
1.00-1.45	CPT	17						
1.70-2.00	D2							
2.00-2.45	CPT	6					(4.70)	... Loose from 2.00m to 4.50m
3.00-3.45	CPT	5						
3.50-4.00	D3							
4.00-4.45	CPT	7			69.32		4.80	
4.80-5.00	D4						(0.57)	Very stiff light brown SILT
5.00-5.37	CPT	25 blows for 150mm / 50 blows for 220mm			68.75		5.37	

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

All dimensions in metres Scale 1:50	Contractor: JETG	Method: WINDOWLESS SAMPLING Machine: COMPETITOR 150 RIG	Logged By: JL
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BOREHOLE LOG

JPB

Client: Hill & Smith Holdings				Borehole No BH8	
Project: Wombwell Foundry				Full Depth: 2.44m	
Job No: DS074	Date: 30.09.03	Ground Level (m): 67.26	Co-Ordinates (i)		Sheet: 1 of 1

SAMPLES & TESTS			Water	Instrument/ Backfill	STRATA			Geology
Depth	Type No	Test Result			Reduced Level	Legend	Depth (Thickness)	
0.00-0.30	D1	40			66.96		0.30	Grass over FILL: Stiff orange mottled grey CLAY/SILT (placed natural soil)
0.30-0.50	B1				66.91		0.20	Topsail
0.50-1.00							(0.85)	Stiff to very stiff orange mottled grey CLAY/SILT.
1.00-1.45	CP1				66.06		1.20	Very weak light brown silty SANDSTONE. Distictly weathered.
1.20-1.50	D2						(1.24)	
2.00-2.45	CPT	25 blows for 150mm / 50 blows for 295mm			64.82		2.44	

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

All dimensions in metres Scale 1:50	Contractor: IETG	Method: WINDOWLESS SAMPLING Machine: COMPETITOR 130 RIG	Logged By: JL
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BOREHOLE LOG

JPB

Client: Hill & Smith Holdings				Borehole No BH10	
Project: Wombwell Foundry				Full Depth: 5.45m	
Job No: DS074	Date: 30-09-03	Ground Level (m): 74.59	Co-Ordinates (1)		
				Sheet: 1 of 1	

SAMPLES & TESTS			Water	Instrument/ Backfill	STRATA			Geology
Depth	Type No	Test Result			Reduced Level	Legend	Depth (Thickness)	
0.00-0.30	D1				74.29		0.30	
0.30-0.40	D2				74.40		0.10	
0.40-0.55					74.64		0.24	
0.55-0.70	D3				73.89		0.70	
1.00-1.45	CPT	6						
2.00-2.20	D4							
2.00-2.45	CPT	5					(3.79)	
3.00-3.45	CPT	9						
4.00-4.45	CPT	7			70.10		4.40	
4.40-4.60	D5						(1.05)	
5.00-5.45	CPT	55			69.14		5.45	

Boring Progress and Water Observations						Chiselling			GENERAL REMARKS
Date	Time	Depth	Casing	Strike	Standing	From	To	Hours	
									Poor recovery between 1m and 5m

All dimensions in metres Scale 1:50	Contractor: IETG	Method: WINDOWLESS SAMPLING Machine: COMPETITOR 130 RIG	Logged By: JH
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BOREHOLE LOG

JPB

Client: Hill & Smith Holdings				Borehole No	
Project: Wombwell Foundry				BH11	
Job No: DS074	Date: 30-09-03	Ground Level (m): 75.55	Co-Ordinates ()		Full Depth: 4.44m
					Sheet: 1 of 1

SAMPLES & TESTS			Water	Instrument Backfill	STRATA			Geology
Depth	Type No	Test Result			Reduced Level	Legend	Depth (Thickness)	
0.00-0.50	D1				75.15		(0.40) 0.40	MADE GROUND : Brown dark brown slightly silty sandy fine to coarse angular to subrounded GRAVEL of clinker and slag with some brick
0.60-0.80	D2				75.45		(0.20)	MADE GROUND : Brick
1.00-1.45	CPT	16					(1.55)	MADE GROUND : Medium dense (below 1m) dark brown to black slightly silty sandy fine to coarse angular to subrounded GRAVEL of clinker and slag
					75.70		1.85	
					75.55		2.00	MADE GROUND : Red silty fine to coarse SAND
2.00-2.45	CPT	15			75.15		(0.40) 2.40	MADE GROUND : Medium Dense black slightly silty sandy fine to coarse angular to subrounded GRAVEL of clinker and slag
2.40-2.55	D3						(0.40) 2.80	Soft to firm light brown light grey slightly sandy SILT (becoming firm at 2.60m and stiff by 2.80m)
					72.75			Very weak light brown sandy SANDSTONE. Distinctly weathered.
3.00-3.45	CPT	42					(1.64)	
3.50-4.00	D4							
4.00-4.44	CPT	25 blows for 150mm / 50 blows for 295mm			71.11		4.44	

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

All dimensions in metres Scale 1:50	Contractor: IETG	Method: WINDOWLESS SAMPLING Machine: COMPETITOR 130 RIG	Logged By: JI.
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BOREHOLE LOG

JPB

Client: Hill & Smith Holdings				Borehole No	
Project: Wombwell Foundry				BH12	
Job No: DS074	Date: 30-09-03	Ground Level (m): 77.61	Co-Ordinates (i)		Full Depth: 4.18m
					Sheet: 1 of 1

SAMPLES & TESTS			Water	Instrument	Backfill	STRATA			Geology
Depth	Type No	Test Result				Reduced Level	Legend	Depth (Thickness)	
0.20-0.30	B1					77.54		0.10	MADE GROUND: Limestone sub-base
0.30-0.50						77.33		0.20	MADE GROUND: Red black slightly sandy CLAY with occasional fine to medium angular GRAVEL of brick and choker
0.50-0.70	B2								
0.70-1.00	B3							(1.20)	Firm orange mottled light grey slightly sandy CLAY, (becoming stiff below 0.70m)
1.00-1.45	CPT	9				76.11		1.50	
1.60-1.80	B4								
2.00-2.45	CPT	15						(2.20)	Very weak light brown light grey sandy SILTSTONE. Distinctly weathered.
3.00-3.45	CPT	20							
3.70-3.90	B5					73.91		3.70	
3.90-4.00						73.71		3.90	COAL
4.00-4.18	CPT	25 blows for 80mm / 50 blows for 95mm				73.43		4.18	Very weak light brown silty SILTSTONE. Distinctly weathered.

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

All dimensions in metres Scale 1:50	Contractor: IETG	Method: WINDOWLESS SAMPLING Machine: COMPETITOR 120 RIG	Logged By: JL
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BOREHOLE LOG

JPB

Client: Hill & Smith Holdings				Borehole No	
Project: Wombwell Foundry				BH13	
Job No: DS074	Date: 30-09-03	Ground Level (m): 79.68	Co-Ordinates (E)		Full Depth: 3.88m
					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				79.48		0.20	MADE GROUND - Dark grey slightly silty sandy fine to coarse angular to subangular GRAVEL of ~~long time~~ sub-base
0.40-0.55	D2						(0.75)	Stiff orange mottled grey slightly sandy CLAY
					78.73		0.95	
1.00-1.45 1.20-1.30	CPT D3	12						Very weak light brown silty SANDSTONE. Distinctly weathered.
2.00-2.45	CPT	22					(2.93)	
2.50-3.00	B1							
3.00-3.45	CPT	44						
3.50-3.88	CPT	25 blows for 145mm / 50 blows for 230mm			75.80		3.88	

Boring Progress and Water Observations						Chiselling			GENERAL REMARKS
Date	Time	Depth	Casing	Strike	Standing	From	To	Hours	
All dimensions in metres Scale 1:50			Contractor: JETG			Method: WIFDOWNLESS SAMPLING Machine: COMPETITOR 150 RIG			Logged By: JL

BOREHOLE LOG

JPB

Client: Hill & Smith Holdings				Borehole No BH14	
Project: Wombwell Foundry				Full Depth: 5.17m	
Job No: DS074	Date: 30-9-03	Ground Level (m): 80.97	Co-Ordinates ()		Sheet: 1 of 1

SAMPLES & TESTS			Water	Instrument	Backfill	STRATA			Geology
Depth	Type No	Test Result				Reduced Level	Legend	Depth (Thickness)	
0.30-0.60	D1					80.12		0.88	
1.00-1.45	CPT	8				79.77		1.20	
1.00-1.10	D2								
2.00-2.45	CPT	36							
2.30-2.70	B1							(2.75)	
3.00-3.45	CPT	32				77.02		3.93	
4.00-4.45	CPT	28				76.97		4.00	
4.10-4.50	D3							(1.17)	
5.00-5.17	CPT	23 blows for 70mm / 50 blows for 95mm				75.80		5.17	

Boring Progress and Water Observations						Chiselling			GENERAL REMARKS
Date	Time	Depth	Casing	Strike	Standing	From	To	Hours	
30/9/03		4.40		1.00					

All dimensions in metres Scale 1:50	Contractor: IETG	Method: WINDOWLESS SAMPLING Machine: COMPETITOR 150 RIG	Logged By: JL
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APPENDIX B

Rotary Open Hole Drillhole Logs

Johnson Poole & Bloomer
DRILLHOLE LOG

JPB

Client: Hill & Smith Holdings Ltd				DRILLHOLE No BH 16	
Project: Wombwell Foundry				Full Depth: 30m	
Job No: DS074	Date: 1-10-03	Ground Level (m): 74.90	Co-Ordinates ()		
				Sheet: 1 of 4	

RUN DETAILS				Test Result Water	Instrument Backfill	STRATA			Geology
Date Depth	TCR %	SCR %	RQD %			Reduced Level	Legend	Depth (Thickness)	
						74.1		0.80	Foundry SAND**
								(3.70)	Weathered yellow SANDSTONE**
						70.4		4.50	Grey SANDSTONE with yellow sandstone and mudstone bands.**

GENERAL REMARKS

Standpipe installed to 10m depth from surface, beneath 10m backfilled with bentonite grout.
 Slight groundwater at 24m - dried out
 ** denotes drillers description

All dimensions in metres Scale 1:50	Contractor: FORKERS Ltd	Method: ROTARY OPEN HOLE, Air Flush Machine: KLEMM	Logged By: Driller
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Johnson Poole & Bloomer
DRILLHOLE LOG

JPB

Client: Hill & Smith Holdings Ltd				DRILLHOLE No BH 16	
Project: Wombwell Foundry				Full Depth: 30m	
Job No: DS074	Date: 1-10-02	Ground Level (m): 74.90	Co-Ordinates (U)		Sheet: 2 of 4

RUN DETAILS				Test Result Water	Instrument Backfill	STRATA			Geology
Date Depth	TCR %	SCK %	RQD %			Reduced Level	Legend	Depth (Thickness)	
								(18.70)	

GENERAL REMARKS

Standpipe installed to 10m depth from surface, beneath 10m backfilled with bentonite grout.
 Slight groundwater at 24m - dried out.

** denotes drillers description

All dimensions in metres Scale 1:50	Contractor: FORCERS Ltd	Method: ROTARY OPEN HOLE, Air Flush Machine: KLEMM	Logged By: Driller
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Client: Hill & Smith Holdings Ltd				DRILLHOLE No BH 16
Project: Wombwell Foundry				
Job No: DSB74	Date: 1-10-03	Ground Level (m): 74.90	Coordinates (E)	Drill Depth: 30m Sheet: 3 of 4

[illegible]

GENERAL	Standpipe installed to 10m depth from surface, beneath 10m backfilled with bentonite grout.
REMARKS	Slight groundwater at 24m - dried out. ** denotes drillers description

All dimensions in metres Scale 1:50	Contractor: FORKERS Ltd	Method: ROTARY OPEN HOLE, Air Flush Machine: KLEIN	Logged By: Driller
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DRILLHOLE LOG

JPB

Client: Hill & Smith Holdings Ltd				DRILLHOLE No BH 16	
Project: Wombwell Foundry				Full Depth: 30m	
Job No: DS074	Date: 1-10-05	Ground Level (m): 74.90	Co-Ordinates ()		Sheet: 4 of 4

RUN DETAILS				Test Result/ Water	Instrument/ Backfill	STRATA				Geology
Date Depth	TCR %	SCR %	RQD %			Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
								(4.80)		
						46.9		28.00		
								(0.70)	Black SHALE**	
						46.2		28.70		
								(1.30)	Grey SHALE**	
						44.0		30.00		

GENERAL REMARKS

Standpipe installed to 10m depth from surface, beneath 10m backfilled with bentonite grout.
Slight groundwater at 24m - dried out

**denotes drillers description

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

JPB

Client: Hill & Smith Holdings Ltd				DRILLHOLE No BH 17	
Project: Wombwell Foundry				Full Depth: 30m	
Job No: DS074	Date: 2-10-03	Ground Level (m): 73.14	Co-Ordinates ()		
				Sheet: 1 of 4	

RUN DETAILS				Test Results/ Water	Instrument/ Backfill	STRATA			Geology	
Date Depth	TCR %	SCR %	RQD %			Reduced Level	Legend	Depth (Thick- ness)		DESCRIPTION
						72.64		10.50) 0.50	Mudstone FILL**	
								(2.20)	Weathered yellow SANDSTONE**	
						70.44		2.70	Yellow / grey MUDSTONE - Sandstone bands **	
								(7.10)		

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 Machine: KLEMM	Logged By: Driller
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Client: Bill & Smith Holdings Ltd				DRILLHOLE No BH 17
Project: Wombwell Foundry				
Job No: DS074	Date: 2-10-03	Ground Level (m) 73.14	Co-Ordinates ()	Full Depth: 30m
				Sheet: 2 of 4

RUN DETAILS				Test Results/ Water	Instrument/ Backfill	STRATA				Geology
Date Depth	TCR %	SCR %	RQD %			Reduced Level	Legend	Depth (Thick- ness)	DESCRIPTION	
							63.34	9.80	Yellow / grey SANDSTONE - Mudstone Bands* *	
								(2.70)		
							60.64	12.50	Grey SANDSTONE - Shale bands* *	

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: TORKERS Ltd	Method: ROTARY OPEN HOLE, Air Flush Machine: KLEMM	Logged by Driller
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DRILLHOLE LOG

JPB

Client: Hill & Smith Holdings Ltd				DRILLHOLE No BH 17	
Project: Wombwell Foundry				Full Depth: 30m	
Job No: DS074	Date: 2-10-03	Ground Level (m): 73.14	Co-Ordinates ()		Sheet: 3 of 4

RUN DETAILS				Test Result/ Water	Instrument Backfill	STRATA				Geology
Date Depth	TCR %	SCR %	RQD %			Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
								(17.50)		

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:
FORKERS Ltd

Method: ROTARY OPEN HOLE, Air Flush
Machine: KLEMM

Logged By
Driller

Client: Hill & Smith Holdings Ltd				GRILLHOLE No BH 17
Project: Wombwell Foundry				
Job No: DS074	Date: 2-10-03	Ground Level (m) 75.14	Co-Ordinates ()	Full Depth: 30m
				Sheet: 4 of 4

[illegible]

GENERAL REMARKS	Standpipe installed to 10m depth from surface, beneath 10m backfilled 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 OPEN HOLE, Air Flush Machine: KLEMM	Logged By Driller
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DRILLHOLE LOG

JPB

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

RUN DETAILS				Test Result/ Water	Instrument/ Backfill	STRATA				Geology
Date Depth	TCR %	SCR %	RQD %			Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
								(5.00)	Yellow / grey MUDSTONE**	
						71.78		5.00	Grey MUDSTONE - Sandstone bands**	
								(3.40)		

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 Machine: KLEMM	Logged By: Driller
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DRILLHOLE LOG

JPB

Client: Hill & Smith Holdings Ltd				DRILLHOLE No BH 18	
Project: Wombwell Foundry				Full Depth: 30m	
Job No: DS074	Date: 2-10-03	Ground Level (m): 76.78	Co-Ordinates ()		
				Sheet: 3 of 4	

RUN DETAILS				Test Result/ Water	Instrument/ Backfill	STRATA			Geology
Date Depth	TCR %	SCR %	RQD %			Reduced Level	Legend	Depth (Thickness)	
						57.98		18.80	
									Grey SANDSTONE**

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
Machine: KLEMM

Logged By
Driller

DRILLHOLE LOG

JPB

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

RUN DETAILS				Test Result/ Water	Instrument/ Backfill	STRATA				Geology
Date Depth	TCR %	SCR %	ROD %			Reduced Level	Legend	Depth (Thick- ness)	DESCRIPTION	
								(11.20)		
						46.78		30.00		

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 Machine: KLEMM	Logged By: Driller
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DRILLHOLE LOG

JPB

Client: Hill & Smith Holdings Ltd				DRILLHOLE No BH 19	
Project: Wombwell Foundry				Full Depth: 15m	
Job No: DS074	Date: 2-10-03	Ground Level (m) 80.65	Co-Ordinates ()		Sheet: 1 of 2

RUN DETAILS				Test Result/ Water	Instrument/ Backfill	STRATA			Geology	
Date Depth	TCR %	SCR %	RQD %			Reduced Level	Legend	Depth (Thick- ness)		DESCRIPTION
						80.15		(0.50) 0.50	Mudstone FILL**	
						79.15		(1.00) 1.50	Yellow MUDSTONE - Clay bands**	
								(2.40) 3.90	Yellow / grey MUDSTONE - Dark bands**	
						76.75		4.00	Firm slaty COAL**	
						76.65			Grey MUDSTONE**	
								(6.00)		

GENERAL REMARKS Standpipe installed to 10m depth from surface, beneath 10m backfilled with bentonite grout.
Damp at 13.00m, medium groundwater inflow at 13.80m.

** denotes drillers description

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

JPB

Client: Hill & Smith Holdings Ltd				DRILLHOLE No	
Project: Wombwell Foundry				BH 19	
Job No: DS074		Date: 2-10-03	Ground Level (m): 80.65	Full Depth: 15m	
				Sheet: 2 of 2	

RUN DETAILS				Test Result/ Water	Instrument/ Backfill	STRATA			Geology
Date Depth	TCR %	SCR %	RQD %			Reduced Level	Legend	Depth (Thick- ness)	
						70.65		10.00	
						70.5		10.15	Firm COAL**
						70.35		10.30	Grey MIDSTONE**
									Black SHALE**
								(1.20)	
						69.15		11.50	Firm shaley COAL - Shale bands**
								(1.50)	
						67.65		13.00	Black SHALE**
								(0.80)	
						66.85		13.80	Grey SANDSTONE**
								(1.20)	
						65.65		15.00	

GENERAL
REMARKS

Standpipe installed to 10m depth from surface, beneath 10m back filled with bentonite grout.
Damp at 13.00m, medium groundwater inflow at 13.80m.

**denotes drillers description

All dimensions in metres Scale 1:50	Contractor: FORKFES Ltd	Method: ROTARY OPEN HOLE, Air Flush Machine: KLEMM	Logged By: Driller
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APPENDIX C

Light Cable Percussive Borehole Logs

BOREHOLE LOG

JPB

Client: Hill & Smith Holdings Ltd				Borehole No BH 20	
Project: Wombwell Foundry				Full Depth: 6.3m	
Joh No: DS074	Date: 13-10-03	Ground Level (m): 73.86	Co-Ordinates ()		Sheet: 1 of 1

SAMPLES & TESTS			Water	Instrument/ Backfill	STRATA			Geology
Depth	Type No	Test Result			Reduced Level	Legend	Depth (Thickness)	
0.00-0.00	B1							
1.00-1.00	B2							
1.00-1.45	CPT	9						
2.00-2.00	B3	No Progress						
2.00-2.00	CPT							
3.00-3.00	B4						(6.10)	
3.00-3.45	CPT	14						
4.00-4.00	B5							
4.00-4.45		17						
5.00-5.00	B6							
5.00-5.45		10						
6.00-6.00	B7				67.76		6.10	
6.00-6.33		25blows for 150mm / 50blows for 175mm			67.56		6.30	
					Very weak, light brown / grey SANDSTONE. Distinctly weathered.			

Boring Progress and Water Observations						Chiselling			GENERAL REMARKS
Date	Time	Depth	Casing	Strike	Standing	From	To	Hours	
13/10/03		6.30	6.00			6.00	6.30	1.00	Standpipe installed from 0.00m to 6.30m No groundwater encountered.

All dimensions in metres Scale 1:50	Contractor: A.C. SOILS	Method: CABLE PERCUSSIVE BORING Machine: DANDO 150 RIG	Logged By: JL
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BOREHOLE LOG

JPB

Client: Hill & Smith Holdings Ltd				Borehole No BH 21	
Project: Wombwell Foundry				Full Depth: 5.5m	
Job No: DS07J	Date: 11-10-03	Ground Level (m): 74.46	Co-Ordinates ()		Sheet: 1 of 1

SAMPLES & TESTS			Water	Instrument/ Backfill	STRATA			Geology
Depth	Type No	Test Result			Reduced Level	Legend	Depth (Thickness)	
1.00-1.00 1.00-1.45	B1	18						MADE GROUND : Medium dense black dark brown slightly silty gravelly fine to coarse SAND. Gravel is of fine to coarse angular to subangular clinker and slag. (Foundry sand)
2.00-2.00 2.00-2.45	B2	11					(5.20)	
3.00-3.00 3.00-3.00	B3	20 blows for no progress						
4.00-4.00 4.00-4.45	B4	27						
5.00-5.00 5.00-5.20	B5	7 blows for 150mm / 50 blows for 150mm			69.26 68.96		5.20 5.50	
								Soft light brown mottled grey slightly sandy CLAY

Boring Progress and Water Observations						Chiselling			GENERAL REMARKS
Date	Time	Depth	Casing	Strike	Standing	From	To	Hours	
11/10/03		5.50	5.20			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. SOILS	Method: CABLE PERCUSSIVE BORING Machine: DANDO 150 R/G	Logged By: JL
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BOREHOLE LOG

JPB

Client: Hill & Smith Holdings Ltd				Borehole No BH 22	
Project: Wombwell Foundry				Full Depth: 9m	
Job No: DS074	Date: 10-10-05	Ground Level (m): 75.55	Co-Ordinates ()		
				Sheet: 1 of 2	

SAMPLES & TESTS			Water	Instrument Backfill	STRATA			Geology
Depth	Type No	Test Result			Reduced Level	Legend	Depth (Thickness)	
0.00-0.00	B1							MADE GROUND. Loose to medium dense black dark brown slightly silty gravelly fine to coarse SAND. Gravel is of fine to coarse angular to subangular chinker and slag. (Foundry sand)
1.00-1.00	B2							
1.00-1.45	CPT	9						
2.00-2.00	B3							
2.00-2.45	CPT	19						
3.00-3.00	B4							
3.00-3.45	CPT	12						
4.00-4.00	B5							
4.00-4.45	CPT	8						
5.00-5.00	B6							Very loose to loose at 6.00m
5.00-5.45	CPT	35						
6.00-6.00	B7							
6.00-6.45	SPT	4						
7.00-7.00	B8							Soft light brown mottled grey slightly sandy CLAY
7.00-7.45	SPT	7			65.83		7.50	
7.50-7.50	B9				65.55		8.00	

Boring Progress and Water Observations						Chiseling			GENERAL REMARKS
Date	Time	Depth	Casing	Strike	Standing	From	To	Hours	
									Standpipe installed from 0.00m to 9.00m No groundwater encountered during drilling

All dimensions in metres Scale 1:50	Contractor: A.C. SOILS	Method: CABLE PERCUSSIVE BORING Machine: DANDO 150 R/G	Logged By: JL
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BOREHOLE LOG

JPB

Client: Hill & Smith Holdings Ltd				Borehole No BH 22	
Project: Wombwell Foundry				Full Depth: 9m	
Job No: DS074	Date: 10-10-03	Ground Level (m): 73.33	Co-Ordinates (1)		Sheet: 2 of 2

SAMPLES & TESTS			Water	Instrument/ Thickness	STRATA			Geology
Depth	Type No	Test Result			Reduced Level	Legend	Depth (Thickness)	
8.00-8.00	B10					o o o		
8.00-8.45	CPT	34			64.33	o o o	(0.60) 8.60	Dense Light brown slightly silty slightly sandy fine to coarse angular GRAVEL of silty sandstone
					64.33		(0.40) 9.00	Yellow rusty brown SANDSTONE**
9.00-9.00	B11	25blows for 25mm / 50						
9.00-9.07	CPT	blows for 50mm						

Boring Progress and Water Observations						Chiselling			GENERAL REMARKS
Date	Time	Depth	Casing	Strike	Standing	From	To	Hours	
11/10/03		9.00	9.00			8.60	9.00	1.00	Standpipe installed from 0.60m to 9.00m No groundwater encountered during drilling.

All dimensions in metres Scale 1:50	Contractor: A.C. SOILS	Method: CABLE PERCUSSIVE BORING Machine: DANDO 150 RIG	Logged By: JL
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BOREHOLE LOG

JPB

Client: Hill & Smith Holdings Ltd				Borehole No BH 23	
Project: Wombwell Foundry				Full Depth: 9m	
Job No: DS074	Date: 8-10-03	Ground Level (m): 73.65	Co-Ordinates (E)		Sheet: 1 of 2

SAMPLES & TESTS			Water	Instrument/ Backfill	STRATA			Geology
Depth	Type No	Test Result			Reduced Level	Legend	Depth (Thickness)	
0.00-0.00	B1				73.65		0.00	
					73.15		0.50	
1.00-1.45	CPT B2	11					(0.40)	
1.00-1.00							0.50	
2.00-2.45	CPT B3	18						
2.00-2.00								
3.00-3.45	CPT B4	13						
3.00-3.00								
4.00-4.45	CPT B5	13					(7.00)	
4.00-4.00								
5.00-5.45	CPT B6	15						
5.00-5.00								
6.00-6.45	CPT B7	16						
6.00-6.00								
7.00-7.45	CPT B8	17			66.15		7.50	
7.00-7.00								
								MADE GROUND : Medium dense black fine to coarse SAND with occasional fragments of flint to

Boring Progress and Water Observations						Chiselling			GENERAL REMARKS
Date	Time	Depth	Casing	Strike	Standing	From	To	Hours	
5/10/03		0.00	7.50						Standpipe installed from 0.00m to 9.00m No groundwater encountered.
9/10/03		7.50	9.00						

All dimensions in metres Scale 1:50	Contractor: A.C. SOILS	Method: CABLE PERCUSSIVE BORING Machine: DANDO 150 RIG	Logged By: JL
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BOREHOLE LOG

JPB

Client: H&H & Smith Holdings Ltd				Borehole No BH 23	
Project: Wombwell Foundry				Full Depth: 9m	
Job No: DS074	Date: 8-10-03	Ground Level (m): 73.65	Co-Ordinates (E)		Sheet: 2 of 2

SAMPLES & TESTS			Water	Instrument?	Backfill	STRATA			Geology
Depth	Type No	Test Result				Reduced Level	Legend	Depth (Thickness)	
8.00-8.43 8.00-8.00	CPT B9	11						(1.50)	coarse angular clinker, (foundry sand)
8.80-8.80	B10					64.85		8.80	
9.00-9.18 9.00-9.00	SPT B11	25 blows for 75mm / 50 blows for 100mm				64.20		(0.65) 9.45	Very stiff light brown mottled grey slightly sandy CLAY.

Boring Progress and Water Observations						Chiselling			GENERAL REMARKS
Date	Time	Depth	Casing	Strike	Standing	From	To	Hours	
									Standpipe installed from 0.00m to 9.00m No groundwater encountered

All Dimensions in metres Scale 1:50	Contractor: A.C. SOILS	Method: CABLE PERCUSSIVE BORING Machine: DANDO 150 RIG	Logged By: JL
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BOREHOLE LOG

JPB

Client: Hill & Smith Holdings Ltd				Borehole No BH 24	
Project: Wombwell Foundry				Full Depth: 5m	
Job No: DS074	Date: 07-10-03	Ground Level (m): 74.37	Co-Ordinates (1)		Sheet: 1 of 1

SAMPLES & TESTS			Water	Instrument / Backfill	STRATA			Geology
Depth	Type No	Test Result			Reduced Level	Legend	Depth (Thickness)	
0.00-0.00	B1						(1.50)	
1.00-1.45 1.00-1.00	SPT B2	15			72.87		1.50	
2.00-2.45 2.00-2.00	SPT B3	11					(2.00)	
3.00-3.45 3.00-3.00	SPT B4	19						
4.00-4.45 4.00-4.00	SPT B5	22			69.87		4.50	
					69.37		(0.50) 5.00	
5.00-5.14 5.00-5.00	SPT B6	25 blows for 75mm / 30 blows for 65mm						

Boring Progress and Water Observations						Chiselling			GENERAL REMARKS
Date	Time	Depth	Casing	Strike	Standing	From	To	Hours	
07/10/03		0.00	3m			4.50	5.00	1.00	Standpipe installed from 0.00m to 5.00m
08/10/03		3.00	3.00						No groundwater encountered.

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

JPB

Client: Hill & Smith Holdings Ltd				Borehole No BH 25	
Project: Wombwell Foundry				Full Depth: 7m	
Job No: DS074	Date: 7-10-03	Ground Level (m): 73.87	Co-Ordinates ()		Sheet: 1 of 1

SAMPLES & TESTS			Water	Instrument	Backfill	STRATA			Geology
Depth	Type No	Test Result				Reduced Level	Legend	Depth (Thickness)	
0.00-0.00	B1							(1.50)	
1.00-1.45	SPT	9				73.37		1.50	
1.60-1.00	B2								
1.50-1.50	B3								
2.00-2.45	SPT	14							
2.00-2.00	B4								
3.00-3.45	SPT	36							
3.00-3.00	B5								
4.00-4.45	SPT	47						(4.95)	
4.00-4.00	B6								
5.00-5.45	SPT	40							
5.00-5.00	B7								
6.00-6.08	SPT	50 blows for 75mm				68.42		6.45	
6.00-6.00	B8					67.87		(0.50) 7.00	

Boring Progress and Water Observations						Chiselling			GENERAL REMARKS
Date	Time	Depth	Casing	Strike	Standing	From	To	Hours	
7/10/03		7.00	1.50			6.30	7.00	1.00	Standpipe installed from 6.00m to 7.00m No groundwater encountered.

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

JPB

Client: Hill & Smith Holdings Ltd				Borehole No BH 26	
Project: Wombwell Foundry				Full Depth: 8.2m	
Job No: DS074	Date: 6-10-93	Ground Level (m): 74.14	Co-ordinates ()		Sheet: 1 of 2

SAMPLES & TESTS			Water	Instrument: Back fill	STRATA			Geology
Depth	Type No	Test Result			Reduced Level	Legend	Depth (Thickness)	
0.00-0.00	B1							MADE GROUND : Medium dense black brown and orange slightly silty sandy fine to coarse angular GRAVEL of demolition rubble and fused foundry sand.
1.00-1.25 1.00-1.00	CPT B2	25 blows for 150mm / 30 blows for 100mm						
2.00-2.45 2.00-2.00	SPT B3	16					(5.50)	
3.00-3.45 3.00-3.00	SPT B4	14						
4.00-4.45 4.00-4.00	SPT B5	9						
5.00-5.45 5.00-5.00 5.50-5.50	SPT B6 B7	7			68.64		5.50	
6.00-6.00	B8							Soft to firm light brown mottled grey slightly sandy CLAY/SILT ...becomes very stiff by 6.50m
6.50-6.95 6.50-6.50	SPT B9	38					(2.65)	

Boring Progress and Water Observations						Chiselling			GENERAL REMARKS
Date	Time	Depth	Casing	Strike	Standing	From	To	Hours	
									Standpipe installed from 0.00m to 8.20m No groundwater encountered during drilling.
All dimensions in metres Scale 1:50			Contractor: A.C. SO'LS			Method: CABLE PERCUSSIVE BORING Machine: DANDO 150 RIG			Logged By JH

Client: Hill & Smith Holdings Ltd				Borehole No
Project: Wombwell Foundry				BH 26
Job No: DS074	Date: 6-10-05	Ground Level (m) 71.14	Co-Ordinates (j)	Full Depth: 8.2m
				Sheet: 2 of 2

SAMPLES & TESTS			Water	Instrument/ Backfill	STRATA			Geology
Depth	Type No	Test Result			Reduced Level	Legend	Depth (Thickness)	
8.00-8.23 8.00-8.00	SP1 B10	25 blows for 75mm / 50 blows for 125mm			65.00 65.94	8.15 8.20	Very weak light brown / grey SANDSTONE. Distinctly weathered	

Boring Progress and Water Observations						Chiselling			GENERAL REMARKS
Date	Time	Depth	Casing	Strike	Standing	From	To	Hours	
6/10/03		8.20	6.00			8.15	8.20	1.00	Standpipe installed from 0.00m to 8.20m No groundwater encountered during drilling.

All dimensions in inches Scale 1:50	Contractor: A.C. SOILS	Method: CABLE PERCUSSIVE BORING Machine: DANDO 150 RB	Logged By: JL
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[illegible]

Boring Progress and Water Observations						Chiselling			GENERAL REMARKS
Date	Time	Depth	Casing	Strike	Standing	From	To	Hours	
10/10/10		4.50	4.50			4.50	4.50	1.00	Standpipe installed from 0.00m to 4.50m No groundwater encountered. No progress possible past 4.50m

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

JPB

Client: Bill & Smith Holdings Ltd				Borehole No	
Project: Wombwell Foundry				BH 28	
Job No: DS07-1	Date: 9-10-03	Ground Level (m): 70.65	Co-Ordinates (1)		Full Depth: 4.5m
					Sheet: 1 of 1

SAMPLES & TESTS			Water	Instrument/ Backfill	STRATA			Geology
Depth	Type No	Test Result			Reduced Level	Legend	Depth (Thickness)	
0.00-0.00	B1							
1.00-1.45 1.00-1.00	CPT B2	10						
2.00-2.45 2.00-2.00	CPT B3	9					(4.50)	
3.00-3.45 3.00-3.00	CPT B4	10						
4.00-4.45 4.00-4.00 4.50-4.50	CPT B5 B6	31			66.15		4.50	

MADE GROUND : Loose to medium dense black dark brown slightly silty gravelly fine to coarse SAND. Gravel is of fine to coarse angular to subangular clinker and slag with some brickends (Foundry sand)

Boring Progress and Water Observations						Chiselling			GENERAL REMARKS
Date	Time	Depth	Casing	Strike	Standing	From	To	Hours	
9/10/03		4.50	4.50			4.50	4.50	2.00	Standpipe installed from 0.00m to 4.50m No groundwater encountered. No progress possible past 4.50m

All dimensions in metres Scale 1:50	Contractor: A.C. SOILS	Method: CABLE PERCUSSIVE BORING Machine: DANDO 150 RIG	Logged By: J.L.
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Client: Hill & Smith Holdings Ltd				Borehole No BH 28a
Project: Wombwell Foundry				
Job No: DS074	Date: 09-10-03	Ground Level (m)	Co-Ordinates ()	Full Depth: 1.5m
				Sheet: 1 of 1

[illegible]

Boring Progress and Water Observations						Chiselling			GENERAL REMARKS
Date	Time	Depth	Casing	Strike	Standing	From	To	Hours	No groundwater encountered.
03/10/03		1.50	1.50			1.50	1.50	1.00	

All dimensions in metres Scale 1:50	Contractor: A C SOILS	Method: CABLE PERCUSSIVE BORING Machine: DANDO 150 RIG	Logged By: H.
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APPENDIX D

Machine Excavated Trial Pit Logs

TRIAL PIT LOG

JJPB

Client: Hill & Smith Holdings Ltd				Trial Pit No	
Project: Wombwell Foundry				TP1	
Job No: DS074	Date: 7-10-03	Ground Level (m): 74.39	Full Depth: 3.8m		
			Sheet: 1 of 1		

SAMPLES & TESTS			Water	STRATA				
Depth	Type No	In situ PSV result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	No.
0.00-0.20	B1					0.20	MADE GROUND : Limestone sub-base	
0.40-1.00	B2						MADE GROUND : Dark brown - black slightly silty slightly sandy gravelly angular CORBBLES of sandstone with occasional Boulder of sandstone. Gravel is fine to coarse angular to subangular sandstone.	
1.60-2.20	B3					(3.30)		
3.50-3.70	B4			70.80		3.50		
				70.55		3.80	Soft light grey very sandy CLAY	

SKETCH OF FACES (as required)

PLAN Orientation	Stability: Stable Excavation: Groundwater & Remarks: No groundwater encountered
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All dimensions in metres Scale 1:50	Contractor: Broadhead & Sons Ltd	Plant: JCB 3CN	Logged By: JL
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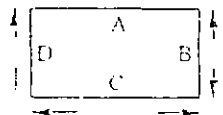
TRIAL PIT LOG

JPB

Client: Hill & Smith Holdings Ltd				Trial Pit No	
Project: Wombwell Foundry				TP2	
Job No: DS074	Date: 7-10-93	Ground Level (m): 73.85	Co-Ordinates (i)		Full Depth: 4.6m
					Sheet: 1 of 1

SAMPLES & TESTS			Water	STRATA				
Depth	Type No.	In situ HSV result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	No.
0.40-0.60	B1			73.85		0.30	Concrete	
1.00-1.40	B2					(2.40)	MADE GROUND: Dark brown silty slightly sandy gravelly angular COBBLES of brick and stone gravel is fine to coarse angular to subangular brick and sandstone.	
3.70-3.85	B3			70.15		5.70	Firm brown pseudo fibrous PEAT	
4.40-4.60	B4			69.45		4.20	Soft light grey very sandy CLAY	
						4.60		

SKETCH OF FACES (as required)			
D	C	B	A

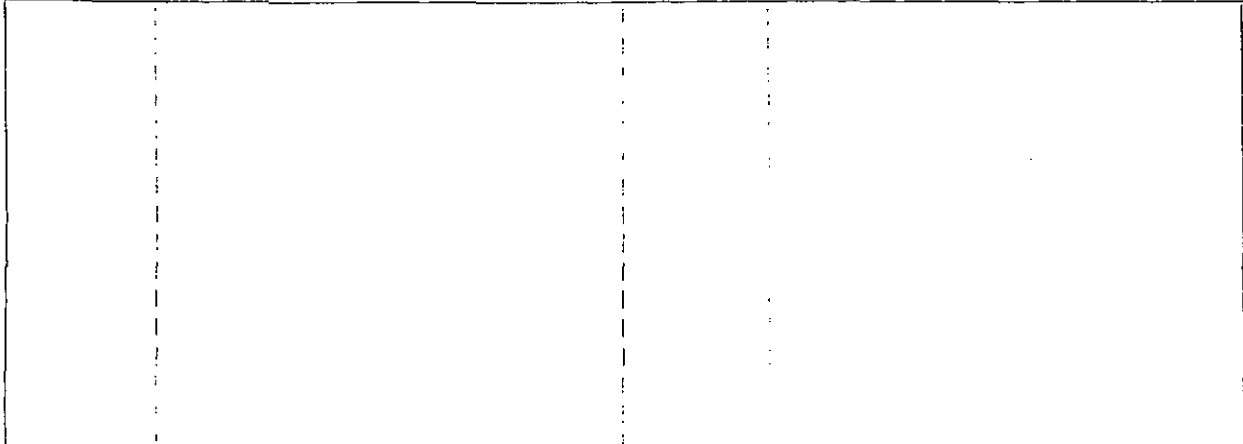
PLAN 	Stability: Stable
	Excavation:
	Groundwater & Remarks: No groundwater encountered

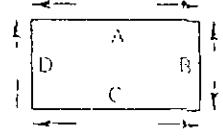
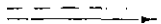
All dimensions in metres Scale 1:50	Contractor: Broadhead & Sons Ltd	Plant: JCB 3CX	Logged By: J.
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TRIAL PIT LOG

JPB

Client: EBB & Smith Holdings Ltd						Trial Pit No	
Project: Wombwell Foundry						TP3	
Job No: DS074		Date: 7-10-03	Ground Level (m): 77.75	Co-Ordinates ()		Full Depth: 1.5m	
						Sheet: 1 of 1	

SAMPLES & TESTS			Water	STRATA				
Depth	Type No.	In situ HSY result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	$\frac{e}{z}$
0.30-0.50	B1			77.45		0.30	Concrete	
0.80-1.20	B2			76.95		0.50	MADE GROUND - Dark brown silty slightly sandy fine to coarse angular GRAVEL of brick and sandstone with occasional cobble of subangular brick	
						0.70	Thin orange mottled grey CLAY	
				76.25		1.50		
SKETCH OF FACES (as required) () A B A 								

PLAN  Orientation 		Stability: Stable Excavation: Groundwater & Remarks: No groundwater encountered	
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All dimensions in metres Scale 1:50	Contractor: Broadhead & Sons Ltd	Plant: JCB 3CX	Logged By: JL
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TRIAL PIT LOG

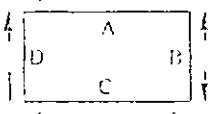
JPB

Client: Hill & Smith Holdings Ltd				Trial Pit No	
Project: Wombwell Foundry				TP4	
Job No: DS074	Date: 7-10-05	Ground Level (m): 74.80	Co-Ordinates ()	Full Depth: 4.2m	
				Sheet: 1 of 1	

SAMPLES & TESTS			Water	STRATA			
Depth	Type No.	In situ HSV result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION
0.50-0.60	B1					(0.25)	Concrete
1.00-1.50	B2					(5.15)	MADE GROUND: Dark brown silty slightly sandy fine to coarse angular GRAVEL of brick and sandstone with occasional cobbles of angular brick.
3.80-4.20	B3			74.40		3.40 (0.80)	Firm light grey mottled orange very sandy CLAY.
				70.60		4.20	

SKETCH OF FACES (as required)

D	C	B	A

PLAN 	Stability: Stable Excavation: Groundwater & Remarks: No groundwater encountered
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All dimensions in metres Scale 1:50	Contractor: Broadhead & Sons Ltd	Plant: JCB 3CX	Logged By: JL
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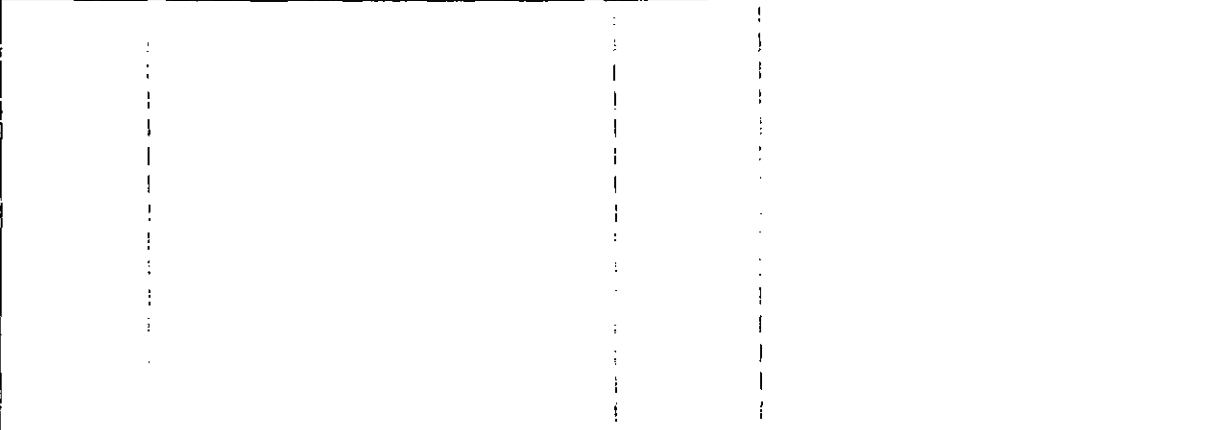
TRIAL PIT LOG

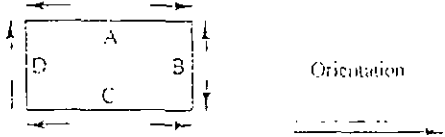
JPB

Client: Hill & Smith Holdings Ltd				Trial Pit No TP5	
Project: Wombwell Foundry				Full Depth: 4m	
Job No: DS074	Date: 7-10-03	Ground Level (m): 72.49	Co-Ordinates (i)		
				Sheet: 1 of 1	

SAMPLES & TESTS			Water	STRATA				
Depth	Type No.	In situ HSV result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	No.
0.40-0.70	B1					(0.20)	MADE GROUND : Dark brown silty sandy fine to coarse angular GRAVEL of clinker, brick and sub-base stone	
2.20-2.50	B2							
3.30-3.50	B3			72.29		(0.80)	Firm grey becoming light brown slightly sandy CLAY.	
				71.49		4.00		

SKETCH OF FACES (as required)

DCBA 

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: JL
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TRIAL PIT LOG

JPB

Client: HBI & Smith Holdings Ltd			Trial Pit No	
Project: Wombwell Foundry			TP6	
Job No: DS074	Date: 7-10-05	Ground Level (m): 72.76	Full Depth: 4.2m	
			Sheet: 1 of 1	

SAMPLES & TESTS			Water	STRATA			
Depth	Type No	In situ HSV result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION
0.30-0.50	B1			73.46		0.30	MADE GROUND - Ash and sub-base stone
1.20-1.40	B2						
3.00-3.50	B3					(3.90)	MADE GROUND - Dark brown slightly silty gravelly SAND with some cobbles. Gravel is of fine to coarse angular brick and chinner cobbles are of the same (Foundry sand)
				68.56		4.20	

SKETCH OF FACES (as required)

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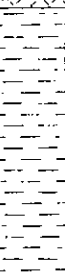
PLAN 	Stability: Stable
	Excavation:
	Groundwater & Remarks: No groundwater encountered

All dimensions in metres Scale 1:50	Contractor: Broadhead & Sons Ltd	Plant: JCB 3CX	Logged By: JL
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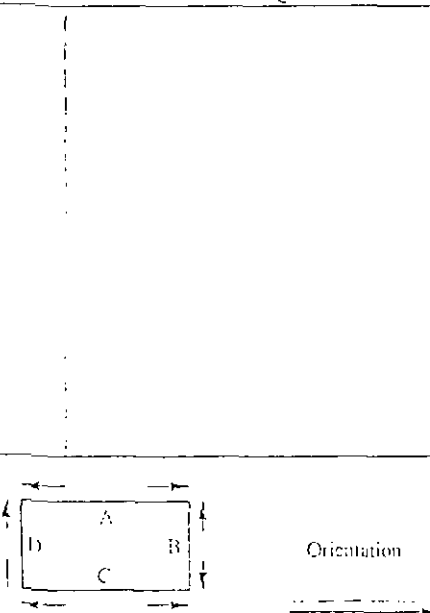
TRIAL PIT LOG

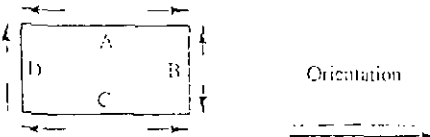
JPB

Client: Hill & Smith Holdings Ltd				Trial Pit No	
Project: Wombwell Foundry				TP7	
Job No: DS074	Date: 8-10-05	Ground Level (m): 72.99	Co-Ordinates (D)		
				Full Depth: 3.2m	
				Sheet: 1 of 1	

SAMPLES & TESTS			Water	STRATA				
Depth	Type No.	In situ HSM result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Σ
0.50-1.00	B1					(1.40)	MADE GROUND: Black slightly silty sandy slightly gravelly COBBLES of fused foundry sand moulds, brick and clinker. Gravel is fine to coarse angular to subangular of the same. Many plastic bags present.	
1.60-2.00	B2			72.59		1.40 (1.80)	Firm orange slightly gravelly CLAY. Gravel is of fine to coarse angular to subangular sandstone.	
				70.79		3.20	... By 3.20m becoming sandstone bedrock.	

SKETCH OF FACES (as required)

	Stability: Stable Excavation: Groundwater & Remarks: No groundwater encountered
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PLAN  Orientation	Stability: Stable Excavation: Groundwater & Remarks: No groundwater encountered
All dimensions in metres Scale 1:50	Contractor: Broadhead & Sons Ltd
Plant: JCB 3CX	Logged By: JL

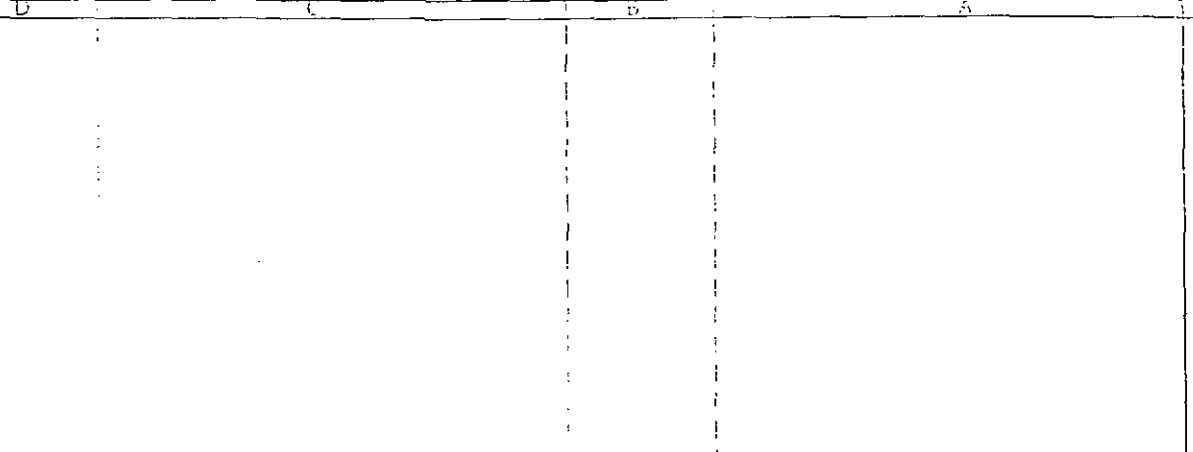
TRIAL PIT LOG

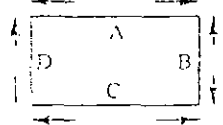
JPB

Client: Hill & Smith Holdings Ltd				Trial Pit No TP8	
Project: Wombwell Foundry				Full Depth: 4m	
Job No: DS074	Date: 8-10-03	Ground Level (m): 73.23	Grid Coordinates ()		Sheet: 1 of 1

SAMPLES & TESTS			STRATA					
Depth	Type No.	In situ ISV result	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	No.
0.50-0.70	B1						MADE GROUND : Black slightly silty sandy slightly gravelly COBBLES of fused foundry sand moulds, brick and clinker. Gravel is fine to coarse angular to subangular of the same. Many plastic bags present.	
1.50-1.70	B2					(4.00)		
3.50-4.00	B3			69.23		4.00		

SKETCH OF FACES (as required)


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

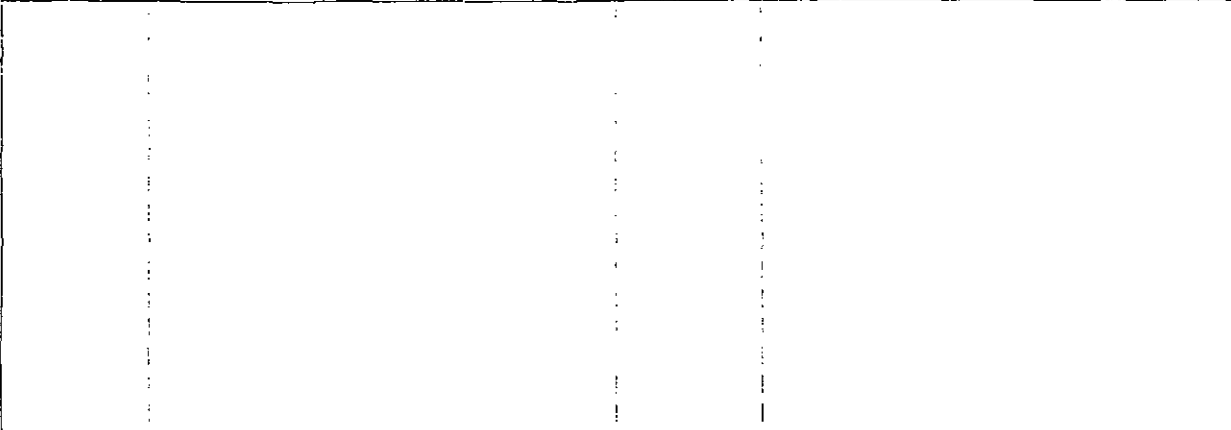
All dimensions in metres Scale 1:50	Contractor: Broadhead & Sons Ltd	Plant: JCB 3CX	Logged By: JL
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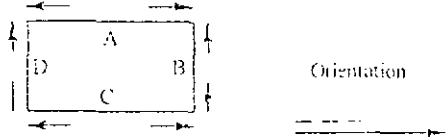
TRIAL PIT LOG

JPB

Client: Hill & Smith Holdings Ltd				Trial Pit No	
Project: Wombwell Foundry				TP9	
Job No: DS074	Date: 8-10-05	Ground Level (m): 72.44	Co-ordinates (E)		
				Full Depth: 4m	
				Sheet: 1 of 1	

SAMPLES & TESTS			Water	STRATA			
Depth	Type No.	In situ HSY result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION
0.00-0.40	B1			72.04		(0.40) 0.40	MADE GROUND: Very silty slightly gravelly fine to coarse angular to subrounded GRAVEL of brick, ~~clinker and general demolition rubble~~
0.60-0.85	B2			71.14		(0.90) 1.30	MADE GROUND: Orange sandy fine to coarse angular to subangular GRAVEL of clinker and slag with occasional angular cobbles of clinker
1.50-2.00	B3			69.54		(1.60) 2.90	MADE GROUND: Soft to firm grey with lenticular patches of black sand, sandy CLAY (Reworked material)
3.00-3.40	B4			68.44		(1.10) 4.00	Firm to stiff orange mottled grey slightly sandy CLAY.

SKETCH OF FACES (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: JL
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TRIAL PIT LOG

JPB

Client: Hill & Smith Holdings Ltd					Trial Pit No TP10	
Project: Wombwell Foundry					Full Depth: 2.8m	
Job No: DS074	Date: 8-10-93	Ground Level (m): 76.10	Co-Ordinates (y)		Sheet: 1 of 1	

SAMPLES & TESTS			Water	STRATA			
Depth	Type No.	In situ MSV result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION
0.50-0.80	B1					0.20	Long grass over 1 Topsoil
						(2.10)	Firm becoming stiff after 0.40m depth orange mottled grey slightly sandy CLAY
2.40-2.60	B2					2.30	
						(0.50)	Grey slightly clayey slightly sandy fine to coarse angular GRAVEL of siltstone, with occasional cobble of siltstone
						2.80	

SKETCH OF FACES (as required)

PLAN

Stability: Stable

Excavation:

Groundwater & Remarks:
No groundwater encountered

All dimensions in metres
Scale 1:50

Contractor:
Broadhead & Sons Ltd

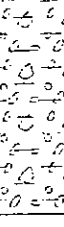
Plant:
JCB 3CX

Logged By:
JL

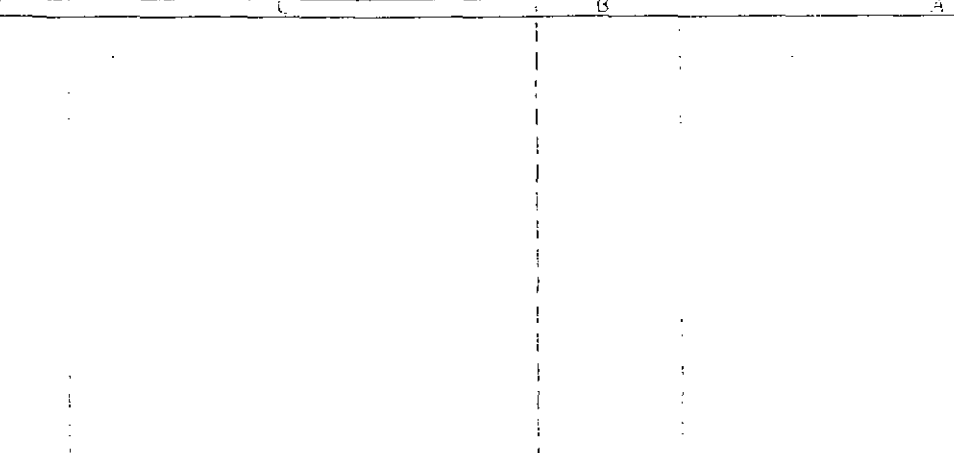
TRIAL PIT LOG

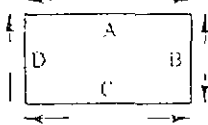
JPB

Client: Hill & Smith Holdings Ltd				Trial Pit No TP11	
Project: Wombwell Foundry				Full Depth: 3.3m	
Job No: DS074	Date: 8-10-03	Ground Level (m): 73.55	Co-Ordinates (E)		Sheet: 1 of 1

SAMPLES & TESTS			Water	STRATA			
Depth	Type No	In situ HSV result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION
0.50-0.50	B1			74.55		1.00	MADE GROUND - Black gravelly fine to coarse SAND. Gravel is of fine to coarse angular to rounded clinker and fused kind (Foundry sand).
1.20-1.50	B2			73.85		1.70	Firm to stiff orange mottled grey slightly sandy CLAY
2.20-2.60	B3			72.25		3.50	Light grey clayey fine to coarse angular to subangular GRAVEL of sandy siltstone (Bedrock: regolith)

SKETCH OF FACES (as required)


--

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: J.L.
---	-------------------------------------	-------------------	--------------------

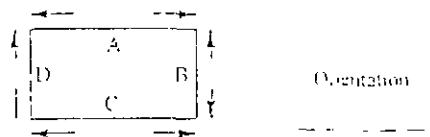
TRIAL PIT LOG

JPB

Client: Hill & Smith Holdings Ltd						Trial Pit No. TP12	
Project: Wombwell Town						Full Depth: 1.6m	
Job No: DS074		Date: 8-10-03		Ground Level (m): 81.86		Co-Ordinates (m):	
						Sheet: 1 of 1	

SAMPLES & TESTS			Water	STRATA			
Depth	Type No.	In situ HSA result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION
1.00-1.46	B					0.20	Grass over MADE GROUND - Black silty slightly gravelly SAND. Gravel is of fine to medium angular chader (finely sand)
						1.40	Light grey brown silty fine to coarse angular to subangular GRAVEL of very weak siltstone (bedrock, redolent)
			80.26			1.60	

SKETCH OF FACES (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: JL
--	-------------------------------------	-------------------	------------------

TRIAL PIT LOG

JPB

Client: HBI & Smith Holdings Ltd				Trial Pit No TP13	
Project: Wombwell Foundry				Full Depth: 3.6m	
Job No: DS074	Date: 8-10-03	Ground Level (m): 74.55	Co-ordinates (1)		Sheet: 1 of 1

SAMPLES & TESTS			Water	STRATA				
Depth	Type No.	In situ PSV result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	$\frac{m}{ft}$
0.10-0.60	B1					0.10 (0.50)	Concrete	
0.70-1.20	B2			73.95		0.60 (1.00)	MADE GROUND: Slightly silty very sandy fine to coarse angular to subangular GRAVEL of clinker (boulders sand and clinker)	
				72.95		1.60 (1.50)	MADE GROUND: Slightly silty sandy fine to coarse subangular to subrounded GRAVEL of sandstone with occasional sandstone cobble.	
							MADE GROUND: Soft to firm grey slightly sandy CLAY with many house bricks.	
3.10-3.50	B3			71.45		3.10 (0.50)	Stiff orange mottled grey slightly sandy CLAY with some fine to coarse subangular gravels of sandstone.	
				70.95		3.60		

SKETCH OF FACES (as required)

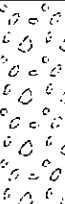
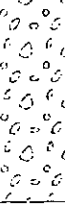
	Stability: Stable Excavation: Groundwater & Remarks: No groundwater encountered
--	--

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

TRIAL PIT LOG

JPB

Client: Hill & Smith Holdings Ltd				Trial Pit No TP14	
Project: Wombwell Foundry				Full Depth: 2.7m	
Job No: DS074	Date: 8-10-03	Ground Level (m): 77.12	Coordinates (E)		Sheet: 1 of 1

SAMPLES & TESTS			Water	STRATA			
Depth	Type No	In situ HSV result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION
0.50-0.70	B1					(2.70)	Grass over Brown slightly silty sandy fine to coarse angular to subangular GRAVEL of Sandstone.
2.60-2.70	B2			74.42		2.70	... By 2.10m becoming very weak orange mottled grey SILTSTONE. Highly weathered (a fractured)

SKETCH OF FACES (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: JL
--	-------------------------------------	-------------------	------------------



APPENDIX E

Physical Laboratory Test Results

LABORATORY REPORT FOR INDEX PROPERTY AND CHEMICAL TESTING

CONTRACT: Wombwell Foundry.

CLIENT Johnson Poole & Bloomer.

Copthall House,
New Road,
Stourbridge,
West Midlands.
DY8 1PH.



Devonshire House, Ettingshall Road

Wolverhampton, WV2 2JT

Phone 01902 459558, Fax 01902 459555

REF: L/5150 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
T/P No	DEPTH m	SAMPLE TYPE		W %	WL 1pt %	WP %	Ip	TOTAL SO ₄ %	Soluble SO ₄ g/L	pH Value	LOI %	ORG %	CI %	2.00 mm	0.425 mm		
1	0.40-1.00m	B	24.10.03	15												MADE GROUND: Dark brown slightly silty slightly gravelly SAND. Gravel is clinker.	
1	1.60-2.20m	B	24.10.03	# 13												MADE GROUND: Grey slightly clayey gravelly SAND. Gravel is siltstone with occasional glass.	
2	0.40-0.60m	B	24.10.03	8.7												MADE GROUND: Dark brown slightly silty slightly gravelly SAND. Gravel is clinker with occasional glass and brick.	
2	1.00-1.40m	B	24.10.03	# 11												MADE GROUND: Brown silty slightly sandy GRAVEL. Gravel is slag, clinker and occasionally concrete.	
2	3.20-3.85m	B	24.10.03	135	239	108	131							57		MADE GROUND: Dark brown clayey SAND with occasional roots and rootlets and firm clay pockets.	
2	4.40-4.60m	B	24.10.03	30												Soft light brown/grey and occasionally light grey sandy CLAY.	
3	0.80-1.20m	B	24.10.03	31	71	27	44							95		Firm to stiff light brown/orange and occasionally light grey CLAY.	
4	1.00-1.30m	B	24.10.03	34												Firm orange brown and occasionally light grey and dark grey CLAY.	

Sample type		Test abbreviations		Test methods - Unless otherwise stated.		
D	Disturbed	W	Moisture Content	W%	BS1377:PART2:1990:3	Total SO ₂ BS1377:PART3:1990:5.5
B	Bulk disturbed	WL	Liquid limit	WL	BS1377:PART2:1990:4.3/4.4	Soluble S BS1377:PART3:1990:5.5
U	Undisturbed	WP	Plastic limit	WP	BS1377:PART2:1990:5.3	Approved signatures:- A.L.Pearce, Laboratory director E.H.Loving, Laboratory manager
S	SPT split spoon	Ip	Index property	Ip	BS1377:PART2:1990:5.4	
W	Ground water	L.O.I	Loss on ignition	LOI	BS1377:PART3:1990:4	
		ORG	Organic content	ORG	BS1377:PART3:1990:3	
		CI	Soluble chloride	CI	BS1377:PART3:1990:7.2/7.3	
Opinions and interpretations are outside the scope of UKAS accreditation						
This test report shall not be reproduced except in full without written approval by the laboratory.						

 1997
Tests marked * are not UKAS accredited.
The reported results relate only to samples received.
* = Sample mass smaller than BS1377 requirements.



1897

Tests marked * are not UKAS accredited.

The reported results relate only to samples received.

= Sample mass smaller than BS1377 requirements.

LABORATORY REPORT FOR INDEX PROPERTY AND CHEMICAL TESTING

CONTRACT: Wombwell Foundry.

CLIENT Johnson Poole & Bloomer.

Copthall House,

New Road,

Stourbridge,

West Midlands

DYE LPH.



Devonshire House, Ellingsham Road

Wolverhampton, WV2 1JT

Phone 01902 489888 Fax 01902 489038

REF: U5157

PAGE NO: 2 of 2

DATE RECEIVED: 21.10.03

DATE ISSUED: 11.11.03

SAMPLE DETAILS			TEST DATE	INDEX PROPERTIES				CHEMICAL						PASSED BS SIEVE SIZE		SAMPLE DESCRIPTION	REMARKS
SP No	DEPTH m	SAMPLE TYPE		W %	WL %	WP %	Ip	TOTAL SO ₄ %	Soluble SO ₄ g/L	pH Value	LOI %	ORG %	CI %	2.00 mm	0.425 mm		
5	0.40-0.70m	B	24.10.03	10												MADE GROUND: Orange brown slightly silty slightly gravelly SAND. Gravel is mudstone with occasional slag.	
5	2.20-2.50m	B	24.10.03	9.1												MADE GROUND: Green brown clayey slightly sandy GRAVEL. Gravel is mudstone with occasional clinker.	
5	1.20-1.40m	B	24.10.03	10												MADE GROUND: Dark brown slightly silty slightly gravelly SAND. Gravel is clinker with occasional slag.	
5	3.00-3.50m	B	24.10.03	11												MADE GROUND: Dark brown slightly silty slightly gravelly SAND. Gravel is clinker.	
8	1.50-1.70m	B	24.10.03	8.8												MADE GROUND: Dark brown slightly silty GRAVEL with occasional cobbles. Gravel is clinker with occasional brick. Cobble is clinker	
11	1.20-1.50m	B	24.10.03	20	54	24	30							85		Stiff light orange brown and occasionally light grey slightly sandy CLAY.	
12	1.00-1.40m	B	24.10.03	12												Light brown slightly sandy GRAVEL. Gravel is siltstone.	
13	0.70-1.20m	B	24.10.03	# 11												MADE GROUND: Brown slightly silty very sandy GRAVEL. Gravel is sandstone.	

Sample type		Test abbreviations		Test methods - Unless otherwise stated.		
D	Disturbed	W	Moisture Content	W%	BS1377:PART2:1990:3	Total SO ₄ BS1377:PART3:1990:5.5
B	Bulk disturbed	WL	Liquid limit	WL	BS1377:PART2:1990:4.3/4.4	pH Value BS1377:PART3:1990:9
U	Undisturbed	WP	Plastic limit	WP	BS1377:PART2:1990:5.3	Soluble S BS1377:PART3:1990:5.5
S	SPT split spoon	Ip	Index property	Ip	BS1377:PART2:1990:5.4	Approved signatories:-
W	Ground water	LOI	Loss on ignition	LOI	BS1377:PART3:1990:4	
		ORG	Organic content	ORG	BS1377:PART3:1990:3	A.L.Pearce, Laboratory director.....
		CI	Soluble chloride	CI	BS1377:PART3:1990:7.2/7.3	
Opinions and interpretations are outside the scope of UKAS accreditation						
This test report shall not be reproduced except in full without written approval by the laboratory.						
E.H.Lewing, Laboratory manager.....						 1897 Tests marked * are not UKAS accredited The reported results relate only to samples received # = Sample mass smaller than BS1377 requirements.



1897

Tests marked * are not UKAS accredited

The reported results relate only to samples received

* = Sample mass smaller than BS1377 requirements

GROUND INVESTIGATION & PILING LIMITED

COMPACTION TEST REPORT

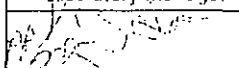
Job No:- L/5150
Received:- 21.10.03
Tested:- 31.10.03
Report:- 05.11.03

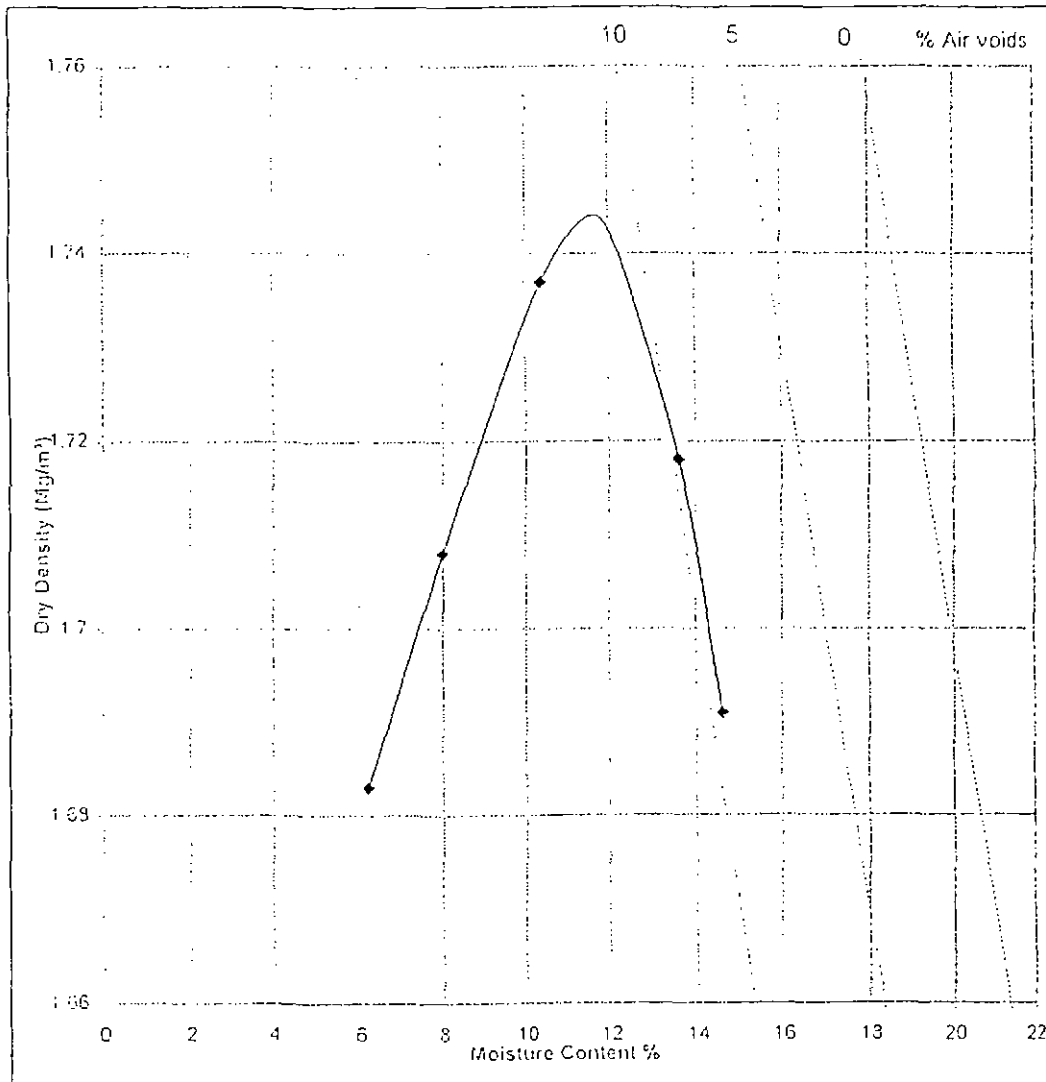
Location:- Wombwell Foundry.
Client:- Johnson Poole & Bloomer
Copthall House, New Road,
Stourbridge, West Midlands. DY8 1PH.

BH 22
Depth:- 1.0,2.0,4.0m



Page 1 of 2

TEST METHODS:- Compactions BS1377:Part 1:1990: Clause 3.4 Particle Density BS1377:Part 2:1990: Clause 3.2	Optimum Moisture Content: Maximum Dry Density: Natural Moisture Content: Measured Particle Density: Material > 20.0mm: Material > 37.5mm: If material is cohesive then broken down to pass sieve size: Type of Compaction Rammer:	12 % 1.74 Mg/m ³ 16 % 2.57 Mg/m ³ 23 % 20 % 20 mm 2.5 kg
Sample Preparations: BS1377:Part 1:1990: Clause 7.5	Sample Description: MADE GROUND: Brown slightly silty slightly gravelly SAND with occasional cobbles. Gravel is sandstone with occasional ash and clinker. Cobbles are sandstone.	Authorized by E. Levring Laboratory Manager 



Initial sample mass < BS1377 requirements



1897

GROUND INVESTIGATION & PILING LIMITED

COMPACTION TEST REPORT

Job No:- L/5150
Received:- 21.10.03
Tested:- 31.10.03
Report:- 05.11.03

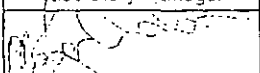
Location:- Wombwell Foundry.
Client:- Johnson Poole & Bloomer
Cophall House, New Road,
Stourbridge, West Midlands. DYS 1PH.

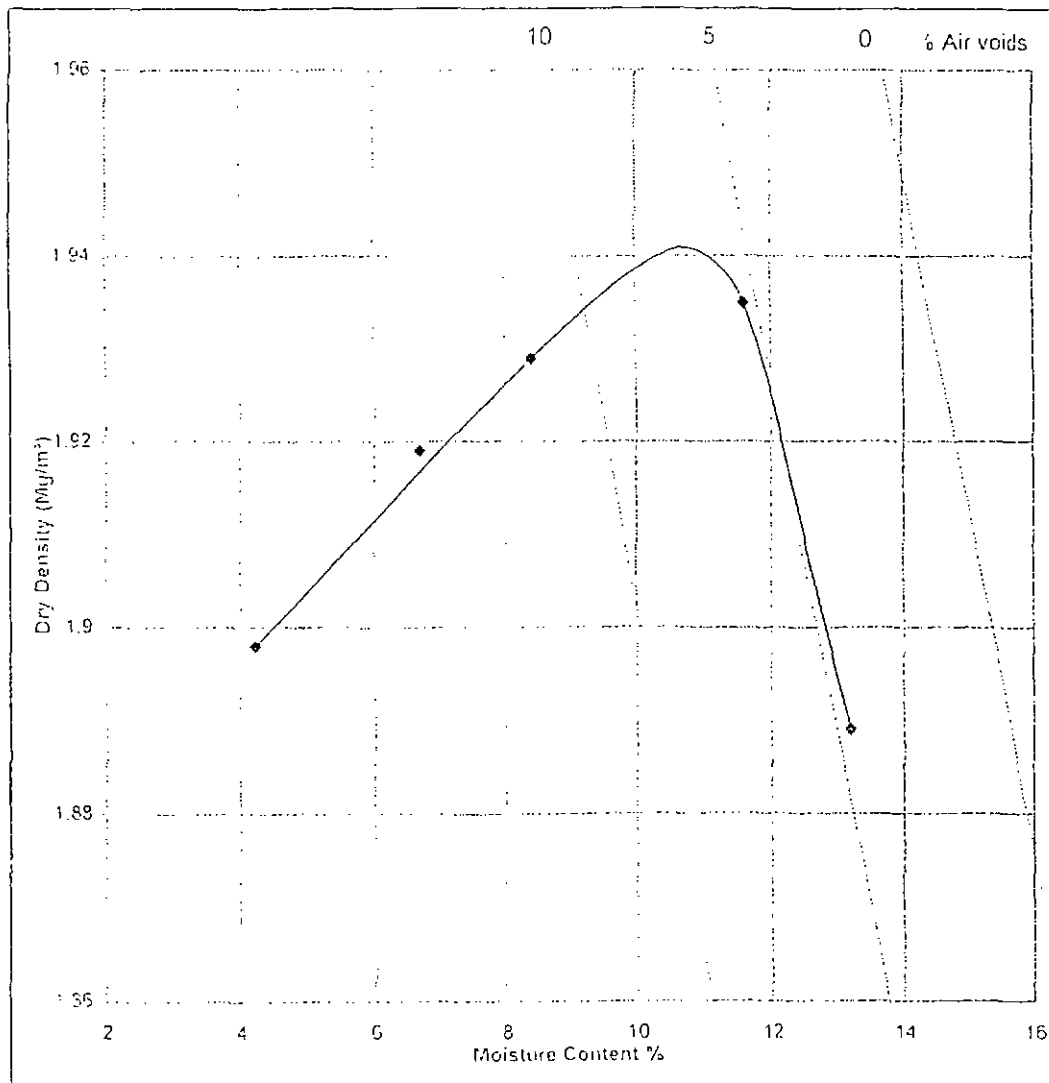
TP - 21, 20, 26

Depth:- 0.0+1.0m



Page 2 of 2

TEST METHODS:- Compactions: BS1377 Part 4 1990 Clause 3.4 Particle Density: BS1377 Part 2 1990: Clause 3.2	Optimum Moisture Content: Maximum Dry Density: Natural Moisture Content: Measured Particle Density: Material > 20.0mm: Material > 37.5mm: If material is cohesive then broken down to pass sieve size: Type of Compaction Rammer.	11 % 1.94 Mg/m ³ 9.6 % 2.68 Mg/m ³ 9 % 5 % 20 mm 2.5 kg
Sample Preparations: BS1377 Part 1 1990: Clause 7.5	Sample Description: MADE GROUND: Dark brown slightly silty slightly gravelly SAND. Gravel is clinker with occasional ash and sandstone.	Authorized by E. Levring Laboratory Manager 



Initial sample mass < BS1377 requirements



1897

GROUND INVESTIGATION & PILING LIMITED

TEST REPORT FOR PARTICLE SIZE DISTRIBUTION

BH 22
Depth:- 1.0,2.0,4.0m



Page 1 of 2

Job No:- L/5150 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

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

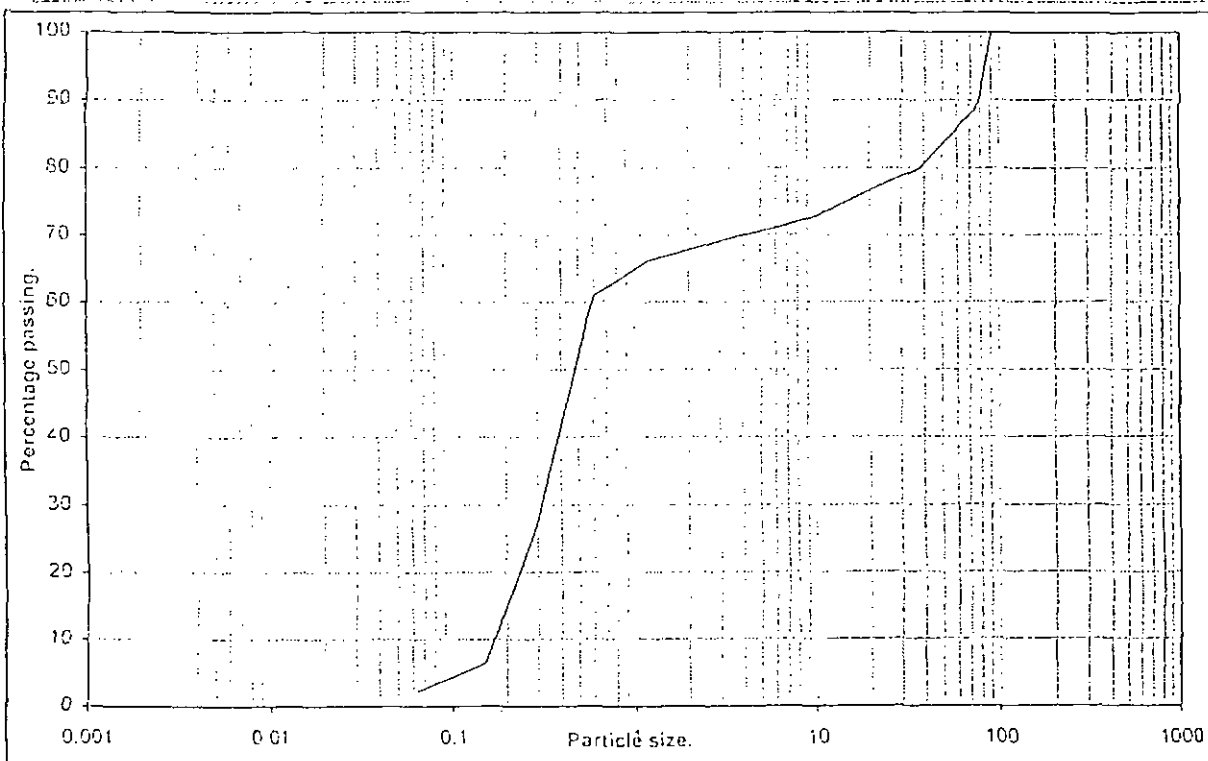
Sedimentation:-
BS 1377: Part 2: 1990
Clause 9.4

Sample Description: MADE GROUND: Brown slightly silty slightly
gravelly SAND with occasional cobbles.
Gravel is sandstone with occasional ash and
clinker. Cobbles are sandstone.

TEST METHODS:-
Sample Preparation:
BS1377: Part 1: 1990.
Clause 7.9 & 7.4.5

Authorized by E. Leving
Laboratory Manager

[Signature]



	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE		
CLAY	SILT			SAND			GRAVEL			COBBLES	BOULDERS

Sieve Size	%	Sieve Size	%
mm	Passing	mm	Passing
150	100	3.35	69
125	100	2	68
90	100	1.18	66
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:- L/5150 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.

BH 21, 20, 26

Depth:- 0.0+1.0m



Page 2 of 2

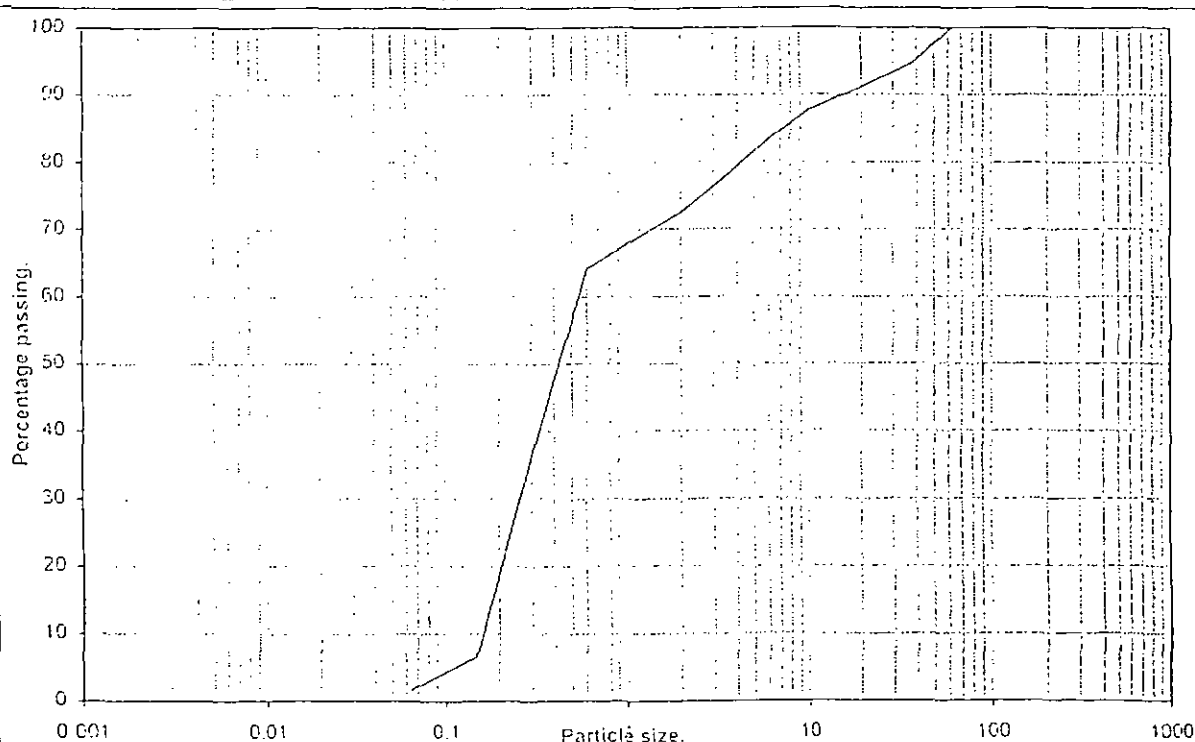
TEST METHODS -
 Particle Size Distribution:-
 BS 1377: Part 2: 1990
 Clause 9.2 & 9.3

Sedimentation:-
 BS 1377: 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:
 BS 1377: Part 1: 1990:
 Clause 7.9 & 7.4.5

Authorized by E. Levring
 Laboratory Manager



	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE		
CLAY	SILT			SAND			GRAVEL			COBBLES	BOULDERS

Sieve Size	%
mm	Passing
150	100
125	100
90	100
75	100
63	100
37.5	95
20	91
10	88
6.3	84

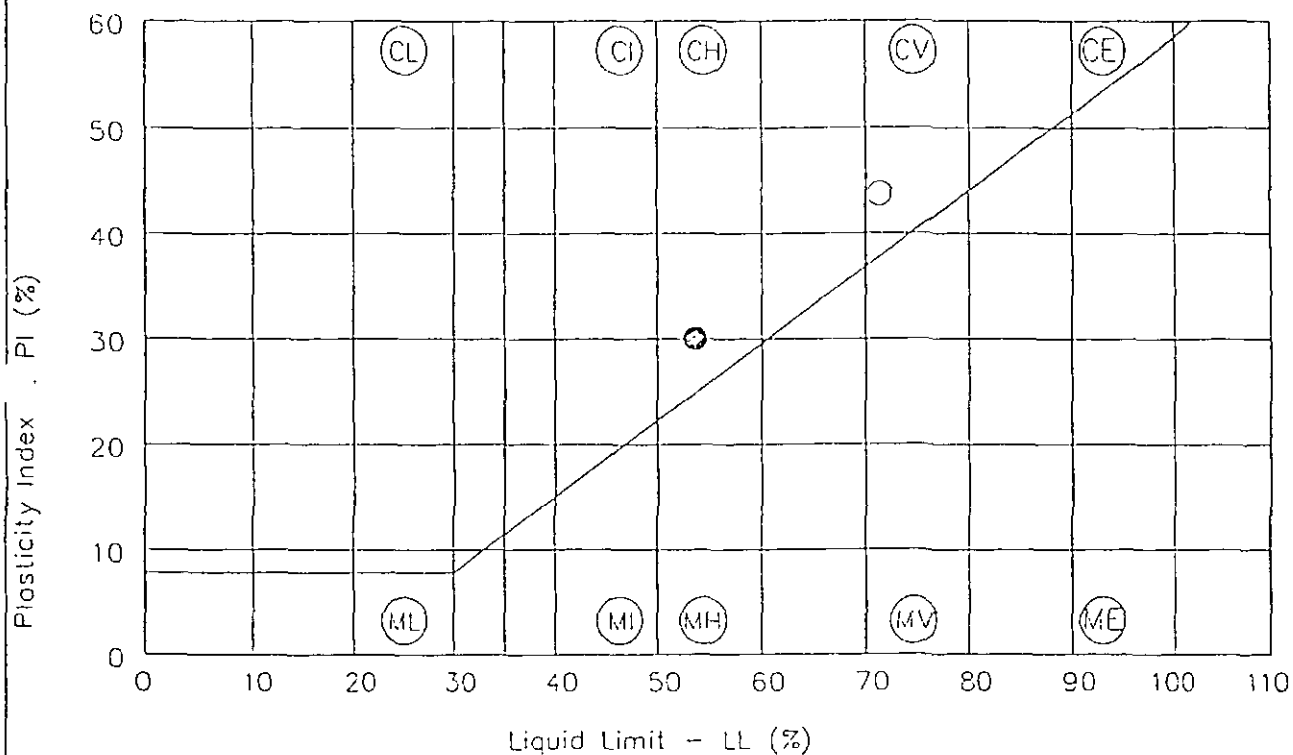
Sieve Size	%
mm	Passing
3.35	78
2	73
1.18	69
0.6	64
0.3	36
0.15	7
0.063	2

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



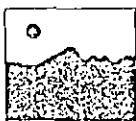
1897

ATTERBERG LINE PLOT



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
TOOLE &
LOOMER
LAND CONSULTANTS



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Engineer

Client

HILL & SMITH
HOLDINGS PLC.

Title

"ATTERBERG LIMIT A - LINE"

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

JPR	Client	Hill & Smith Holdings plc	Equipment	GA 2000 Dipmeter	Reference: US074							Title Summary Sheet For daily Monitoring		
	Project:	Wombwell Foundry			Monitored by KR									
					Sheet No	1 of 6								
3	BOREHOLE NO	TEST	15/10/03	05/11/03	10/12/03	27/01/04								
		CH4 % LEL	2	0	0	0								
		CH4 % VOL	0.1	0	0	0								
		CO2 %	0	0.4	0.9	1.2								
		O2 %	19.7	20	19.2	11.8								
		H2S PPM	0	0	0	0								
		CO PPM	0	0	0	0								
		BOREHOLE PRESSURE (mb)	0.7	-0.23	n/a	0								
		TEMPERATURE °C in/out	n/a	n/a	n/a	n/a								
		WATER LEVEL (mbgl)	dry	dry	n/a	n/a								
		AVERAGE FLOW (l/hr)	0	0.3	0	0								
		ATMOSPHERIC PRESSURE (mb)	1024	1013	1003	982								
6	BOREHOLE NO	TEST	15/10/03	05/11/03	10/12/03	27/01/04								
		CH4 % LEL	0	0	0	n/a								
		CH4 % VOL	0	0	0	n/a								
		CO2 %	2.4	0	3.5	n/a								
		O2 %	9.9	20.1	8.0	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 in/out	n/a	n/a	n/a	n/a								
		WATER LEVEL (mbgl)	dry	dry		n/a								
		AVERAGE FLOW (l/hr)	0	0	4	n/a								
		ATMOSPHERIC PRESSURE (mb)	1024	1013	1003	982								
8	BOREHOLE NO	TEST	15/10/03	05/11/03	10/12/03	27/01/04								
		CH4 % LEL	2	0	0	0								
		CH4 % VOL	0.1	0	0	0								
		CO2 %	2.8	2.7	3.6	0								
		O2 %	15.0	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 in/out	n/a	n/a	n/a	n/a								
		WATER LEVEL (mbgl)	dry	dry	n/a	n/a								
		AVERAGE FLOW (l/hr)	0	0	4	0								
		ATMOSPHERIC PRESSURE (mb)	1024	1013	1003	982								

BOREHOLE NO	TEST	15/10/03	05/11/03	10/12/03	27/01/04								
9	CH4 % LEL	2	0	n/a	0								
	CH4 % VOL	0.1	0	n/a	0								
	CO2 %	3.2	2.6	n/a	0								
	O2 %	16.6	16.7	n/a	20.9								
	H2S PPM	0	0	n/a	0								
	CO PPM	0	0	n/a	0								
	BOREHOLE PRESSURE (mb)	-0.06	-0.07	n/a	0								
	TEMPERATURE °C in/out	n/a	n/a	n/a	n/a								
	WATER LEVEL (mbsgl)	dry	dry	n/a	n/a								
	AVERAGE FLOW (l/hr)	-0.1	0	n/a	0								
	ATMOSPHERIC PRESSURE (mb)	1021	1013	1003	982								
BOREHOLE NO	TEST	15/10/03	05/11/03	10/12/03	27/01/04								
12	CH4 % LEL	-	0	0	None								
	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)	-	-1.35	n/a									
	TEMPERATURE °C in/out	-	n/a	n/a									
	WATER LEVEL (mbsgl)	-	1.2	n/a									
	AVERAGE FLOW (l/hr)	-	0	4									
	ATMOSPHERIC PRESSURE (mb)	-	1013	1003	982								
BOREHOLE NO.	TEST	15/10/03	05/11/03	10/12/03	27/01/04								
16	CH4 % LEL	0	0	0	0								
	CH4 % VOL	0	0	0	0								
	CO2 %	2.5	2.9	4.1	2.4								
	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	-0.11	n/a	2								
	TEMPERATURE °C in/out	n/a	n/a	n/a	n/a								
	WATER LEVEL (mbsgl)	dry	dry	n/a	n/a								
	AVERAGE FLOW (l/hr)	0	0	4	1								
	ATMOSPHERIC PRESSURE (mb)	1024	1013	1003	982								

BOREHOLE NO	TEST	15/10/03	05/11/03	10/12/03	27/01/04								
17	CH4 % LEL	0	0	0	0								
	CH4 % VOL	0	0	0	0								
	CO2 %	2.2	4.1	5.3	0								
	O2 %	17.4	15.4	12	20.9								
	H2S PPM	0	0	0	0								
	CO PPM	0	0	0	0								
	BOREHOLE PRESSURE (mb)	-0.07	0.02	n/a	0								
	TEMPERATURE °C in/out	n/a	n/a	n/a	n/a								
	WATER LEVEL (mtyl)	5.35	5.25	n/a	n/a								
	AVERAGE FLOW (mlr)	0	0	3	0								
	ATMOSPHERIC PRESSURE (mb)	1024	1013	1003	992								
BOREHOLE NO	TEST	15/10/03	05/11/03	10/12/03	27/01/04								
18	CH4 % LEL	0	0	0	0								
	CH4 % VOL	0	0	0	0								
	CO2 %	1	3	1.1	0.5								
	O2 %	19	29	14.8	18.1								
	H2S PPM	0	0	0	0								
	CO PPM	0	0	1	0								
	BOREHOLE PRESSURE (mb)	0.03	0	n/a	0								
	TEMPERATURE °C in/out	n/a	n/a	n/a	n/a								
	WATER LEVEL (mtyl)	2.5	2.4	n/a	n/a								
	AVERAGE FLOW (mlr)	0.1	0	1	0								
	ATMOSPHERIC PRESSURE (mb)	1024	1013	1003	982								
BOREHOLE NO	TEST	15/10/03	05/11/03	10/12/03	27/01/04								
19	CH4 % LEL	0	0	0	0								
	CH4 % VOL	0	0	0	0								
	CO2 %	1	0.7	2.1	1.9								
	O2 %	17.8	17.5	10.1	13.5								
	H2S PPM	0	0	0	0								
	CO PPM	0	0	0	0								
	BOREHOLE PRESSURE (mb)	-0.12	-0.1	n/a	2								
	TEMPERATURE °C in/out	n/a	n/a	n/a	n/a								
	WATER LEVEL (mtyl)	4.15	4.15	n/a	n/a								
	AVERAGE FLOW (mlr)	0	0.1	2	0								
	ATMOSPHERIC PRESSURE (mb)	1024	1013	1003	982								

BOREHOLE NO.	TEST	15/10/03	05/11/03	10/12/03	27/01/04								
20	CH4 % LEL	0	0	0	0								
	CH4 % VOL	0	0	0	0								
	CO2 %	0.3	0.6	1.1	1.0								
	O2 %	18.8	18.4	18.1	19.9								
	H2S PPM	0	0	0	0								
	CO PPM	0	0	0	0								
	BOREHOLE PRESSURE (mb)	0.02	0.07	n/a	0								
	TEMPERATURE °C in/out	n/a	n/a	n/a	n/a								
	WATER LEVEL (mbsgl)	6.15	6.11	n/a	n/a								
	AVERAGE FLOW (l/hr)	-0.1	-0.1	0	0								
	ATMOSPHERIC PRESSURE (mb)	1024	1013	1003	982								
BOREHOLE NO.	TEST	15/10/03	05/11/03	10/12/03	27/01/04								
21	CH4 % LEL	2	0	0	0								
	CH4 % VOL	0.1	0	0	0								
	CO2 %	2.1	1.4	3.7	1.5								
	O2 %	17	18.1	14.3	19.4								
	H2S PPM	0	0	0	0								
	CO PPM	3	0	2	0								
	BOREHOLE PRESSURE (mb)	0.17	0.58	n/a	0								
	TEMPERATURE °C in/out	n/a	n/a	n/a	n/a								
	WATER LEVEL (mbsgl)	4.3	4.7	n/a	n/a								
	AVERAGE FLOW (l/hr)	0	0	2	0								
	ATMOSPHERIC PRESSURE (mb)	1024	1013	1003	982								
BOREHOLE NO.	TEST	15/10/03	05/11/03	10/12/03	27/01/04								
22	CH4 % LEL	2	0	0	0								
	CH4 % VOL	0.1	0	0	0								
	CO2 %	1	1.1	2.6	1.8								
	O2 %	17.9	17.8	16.9	17.4								
	H2S PPM	0	0	0	0								
	CO PPM	0	0	0	0								
	BOREHOLE PRESSURE (mb)	0.22	-0.18	n/a	-2								
	TEMPERATURE °C in/out	n/a	n/a	n/a	n/a								
	WATER LEVEL (mbsgl)	7.42	7.58	n/a	n/a								
	AVERAGE FLOW (l/hr)	0	0	3	0								
	ATMOSPHERIC PRESSURE (mb)	1024	1013	1003	982								

BOREHOLE NO.	TEST	15/10/03	05/11/03	10/12/03	27/01/04							
23	CH4 % LEL	0	0	0	Inaccessible							
	CH4 % VOL	0	0	0								
	CO2 %	0	0	3.3								
	O2 %	20	20.1	5.8								
	H2S PPM	0	0	0								
	CO PPM	0	0	0								
	BOREHOLE PRESSURE (mb)	0.21	-0.2									
	TEMPERATURE °C in/out	n/a	n/a	n/a								
	WATER LEVEL (mbsgl)	-	7.45									
	AVERAGE FLOW (l/hr)	-0.2	0.1	3								
	ATMOSPHERIC PRESSURE (mb)	1024	1013	1003	982							
BOREHOLE NO.	TEST	15/10/03	05/11/03	10/12/03	27/01/04							
24	CH4 % LEL	0	0	0	0							
	CH4 % VOL	0	0	0	0							
	CO2 %	1.0	1.2	1.3	0.0							
	O2 %	18.8	18.6	12.4	14.7							
	H2S PPM	0	0	0	0							
	CO PPM	0	0	2	1							
	BOREHOLE PRESSURE (mb)	0	-0.05	n/a	2							
	TEMPERATURE °C in/out	n/a	n/a	n/a	n/a							
	WATER LEVEL (mbsgl)	dry	dry	n/a	n/a							
	AVERAGE FLOW (l/hr)	0.2	0.1	0	0							
	ATMOSPHERIC PRESSURE (mb)	1024	1013	1003	982							
BOREHOLE NO.	TEST	15/10/03	05/11/03	10/12/03	27/01/04							
25	CH4 % LEL	2	0	0	flooded							
	CH4 % VOL	0.1	0	0								
	CO2 %	1.7	1.3	2.1								
	O2 %	18.3	17.7	12.5								
	H2S PPM	0	0	0								
	CO PPM	0	0	2								
	BOREHOLE PRESSURE (mb)	0.7	-0.02									
	TEMPERATURE °C in/out	n/a	n/a	n/a								
	WATER LEVEL (mbsgl)	3.1	3.12									
	AVERAGE FLOW (l/hr)	0.2	0.1	1								
	ATMOSPHERIC PRESSURE (mb)	1024	1013	1003	982							

BOREHOLE NO	TEST	15/10/03	05/11/03	10/12/03	27/01/04								
26	CH4 % LEL	0	0	0	0								
	CH4 % VOL	0	0	0	0								
	CO2 %	2.0	2.2	2.4	2.0								
	O2 %	5.1	7.9	0.8	19.1								
	H2S PPM	0	0	0	0								
	CO PPM	0	0	0	0								
	BOREHOLE PRESSURE (mb)	-0.04	0.1	n/a	0								
	TEMPERATURE °C in/out	n/a	n/a	n/a	n/a								
	WATER LEVEL (mvg)	7.4	8.12	n/a	n/a								
	AVERAGE FLOW (l/hr)	0	0	4	0								
	ATMOSPHERIC PRESSURE (mb)	1024	1013	1003	982								
BOREHOLE NO	TEST	15/10/03	05/11/03	10/12/03	27/01/04								
27	CH4 % LEL	4	2	10	6								
	CH4 % VOL	0.2	0.1	0.5	0.3								
	CO2 %	0.7	0.7	0.2	0.1								
	O2 %	1.5	0	0.3	6.7								
	H2S PPM	0	0	0	0								
	CO PPM	0	0	2	0								
	BOREHOLE PRESSURE (mb)	0.03	0	n/a	2								
	TEMPERATURE °C in/out	n/a	n/a	n/a	n/a								
	WATER LEVEL (mvg)	dry	dry	n/a	n/a								
	AVERAGE FLOW (l/hr)	0	0.2	2	2								
	ATMOSPHERIC PRESSURE (mb)	1024	1013	1003	982								
BOREHOLE NO	TEST	15/10/03	05/11/03	10/12/03	27/01/04								
28	CH4 % LEL	4	0	0	0								
	CH4 % VOL	0.2	0	0	0								
	CO2 %	0.9	3.5	1	3.1								
	O2 %	0.7	1.1	2.6	3.2								
	H2S PPM	0	0	0	0								
	CO PPM	0	0	1	1								
	BOREHOLE PRESSURE (mb)	-0.01	-0.24	n/a	4								
	TEMPERATURE °C in/out	n/a	n/a	n/a	n/a								
	WATER LEVEL (mvg)	dry	dry	n/a	n/a								
	AVERAGE FLOW (l/hr)	0.1	0.1	1	2								
	ATMOSPHERIC PRESSURE (mb)	1024	1013	1003	982								



APPENDIX H

Envirocheck Report
Referenced 36993 and dated 12th October 2001

Envirocheck Report On :

Wombwell Foundry Ltd
Hough Lane
Wombwell
Barnsley
South Yorkshire
S73 9LT

National Grid Reference :

439063, 402325

Prepared For :

Your Reference :

32993

Prepared By :

Martha McSarron

Summary

Details

Useful Contacts

BGS Borehole Order Form

Introduction

The Environment Act 1995 has made site sensitivity a key issue, as the legislation pays as much attention to 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 Sheet 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 hydrogeological features required by environmental and geotechnical consultants. The data sheet is produced by querying the legend database to 1000m from the site polygon provided by the client.

In the attached datasheet the National Grid References (NGRs) are rounded to the nearest 10m in accordance with Landmark's agreements with a number of Data Suppliers.

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	50m	250m	500m	1000m
Agency & Hydrological				
Air Pollution Controls ("APC")	1			2
Discharge Consents to Controlled Waters				2
Enforcement and Prohibition Notices				
Integrated Pollution Controls ("IPC")				
Nearest Surface Water Feature	Yes			2
Pollution Incidents to Controlled Waters				2
Prosecutions relating to Authorised Processes				
Prosecutions to Controlled Waters				
Red List Discharge Consents				2
Radioactive Substance Authorisations ("RSA")				2
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				3
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				
SGS 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	2		2
Potentially Contaminative Uses (Past Use)	1			11
Potentially Contaminative Uses (Non-Water Related)				13
Potentially Contaminative Uses (Water Related)		1		10
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.

Wombwell Foundry Ltd
35593

SITE DATA
Hough Lane
Wombwell
Barnsley
South Yorkshire
S73 0LT
OS Grid Ref: Easing 430053
Northing 602325
Easting 430053
1:100:19 approx.



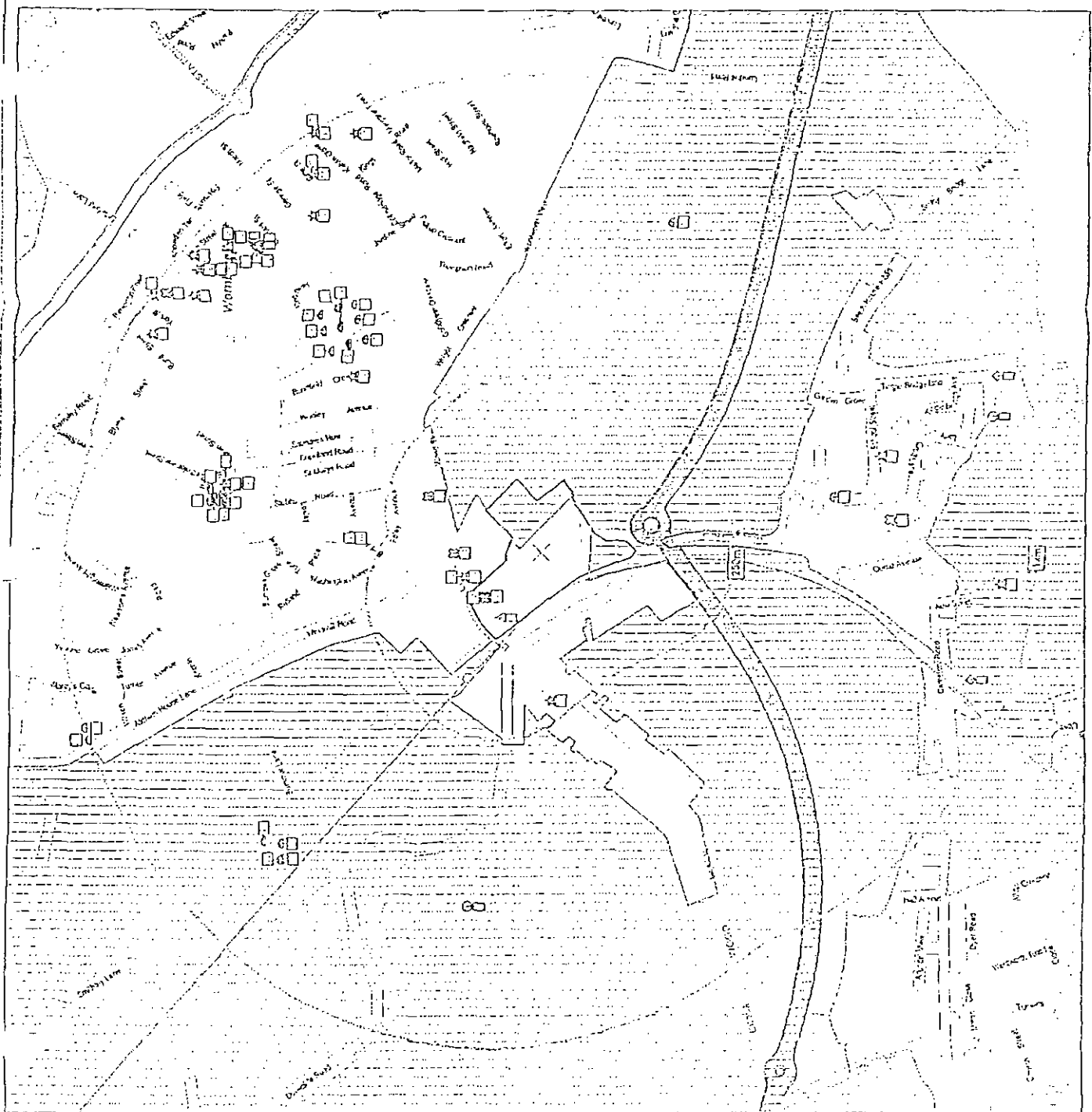
Castings Technology

KEY TO MAP SYMBOLS

- | | |
|---|---|
| Centre of Search | Registered radioactive substances |
| Water Abstractions | BGS Boreholes |
| Pollution Incidents Relating to Controlled Waters | Potentially Contaminative Industrial Land Use |
| Post 1988 Planning Applications | Registered Waste Treatment or Disposal Site |
| Discharge Consents | Unadopted Green Belt |
| Air Pollution Controls | |

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Value Added Reseller



Map ID	Details	Compass Direction	Estimated Distance from site	Source	NGR
APC					
1	Name Wombwell Foundry Ltd Location Hough Lane, Wombwell, BARNISLEY, South Yorkshire, S73 0LT Authority Barnsley Metropolitan Borough Council Permit Reference Not Given Dated 6 Apr 1993 Process Type Local Authority Air Pollution Control Description PG211 Furnaces for the extraction of non-ferrous 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 Osarne Discharge Reference C5207 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	854	2	439750 401250
Discharge Consent to Controlled Waters					
3	Operator Yorkshire Water Services Ltd Property Type Pumping Station Location Tinglebridge Lane Ps Near, Hayland Nether, South Yorkshire Authority North East Region - Environment Agency Catchment Area Osarne Discharge Reference WAD0427 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 Knoll Beck Status Not given Positional Quality Located by supplier to within 100 m	S	995	2	439500 401150



Reference to 2013 Part 1 with effect by 2001									
Product Licence v 1.0.5.6.79									
A Plan 'Mark' Information from Source									
6									
RSA									
7									
Name	Location	Authority	Permit Reference	Dated	Process Type	Description	Status	Positional Quality	Notes
Medicinal Radiographic Services Ltd	Medicinal House, 145/146, South Yorkshire, S73 8HJ	North East Region - Environment Agency	117602	23 Jun 1993	Registration under S10 RSA for the keeping and use of mobile radioactive sources (was RSA50 E3)	Minor variation to a registration under the Act for 1 or more mobile sources other than a tracer test source	Application has been authorised and any conditions apply to the operator	Automatically located to estate within address	Authorisation suspended by a substantial or non-substantial variation
439530	439530	NE	557	2					
RSA									
5									
Name	Location	Authority	Permit Reference	Dated	Process Type	Description	Status	Positional Quality	Notes
Medicinal Radiographic Services Ltd	Medicinal House, 145/146, South Yorkshire, S73 8HJ	North East Region - Environment Agency	117602	23 Jun 1993	Registration under S10 RSA for the keeping and use of mobile radioactive sources (was RSA50 E3)	Minor variation to a registration under the Act for 1 or more mobile sources other than a tracer test source	Application has been authorised and any conditions apply to the operator	Automatically located to estate within address	Authorisation suspended by a substantial or non-substantial variation
439520	439520	NE	555	2					
Pollution Incident to Controlled Waters									
3									
Property Type	Location	Authority	Notes	Incident Date	Incident Reference	Catchment Area	Received Water	Cause of Incident	Severity of Incident
Miscellaneous from the Unknown	Unidentified Source Dover (S) Ash	North East Region - Environment Agency	Not given	21 Dec 1991	129321	Not Given	Freshwater Stream Flow	Not Given	Category 3 - Minor Incident
439200	439200	W	603	2					
Pollution Incident to Controlled Waters									
4									
Property Type	Location	Authority	Notes	Incident Date	Incident Reference	Catchment Area	Received Water	Cause of Incident	Severity of Incident
Water Company Sewage Outflow	Elstow Canal at HELMINGFIELD	North East Region - Environment Agency	No Fish Killed	27 Sep 1997	SH1970525	Deane Thibaudes	Freshwater Stream/River	Not Given	Category 3 - Minor Incident
439400	439400	S	547	3					

	Positional Quality	Unknown				
	RSA					
6	Name	Medcrest Radiographic Services Ltd	NE	574	1	439530 403040
	Location	Medcrest House, Melville Street, Wombwell, BARNSLY, South Yorkshire, S73 6HJ				
	Authority	North East Region - Environment Agency				
	Permit Reference	AX4068				
	Dated	16 Dec 1996				
	Process Type	Registration under S10 RSA for the keeping and use of mobile Radioactive sources (was RSA60 S2)				
	Description	Substantial 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				
	Positional Quality	Unknown				
	RSA					
9	Name	Medcrest Radiographic Services Ltd	NE	553	2	439530 403030
	Location	Medcrest House, Melville Street, Wombwell, BARNSLY, South Yorkshire, S73 6HJ				
	Authority	North East Region - Environment Agency				
	Permit Reference	4TS211				
	Dated	20 Feb 1996				
	Process Type	Registration under S10 RSA for the keeping and use of mobile Radioactive 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				
	Positional Quality	Unknown				
	RSA					
10	Name	Medcrest Radiographic Services Ltd	NE	555	2	439530 403040
	Location	Melville Street, BARNSLY, South Yorkshire, S73 6HJ				
	Authority	North East Region - Environment Agency				
	Permit Reference	AY4826				
	Dated	11 Jun 1997				
	Process Type	Registration under S10 RSA for the keeping and use of mobile Radioactive sources (was RSA60 S3)				
	Description	Substantial 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				
	Positional Quality	Automatically located to centre within address				
	RSA					
11	Name	Medcrest Radiographic Services Ltd	NE	570	2	439530 403040
	Location	Medcrest House, Melville Street, Wombwell, BARNSLY, South Yorkshire, S73 6HJ				
	Authority	North East Region - Environment Agency				
	Permit Reference	A17637				
	Dated	31 Mar 1991				
	Process Type	Not Supplied				
	Description	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				
	Positional Quality	Unknown				



RSA

12 Name

Metecst Inspection Services Ltd

NE

657

2

439520 403549

Location

Medwest House, Medway Street, Waltham, Essex, South

EH10

Authority

North East Region - Environmental Agency

Period Reference

A14554

Dated

4 Oct 1995

Process Type

Registration under 07 RSA for the keeping and use of radioactive

materials (was: RSA60 S1)

Registration

Registration under 07 or 010 RSA for 1 or more class 2 sources or 4

Terrestrial sources also for storage in transit

Status

Authorisation either revoked or cancelled

Personal Quality

Unknown

RSA

11 Name

Medwest Ndt Ltd

NE

677

2

439520 40711

Location

Medwest House, Medway Street, Waltham, Essex, South

EH10

Authority

North East Region - Environmental Agency

Period Reference

SK2347

Dated

Not given

Process Type

Registration under 010 RSA for the keeping and use of portable

radioactive sources (was: RSA60 S3)

Description

Registration under the Act for 1 or more mobile sources other than a

tracer test source

Status

Application has met the requirements for authorisation (but not yet

authorised)

Personal Quality

Automatically located to the address

Water Abstraction

Operator	British Coal	NE	1684	2	440180 403800
Licence Number	2/27/03/015				
Location	Location Description Not Available				
Authority	North East Region - Environment Agency				
Abstraction	General Industrial				
Source	Surface				
Daily rate	1009 cubic metres				
Yearly rate	365807 cubic metres				
Details	Licence Revoked				
Positional Quality	Located by supplier to within 100 m				

Water Abstraction

Operator	Burnett & Hammershire Fuel Limited	E	1584	2	440700 401700
Licence Number	2/27/03/039				
Location	Location Description Not Available				
Authority	North East Region - Environment Agency				
Abstraction	Unclassified Combinations				
Source	Surface				
Daily rate	114 cubic metres				
Yearly rate	37000 cubic metres				
Details	Licence Revoked				
Positional Quality	Located by supplier to within 100 m				

Water Abstraction

Operator	National Coal Board	SE	1431	2	440510 401600
Licence Number	2/27/03/007				
Location	Location Description Not Available				
Authority	North East Region - Environment Agency				
Abstraction	General Industrial				
Source	Surface				
Daily rate	1591 cubic metres				
Yearly rate	477330 cubic metres				
Details	Licence Revoked				
Positional Quality	Located by supplier to within 100 m				

Water Abstraction

Operator	British Coal Board	S	1305	2	439500 400300
Licence Number	2/27/03/009				
Location	Location Description Not Available				
Authority	North East Region - Environment Agency				
Abstraction	General Industrial				
Source	Surface				
Daily rate	1308 cubic metres				
Yearly rate	363630 cubic metres				
Details	Licence Revoked				
Positional Quality	Located by supplier to within 100 m				

Details

Date	1 Apr 1993
Preceded By License	Not Given
Superseded By License	Not Given
Positional Quality	Approximate location provided by a supplier
Waste Types on Site	
Authorized Waste	Esthetics Max Scrap Cooling Oil Max Scrap Non-Ferrous Metal Scrap Max Scrap Ferrous Metal Scrap Max Scrap Cars/Light Comm'l Veh Max Scrap

Registered Landfill Site

License Holder	Wombwell Foundry Ltd	0	5	On Site
License Reference	WCD0 B 142 MOD 4			
Site Location	Hough Lane, Wombwell, BARNSLY, South Yorkshire S73 6LT			
License Holder Address	as site address			
Authority	Ridings Area Environment Agency North East Region			
Site Category	Landfill			
Maximum Input Rate	Very Small (<10,000 tonnes/yr)			
Waste Source Restrictions	No known restriction on source of waste			
License Status	Record superseded			
Date	1 Dec 1977			
Preceded By Licence	Not Given			
Superseded By Licence	WCD0 B 142 MOD 6			
Positional Quality	Manually located to road within address			
Boundary Quality	Not Applicable			
Waste Types on Site				
Authorised Waste	Detergent/Only Waste From Mach. Cleaners Foundry Slag Boiler Clinker Broken Asbestos Sheets Ind. Non-Haz. Waste including Refractory Bricks Sand General Foundry Debris Max Waste Permitted By Licence			
Prohibited Waste	Liq/Slurry In Drums/Containers > 4 L Cap'ity			

Registered Landfill Site

License Holder	Wombwell Foundry Ltd	0	12	On Site
License Reference	WD20 B 142 MOD 6			
Site Location	Hough Lane, Wombwell, BARNSLEY, South Yorkshire, S73 0LT			
License Holder Address	as site address			
Authority	Ridings Area - Environment Agency - North East Region			
Site Category	Landfill			
Maximum Input Rate	Very Small (<10,000 tonnes/year)			
Waste Source Restrictions	Only waste produced on site			
License Status	Operational as far as is known			
Date	1 Mar 1997			
Provided By License	WD20 B 142 MOD 4			
Supervised By	Not Given			
153366				



Positional Quality	Approximate location provided by supplier
Boundary Quality	Not Applicable
Waste Types on Site	
Authorised Waste	Boiler Clinker Ind. Non-Haz Waste Including Refractory Bricks Dend General Foundry Debris Mar Waste Permitted By Licence Foundry Slag
Prohibited Waste	Liq/Slurry In Drum/Cont Re > 4 L Capacity Waste N O S

Registered Landfill Site

License Holder	J L F Civil Engineering Ltd	NE	609	5	439570 432830
License Reference	WDD 2 609 (WDD 2 617)				
Site Location	Dis.Canal Station Road, Littlefield Lane, Wombwell, BARNOLBY, South Yorkshire				
License Holder Address	Stanley Mill Road, Little Stanley, CHESTER, Cheshire CH2 4HX				
Authority	Ridings Area - Environment Agency - North East Region				
Site Category	Landfill				
Maximum Input Rate	Undefined				
Waste Source Restrictions	Waste produced/controlled by licence holder				
License Status	License lapsed/cancelled/discontinued/not applicable/surrendered				
Date	1 Mar 1998				
Preceded By Licence	Not Given				
Superseded By Licence	Not Given				
Positional Quality	Approximate location provided by supplier				
Boundary Quality	Not Applicable				
Waste Types on Site					
Authorised Waste	Clean Excavation Spoil Ex Rly Embank				

Registered Landfill Site

License Holder	Barnsley M B C	NE	607	5	439570 432830
License Reference	WDD 2 617				
Site Location	Wombwell Canal & Aldham Embankment, Wombwell, BARNOLBY, South Yorkshire				
License Holder Address	Central Offices, Kendray Street, BARNOLBY, South Yorkshire				
Authority	Ridings Area - Environment Agency - North East Region				
Site Category	Landfill				
Maximum Input Rate	Undefined				
Waste Source Restrictions	No known restriction on source of waste				
License Status	License lapsed/cancelled/discontinued/not applicable/surrendered				
Date	1 Mar 1998				
Preceded By Licence	Not Given				
Superseded By Licence	Not Given				
Positional Quality	Manually located to road within address				
Boundary Quality	Not Applicable				
Waste Types on Site					
Authorised Waste	Clean Excav Spoil Ex Aldham Embankment				

Registered Landfill Site

License Holder	P Parole	SA	701	2	439360 401940
License Reference	WD20 B 25				
Site Location	Landfill Road, Wombwell, BARNESLEY, South Yorkshire				
License Holder Address	14A Woodrope Road, Easington, WARRINGTON, North Yorkshire, YO21 5TA				
Authority	Ridings Area - Environment Agency - North East Region				
Site Category	Landfill				
Maximum Input Rate	Medium (< 75,000 tonnes/year)				
Waste Source Restrictions	No known restriction on source of waste				
License Status	License lapsed/cancelled/forfeited/not applicable/surrendered				
Date	1 Nov 1977				
Preceded By License	Not Given				
Superceded By License	Not Given				
Positional Quality	Approximate location provided by supplier				
Boundary Quality	Not Applicable				
Waste Types on Site					
Authorized Waste	Excavation Waste, Soil, Subsoil Construction And Demolition Wastes Incl. Non-Haz. Inert, Non-Flammable incl. Non-Haz. Potentially Combustible House + Com. Untreated Waste				
Prohibited Waste	Asbestos Liquids In Containers Over 4l Cap Slurry In Containers Over 4l Cap				

BGS Borehole						
15	BGS Reference	Se30se123	N	995	£	436830 403450
	Drilled Length	2 metres				
	Borehole Name	Wombwell J1 School B				
BGS Borehole						
16	BGS Reference	Se30se124	NE	535	£	436590 402610
	Drilled Length	3 metres				
	Borehole Name	Kings Road School Bb 4				
BGS Borehole						
17	BGS Reference	Se30se151	N	500	£	436210 403120
	Drilled Length	3 metres				
	Borehole Name	Wombwell Home Bb 2				
BGS Borehole						
18	BGS Reference	Se30se170	NW	752	£	430360 403000
	Drilled Length	22 metres				
	Borehole Name	Wombwell 2				
BGS Borehole						
19	BGS Reference	Se30se175	N	548	£	439150 401110
	Drilled Length	3 metres				
	Borehole Name	Wombwell Home Bb 7				
BGS Borehole						
20	BGS Reference	Se30se156	NE	552	£	439540 401750
	Drilled Length	3 metres				
	Borehole Name	Kings Road School Bb 3				
BGS Borehole						
21	BGS Reference	Se30se151	NE	552	£	431100 402550
	Drilled Length	3 metres				
	Borehole Name	Kings Road School Bb 1				
BGS Borehole						
22	BGS Reference	Se30se18	E	591	£	435830 402010
	Drilled Length	195 metres				
	Borehole Name	Lundhill Colliery				
BGS Borehole						
23	BGS Reference	Se30se152	N	678	£	438200 403140
	Drilled Length	2 metres				
	Borehole Name	Wombwell Home Bb 3				

BGS Borehole						
24	BGS Reference	Se30se55	NE	576	5	439520 402630
	Drilled Length	3 metres				
	Borehole Name	Kings Road School Sh 5				
BGS Borehole						
25	BGS Reference	Se30se77A	NW	742	5	438320 402690
	Drilled Length	445 metres				
	Borehole Name	Wombwell Main Colliery Shaft 1				
BGS Borehole						
26	BGS Reference	Se30se59	NE	506	5	439590 402800
	Drilled Length	3 metres				
	Borehole Name	Kings Road School Sh 9				
BGS Borehole						
27	BGS Reference	Se30se52	NE	500	5	439510 402870
	Drilled Length	3 metres				
	Borehole Name	Kings Road School Sh 2				
BGS Borehole						
28	BGS Reference	Se30se56	NE	615	5	439570 402840
	Drilled Length	4 metres				
	Borehole Name	Kings Road School Sh 6				
BGS Borehole						
29	BGS Reference	Se30se53	N	650	5	439200 403110
	Drilled Length	2 metres				
	Borehole Name	Wombwell Home Sh 4				
BGS Borehole						
30	BGS Reference	Se30se122	NW	992	5	438300 403440
	Drilled Length	2 metres				
	Borehole Name	Wombwell J1 Sch Sh 7				
BGS Borehole						
31	BGS Reference	Se30se77C	NW	724	5	438350 402950
	Drilled Length	34 metres				
	Borehole Name	Wombwell 1				
BGS Borehole						
32	BGS Reference	Se30se77B	NW	753	5	438320 402950
	Drilled Length	85 metres				
	Borehole Name	Wombwell Main Colliery Ug Shaft 3				

BGS Borehole

33	BGS Reference	Se30se53	NE	635	5	439550 402530
	Drilled Length	3 metres				
	Borehole Name	Kings Road School Bh 3				
BGS Borehole						
34	BGS Reference	Se30se60	N	631	5	439220 403150
	Drilled Length	2 metres				
	Borehole Name	Wombwell Home Bh 1				
BGS Borehole						
35	BGS Reference	Se30se129	S	504	5	439200 401500
	Drilled Length	7 metres				
	Borehole Name	Deane Valley Highway Bh3				
BGS Borehole						
36	BGS Reference	Se30se65	N	635	5	439110 403130
	Drilled Length	2 metres				
	Borehole Name	Wombwell Home Bh 6				
BGS Borehole						
37	BGS Reference	Se30se57	NE	513	5	439590 402770
	Drilled Length	3 metres				
	Borehole Name	Kings Road School Bh 7				
BGS Borehole						
38	BGS Reference	Se30se64	N	654	5	439180 403150
	Drilled Length	2 metres				
	Borehole Name	Wombwell Home Bh 5				
BGS 1:625 000 Surface Geology						
-	Geology	Lower Westphalian (mainly Productive Coal Measures)	-	0	4	0
Coal Mining Affected Area						
-	In an area which may be affected by coal mining activity. It is recommended that a coal mining report is obtained from the Coal Authority. Contact details are included in the Useful Contacts section of this report.		-	0	2	On Site
Shallow Mining Hazard						
-	Risk	Moderate	-	0	4	On Site
	Source	Information Services Group - British Geological Survey				
Natural Subsidence Hazard						
-	Risk	Low	-	-	5	On Site

Radon Affected Area

Less than 1% of homes are above the Action Level

0

5

On Site

Radon Protection Measures

Type Basic radon protective measures should be installed

0

5

On Site

Source Information Services Group (British Geological Survey)

Contemporary Trade Directory Entry (of possible contaminative use)

39	Name	Galglass Industrial	N	41	<u>10</u>	439000 402520
	Location	321 Hough Lane, Wombwell, BARNISLEY, South Yorkshire, S72 9LR				
	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	572	<u>10</u>	439000 403200
	Location	Littlefield Lane, Wombwell, BARNISLEY, South Yorkshire, S72 8DP				
	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	438500 402800
	Location	Waterside Park, Valley Way, Wombwell, BARNSELEY, South Yorkshire, S73 0SB				
	Classification	Electronic Component Manufacture				
	Premises Type	Single Site				
	Status	Active				
	Positional Quality	Automatically located to point of entry				

Contemporary Trade Directory Entry (of possible contaminative use)

42	Name	Chris Bell Haulage	S	914	10	438850 401150
	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	Murco Service Station	NE	948	10	440100 402800
	Location	91 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	910	10	438700 402200
	Location	Ford House, Barnsley Road, Wombwell, BARNSELEY, South Yorkshire, S73 8DD				
	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	656	10	438200 401110
	Location	Summer Lane, Wombwell, BARNSELEY, South Yorkshire, S73 8QH				
	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	438300 401490
	Location	27 School Street, Hemmingfield, BARNSELEY, South Yorkshire, S73 0PS				
	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	Smazys Dry Cleaners	NE	912	10	440000 402900
	Location	7 High Street, Wombwell, BARNSELEY, South Yorkshire, S73 8DA				
	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	912	10	440000 402900
	Location	Unit 2, Low Valley Industrial Estate, Wombwell, BARNSELEY, South Yorkshire, S73 8AG				
	Classification	Haulage Contractors				
	Premises Type	Head Office				
	Status	Active				
	Positional Quality	Automatically located to postcode unit				

Contemporary Trade Directory Entry (of possible contaminative use)

49	Name	Acorn Concrete Products	NE	995	10	439500 403100
	Location	Acorn House, Michells Industrial Park, Wombwell, BARNSELEY, South Yorkshire, S73 8HR				
	Classification	Concrete Pre-cast Manufacture				
	Premises Type	Single Site				
	Status	Active				
	Positional Quality	Automatically located to postcode unit				

Contemporary Trade Directory Entry (of possible contaminative use)

50	Name	Thomsby Printers	NE	925	10	440100 402900
	Location	Central Printing Works, Prospect Terrace, Wombwell, BARNSELEY, South Yorkshire, S73 8AR				
	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	993	10	439700 403300
	Location	Rimington Garage, Rimington Road, BARNSELEY, South Yorkshire, S73 8DQ				
	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	Galglass	N	41	10	439000 402520
	Location	321 Hough Lane, Wombwell, Barnsley, South Yorkshire, S73 9LR				
	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	543	<u>10</u>	439600 403300
	Location	Little Field Lane, Wombwell, BARNSELEY, South Yorkshire, S73 8D5				
	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	W	203	<u>10</u>	439700 403300
	Location	The Hut, Wood Walk, BARNSELEY, South Yorkshire, S73 0HG				
	Classification	Fireplace 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 Thornsbey & Son	NE	995	<u>10</u>	440100 403300
	Location	Central Printing Works, Wombwell, BARNSELEY, South Yorkshire, S73 0AR				
	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	541	<u>10</u>	439770 403190
	Location	7 Cemetery Road, Wombwell, BARNSELEY, South Yorkshire, S73 8HZ				
	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	530	<u>10</u>	439900 402900
	Location	George Street, Wombwell, BARNSELEY, South Yorkshire, S73 0DD				
	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 Silicones	NE	838	<u>10</u>	439800 403100
	Location	Michells Industrial Park, Bradbury Ball Lane, Wombwell, BARNSELEY, South Yorkshire, S73 8HR				
	Classification	Rubber Manufacture				
	Premises Type	Single Site				



Envirocheck
A Landmark Group

Details

Status	Positional Quality	Automatically located to position and
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Post 1995 Planning Application (or possible contaminative use)

Name	Industrial (extension)	NE	150	1	403200	403210
Location	(Kraiglast Industrial Ltd. Hough Lane, Worsley, W. MANCHESTER, South Yorkshire, S23 0					
4. Priority	Landfill Refuse Transfer Station, Worsley Council					
Exception	Light Industrial					
Application Reference	B/03/0703/W/W					
Date	29 Jun 2000					
Status	Detailed Plans Submitted					
Site Area	Not given					
Positional Quality	Manually located to road within address					

Post 1995 Planning Application (of possible contaminative use)

50	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	29 Jul 1998				
	Status	Detailed Plans Submitted				
	Site Area	0.00 hectares				
	Positional Quality	Unknown				

Post 1995 Planning Application (of possible contaminative use)

51	Name	Vehicle Workshop (Conversion)	S	633	1	439140 401450
	Location	18 Cemetery Road, Hemingfield, BARNSELEY, South Yorkshire, S73 0PU				
	Authority	Barnsley Metropolitan Borough Council				
	Description	Vehicle Maintenance				
	Application Reference	5/00/0004/WW				
	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)

52	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	93/185				
	Dated	13 Feb 1998				
	Status	Detailed Plans Submitted				
	Site Area	1.00 hectares				
	Positional Quality	Unknown				

Post 1995 Planning Application (of possible contaminative use)

53	Name	Security Fence	NE	967	1	42° 19' 46° 19'
	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)

54	Name	Manufacturing (cpu)	N	101	1	439350 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

439990

402990

Mapping Dates(s) 1855

Potentially Contaminative Use (Past Use)

Mineral railway

S

783

11

439990

401990

Mapping Dates(s) 1893

Potentially Contaminative Use (Past Use)

General quarrying

S

455

11

439920

401550

Mapping Dates(s) 1925

Potentially Contaminative Use (Past Use)

Railways

W

2

11

438890

402390

Mapping Dates(s) 1903, 1933, 1955, 1959

Potentially Contaminative Use (Past Use)

Sewage

NW

494

11

438580

402550

Mapping Dates(s) 1938, 1955

Potentially Contaminative Use (Past Use)

General quarrying

W

725

11

438190

402150

Mapping Dates(s) 1855, 1893

Potentially Contaminative Use (Past Use)

Mineral railway

NW

962

11

438290

403180

Mapping Dates(s) 1907, 1935

Potentially Contaminative Use (Past Use)

Railways

NW

914

11

438160

403030

Mapping Dates(s) 1907, 1933, 1955, 1989

Potentially Contaminative Use (Past Use)

Resp. unknown constituents

SE

715

11

439590

401910

Mapping Dates(s) 1905

Potentially Contaminative Use (Past Use)

Factory or works - use not specified

SW

20

11

439000

402180

Mapping Dates(s) 1909

Potentially Contaminative Use (Past Use)					
Cemetery or Graveyard	SW	891	11	433510	401390
Mapping Dates(s)	1905, 1936, 1956, 1959				
Potentially Contaminative Use (Past Use)					
Heap, unknown constituents	W	524	11	433540	402540
Mapping Dates(s)	1938				
Potentially Contaminative Use (Past Use)					
Mining of coal & lignite	NW	325	11	433510	402650
Mapping Dates(s)	1855, 1894, 1907, 1938, 1955				
Potentially Contaminative Use (Past Use)					
General quarrying	SE	913	11	433510	401450
Mapping Dates(s)	1855, 1893				
Potentially Contaminative Use (Past Use)					
Metal casting/foundries	-	0	11	On Site	
Mapping Dates(s)	1938, 1956				
Potentially Contaminative Use (Past Use)					
General quarrying	NW	873	11	433540	402720
Mapping Dates(s)	1855, 1893, 1905, 1935				
Potentially Contaminative Use (Past Use)					
General quarrying	N	343	11	433160	402900
Mapping Dates(s)	1905				
Potentially Contaminative Use (Past Use)					
Railways	-	0	11	On Site	
Mapping Dates(s)	1905, 1938, 1956				
Potentially Contaminative Use (Past Use)					
Clay bricks & tiles (manufacture)	NW	452	11	433540	402950
Mapping Dates(s)	1893				
Potentially Contaminative Use (Past Use)					
Mineral railway	NW	788	11	433540	403040
Mapping Dates(s)	1854, 1894, 1907, 1935, 1955				
Potentially Contaminative Use (Past Use)					
Mineral railway	NW	561	11	433330	402530
Mapping Dates(s)	1855, 1895, 1905, 1938				

Potentially Contaminative Use (Past Use)					
	Mining of coal & lignite	E	439	<u>11</u>	438590 402090
Mapping Dates(s)	1893				
Potentially Contaminative Use (Past Use)					
	Factory or works - use not specified	-	0	<u>11</u>	On Site
Mapping Dates(s)	1959				
Potentially Contaminative Use (Past Use)					
	General quarrying	W	555	<u>11</u>	438520 402590
Mapping Dates(s)	1893				
Potentially Contaminative Use (Past Use)					
	Cemetery or Graveyard	N	631	<u>11</u>	438510 403090
Mapping Dates(s)	1894, 1907, 1933, 1956, 1959				

2. POTENTIALLY CONTAMINATIVE USE (Past Use)

Potentially Contaminative Use (Non-Water Related)

Unknown Filled Ground (Pit, quarry etc)

E

458

11

438590

402050

Mapping Dates(s) 1999

Potentially Contaminative Use (Non-Water Related)

Unknown Filled Ground (Pit, quarry etc)

NW

325

11

438510

402650

Mapping Dates(s) 1999

Potentially Contaminative Use (Non-Water Related)

Unknown Filled Ground (Pit, quarry etc)

N

343

11

438160

402300

Mapping Dates(s) 1999

Potentially Contaminative Use (Non-Water Related)

Unknown Filled Ground (Pit, quarry etc)

NE

954

11

437

40

Mapping Dates(s) 1999

Potentially Contaminative Use (Non-Water Related)

Unknown Filled Ground (Pit, quarry etc)

S

455

11

438920

401650

Mapping Dates(s) 1999

Potentially Contaminative Use (Non-Water Related)

Unknown Filled Ground (Pit, quarry etc)

NW

452

11

438540

402850

Mapping Dates(s) 1999

Potentially Contaminative Use (Non-Water Related)

Unknown Filled Ground (Pit, quarry etc)

SE

903

11

438740

401430

Mapping Dates(s) 1999

Potentially Contaminative Use (Non-Water Related)

Unknown Filled Ground (Pit, quarry etc)

W

555

11

43

402590

Mapping Dates(s) 1999

Potentially Contaminative Use (Water Related)

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

SE

494

11

438540

401930

Mapping Dates(s) 1995



Potentially Contaminative Use (Water Related)

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

SE

882

11

440020
401850

Mapping Dates(s) 1855

Potentially Contaminative Use (Water Related)

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

W

870

11

438020
402180

Mapping Dates(s) 1856

Potentially Contaminative Use (Water Related)

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

SE

886

11

438730
401950

Mapping Dates(s) 1893

Potentially Contaminative Use (Water Related)

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

SE

861

11

438530
402050

Mapping Dates(s) 1893

Potentially Contaminative Use (Water Related)

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

N

181

11

438830
402700

Mapping Dates(s) 1856

Unadopted Green Belt

Plan name Bamsley Metropolitan Borough Council Unitary Development Plan

0

1

On Site

Status Deposit Draft

Plan Date 30 Nov 1994

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



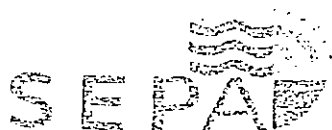
Licensed Partner

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

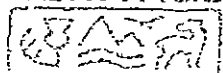
Value Added Reseller



CYNGOR CEFN GWLAD CYMRU
COUNTRYSIDE COUNCIL FOR WALES

Countryside Council For Wales

SCOTTISH
NATURAL
HERITAGE



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)
Unadopted Green Belt
Telephone 01226 772600
Fax 01226 772595
Website www.barnsley.gov.uk
Last Update 1 Mar 2000
- 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, Almondsbury, Bristol, Avon, BS12 4UD
Groundwater Vulnerability
Telephone 01454 62 1
Fax 01454 624 409
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 1:525 000 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 1999
Last Update 31 Aug 1999
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 8PG
Registered Waste Treatment or Disposal Sites
Registered Landfill Sites
Telephone 0113 244 0191
Fax 0113 245 1889
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 3276
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, NG18 4RG
Coal Mining Affected Areas
Telephone 0845 7628848
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 0RQ
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 (Past Use)

Last Update 1 Sep 2000

Potentially Contaminative Uses (Water 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.

Other Contacts

Contact Name and Address

Ordnance Survey

Romsey Road, Southampton, Hampshire, SO16 4GU

Telephone 023 8079 2000

Fax 023 8079 2515

Website www.ordnancesurvey.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 McBaron.35993

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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 1962

National Grid Series	Mapsheet	Scale	Year
Ordnance Survey Plan	SE3801	1:2,500	1962
Ordnance Survey Plan	SE3802	1:2,500	1962
Ordnance Survey Plan	SE3901	1:2,500	1962
Ordnance Survey Plan	SE3902	1:2,500	1962

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 1966 to 1967

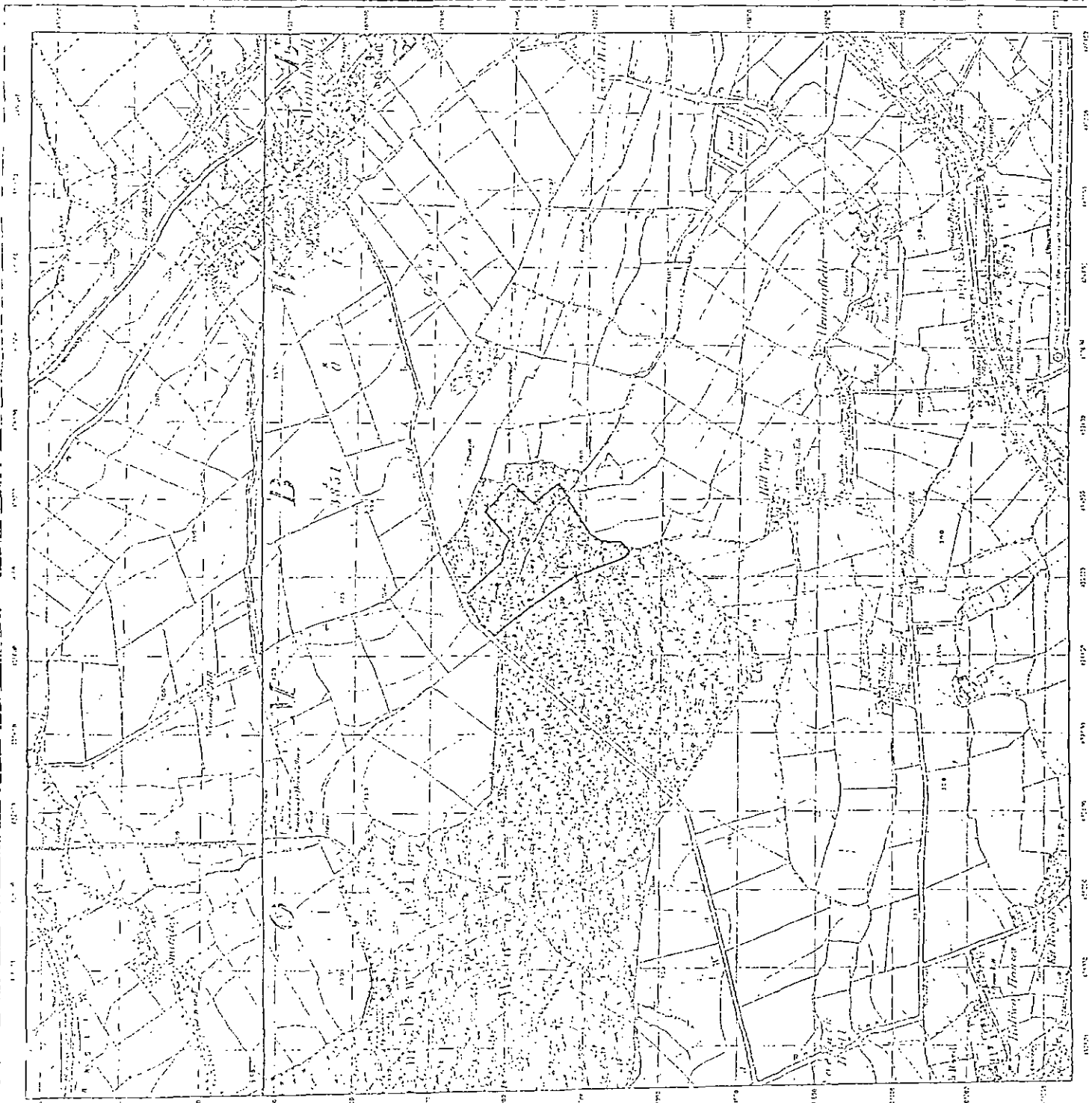
National Grid Series	Mapsheet	Scale	Year
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Ordnance Survey Plan	SE40SW	1:10,560	1967

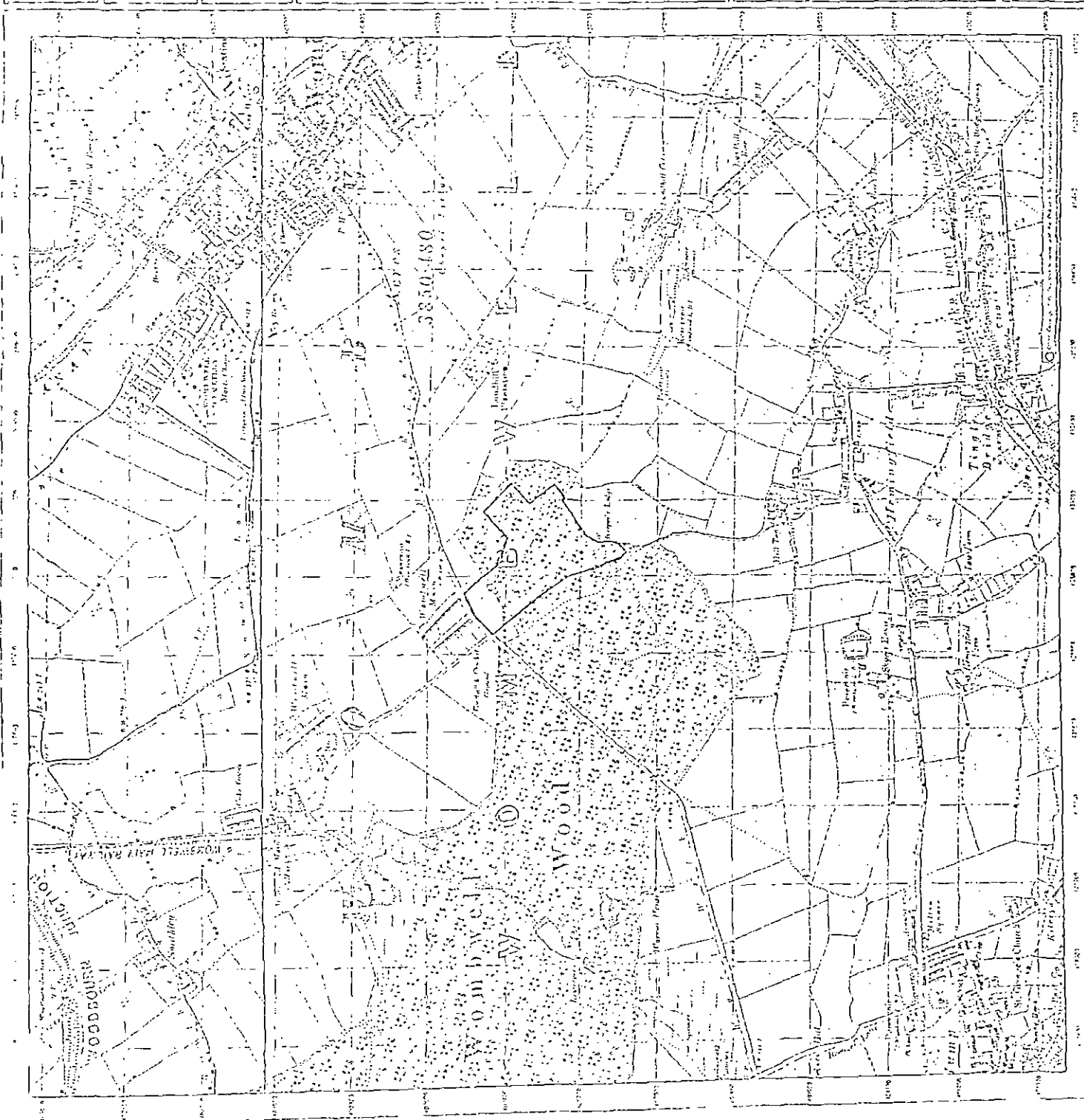
Ordnance Survey Plan Published 1980

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







Envirocheck

SITE DETAILS

Project Name: Wombwell UD & PHA
Client: Wombwell Urban Development
Date: 10/10/2010

SITE DETAILS

Site Name: Wombwell Urban Development
Site Address: Wombwell Urban Development
Site Area: 10.00 Ha

Site Description: Wombwell Urban Development
Site Location: Wombwell Urban Development
Site Status: Wombwell Urban Development

Site History: Wombwell Urban Development
Site Features: Wombwell Urban Development
Site Notes: Wombwell Urban Development

Site Photos: Wombwell Urban Development
Site Plans: Wombwell Urban Development
Site Documents: Wombwell Urban Development

Site Contact: Wombwell Urban Development
Site Manager: Wombwell Urban Development
Site Engineer: Wombwell Urban Development

Site Survey: Wombwell Urban Development
Site Design: Wombwell Urban Development
Site Construction: Wombwell Urban Development

Site Completion: Wombwell Urban Development
Site Handover: Wombwell Urban Development
Site Closeout: Wombwell Urban Development

Site Review: Wombwell Urban Development
Site Audit: Wombwell Urban Development
Site Report: Wombwell Urban Development

Site Signage: Wombwell Urban Development
Site Security: Wombwell Urban Development
Site Insurance: Wombwell Urban Development

Site Maintenance: Wombwell Urban Development
Site Repairs: Wombwell Urban Development
Site Upkeep: Wombwell Urban Development

Site Safety: Wombwell Urban Development
Site Health: Wombwell Urban Development
Site Environment: Wombwell Urban Development

Site Quality: Wombwell Urban Development
Site Quantity: Wombwell Urban Development
Site Value: Wombwell Urban Development

Site Risk: Wombwell Urban Development
Site Impact: Wombwell Urban Development
Site Benefit: Wombwell Urban Development

Site Cost: Wombwell Urban Development
Site Revenue: Wombwell Urban Development
Site Profit: Wombwell Urban Development

Site Loss: Wombwell Urban Development
Site Gain: Wombwell Urban Development
Site Net: Wombwell Urban Development

Site Total: Wombwell Urban Development
Site Average: Wombwell Urban Development
Site Median: Wombwell Urban Development

Site Mode: Wombwell Urban Development
Site Range: Wombwell Urban Development
Site Variance: Wombwell Urban Development

Site Standard Deviation: Wombwell Urban Development
Site Coefficient of Variation: Wombwell Urban Development
Site Skewness: Wombwell Urban Development

Site Kurtosis: Wombwell Urban Development
Site Jarque-Bera Statistic: Wombwell Urban Development
Site Shapiro-Wilk Test: Wombwell Urban Development

Site Kolmogorov-Smirnov Test: Wombwell Urban Development
Site Anderson-Darling Test: Wombwell Urban Development
Site Lilliefors Test: Wombwell Urban Development

Site D'Agostino-Pearson Test: Wombwell Urban Development
Site Omnibus Test: Wombwell Urban Development
Site Jarque-Bera Test: Wombwell Urban Development

Site Shapiro-Wilk Test: Wombwell Urban Development
Site Kolmogorov-Smirnov Test: Wombwell Urban Development
Site Anderson-Darling Test: Wombwell Urban Development

Site Lilliefors Test: Wombwell Urban Development
Site D'Agostino-Pearson Test: Wombwell Urban Development
Site Omnibus Test: Wombwell Urban Development

Site Jarque-Bera Test: Wombwell Urban Development
Site Shapiro-Wilk Test: Wombwell Urban Development
Site Kolmogorov-Smirnov Test: Wombwell Urban Development

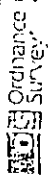
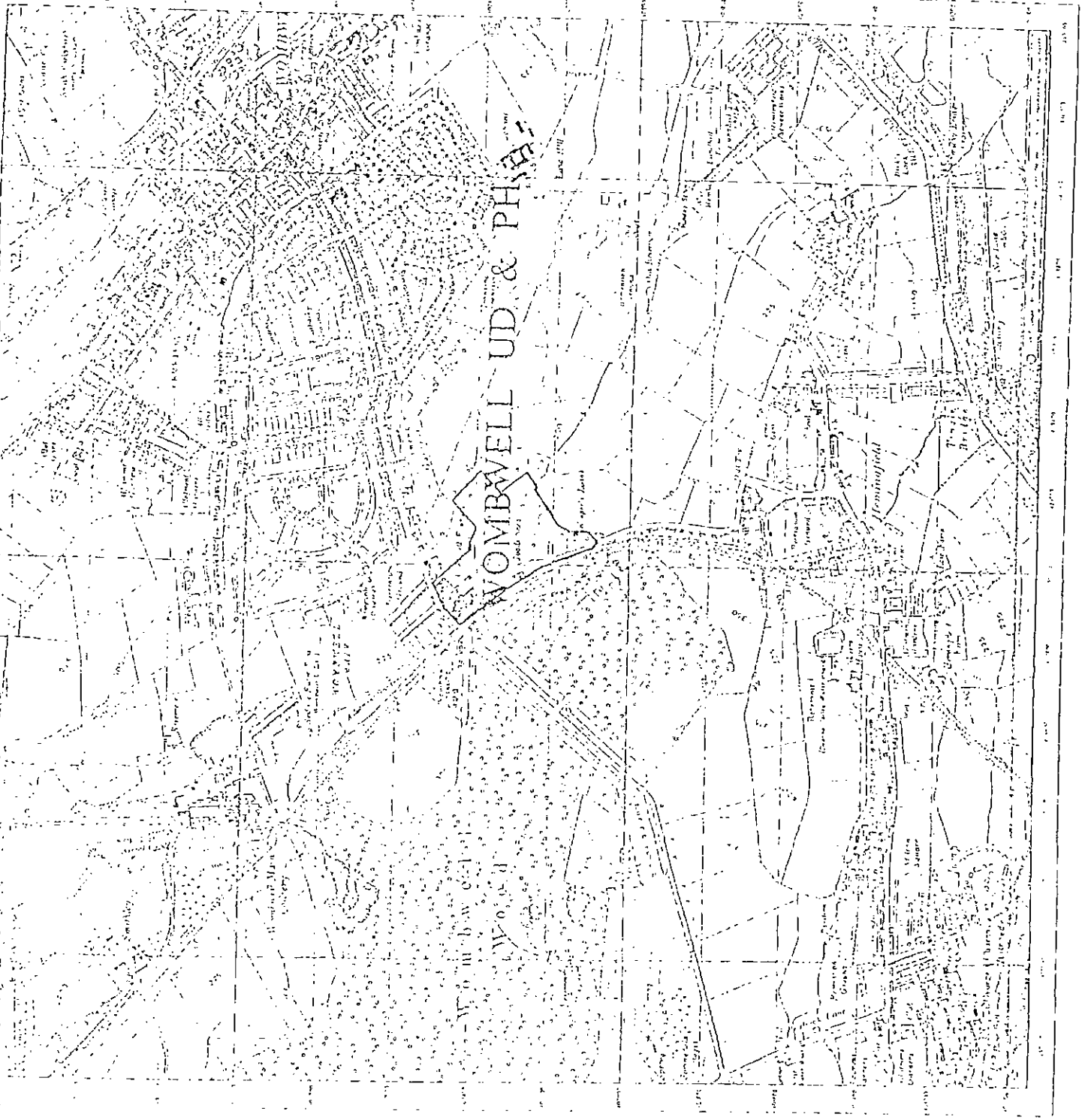
Site Anderson-Darling Test: Wombwell Urban Development
Site Lilliefors Test: Wombwell Urban Development
Site D'Agostino-Pearson Test: Wombwell Urban Development

Site Omnibus Test: Wombwell Urban Development
Site Jarque-Bera Test: Wombwell Urban Development
Site Shapiro-Wilk Test: Wombwell Urban Development

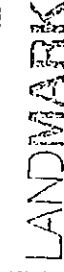
Site Kolmogorov-Smirnov Test: Wombwell Urban Development
Site Anderson-Darling Test: Wombwell Urban Development
Site Lilliefors Test: Wombwell Urban Development

Site D'Agostino-Pearson Test: Wombwell Urban Development
Site Omnibus Test: Wombwell Urban Development
Site Jarque-Bera Test: Wombwell Urban Development

WOMBWELL UD & PHA



Ordnance Survey

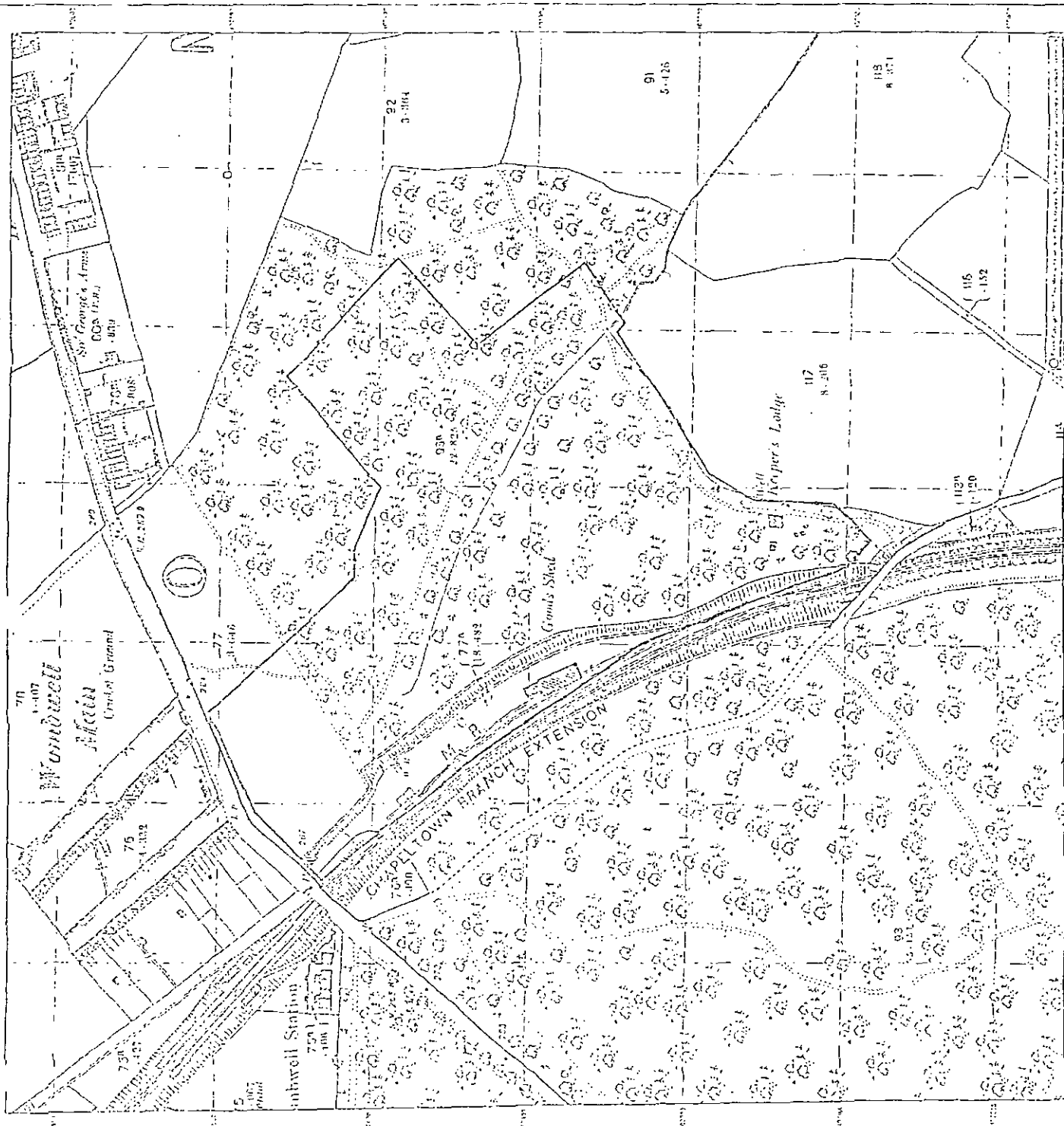
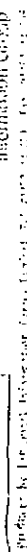


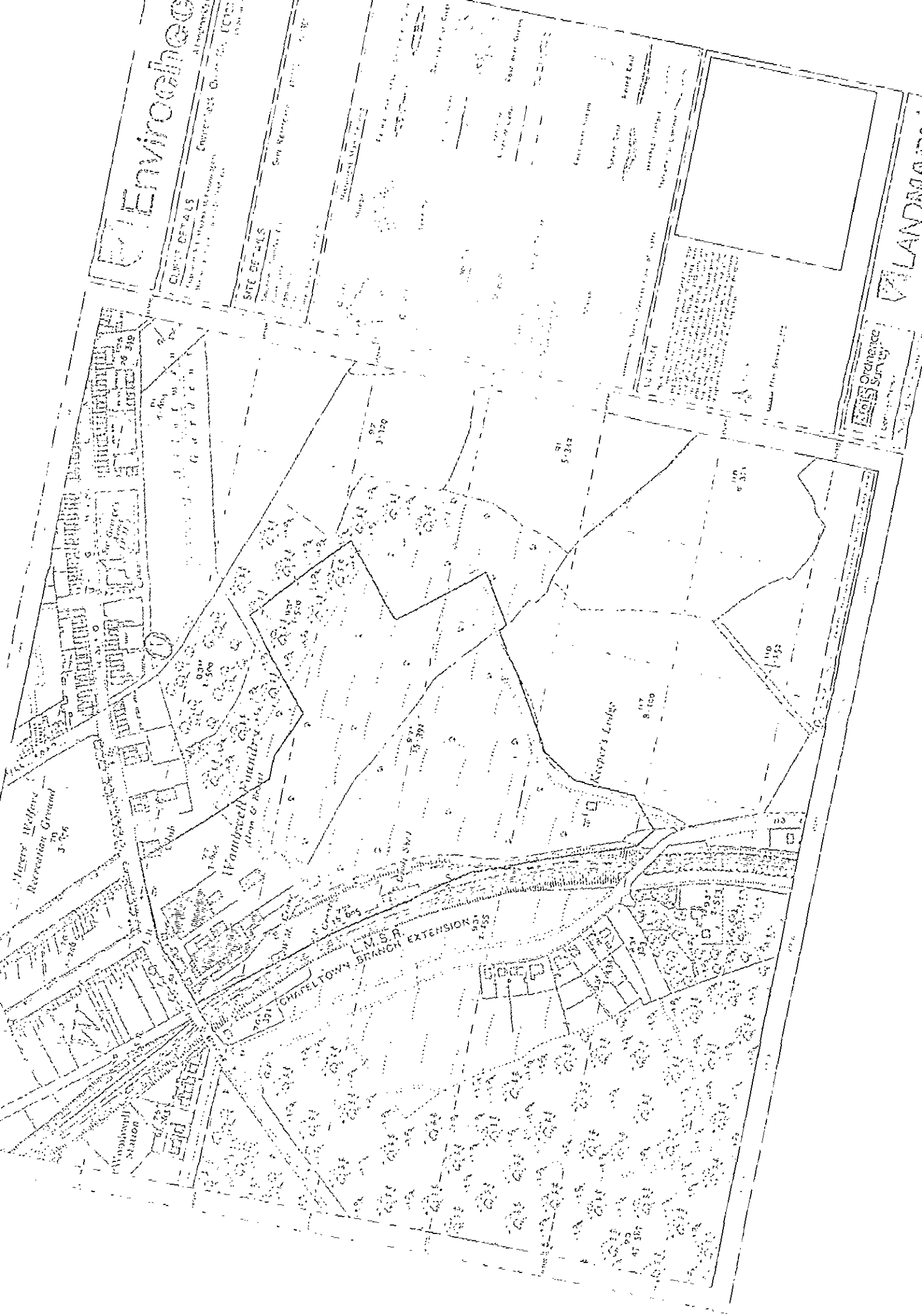
LANDMARK

Information Group







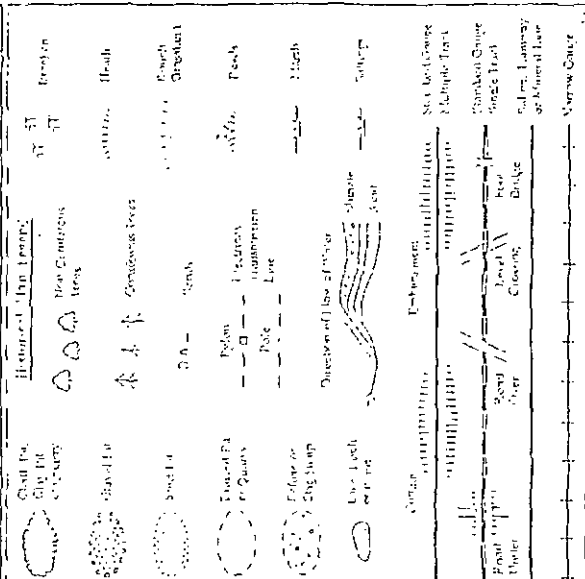




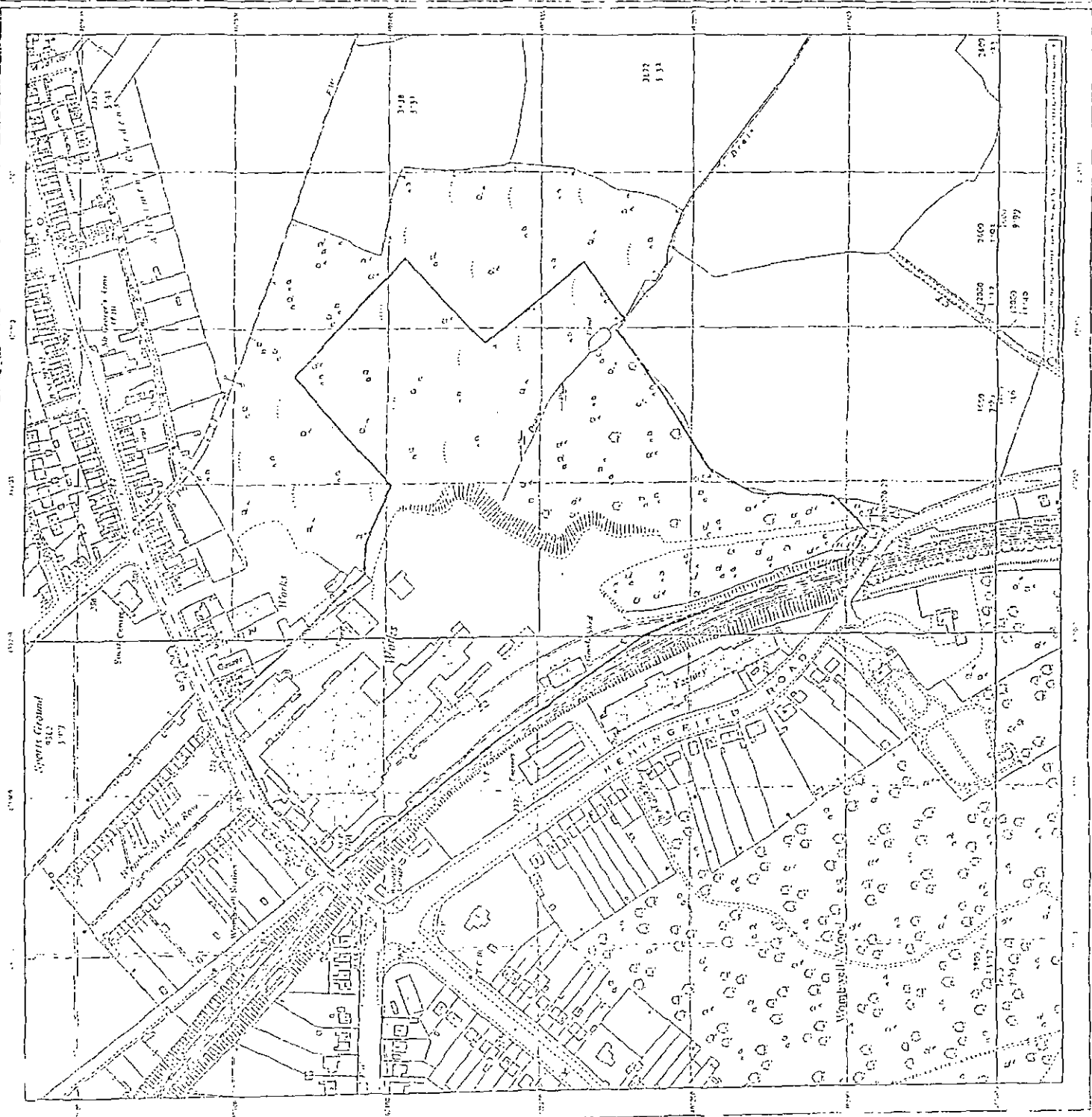
CLIENT DETAILS

Customer Ref: M09768 (January 1995)
Business: Mary Leam CP Products
Enquiries Order No. EC62269-1-1
Reference No.

SITE DETAILS		Grid Reference	1500g	100300
Woodford Surgery, LU				
March 2006				
Woodford				
Barnack				
South Bedfordshire, UK				

[illegible]

Geographical Information Systems
LANDMARK
 Information Group
 10000 Lakeside Drive, Suite 100, Irvine, CA 92618-1697
 (714) 261-1400





APPENDIX I

Coal Authority Mining Report

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, BARNSELY, 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 530m depth, the last date of working being 1980.

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 300 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

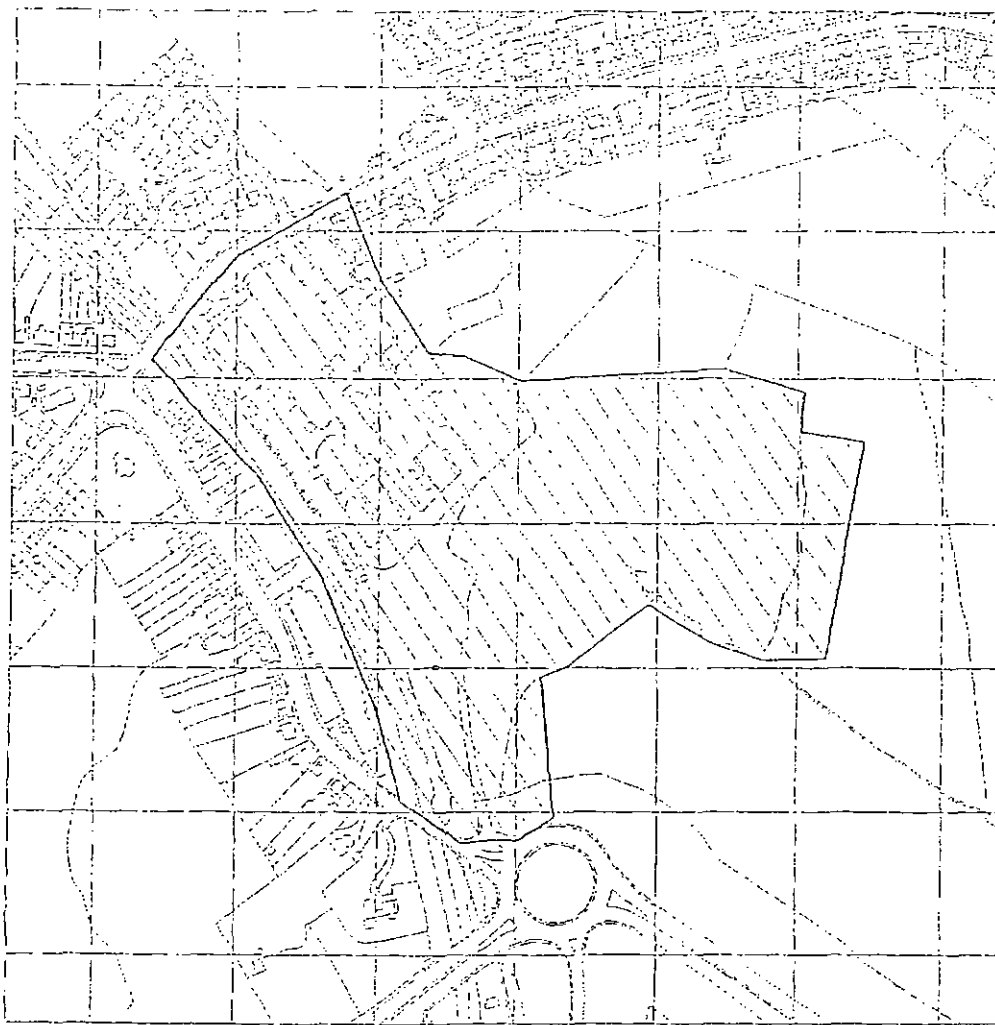


Albert Schofield

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: ALS1057A901.

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

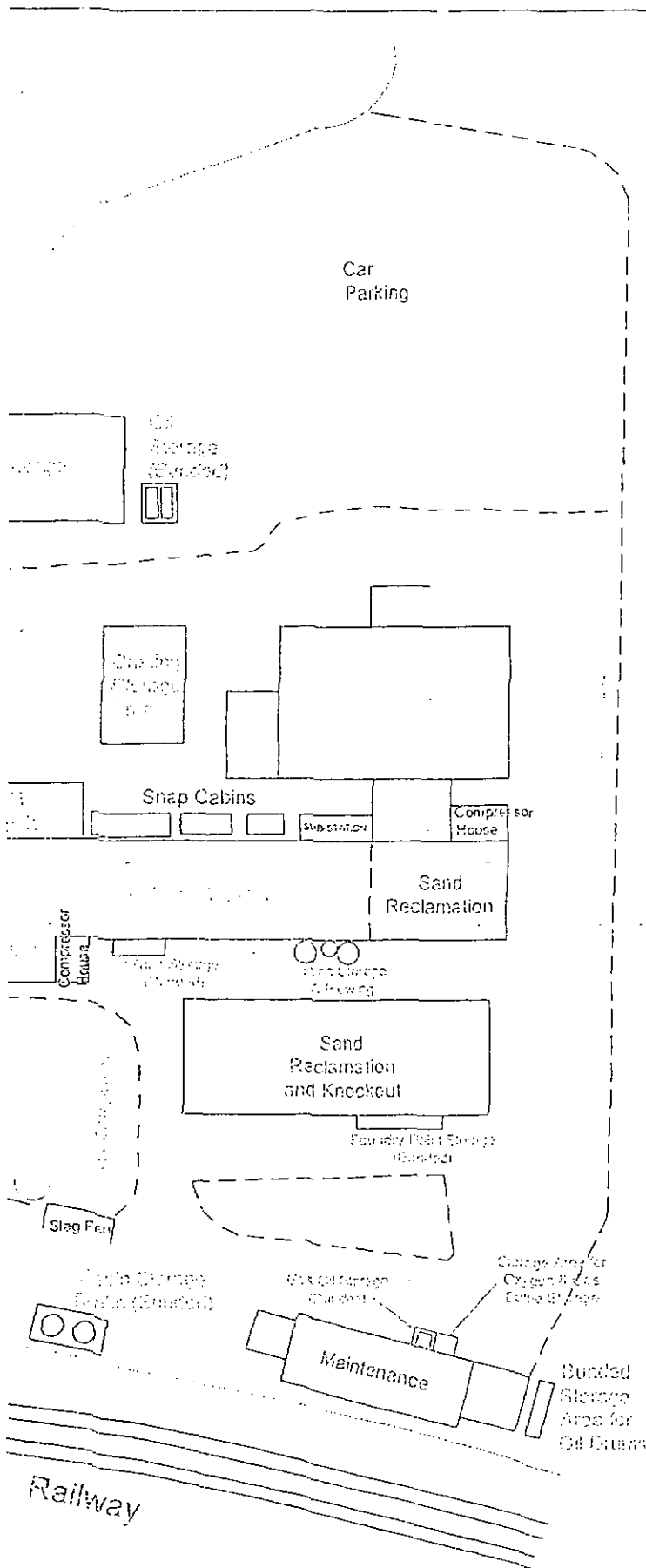


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APPENDIX J

Historical Site Use Plans

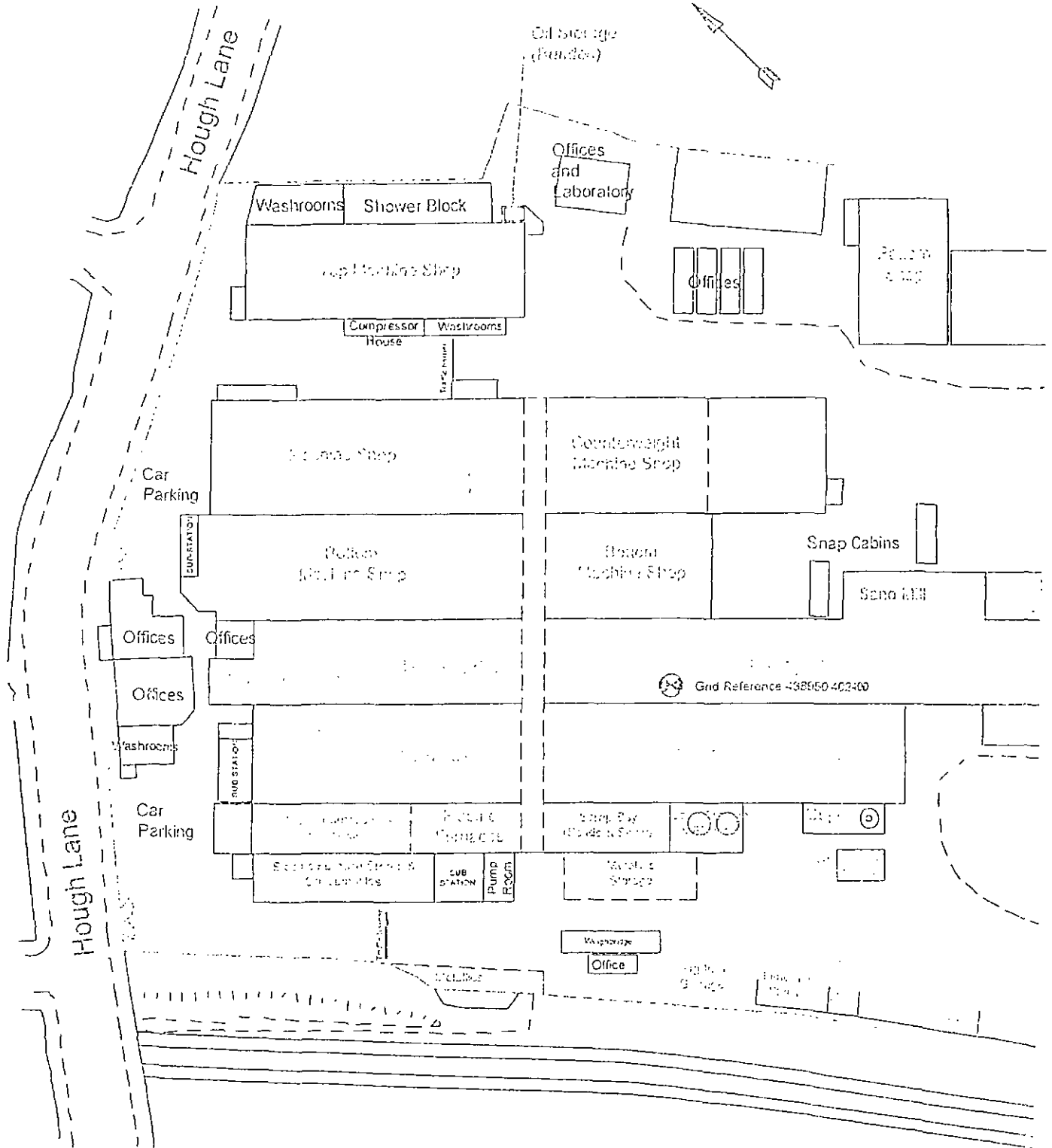


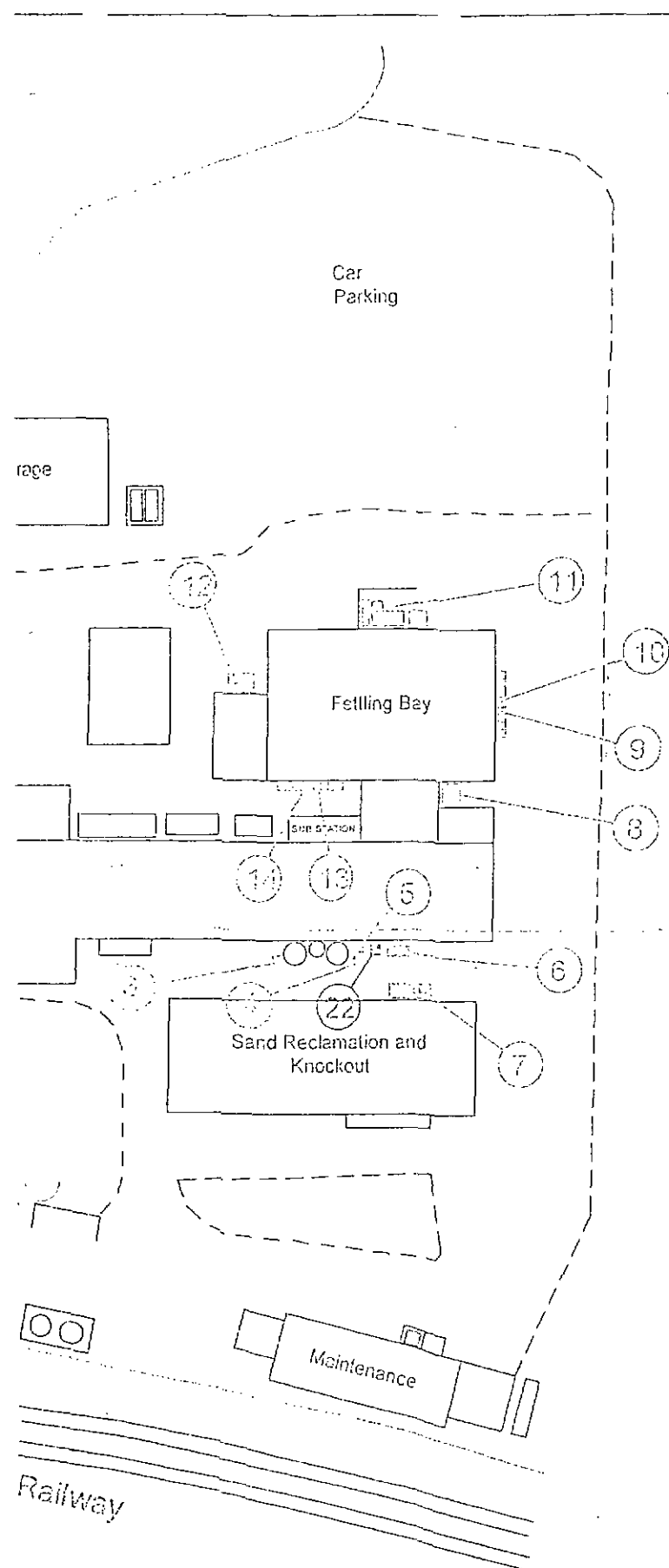
COLOUR KEY

- Storage Buildings & Areas
- Mould & Core Making
- Metal Melting
- Sand Reclamation
- Fetting, Grinding & Shotblast
- Heat Treatment
- Pattern Making
- Casting Paining
- Casting Machining
- Non Production Ancillaries

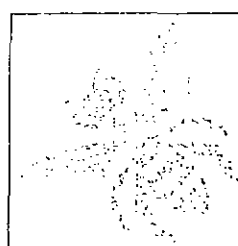
	Burdett Engineering and Environmental Services Ltd. 1, Ryland Close Millers Dale Oldham Tel: 0161 275 1100 Email: enquiries@bessltd.co.uk	Customer WOMBWELL FOUNDRY LTD		
		Title Layout of works showing production areas		
		Drawn by	R.F.S.	Scale (on A4) 1:1250
		Date	6/10/01	Drawing Number BL 912/3

North





No.	Type	Discharge Point
1	Dry Bag Filter	Cupola Gas Cleaning Vent
2	Dry Bag Filter	Sand Storage Hoppers
3	Dry Bag Filter	Sand Storage Hoppers
4	Dry Bag Filter	Sand Storage Hoppers
5	Dry Bag Filter	Sand Storage Hoppers
6	Dry Bag Filter	Sand Reclamation Unit
8	Dry Bag Filter	Shotblast Room
9	Dry Bag Filter	Fettling Shop
10	Dry Bag Filter	Fettling Shop
11	Dry Bag Filter	Fettling Shop
12	Dry Bag Filter	Shotblast
13	Dry Bag Filter	Fettling Shop
14	Dry Bag Filter	Fettling Shop
15	Vent	Paint Spray
16	Vent	Paint Spray
17	Vent	PA Room Exhaust
18	Vent	Machining Area
19	Vent	Automated Crane
20	Dry Bag Filter	Abandonment Area
21	Vent	Cooling Tower
22	Vent	Cooling Tower



**Burdett
Engineering and
Environmental
Services Ltd.**

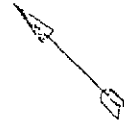
1, Victoria Close
Buckley
Dorset
DE21 1EX

Tel: 01302 515 994
email: engineering@burdett.co.uk

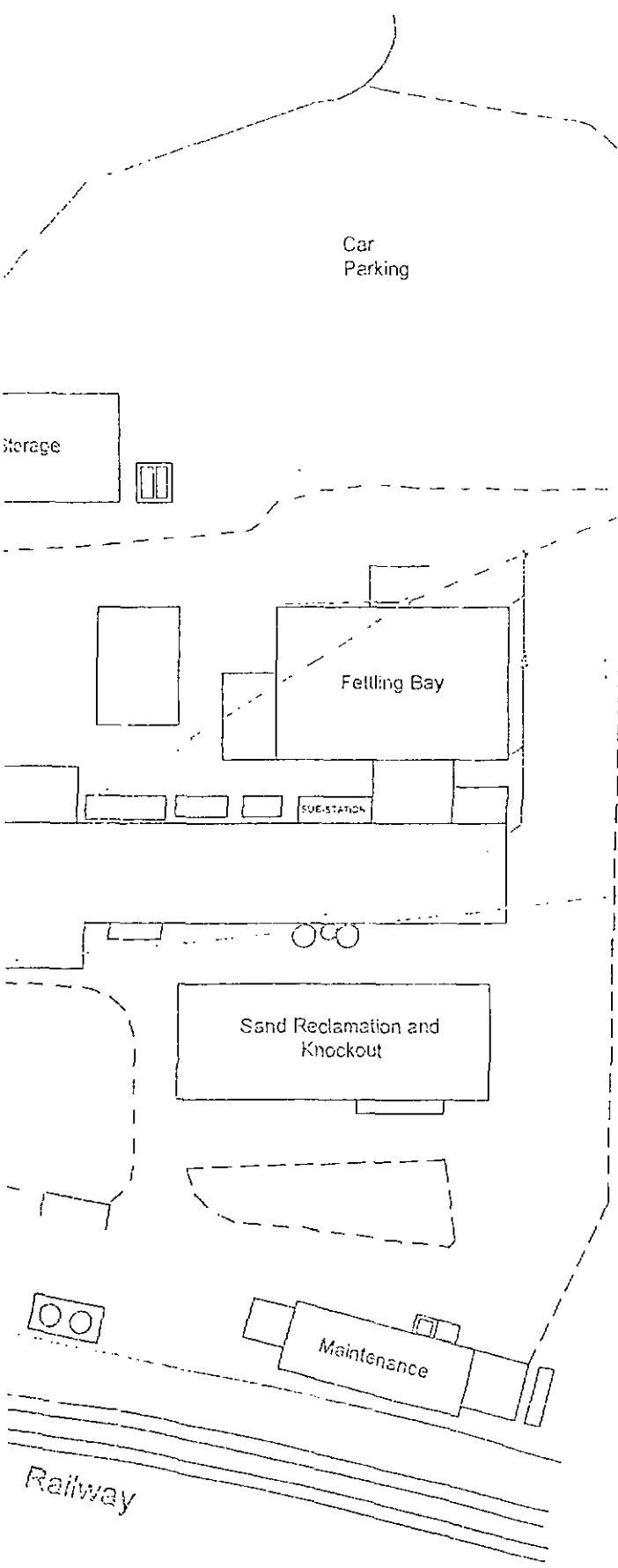
Customer **WOMBSWELL FOUNDRY LTD**

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

Drawn by	R.F.B.	Scales (on A4)	Drawing Number
Date	10/10/01	1:1250	BL 912/4



Drawing
 No. 019012/5
 019012/5
 019012/5
 019012/5



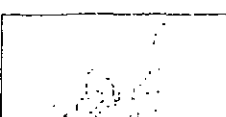
KEY

Public Foul Sewer

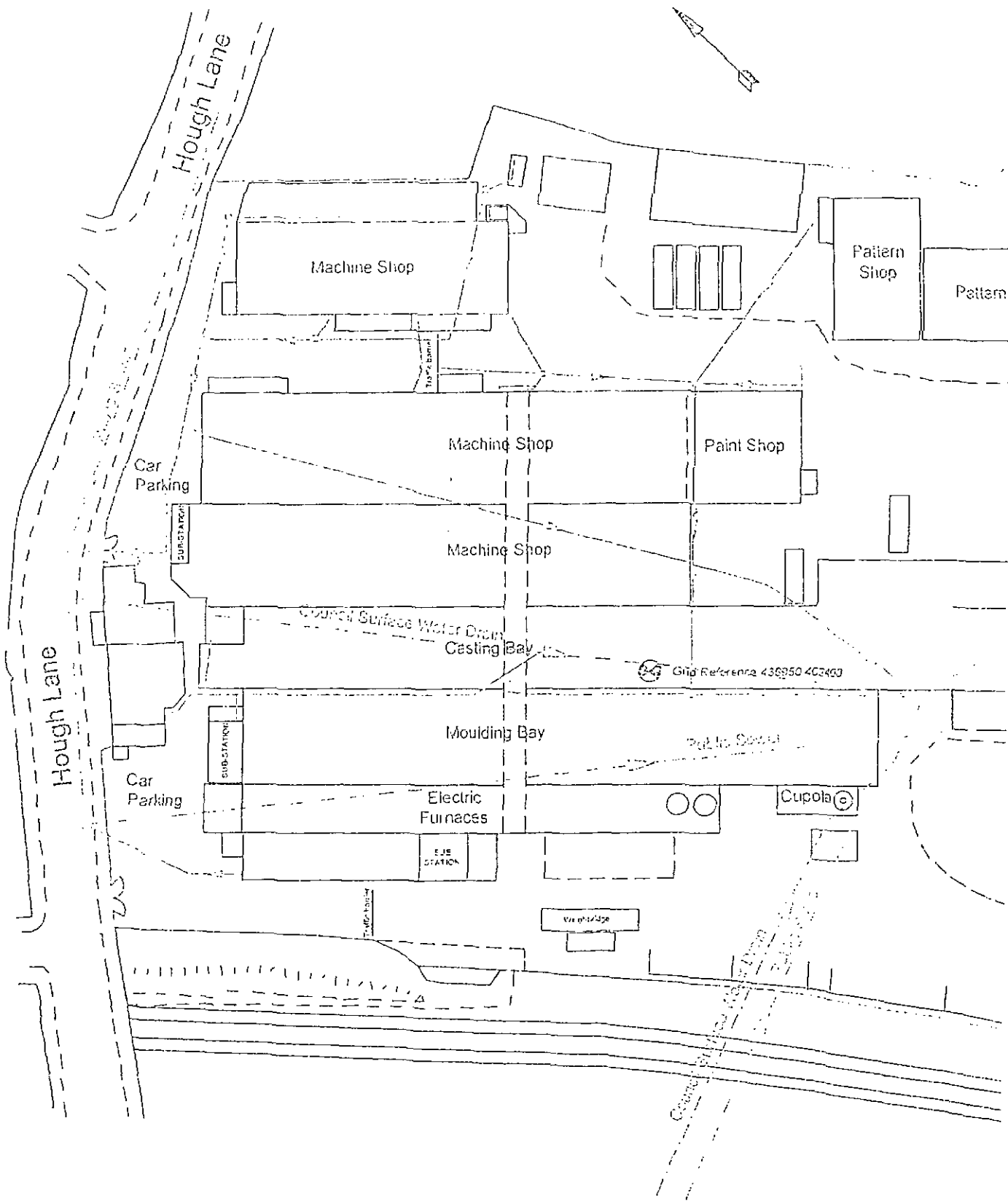
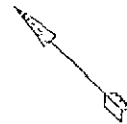
Foul Drains

Council Surface Water Drains

Surface Water Drains

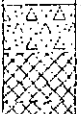
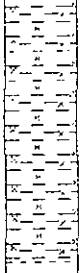
	Burdett Engineering and Environmental Services Ltd.	Customer WOMEWELL FOUNDRY LTD		
	1, Victoria Close Marlow Bucks DP8 3JN	Title Layout of works showing foul and surface water drainage		
	Tel : 0494 71954 Cable : meosw/Essex/UK	Drawn by R.F.D.	Scales (on A4) 1:1250	Drawing Number BL 912/5
		Date 17/10/01		

North

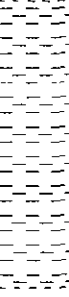


APPENDIX B

Trial Pit Logs

Trial Pit ID TP1A		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			Co-ords:		Field Records: DRS05/03		www.joynespike.co.uk		
Ground Level:			Logged DRS		Chkd. DRS		Appr. 		
Strata Description	Depth (m)	Level (m)	Legend	Sample Type	Sample Depth (m)	Test Results	Groundwater Records		
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.									
1.0m 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				

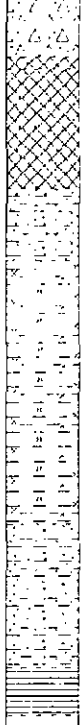
Trial Pit ID: TP2A		Client Ben Bailey Homes Limited.				Sheet Sheet 1 of 1		JPA JOYNES PIKE & ASSOCIATES LTD www.joynespike.co.uk	
Job No: 232095		Site Land at Wombwell Foundry, off Hough Lane, Wombwell				Date: 24/11/2005			
Excavation Equipment 360 degree excavator		Co-ords:		Field Records: DRS05/03		Logged DRS			
		Ground Level		Chkd DRS		Appr: 			
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							
		1.80							
Firm to orange brown slightly mottled grey silty CLAY.									
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		Field Records: DRS05/03			
				Ground Level		Logged DRS		Chkd DRS	
						Appr. 			
Strata Description				Depth (m)	Level (m)	Legend	Sample Type	Sample Depth (m)	Test Results
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					
MADE GROUND: 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: - Excavation carried out adjacent to the stantions to detemrine foundations. - No groundwater encountered. - Sides remained stable throughout excavation. - 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		 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:				Field Records DRS05/03		
		Ground Level				Logged DRS	Chkd ONS	Appr: Z
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		Client Ben Bailey Homes Limited.				Sheet Sheet 1 of 1		JPA JOYNES PIKE & ASSOCIATES LTD www.joynespike.co.uk		
TP5A		Site Land at Wombwell Foundry, off Hough Lane, Wombwell				Date 23/11/2005				
Job No 232095										
Excavation Equipment: 360 degree excavator				Co-ords		Field Records: DRS05/03				
				Ground Level		Logged DRS		Chkd DJS		
Strata Description				Depth (m)	Level (m)	Legend	Sample Type	Sample Depth (m)	Test Results	Groundwater Records
MADE GROUND: Dense black sand with occasional brick.				1.00						
MADE GROUND: Medium dense red crushed brick and d 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 (beg!) 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 TP6A		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		Field Records: DRS05/03				
			Ground Level			Logged DRS	Chkd DRS	Appr: 	
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. 1. Excavation carried out down the side of the concrete base with the concrete locally deepened to 2.0m on the gable end. 2. No groundwater encountered. 3. Sides remained stable throughout excavation. 4. Pit terminated at 3.8m (begl).						Sample Type Key D - Disturbed Representative B - Bulk Representative S - Spot Non-Representative W - Water PID - PID Reading			

Trial Pit ID TP7A		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 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.		0.80						
m 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 moderatley 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 (begl).					Sample Type Key D - Disturbed Representative B - Bulk Representative S - Spot Non-Representative W - Water PID - PID Reading			

Trial Pit ID TP8A		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		Field Records DRS05/03				
		Ground Level				Logged DRS	Chkd. OZS	Appr. 
Strata Description		Depth (m)	Level (m)	Legend	Sample Type	Sample Depth (m)	Test Results	Groundwater Records
MADE GROUND: Loose to medium dense red brown gravelly sand with ash, clinker and brick.								
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 B - Bulk Representative S - Spot Non-Representative W - Water PID - PID Reading		

Trial Pit ID: TP9A		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		Field Records: DRS05/03				
			Ground Level:		Logged: DRS		Chkd: 	Appr: 	
Strata Description			Depth (m)	Level (m)	Legend	Sample Type	Sample Depth (m)	Test Results	Groundwater Records
MADE GROUND: Concrete.									
MADE GROUND: Medium dense black red gravelly sand. Gravel is of ash, clinker and brick.			0.30						
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 PID - PID Reading			

Trial Pit ID P10A		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				Co-ords		Field Records DRS05/03		www.joynespike.co.uk
				Ground Level		Logged DRS	Chkd 	Appr. 
Strata Description				Depth (m)	Level (m)	Legend	Sample Type	Sample Depth (m)
MADE GROUND: Concrete.				0.20				
MADE GROUND: Very dense black brown red gravelly sand with ash, clinker and brick.								
End of Trial Pit at 0.60 m				0.60				
Remarks: - Concrete base stands 0.3m above ground level, base is 0.5m thick in total. - No groundwater encountered. - Sides remained stable throughout excavation. - Pit terminated at 0.6m (begl) due to dense ground.						Sample Type Key O - Disturbed Representative B - Bulk Representative S - Spot Non-Representative W - Water PID - PID Reading		

Trial Pit ID: P11A		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		Field Records: DRS05/03		Chkd: ORS	Appr: 	
				Ground Level		Logged: DRS				
Strata Description				Depth (m)	Level (m)	Legend	Sample Type	Sample Depth (m)	Test Results	Groundwater Records
MADE GROUND: Loose to medium dense orange sand.				0.50						
MADE GROUND: Loose to medium dense gravelly sand with ash, clinker and brick.										
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 - 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		
TP12A		Site Land at Wombwell Foundry, off Hough Lane, Wombwell				Date 24/11/2005				
Job No 232095										
Excavation Equipment 360 degree excavator				Co-ords		Field Records NLM0503				
				Ground Level		Logged NMCC		Chkd DPS	Appr. 	
Strata Description				Depth (m)	Level (m)	Legend	Sample Type	Sample Depth (m)	Test Results	Groundwater Records
MADE GROUND: Sandy topsoil with whole brick and brick fragments.										
Firm orange brown CLAY with rootlets.				1.60						
End of Trial Pit at 1.90 m				1.90						
Remarks 1. No groundwater encountered. 2. Sides remained stable throughout excavation. 3. Pit terminated at 1.90m (begl) due to base of concrete.							Sample Type Key D - Disturbed Representative B - Bulk Representative S - Spot Non-Representative W - Water PID - PID Reading			

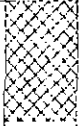
Trial Pit ID		Client Ben Bailey Homes Limited.				Sheet: Sheet 1 of 1		JPA JOYNES PIKE & ASSOCIATES LTD www.joynespike.co.uk									
P13A		Site Land at Wombwell Foundry, off Hough Lane, Wombwell				Date 24/11/2005											
Job No 232095						Field Records: NLM0504											
Excavation Equipment: 360 degree excavator				Co-ords:		Ground Level		Logged: NMCC		Chkd OJL		Appr: 					
Strata Description				Depth (m)		Level (m)		Legend		Sample Type		Sample Depth (m)		Test Results		Groundwater Records	
MADE GROUND: Medium dense black ashy sand with whole brick and brick fragments, scarp metal, plastic and metal pipes, plastic and metal sheeting, corrugated plastic, wood and occasional boulders of foundary sand, concrete and clinker boulders																	
End of Trial Pit at 4.50 m				4.50													
Remarks: 1. Groundwater encountered at 3.50m (begl). 2. Sides very unstable in MADE GROUND. 3. Pit terminated at 4.0m (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 P14A		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		Field Records NLM0505			
			Ground Level			Logged NMcC	Chkd. DJS	Appr. 
Strata Description			Depth (m)	Level (m)	Legend	Sample Type	Sample Depth (m)	Test Results
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.			2.00					
End of Trial Pit at 2.00 m								
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 PID - PID Reading		

Trial P# ID. TPE 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.joynespike.co.uk	
Excavation Equipment: 360 degree excavator				Co-ords		Field Records DRS05/03			
				Ground Level		Logged DRS		Chkd DRS	
								Appr: 	
Strata Description				Depth (m)	Level (m)	Legend	Sample Type	Sample Depth (m)	Test Results
MADE GROUND: Dense black sand with brick and wood. Becoming increasingly dense with depth.				2.50					
End of Trial Pit at 2.50 m									
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		

Trial Pit ID: TPF		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: 23/11/2005		
Excavation Equipment: 360 degree excavator				Co-ords: Ground Level		Field Records: DRS05/03		
						Logged: DRS	Chkd: <i>DRS</i>	Appr: 
Strata Description		Depth (m)	Level (m)	Legend	Sample Type	Sample Depth (m)	Test Results	Groundwater Records
MADE GROUND: Medium dense dark reddish black brown sand with brick and concrete blocks up to 0.4m in size and occasional sandstone.								
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 (begl) due to difficult digging.						Sample Type Key D - Disturbed Representative B - Bulk Representative S - Spot Non-Representative W - Water PID - PID Reading		

Trial Pit ID TPG		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 23/11/2005		
Excavation Equipment 360 degree excavator		Co-ords 				Field Records DRS05/03		
		Ground Level 				Logged DRS		Chkd DRS
						Appr. 		
Strata Description		Depth (m)	Level (m)	Legend	Sample Type	Sample Depth (m)	Test Results	Groundwater Records
MADE GROUND: Medium dense to dense black sand.								
End of Trial Pit at 2.00 m		2.00						
Remarks 1. Excavation carried out within the pit 2. Groundwater encountered at 0.9m (begl). 3. Sides remained stable throughout excavation. 4. Pit terminated at 2.0m (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 TPH	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 23/11/2005					
Excavation Equipment: 360 degree excavator		Co-ords			Field Records DRS05/03		
		Ground Level			Logged DRS	Chkd OKS	Appr. 
Strata Description	Depth (m)	Level (m)	Legend	Sample Type	Sample Depth (m)	Test Results	Groundwater Records
MADE GROUND: Loose red brick.	0.50						
End of Trial Pit at 0.50 m							
Remarks: 1. Excavation carried out within the pit. 2. No groundwater encountered. 3. Sides remained stable during excavation. 4. Pit terminated at 0.5m (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 TPK		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 24/11/2005					
Excavation Equipment 360 degree excavator				Co-ords		Field Records DRS05/03					
				Ground Level		Logged DRS		Chkd DRL		Appr. 	
Strata Description				Depth (m)	Level (m)	Legend	Sample Type	Sample Depth (m)	Test Results	Groundwater Records	
MADE GROUND: Brick, wood, metal and plastic with a loose red brown sandy matrix.				0.90							
End of Trial Pit at 0.90 m											
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 - PID Reading				

Trial PID TPL		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 23/11/2005			
Excavation Equipment 360 degree excavator				Co-ords		Field Records DRS05/03		
				Ground Level		Logged DRS	Chkd. DRS	Appr: 
Strata Description				Depth (m)	Level (m)	Legend	Sample Type	Sample Depth (m)
MADE GROUND: Loose to medium dense red and black brick, metal and occasional wood with a slight sand matrix.				0.60				
End of Trial Pit at 0.60 m								
Remarks: 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 - Water PID - PID Reading	

Trial Pit ID TPM	Client Ben Bailey Homes Limited.				Sheet: Sheet 1 of 1		 JOYNES PIKE & ASSOCIATES LTD www.joynespike.co.uk
	Site Land at Wombwell Foundry, off Hough Lane, Wombwell				Date 23/11/2005		
Job No 232095							
Excavation Equipment 360 degree excavator		Co-ords:		Field Records DRS05/03			
		Ground Level:		Logged DRS	Chkd DRS	Appr. 	
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 1.80 m	1.80						
Remarks 1. Excavation carried out within the pit. 2. Groundwater encountered at 0.1m (begl). 3. Sides remained stable throughout excavation. 4. Pit terminated at 1.8m (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 TPN		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		Field Records DRS05/03		Logged: DRS			Chkd DRS
Strata Description		Depth (m)	Level (m)	Legend	Sample Type	Sample Depth (m)	Test Results	Groundwater Records	
MADE GROUND: Brick and concrete with a medium dense grey sandy matrix.		0.40							
MADE GROUND: Soft red, very sandy clay.									
MADE GROUND: Dark grey black shale.		1.50							
Dark grey brown CLAY.		2.50							
Strong grey MUDSTONE.		2.80							
End of Trial Pit at 3.20 m		3.20							
Remarks: 1. Excavation carried out within the pit. 2. Groundwater encountered at 1.5m (begl). 3. Sides unstable throughout made ground. 4. Pit terminated at 3.2m (begl) due to solid rock.					Sample Type Key D - Disturbed Representative B - Bulk Representative S - Spot Non-Representative W - Water PID - PID Reading				

Trial Pit ID TPJ		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 24/11/2005			
Excavation Equipment 360 degree excavator			Co-ords			Field Records: NLM0502			www.joynespike.co.uk
			Ground Level			Logged NLMCC		Chkd. ORS	
Strata Description			Depth (m)	Level (m)	Legend	Sample Type	Sample Depth (m)	Test Results	Groundwater Records
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.				Sheet Sheet 1 of 1		JPA JOYNES PIKE & ASSOCIATES LTD www.joynespike.co.uk		
-TPJA		Site Land at Wombwell Foundry, off Hough Lane, Wombwell				Date 24/11/2005				
Job No 232095										
Excavation Equipment 360 degree excavator				Co-ords		Field Records NLM0501				
				Ground Level		Logged NMCC		Chkd DLS		
								Appr. 		
Strata Description				Depth (m)	Level (m)	Legend	Sample Type	Sample Depth (m)	Test Results	Groundwater Records
MADE GROUND: Very frequent whole brick and brick fragments, wood debris and occasional metal.				0.50						
----- End of Trial Pit at 0.50 m										
Remarks 1. Pit flooded. 2. Sides remained stable throughout excavation. 3. Pit terminated at 0.50m (begl) due to concrete base.							Sample Type Key D - Disturbed Representative B - Bulk Representative S - Spot Non-Representative W - Water PID - PID Reading			

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Trial Pit ID TP0		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:		Co-ords		Field Records DRS05/03		Logged DRS		
		Ground Level:				Chkd DRS		Appt. 
Strata Description		Depth (m)	Level (m)	Legend	Sample Type	Sample Depth (m)	Test Results	Groundwater Records
End of Trial Pit at 0.10 m								
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					
Job No 232095	Site Land at Wombwell Foundry, off Hough Lane, Wombwell	End Date 24/11/2005						
Drilling Equipment SOIL MECH 405 AND COMP	Co-ords	Backfill Date 24/11/2005						
Ground Level		Field Records DRILLERS	Logged DRILLERS	Chkd OILS	Appr 			
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 80							
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			

Borehole ID BH2A	Client: Ben Bailey Homes Limited.	Start Date 24/11/2005	JPA JOYNES PIKE & ASSOCIATES LTD 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	Co-ords	Backfill Date 24/11/2005						
		Field Records DRILLERS	Logged: DRILLERS		Chkd DPS	Appr: Z.		
Strata Description	Depth (m)	Level (m)	Legend	Sample Type	Sample Depth (m)	Tests	Groundwater Records	Backfill Details
MADE GROUND: Concrete.	0.20							
Clay.	1.40							
Mudstone.								
Dark mudstone.	10.70							
Sandstone.	13.20							
End of Borehole at 14.70 m	14.70							
Remarks: 1. Hole terminated at 14.70m (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

Client

Ben Bailey Homes Limited.

BH3A

Site

Land at Wombwell Foundry, off Hough Lane,
Wombwell

Job No

232095

Drilling Equipment

SOIL MECH 405 AND COMP

Co-ords

Start Date

24/11/2005

End Date

24/11/2005

Borehole Date

24/11/2005

Field Records

DRILLERS

JPA
JOYNES PIKE
& ASSOCIATES LTD

www.joynespikes.co.uk

Logged

DRILLERS

Chkd

pjs

Appr

Z

Strata Description

Depth
(m)Level
(m)

Legend

Sample
TypeSample
Depth
(m)

Tests

Groundwater
RecordsBackfill
Details

MADE GROUND Concrete

0 10

Clay

Mudstone

1 30

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

(S) - Spoon SPT

Sheet

Sheet 1 of 1

Borehole ID

BH4A

Job No

232095

Drilling Equipment

SOIL MECH 405 AND COMP

Client

Ben Bailey Homes Limited.

Site

Land at Wombwell Foundry, off Hough Lane,
Wombwell

Start Date

24/11/2005

End Date

24/11/2005

Backfill Date

24/11/2005

Field Records

DRILLERS

JPA
JOYNES PIKE
& ASSOCIATES LTD

www.joynespike.co.uk

Co-ords

Ground Level

Logged

DRILLERS

Chkd

DRS

Appr

7

Strata Description

Depth
(m)Level
(m)

Legend

Sample
TypeSample
Depth
(m)

Tests

Groundwater
RecordsBackfill
DetailsMADE GROUND Concrete
Clay

0 10

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 (begt)

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 BH5A	Client Ben Bailey Homes Limited.	Start Date 24/11/2005	JPA JOYNES PIKE & ASSOCIATES LTD 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		Backfill Date 24/11/2005						
Co-ords		Field Records DRILLERS						
Ground Level		Logged DRILLERS	Chkd DRS	Appr 				
Strata Description	Depth (m)	Level (m)	Legend	Sample Type	Sample Depth (m)	Tests	Groundwater Records	Backfill Details
Clay.								
Mudstone.	2.00							
Sandstone.	3.50							
Dark mudstone.	10.30							
Mudstone.	12.60							
End of Borehole at 13.60 m	13.60							
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) - Cone SPT (S) - Spoon SPT			
					Sheet Sheet 1 of 1			

Borehole ID BH6A	Client Ben Bailey Homes Limited.	Start Date 24/11/2005		
Job No 232095	Site Land at Wombwell Foundry, off Hough Lane, Wombwell	End Date 24/11/2005		
Drilling Equipment SOIL MECH 405 AND COMP	Co-ords	Backfill Date 24/11/2005		
Ground Level		Field Records DRILLERS	www.joynespike.co.uk	
		Logged DRILLERS	Chkd ORS	Appr. 

Strata Description	Depth (m)	Level (m)	Legend	Sample Type	Sample Depth (m)	Tests	Groundwater Records	Backfill Details
Clay								
Sandstone	2.60							
Dark mudstone	7.00							
Sandstone	9.30							
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 (S) - Spoon SPT
Sheet Sheet 1 of 1	

Borehole ID. BH7A	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						
		Backfill Date 24/11/2005						
Drilling Equipment SOIL MECH 405 AND COMP		Co-ords	Field Records: DRS05/03					
		Ground Level	Logged DRS	Chkd ORS	Appr. 			
Strata Description	Depth (m)	Level (m)	Legend	Sample Type	Sample Depth (m)	Tests	Groundwater Records	Backfill 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.	16.50							
End of Borehole at 20.00 m	20.00							
Remarks 1. Hole terminated at 20.0m (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

BH8A

Client

Ben Bailey Homes Limited.

Site

Land at Wombwell Foundry, off Hough Lane,
Wombwell

Job No

232095

Drilling Equipment

SOIL MECH 405 AND COMP

Co-ords

Ground Level

Start Date

24/11/2005

End Date

24/11/2005

Backfill Date

24/11/2005

Field Records

DRS05/03

Logged

DRS

Chkd

0123

Appr

2

JPA
JOYNES PIKE
& ASSOCIATES LTD

www.joynespike.co.uk

Strata Description

MADE GROUND Brick, wood, metal and plastic
with a loose red brown sandy matrix

MADE GROUND Concrete

Depth
(m)

0.90

12.00

Level
(m)

Legend

Sample
TypeSample
Depth
(m)

Tests

Groundwater
RecordsBackfill
Details

End of Borehole at 12.0 m

Remarks

1 Hole terminated at 12.0m (beg)

Sample Type Key

D - Disturbed Representative

B - Bulk Representative

S - Spot Non-Representative

W - Water

U - Undisturbed Representative

J - Jar Sample

IC) - Cone SPT

(S) - Spoon SPT

Sheet

Sheet 1 of 1

Borehole ID: BH9A	Client: Ben Bailey Homes Limited.	Start Date: 24/11/2005						
Job No: 232095	Site: Land at Wombwell Foundry, off Hough Lane, Wombwell	End Date: 24/11/2005						
		Backfill Date: 24/11/2005						
Drilling Equipment: SOIL MECH 405 AND COMP		Co-ords:	Field Records: DRS05/03	www.joynespike.co.uk				
Ground Level:		Logged: DRS	Chkd: DRS	Appr: 				
Strata Description	Depth (m)	Level (m)	Legend	Sample Type	Sample Depth (m)	Tests	Groundwater Records	Backfill 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:					Sample Type Key			
1. Drilled to determine thickness of concrete.					D - Disturbed Representative			
2. Hole terminated at 1.4m (begl).					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	
Job No 232095		Site Land at Wombwell Foundry, off Hough Lane, Wombwell				End Date 24/11/2005			
Drilling Equipment SOIL MECH 405 AND COMP		Co-ords				Backfill Date 24/11/2005			
		Ground Level				Field Records DRS05/03			
						Logged DRS		Chkd. DRS	
								Appr. 	

Strata 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
1. Drilled to determine thickness of concrete.
2. Hole terminated at 3.0m (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 BH11A	Client Ben Bailey Homes Limited.		Start Date 24/11/2005		 JPA JOYNES PIKE & ASSOCIATES LTD 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						
Co-ords		Ground Level:		Logged DRS	Chkd ORS	Appr. 		
Strata Description	Depth (m)	Level (m)	Legend	Sample Type	Sample Depth (m)	Tests	Groundwater Records	Backfill Details
MADE GROUND: Red brick.								
MUDSTONE.	2.50							
End of Borehole at 3.30 m	3.30							
Remarks:				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				
1. Hole terminated at 3.3m (begl).				Sheet Sheet 1 of 1				

Borehole ID: BH12A	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						
		Backfill Date: 24/11/2005						
Drilling Equipment: SOIL MECH 405 AND COMP		Co-ords	Field Records: DRS05/03					
Ground Level:		Logged: DRS	Chkd: DRS	Appr: 				
Strata Description	Depth (m)	Level (m)	Legend	Sample Type	Sample Depth (m)	Tests	Groundwater Records	Backfill 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				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				
1. Hole terminated at 3.0m (begl)				Sheet: Sheet 1 of 1				

Borehole ID: BH13A	Client Ben Bailey Homes Limited.	Start Date: 24/11/2005						
Job No 232095	Site Land at Wombwell Foundry, off Hough Lane, Wombwell	End Date: 24/11/2005						
		Backfill Date 24/11/2005						
Drilling Equipment: SOIL MECH 405 AND COMP		Co-ords	Field Records: DRS05/03	www.joynespike.co.uk				
		Ground Level	Logged DRS	Chkd: DRS	Appr: 			
Strata Description	Depth (m)	Level (m)	Legend	Sample Type	Sample Depth (m)	Tests	Groundwater Records	Backfill 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 (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 BH14A	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						
		Backfill Date 24/11/2005						
Drilling Equipment SOIL MECH 405 AND COMP		Co-ords		Field Records DRS05/03				
		Ground Level		Logged DRS	Chkd DRS			
				Appr. 				
Strata Description	Depth (m)	Level (m)	Legend	Sample Type	Sample Depth (m)	Tests	Groundwater Records	Backfill Details
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.	2.00							
MADE GROUND: Concrete.	2.30							
MADE GROUND: No returns.								
End of Borehole at 5.50 m	5.50							
Remarks: 1. Hole terminated at 5.5m (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 BH15A	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						
		Backfill Date 24/11/2005						
Drilling Equipment SOIL MECH 405 AND COMP		Co-ords	Field Records DRS05/03					
		Ground Level	Logged: DRS	Chkd: 0121	Appr. 			
Strata Description	Depth (m)	Level (m)	Legend	Sample Type	Sample Depth (m)	Tests	Groundwater Records	Backfill Details
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.								
MADE GROUND: Very hard concrete.	4.00							
MADE GROUND: No returns.	4.30							
End of Borehole at 4.40 m	4.40							
Remarks: 1. Hole terminated at 4.4m (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				

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 ICRL 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.ornl.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 / JPA			
17 JAN 2005			
JSP	JPA		
RMB	JPA		
		File:	JPA

Radon (RPM) Report - Standard

Section 1: Location and extent of report area

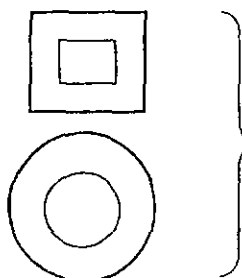
Area centred at: 439032,402342

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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Ordnance
Survey

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 BGS 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: 0115-936-3192; 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

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For further information, please contact:

BGS Central Enquiries Desk
British Geological Survey
Kingsley Dunham Centre
Keyworth
Nottingham
NG12 5GG
Tel: 0115 936 3143
Fax: 0115 936 3276
Email: enquiries@bgs.ac.uk