LK CONSULT LIMITED

PART OF THE LK GROUP

LAND AT NEW ISLINGTON MANCHESTER

OVERARCHING RISK ASSESSMENT ON EXISTING REPORTS



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1 INTRODUCTION

1.1 Background

LK Consult Ltd (LKC) has been commissioned by McCaul Developments to carry out an overarching risk assessment for land at New Islington, Manchester. It is understood that the site was part of a much larger development comprising a joint venture with Urban Splash, English Partnership and Manchester City Council (MCC).

The study site is approximately 0.75ha in size and is centred at National Grid Reference 385223E 398632N (Figure 1-1). The site is bounded to the northwest by the Rochdale Canal, which is located at a slightly elevated position to the site.

This report is to support a planning application to develop the site as apartments with car parking and areas of managed landscaping (Figure 1-2).

1.2 Terms of Reference

LKC have reviewed a number of reports for this over-arching risk assessment, whicha re listed below:

- 'Ancoats Area, Manchester Geotechnical Desk Study,' by Pell Frischmann (reference 500057/01 dated 1999).
- 'Victoria Works Site, Ancoats, Manchester Preliminary Ground Investigation Interpretive Report,' by Pell Frischmann (reference 500057/04 dated 1999).
- 'Site Investigation at New Islington, Manchester,' by Northern Foundation (reference SI7890 dated 2002).
- 'Addendum to Site Investigation at New Islington, Manchester,' by Northern Foundation (reference SI7890 dated 2002).
- 'Urban Splash/English Partnership/Manchester City Council, New Islington, Manchester: Audit Report on Geotechnical and Geo-environmental Investigation,' by Edge Consulting (reference 546.1, dated 2004).
- 'Waller's Mill, New Islington, Manchester; Archaeological Evaluation Interim Report,' by Oxford Archaeology North (reference L9439, dated 2004).

It should be noted that not all records were complete and LKC have not had the opportunity to consult with MCC. It is understood that MCC have had all the reports as part of the joint venture. It is unknown if any of the findings and recommendations in any of the reports have been approved.



Figure 1-1: Location Plan, Land at New Islington, Manchester

Drawn: May 2012 Scale: See Scale Bar (approx 1:25,000 @ A4)

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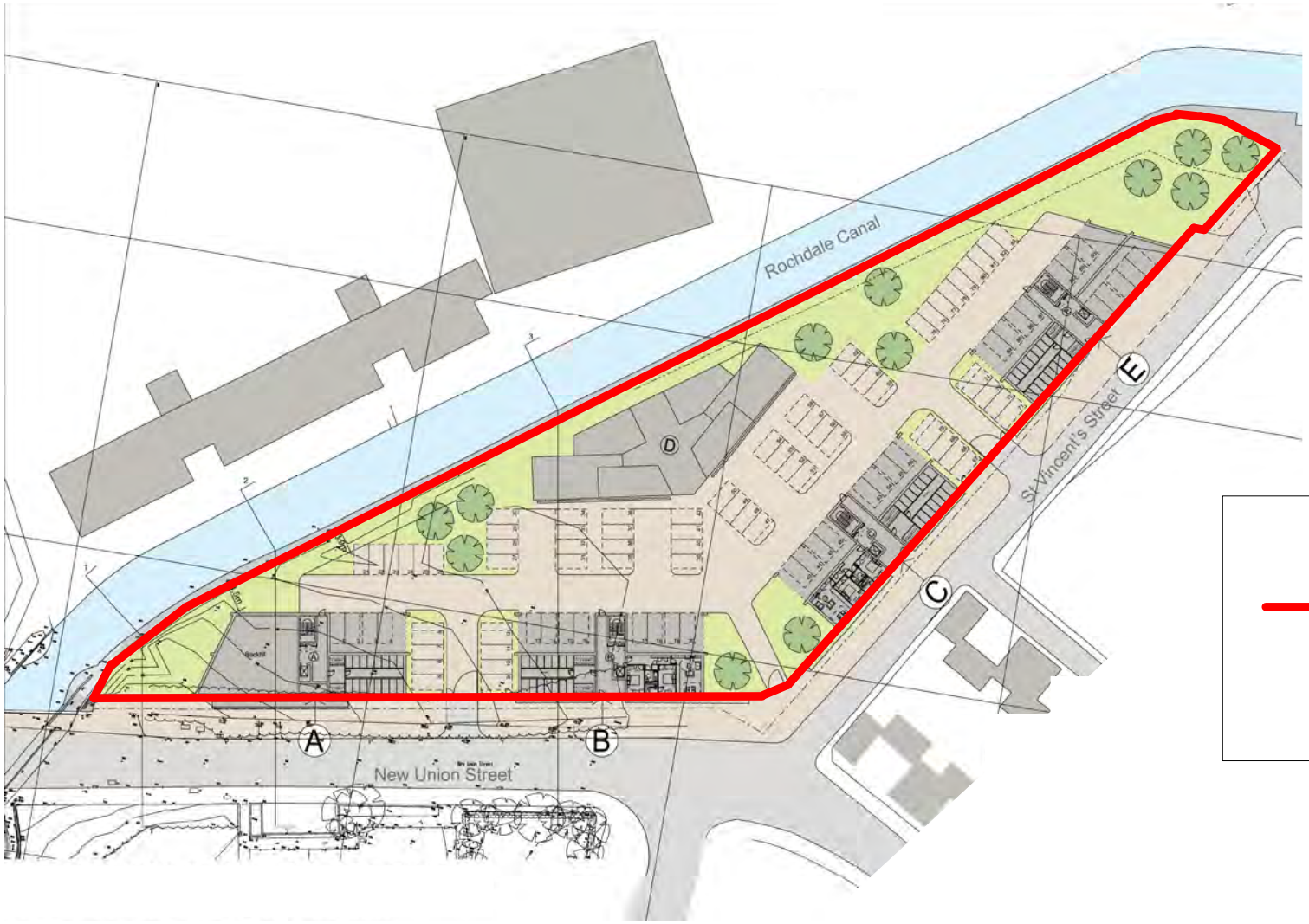

Figure 1-2: Proposed site use and site boundary plan for Land at New Islington, Manchester

Drawn: May 2012 Scale (approx): 1:1,000@ A4

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2 BACKGROUND

2.1 Historical Information

LKC reviewed the 1999 desk study report and the 2004 archaeology report to obtain historical data. Although the maps were difficult to read a summary table (Table 1) was presented in the 1999 desk study report (the site was referred to as Zone 1).

Notable features within 100m of the site boundary have been presented (distances will be approximate). The exception to this will be features that could be infilled historically. The buffer will be 250m for these features. A summary is presented in Table 2-1. Collated historical plans are presented in Appendix A.

A number of historical industrial buildings were noted west of the Rochdale Canal. Considering the canal is located in between the site the risk from these features are unlikely and therefore are not considered in the table below.

Site Features	**Location**	**Map Dates Present**	**Comments**
Terraced Housing	Centre/north	1893-1993	-Initially two thirds of the site. -Terraced houses replaced in centre (1900 mapping) by larger buildings (possible Works). -Remaining terraced housing no longer shown by the 1993 mapping.
Joinery Works	Centre and south	1928-1948	-replaced by builders yard until 1968 mapping.
New Islington Engineering Works	Centre and South	1968-2002	-Southern buildings not present from the 1993 mapping. -Larger building in centre not present during the 2002 site investigation.
Vacant site	All	Present	-Likely between 1993 to 2002 (from site investigation reports).
Surrounding Area Features	**Distance/ Location**	**Map Dates Present**	**Comments**
Wharf building	40m SW	1893-1900	-Galvanising Works by 1922 mapping.
Galvanising Work	35mSW	1922-1948	-Not present by 1948 mapping.
Rochdale Canal	Adj NW	1893-present	
Steel Works	10m E	1893-1900	-Not present on 1900 mapping.
Basin	130m SW	1893-present	
Engineering Works	10m E	1900-1922	-Not present by 1922 mapping.

Table 2-1: Summary of historical features, land at New Islington, Manchester.

2.2 Environmental Setting

The Environmental Settings were summarised from available data and supplemented by LKC information. This is summarised in Table 2-1.

Summary of Environmental Settings			
Geology	Superficial		-Till.
	Bedrock		-Manchester Marl.
Hydrogeology	Aquifer Designation	Superficial	-Unproductive.
		Bedrock	-Secondary B.
	Groundwater vulnerability		-HU (worst case for urban setting).
	Groundwater abstractions		-None within 1km.
Hydrology	Nearest surface water		-Rochdale Canal adjacent to northern boundary (elevated above the site). -River Medlock approximately 500m SE.
	Flooding		-No risk.
	Surface water abstractions		-None within 500m.
	Discharge consent		-Nearest 330m Stormflow discharge (final effluent).
	Pollution Incidents		-Two within 500m. -Category 3-Minor incident into Ashton Canal.
Mining	Coal Mining Referral Area		-Not within referral area
	Coal Report		-Property not within zone of likely physical influence on the surface from any present underground coal workings.
Landfill sites (within 250m)	Known/Registered		-None within 250m.
	Potential		-No potential landfill within 250m.
Radon			-Probability of <1% of homes above Action Level. -No further action required.
Designated Sites			-No designated sites within 1km.

Table 2-2: Summary of the environmental setting , land at New Islington, Manchester.

2.3 Site Reconnaissance 2012

A site reconnaissance of the study site area was carried out by LKC on 12th April 2012. Photographs are provided in Appendix B.

The site is within an area of recent development to the northwest and southeast, with further development in progress to the south.

Site Access is via a locked gate on the southern tip of the site near the junction of New Union Street and St Vincent Street.

The southern western boundary to New Union Street and the south eastern boundary to St Vincent Street are denoted by a metal fence (Photographs 1 and 2). The north western boundary is denoted by a retaining wall beyond which is the Rochdale Canal (Photographs 3 and 4).

New Union Street rises up to the west to a bridge over the canal and site levels increase accordingly towards the western part of the site canal (Photographs 1, 5, 6 and 7).

Evidence of vegetation clearance is present in the western and central parts of the site near to the site where bare soil including demolition rubble and ash and clinker materials are exposed Stockpiles of materials either created by or added to these works are present (Photographs 7 to 12).

The central and eastern part of the site is vegetated with low level scrub vegetation and clusters of apparently self-seeded trees, and much fly tipping is also present in these areas (Photographs 13 to 18).

Ponded water and wet land vegetation is present at various points along the central northern site boundary and may be resultant from leakage from the canal (Photographs 19 and 20).

2.4 Preliminary Contamination Conceptual Model

The aim of the Preliminary Contamination Conceptual Model (PCCM) is to provide a preliminary assessment of the likelihood of a pollutant linkage for each potential combination of contaminant, pathway and receptor. A conceptual model can be used to make an informed decision on the contamination risks associated with the site and whether further site investigation work is required. This is based on potential contaminant, potential pathway and potential receptor as described in CLR11[1].

The PCCM has been derived from the previous historical and environmental search for the site. Typical contamination pollutant linkages will be discussed, which are expected to be present on the site, independently of the previous site work.

It should be noted that there may be risk from short term exposure from contaminated soil to site workers. The Preliminary Contamination Conceptual Model deals with long term exposure to key receptors. Acute risks can be easily mitigated by good environmental management of the site during site works. Standard health and safety precautions (as per HSE guidance[2]) should be adopted by all workers involved with site enabling and construction works. Therefore, this receptor is not considered in the contamination conceptual model.

Pollutant Linkage No.	Contaminant					Pathway	Receptor
	ACM	Gases		Contaminants			
		Hazardous	Ground	Organic	Inorganic		
PL1	?	x	x	?	?	-Dermal contact. -Ingestion of soils. -Inhalation of contaminated soil, fibres and dust.	-Future site residents.
PL2	x	x	x	?	x	-Inhalation of vapours. -Vapour migration through permeable strata.	-Future site residents. -Onsite drain/culvert..
PL3	x	?	x	x	x	-Inhalation of hazardous gas. -Migration through permeable strata.	-Future site residents.
PL4	x	x	x	?	?	-Groundwater migration through permeable strata. -Perched waters migration on site.	-Secondary B Aquifer. -Onsite drain/culvert..
PL5	x	?	x	x	?	-Contact with potential hazards	-Site buildings
PL6	x	x	x	?	?	-Ingestion of tainted water supply. -Corrosion of metal pipework.	-Future site residents. -Pipework.
PL7	x	x	x	x	?	-Root uptake of phytotoxic contaminants	-Flora in future landscaping.

Table 2-3: Contamination Conceptual Model for the New Islington site in Manchester.
(Key: ? – Pollutant Linkage possible; x – Pollutant Linkage unlikely)

2.4.1 Pollutant Linkage 1

Pollutant linkage 1 refers to the potential asbestos (from former buildings), heavy metals and PAHs (from likely ash) and organic contaminants, petroleum hydrocarbons and solvents (from former Works) coming into direct contact with future site residents.

The risk from these contaminants is considered possible in areas of proposed landscaping for future site users.

[1] Defra (2004). "Model Procedures for the Management of Land Contamination." R&D Publication CLR 11
[2] HSE (1991). "Protection of workers and the general public during development of contaminated land" London HMSO.

2.4.2 Pollutant Linkage 2

Potential pollutant linkage 2 refers to possible inhalation of vapours affecting the future site residents from potential hydrocarbons onsite, such as fuels and solvents. This pollutant linkage is considered possible.

2.4.3 Pollutant Linkage 3

Potential pollutant linkage 3 refers to possible hazardous gas from possible infilling onsite affecting the future site residents. The generation of significant hazardous gas (in particular carbon dioxide and methane) is dependent on the composition of any made ground. If significant amounts of putrescible or degradable material is found on site hazardous gas generation may be possible.

2.4.4 Pollutant Linkage 4

Potential pollutant linkage 4 refers to the possible mobile contaminants migrating to the Secondary B Aquifer. Although this is of low sensitivity the historical setting may have generated mobile contaminants, such as petroleum hydrocarbons or solvents. This pollutant linkage is considered possible.

The Rochdale Canal is not considered a potential receptor since it is higher than the site and is actually leaking in parts onto the site (may even be a possible source of contamination).

2.4.5 Pollutant Linkage 5

Potential pollutant linkage 5 refers to the possible deleterious effects that sulphate may have on building materials such as concrete, water pipes and building structures. In addition, methane may potentially build up within confined spaces and cause an explosion and damage to buildings. The latter would only be of risk if significant putrescible material was identified onsite.

2.4.6 Pollutant Linkage 6

Potential pollutant linkage 6 refers to the possible contaminants permeating potable water pipes and consumption by the future residents of the tainted water supply. Given the identified presence of made ground on site and likely contaminants this linkage is considered possible.

2.4.7 Pollutant Linkage 7

Potential pollutant linkage 7 refers to the possible phytotoxic contaminants affecting plant growth. Given the identified presence of made ground onsite and likely heavy metal contamination, this linkage is considered possible.

3 GROUND INVESTIGATIONS

LKC are aware of four intrusive site investigations undertaken at the site from 1999 to 2012. Sampling locations from all available investigations are presented in Figure 3-1 and summarised in Table 3-1.

	SI Type (max depth in mbgl)			Location references			Sampling				Gas Monitoring	
	TP	RBH	CP	TP	RBH	CP	Soil	No.	Water/Leach	No.	Ref	Visits
PF (1999)	10 (4m)	N/A	3 (18.9m)	TP37-TP45 Spoil A-E[a]		BH1 BH3 BH5	Metals Inorganics Phenols TPH Asbestos PCBs	45 20 22 7	Metals Inorganics Phenols TPH Sp./Tot PAHs	9[b] 4 4/5	N/A	
NF (2002) and addendum	10 (4.6m)	1 (31.5m)	5 (16.5m)	TH130-TH139	BH119	BH116-BH119	Metals Inorganics Phenols Tot.PAHs TPH PCBs	19 5 2	Metals Inorganics Phenols Sp./Tot PAHs TPH/banded VOCs	10 5/3 1/1 5	BH118	3
EC (2004)	3 (3.7m)	N/A	2 (10.0m)	TP202 TP204 TP205	N/A	BH201 BH202	Metals Inorganics Phenols Tot.PAHs TPH PCBs	6 8 3 1	Metals Inorganics Phenols Tot. PAHs	2 1	BH201 BH202	3
BM (2012)	8 (2.1m)	N/A	N/A	TP01-TP08	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table 3-1: Summary of site investigation undertaken for the New Islington site in Manchester.

Note

RBH – Follow on Rotary Boreholes; TP = Trial Pits; CP = Cable Percussive Boreholes

PF = Pell Frischmann; NF = Northern Foundation; EC = Edge Consulting; BM = Bell Munro

[a] = It is unknown what Spoil references refer to onsite (1999 report), possible mound identified in recent site reconnaissance.

[b] = Seven water sample (1999 report) relate to Ashton and Rochdale Canal (A1-A3 and R1-R4 respectively).

It should be noted that the Bell Munro trial pitting undertaken in 2012 was purely for geotechnical reasons and no contamination testing was undertaken.

In addition, multiple samples were taken from the same sampling location at various depths. In total there were 31 separate sampling locations.

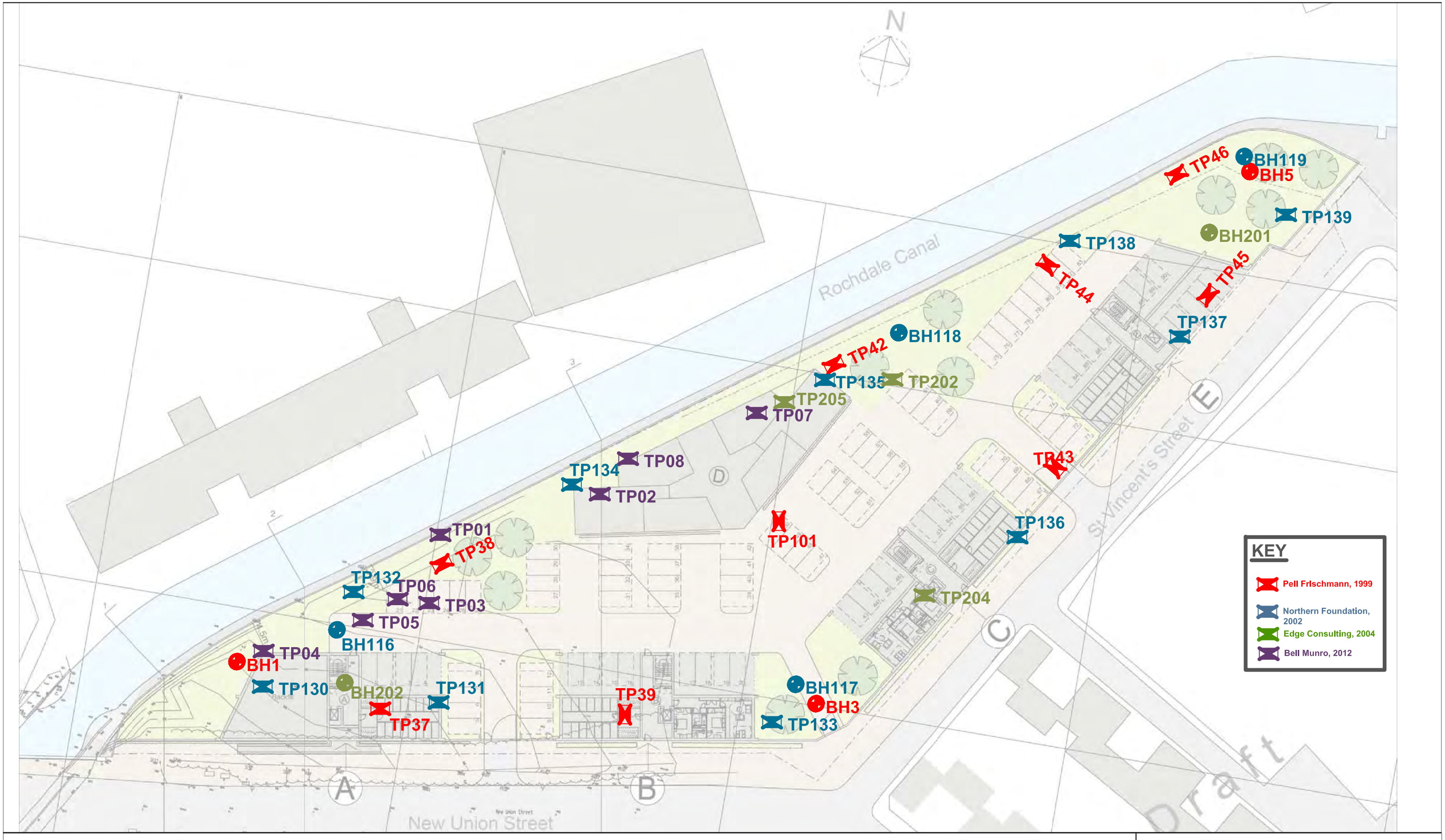

Figure 3-1: Borehole Location Plan, New Islington Site, Manchester
Drawn: May 2012 Scale: ~1:500 @ A3

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4 GROUND CONDITIONS

All relevant soil profile logs for the site are presented in Appendix C in date order from the four intrusive investigations. Ground conditions are summarised in Table 4-1.

Depth to Top of Strata (mbgl)	Depth to Base of Strata (mbgl)	Thickness of Strata (m)	Description
0.0	0.3 to >4.0	0.3 to >4.0	**MADE GROUND 1:** brown/black gravelly sandy clay or clayey sand with primarily ash, brick and concrete. Some with tarmac surface. Diesel odour noted at 2.5mbgl (seepage) in TP39. Hydrocarbon odour noted at 2.85mbgl (seepage) in TP204. Asbestos sheeting noted from 0.2mbgl to 1.0mbgl strata in TP131. Made ground not bottomed in TP39 (0.5mbgl - >3.0mbgl).
0.0 to 2.2	1.0 to 3.3	0.2 to >2.8	**MADE GROUND 2:** brown to black sandy clay or clayey sand with gravel of various litholigies. Pungent odour noted at 2.8mbgl in TP37. Hydrocarbon odour noted in strata 2.85mbgl->3.7mbgl (from standing water) in TP204. Hydrocarbon odour noted in strata at 1.5mbgl (from standing water) in TP002. Made ground not bottomed in TP37 (1mbgl - >3.0mbgl) Made ground not bottomed inTP38 (1.2mbgl - >3.0mbgl). Made ground not bottomed inTP204 (2.85mbgl - >3.7mbgl).
0.2 to 4.0	8.6 to >18.9	7.2 to >18.0	**CLAY:** Firm to stiff clay or slightly sandy gravelly clay. Natural strata not reached in TP37, TP38 and TP39 (>3.0mbgl). Anticipated to be at approximately 4.0mbgl in those sampling locations.
8.6-9.5	10.4-12.8	0.9-4.2	**SAND:** Very dense slightly gravelly very clayey sand. Only identified in BH5 and BH119.
10.4	14.0	3.6	**GRAVEL:** Very dense orange clayey sandy gravel. Occasional cobbles. Only identified in BH119.
12.8-14.0	>14.8-21.5	>2.0-7.5	**MUDSTONE/MARL:** Weathered very silty mudstone/marl. Only identified in BH5 and BH119.
21.5	>31.5	>10.0	**SANDSTONE:** Weathered red sandstone. Only identified in BH119.

Table 4-1: Summary of ground conditions for the New Islington site in Manchester.

A summary of the assessment are as follows:

- No groundwater entries, but seepage above clay strata.
- Hydrocarbon odours from made ground above the clay (source noted from perched groundwater seepages) in TP37, TP39, TP204, TP002.
- Asbestos sheeting identified in TP131.
- Not anticipate more than 4mbgl of made ground where this was not fully penetrated in trial pits. Boreholes around the areas not bottomed (BH1, BH3, BH202, BH116 and BH117) have MG ranging from 1.4 to 4.0mbgl. In line with seepage on top of clay strata, suggest depth is close to natural clay.
- The deeper made ground in the central and southern part of the site likely relates to the historical industrial buildings.
- The superficial firm to stiff clay deposits is a minimum of 7.2m thick overlying mudstone/marl (minimum 7.5m thick). Sandstone was only encountered in BH119 from 21.5mbgl underlying the mudstone/marl strata.

5 GENERIC RISK ASSESSMENT

5.1 Introduction

Current good practice requires that the findings from a site investigation should be evaluated on a site specific basis, using a risk based approach. Risk assessment involves identification and evaluation of the hazards presented by the concentrations of contaminants measured followed by an evaluation of the risks which are associated with these hazards (CLR11[3]). Information gathered from the risk assessment has been collated in the revised contamination conceptual model in Section 5.6.

The assessment was based on available data received by LKC. It should be noted that some of the assessment will need to be based on suites that are not considered robust in the more recent guidelines and therefore some conservative on the assessment has been applied.

A discussion on the validity of analysis or monitoring is presented in each Section.

Laboratory sheets from all investigations relevant to the site are collated in date order in Appendix D.

5.2 Soil Risk Assessment

The results of the soil samples were compared to the new Soil Guideline Values (SGVs). Unfortunately, there are only a select number of new SGVs currently available and therefore, where there are no SGVs, ATRISK Soil Screening Values (SSVs) have been used as screening values. These have been generated using the CLEA V1.06 model[4] based on 1% and 6% SOM and are considered scientifically robust and conservative. All these criteria now follow current UK methodology[5,6,7,8]. Where applicable CL:AIRE[9] Generic Assessment Criteria (GAC) were also used for particular contaminants not issued by the other documents. A summary of the ATRISK SSVs (Revision 3), which also comprises CL:AIRE GACs, are attached for 1 % SOM for a 'residential without plant uptake' (Appendix E).

The lead SSV has been derived using a threshold substance, which differs from the original SGV blood level model. In the interim before the official SGV for lead has been published LKC will continue to use the old lead SGV.

No speciated petroleum hydrocarbon analysis was undertaken at the site. However, TPH, mineral oil and Diesel Range Organics (DRO) were analysed for some samples. LKC considers TPH analysis is not a suitable analysis suite for hydrocarbon, since this test does not allow a risk based assessment and will analayse both natural and anthropogenic sources, thus generating higher values. The DRO do have a silica clean stage to remove natural hydrocarbons, such as humic acids. However, the bandings for carbon fractions

[3] EA (2004). "Model Procedures for the Management of Land Contamination." R&D Publication CLR 11.
[4] EA (2008). "CLEA Software (Version 1.05) Handbook." Science Report – SC050021/SR4.
[5] EA (2008). "Updated Technical Background to the CLEA Model." Science Report – SC050021/SR3.
[6] EA (2008). "Human Health Toxicological Assessment of Contaminants in Soils." Science Report – SC050021/SR2.
[7] EA (2008). "A Review of Body Weight and Height Data used within the Contaminated Land Exposure Assessment Model (CLEA)." Project SC050021/Technical Review 1.
[8] EA (2009). "Compilation of Data for Priority Organic Pollutants for Derivation of Soil Guideline Values." Science report SC050021/SR7.
[9] CL:AIRE (2009). "The Soil Generic Assessment Criteria for Human Health Risk Assessment."

do not equate to UK guidelines[10], where the TPHCWG methodology was adopted[11]. To allow the generation of a conservative screening value to assess the data LKC compared results to the most likely aromatic/aliphatic fraction, where possible.

Elevated results are presented in Table 5-1 and all analysis sheets are collated in Appendix D.

	Contaminant	Units	No. of samples	Result Ranges	No. Exceeded	Assessment Criteria	Source of Criteria
Metals	Arsenic	mg/kg	66	6 to 140 (TP204)	17	36	SGV
Metals	Lead	mg/kg	66	6 to 1919 (TP37)	16	450	Old SGV
	Total PAHs	mg/kg	72	<10 to 2570 (Spoil A)	26	<10[a]	Generic
	Total TPH	mg/kg	28	<1 to 16,200 (BH117)	13	100[b]	Generic
General	pH	pH	66	Range 6.6 to 10.2			
General	Bulk analysis	--	22	AMOSITE: TP37 (0.5m) CHRYSOTILE: Spoil 'A', Spoil 'C', Spoil 'D', Spoil 'E'			

Table 5-1: Summary of elevated analytical results, land at New Islington, Manchester.

Notes:

Only results that exceeded SGVs and SSVs have been shown and results from **all depths** are noted. Assumed pH7 and SOM 1% where this parameter is required.

[a] = Value chosen by LOD to provide a generic screen for assessment.

[b] = Value chosen on ATRISK SSV (1% SOM) for aromatic EC10-EC12 to provide a generic screen for TPH.

Elevated concentrations were noted across the site for arsenic (17no.samples), lead (16no.samples), total PAHs (26no.samples) and TPH (13no.samples). Furthermore, amosite was noted in TP37 and chrysotile was noted from four of the five spoil heaps samples taken in 1999.

5.2.1 Direct Contact Risk – Pollutant Linkage 1

Arsenic, lead, total PAHs, heavy end TPH and asbestos primary route of entry relates to direct contact (ingestion of soil, dermal contact and inhalation of dust and fibres). The likely sources for these contaminants are from a combination of ash and tarmacadam for soils and building material for asbestos.

There is a site wide problem for heavy metals and PAHs that will need to be remediated to prevent direct contact.

The spoil heaps had chrysotile asbestos and shallow soil in TP37 identified amosite asbestos. The risk from fibres will need to be mitigated on this site.

There appears to be some correlation between high total PAHs and high TPH concentrations that suggest the material is not necessarily volatile. Areas, such as the spoil heaps, TP38, shallow soils in TP37 and BH117 had both high concentrations of total PAHs and high TPH, but no olfactory evidence of hydrocarbons. The likely source is tarmac and any bitumen used to waterproof underlying cobble setts. Tarmacadam is known to comprise heavy end hydrocarbons, such as PAHs[12]. Therefore, where no olfactory evidence is recorded in the logs LKC assumes this is likely from tarmacadam and/or bitumen coating on cobble setts. Furthermore, there will likely be some

[10] EA (2005). "The UK Approach for Evaluating Human Health Risks from Petroleum Hydrocarbons in Soils." Science report P5-080/TR3.

[11] TPHCWG (1999). "Human Health Risk-Based Evaluation of Petroleum Release Sites: Implementing the Working Group Approach: Volume 5."

[12] Kim E. Grosenheider, Paul R. Bloom, Thomas R. Halbach and Marilyn R. Johnson (2006). "A Review of the Current Literature Regarding Polycyclic Aromatic Hydrocarbons in Asphalt Pavement." University of Minnesota.

overestimation of hydrocarbon concentrations due to the analysis measuring both natural and anthropogenic sources.

Based upon the above LKC consider Pollutant Linkage 1 to be complete for heavy metals, total PAHs, heavy end TPH and asbestos. Appropriate remediation and asbestos management will be required to mitigate the risks from direct contact. Further details will be presented in Section 6.

5.2.2 Inhalation Risk – Pollutant Linkage 2

A potential risk from volatile TPH has been established, based on olfactory evidence from the logs. The areas of concern relate to made ground in TP37 (from 2.8mbgl), TP39 (from 2.5mbgl), TP204 (from 2.85mbgl) and TP002 (from 1.5mbgl). The source is likely from migrating perched waters, since these depths related to water seepage into the trial pits sitting on the superficial clay. Where other high concentrations of TPH were identified it has been assumed to be derived from tarmacadam and/or bitumen coated cobble setts described previously.

There is uncertainty on TPH soil concentrations due to the test methods employed in the previous investigations. Furthermore, some of these depths where olfactory evidence was identified were not actually analysed.

No VOC suite was analysed in any soil sample, but were done in groundwater. The PCCM by LKC noted a potential risk from VOCs, such as solvents used in the joinery or Engineering Works. However, olfactory evidence suggested fuel hydrocarbons may be the primary source of any volatile risk.

There is uncertainty on the composition and fraction range of the fuel hydrocarbons and the source may be within perched waters. More risk based sampling and delineation of the four identified areas needs to be undertaken and appropriately risk assessed.

Based upon the above LKC consider Pollutant Linkage 2 to still be possible with regards to volatile hydrocarbons (in particular fuel derived hydrocarbons). Further details will be presented in Section 6.

It should be noted that LKC are unaware of any assessments and correspondence from MCC on the risk from this pollutant linkage or any agreed way forward.

5.3 Controlled Water Assessment

LKC considers the Secondary B Aquifer as the primary receptor. The Rochdale Canal adjacent to the site is not considered a key receptor, since it is higher than the site. Site observations noted leakages from the canal onto the site forming waterlogged ground.

At this generic stage LKC considers any perched groundwater results and leachate results should be compared to Environment Agency Values for UK Drinking Water Standard[13,14] (UKDWS), where available and EQS and SWAD[15] values if considered applicable. The latter is considered suitable for TPH at 200µg/l as a generic screen, since more recent guidelines do not consider heavy end hydrocarbons as principal risk drivers[16] to controlled waters.

[13] EA (2002). "Environment Agency technical advice to third parties on Pollution of Controlled Waters for Part IIA of the Environment Protection Act 1990.".
[14] HMSO (2009) "Water England: The private Water Supplies Regulations". Statutory Instruments No.3101.
[15] Surface Water Directive (EC 75/440/EEC); Water Supply (Water Quality) Regulations 1989, as modified.
[16] EA (2009). "Petroleum Hydrocarbons in Groundwater: Supplementary Guidance for hydrological Risk Assessment."

It should be noted that the leaching test used in some analysis is aggressive (de-ionised water) and is not in aqueous equilibrium (steady state) with the solid sample. This may cause rapid dissolution and overestimation of the aqueous phase concentrations compared to groundwater in contact with contaminated soils. Although dissolution may be reduced for highly hydrophobic contaminants[17], such as B(a)P it is likely that the initial leaching will remove the most readily available hydrocarbons and subsequent flushing would reduce the leachable concentrations[18]. Traditionally the leaching test was developed for inorganic constituents and the leaching of organics is poorly understood[19].

Elevated contaminants are presented in Table 5-2 and all analysis sheets are presented in Appendix F.

	Contaminant	Units	No. of samples	Result Ranges	No. Exceeded	Assessment Criteria	Source of Criteria
Inorganic	Arsenic	µg/l	24	<1.0 to 10.7 (TP45)	1	10	UKDWS
Inorganic	Sulphate	µg/l	24	21 to 1800 (TP204)	4	250	UKDWS
General	pH	pH		Range 6.8 to 8.4			
General							

Table 5-2: Summary of elevated groundwater and leaching test results for land at new Islington, Manchester.

Notes:

TPH result based on SWAD value of 200µg/l.

Total PAH based on EA guidance on UKDWS for four PAHs: benzo(b)fluoranthene, benzo(k)fluoranthene, indeno(123cd)pyrene and benzo(ghi)perylene. Note some LODs above criteria value.

Elevated results have been identified for arsenic (1no.sample) and sulphate (4no. samples). Although no elevated hydrocarbons were identified in the water or leaching test samples the depths of the leaching tests did not match with where hydrocarbon odours were identified or there were insufficient samples.

Based on the above there is uncertainty on the risk to controlled waters, in particular from fuel derived hydrocarbons from soils that identified an odour in the made ground. In addition, logs indicate odours were from water seepages in perched waters above the clay.

LKC still considers the risk to the low sensitivity Secondary B Aquifer is not significant, considering the thick depth of stiff Till (minimum 7.2m thick) underlying the site to the Manchester Marl bedrock (location of the aquifer). In addition, there are no potable abstractions within 1km of the site, which indicates groundwater is not used extensively for a potable water supply.

Furthermore, it is unknown what position the Environment Agency (EA) has for this site or if there has been any liaison between the EA and MCC.

Based on the above it is uncertain if the EA considers the site a significant risk to Controlled Waters. Based on limited data and mainly on the low risk setting of the site over a Secondary B Aquifer with thick interceding Till, LKC considers pollutant linkage 4 to be incomplete and the site does not constitute a significant risk to Controlled Waters.

[17] EA (1999)."Methodology for the Derivation of Remedial Targets for the Soil and Groundwater to Protect Water Resources." R&D Technical Report, P20

[18] EA (2006)."Remedial targets Methodology: Hydrological Risk Assessment for Land Contamination."

[19] EA (2009). "Petroleum Hydrocarbons in Groundwater: Supplementary Guidance for Hydrological Risk Assessment."

5.4 Gas Risk Assessment

Limited gas monitoring has been undertaken at the site. It has comprised 3no. visits in 2002 in BH118 and 3no. visits in 2004 in BH201 and BH202. This equates to a total of six separate visits from 22nd August 2002 and 12th January 2004.

A summary of the findings of gas monitoring are presented in Table 5-3 and all analysis sheets are presented in Appendix G.

Boreholes	Range of Monitoring Results					Max GSV (l/hr)	CS/TL
	Peak CH_4 (%v/v)	Steady CO_2 (%v/v)	Peak Flow (l/h)	Groundwater (mbgl)	Pressure (mb)		
BH118	<0.1	0 to 0.8	<0.1 to 1.8	?	988 to 1011	1.4 E-02	CS1
BH201	<0.1	0.3 to 3.1	<0.1	1.65 to 2.45	2 visits monitored <1000mb	3.1E-03	CS1
BH202	<0.1	<0.1	<0.1	1.38 to 1.5		1.0E-04	CS1

Table 5-3: Summary of ground gas monitoring for land at New Islington, Manchester.

Notes:

If concentrations / flow are zero then equipment detection limits are assumed.
If there is a negative flow rate a positive flow rate is assumed a s a conservative screen.
CS – Characteristic Situation; TL= Traffic Light

In accordance with current guidance CIRIA C665[20] a Gas Screening Value (GSV) may be calculated. Assuming worst case scenario maximum concentrations and flow for methane and carbon dioxide generated GSVs of 1.8E-03 l/hr and 1.4E-02 l/hr respectively placing the gas risk within a Characteristic Situation (CS) 1.

Gas readings and flow are typical of relatively inert ash fill, where little putrescible material is found. The maximum fill from these boreholes was 3.8mbgl, although groundwater was up to 1.65mbgl, which would be considered worst case conditions coupled with falling atmospheric pressure.

A recent paper by Card and Wilson (2011)[21] noted made ground to a maximum of 5m that does not contain large quantities of putrescible material, will unlikely require gas protection measures. Ash made ground was noted to have a high organic content, but will not likely generate a significant flow of hazardous gas. Although material was not forensically investigated sample descriptions indicate made ground mainly comprised inert material, such as ash and brick; depth are anticipated to be no more than 4m in the south of the site; and gas readings did not show high concentration or flow rates.

Furthermore, it should be noted that the proposed buildings will be apartment blocks, part of which will include be undercroft parking. This will significantly reduce any build-up of gas, if any is generated.

Although based on limited data LKC considers pollutant linkage 3 and pollutant linkage 5 (methane only) to be incomplete and gas protection measures will not be required in new buildings.

[20] CIRIA (2007). "Assessing Risks Posed by Hazardous Ground Gases to Buildings." CIRIA C665
[21] Card,G and Wilson, S (2011). "A Pragmatic Approach to ground gas Risk Assessment in the 21st Centuary." CIRIA/Environmental Protection UK Ground Gas Seminar 22nd June and 13th September 2011.

5.5 Additional Risk Assessment

The concentrations of soluble sulphate in the soil and water, when contrasted to BRE Digest[22], categorise the concrete requirement as DS-2 AC-1s to protect against concrete attack. Therefore, LKC considers that Pollutant Linkage 5 (sulphate only) is complete and sulphate resistant concrete is required for the proposed buildings.

United Utilities (UU) guidelines have been recently replaced with new guidance[23], where sampling is required for contaminants that include speciated petroleum hydrocarbons, chlorinated compounds, BTEX compounds, phenols, cresols, ethers, nitrobenzene, ketones, aldehydes and amines. However, the guidelines do state a robust risk assessment can be undertaken on why specific pipework is not required. If pipework is to be founded in made ground it is likely barrier pipe would be required. This is subject to completing a UU risk assessment form and consultation with UU. Therefore, at this stage LKC considers Pollutant Linkage 6 is possible pending the completion of a UU risk assessment document.

Analysed soil concentrations are considered phytotoxic as outlined in BS3882[24]for copper, zinc and nickel. Remedial measures will be required for any areas of soft landscaping to protect flora. Therefore, pollutant linkage 7 is considered complete.

5.6 Revised Conceptual Model

A revised conceptual model may be undertaken for the site using all available data and this is presented in Table 5-4. A description of the likelihood for the pollutant linkage to exist is summarised below.

Pollutant Linkage No.	Contaminant					Pathway	Receptor
	ACM	Gases		Contaminants			
		Hazardous	Ground	Organic	Inorganic		
PL1	✓	x	x	✓	✓	-Dermal contact. -Ingestion of soils. -Inhalation of contaminated soil, fibres and dust.	-Future site residents.
PL2	x	x	x	?	x	-Inhalation of vapours. -Vapour migration through permeable strata.	-Future site residents. -Onsite drain/culvert..
PL3	x	x	x	x	x	-Inhalation of hazardous gas. -Migration through permeable strata.	-Future site residents.
PL4	x	x	x	x	x	-Groundwater migration through permeable strata. -Perched waters migration on site.	-Secondary B Aquifer. -Onsite drain/culvert.
PL5	x	x	x	x	✓	-Contact with potential hazards	-Site buildings
PL6	x	x	x	?	?	-Ingestion of tainted water supply. -Corrosion of metal pipework.	-Future site residents. -Pipework.
PL7	x	x	x	x	✓	-Root uptake of phytotoxic contaminants	-Flora in future landscaping.

Table 5-4: Revised Contamination Conceptual Model for land at New Islington, Manchester.
Key: ✓ – Pollutant Linkage identified; ? – Pollutant Linkage possible, x – Pollutant Linkage unlikely

5.6.1 Pollutant Linkage 1

Pollutant linkage 1 (direct contact) refers to the identified ACM in the spoil heaps from the 1999 report, TP131 and TP37. Heavy metals, total PAHs and heavy end TPH were also noted to be elevated across most of the site. This pollutant linkage is considered complete for future site residents and appropriate remediation will be required to mitigate

[22] BRE (2005)."Concrete in Aggressive Ground." Special Digest 1.
[23] UU(2011). "United Utilities Water Supplementary Guidance for the Selection of Water Pipes in Land Potentially Affected by Contamination."
[24] BS (2007). "Specifications for Topsoil and Requirements for use." BS3882:2007

the risk from direct contact in the managed landscaped areas. Furthermore, ACM will need to be appropriately managed.

5.6.2 Pollutant Linkage 2

Considering the uncertainty of the composition and fraction range of the fuel hydrocarbons pollutant linkage 2 is still considered possible for the site. More risk based sampling and delineation of the four identified areas needs to be undertaken and appropriately risked assessed.

5.6.3 Pollutant Linkage 3

Pollutant linkage 3 refers to possible hazardous gas from infilling onsite affecting the future site residents. The generation of significant hazardous gas (in particular carbon dioxide and methane) is dependent on the composition of any made ground

Limited monitoring does not indicate a significant risk from hazardous gas, placing the site in a CS1, where no gas protection is required. Considering the primary gas source related to ash fill (maximum 4mbgl) carbon dioxide will be the principal generated gas and low flow rates are anticipated. This was supported in the limited gas monitoring results. Additionally, the proposed buildings will be partly built with an undercroft for car parking allowing large air flow and reduced construction footprint on the ground.

Based on the above LKC does not consider this pollutant is significant and no specific gas protection will be required.

5.6.4 Pollutant Linkage 4

Pollutant linkage 4 refers to the possible mobile contaminants migrating to the Secondary B Aquifer. Limited sampling only noted slight exceedences for arsenic and sulphate. However, hydrocarbons odours were noted in groundwater seepages into the four identified areas where hydrocarbon odours were observed (TP37, TP39, TP204 and TP002).

It is unknown what liason with the EA has been undertaken, but in the opinion of LKC the low sensitivity of the Secondary B Aquifer; no potable water abstraction within 1km of the site; substantial thick deposits of stiff Till overlying the Manchester Marl bedrock; and water encountered being perched, suggest the site will not pose a significant risk to controlled waters.

It should be noted that if free product is encountered during delineation work then this will likely require removal by the EA.

5.6.5 Pollutant Linkage 5

Pollutant linkage 5 refers to the possible deleterious effects that sulphate may have on building materials such as concrete, water pipes and building structures. Sulphate resistant concrete will be required for this site.

5.6.6 Pollutant Linkage 6

Pollutant linkage 6 refers to the possible contaminants permeating potable water pipes and consumption by the future residents of the tainted water supply. Given the identified presence of made ground on site and likely contaminants this linkage is still considered possible, subject to completing the UU Risk Assessment form.

5.6.7 Pollutant Linkage 7

Pollutant linkage 7 refers to the possible phytotoxic contaminants affecting plant growth. Given the identified elevated phytotoxic contamination onsite remediation in managed landscaped areas will be required.

Further details of the outline remedial proposals and a remedial option appraisal are given in Section 6.

6 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

LKC were commissioned to undertake an assessment of all available data for the study site.

Three investigations have been undertaken between 1999 to 2004. These included soil and water analysis and limited gas monitoring. An investigation was undertaken in 2012 for drainage geotechnical purposes in relation to the adjacent Rochdale Canal.

LKC are unaware of any assessments and correspondence from MCC on the previous reports or any agreed way forward. Furthermore, it is unknown what position the EA has for this site or if there has been any liaison between the EA and MCC.

With regards to soil contamination a large proportion of the site was impacted with heavy metals, PAHs and TPH. The latter may be a vapour risk, subject to further delineation work and more risk based analysis.

The controlled water receptor (Secondary B Aquifer) is not considered a significant risk. Hydrocarbon seepages were noted in four areas of the site, but is likely perched water on top of clay. The site is underlain by at least 7.2m of stiff clay over the Manchester Marl bedrock. It should be noted that if free product is encountered during delineation work then this will likely require removal by the EA.

Limited gas monitoring did not indicate a significant risk from hazardous gas (calculated as CS1). Typical ash and brick fill will generate low concentrations of carbon dioxide with low flow rates, which was observed. Part of the buildings will have undercroft car parking, thus allow high ventilation and reduce the contact footprint of the building on the ground.

LKC conclude that there are three remaining identified pollutant linkages that still exist (relating to direct contact for human health, attack on concrete and phytotoxicity). Possible pollutant linkages still remain for inhalation of vapours and the use of protective potable water supply pipework. Further details are presented below.

6.2 Recommendations

The recommendations and suitable options appraisal are provided below and considered appropriate for the site based on the findings of the site investigations.

6.2.1 Soil Contamination – Direct Contact (Pollutant Linkage 1 and 7)

The risks from these pollutant linkages can be relatively easily mitigated by the use of a capping layer in the managed landscaped area.

In landscaped areas LKC would recommend that a 300mm thick clean capping layer is employed comprising 100mm capillary break layer (MOT type 1 material, 20-30mm, minimal fines) and at least 200mm comprising clean inert fill and sufficient topsoil for a growing medium.

It is imperative that any incoming soil material for use on the site is chemically validated prior to importation at an appropriate sampling rate and should form part of the Remediation Strategy (see Section 6.4).

6.2.2 Soil Contamination - Vapours (Pollutant Linkage 2)

Four areas of the site identified hydrocarbon odours (possible from water seepages). There is still a potential vapour risk from volatile hydrocarbons. Limited risk based analysis was undertaken for petroleum hydrocarbons.

LKC recommend that delineation work (trial pitting) is undertaken around the four areas to ascertain the extent of any hydrocarbon impacted material.

6.2.3 Site Buildings (Pollutant Linkage 5)

The concentrations of soluble sulphate in the soil when contrasted to BRE Digest 2005 categorise the concrete requirement as DS-2 AC-1.

6.2.4 Potable Water Supply (Pollutant Linkage 6)

Potential risk to potable water supplies has been identified and we would advise consulting with United Utilities about suitable protection for water supplies. A United Utility Risk Assessment form will need to be completed and it is likely barrier pipe will be required.

6.3 Additional Considerations

6.3.1 Unexpected Contamination

The relevant contractors should be briefed that during development works at the site should any unusual ground conditions and / or visual or olfactory evidence of contamination be encountered at the site, LKC and the Local Authority should be informed and further assessment of the material may be required.

6.3.2 Health and Safety Considerations

In working with, removing or treating any contaminating material it is important that any potential risks associated with the actual site works are mitigated by good environmental management of the site during the remedial phases. Standard health and safety precautions (as per HSE guidance[25]) should be adopted by all workers involved with site enabling and construction works.

6.3.3 Asbestos Management Plan

ACM was identified onsite, primarily from stockpiles identified in the 1999 report, as well as from TP37. It is unknown if the stockpiles noted on the recent site reconnaissance are the same stockpiles.

An Asbestos Management Plan should inform the contractor on the procedure required in dealing with ACM and protocol in removing the material safely.

[25] HSE (1991). "Protection of workers and the general public during development of contaminated land" London HMSO.

6.3.4 Piling in Contaminated Land

It is understood that the building will be piled into the bedrock. This may provide a preferential pathway for contaminants to the Secondary B Aquifer. Once the method of piling has been determined, good practice for the drilling of piles on contaminated sites should be adhered to, such as guidance provided by the Environment Agency[26].

6.3.5 Reuse of Stockpiled Material

If stockpiled material onsite is to be reused then LKC would advise sampling at a rate of 1 sample per 100m^3. It may be where the ACM material is and therefore will need to be suitably dealt with as part of the Asbestos Management Plan.

6.4 Remediation Strategy

Once additional work has been undertaken a Remedial Strategy should be produced detailing all remediation to be undertaken on the site. It should also discuss suitable sampling frequency for any imported or site won material to be used in soft landscaping and details required for a final Completion Report once all validation has been completed.

[26]Environment Agency (2001) Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention.

APPENDIX A

HISTORICAL PLANS

TABLE 1

SUMMARY OF HISTORICAL SITE LAYOUT (EXCLUDING RESIDENTIAL)
BASED ON ORDNANCE SURVEY MAPS

	Zone 1	Zone 2	Zone 3	Zone 4
Date of OS Map	(Union Street Mills)	(St Jude's School)	(Cardroom Estate)	(Ancoats Hospital Site)
1893		Corporation Yard and Stone Wharf John Street Coal Wharf	School Dye Works New Islington Baths and Wash House Wire Works	Ancoats Hospital Unnamed Wharf
1908		Corporation Yard and Stone Wharf Saw Mill Hydraulic Power Station	School Dye Works (disused) New Islington Baths and Wash House Glass Works Bedstead and Safe Works	Ancoats Hospital Unnamed Wharf
1922		Corporation Yard and Stone Wharf Saw Mill (x2) Clothing Factory Galvanising Works Hydraulic Power Station	School Engineering Works New Islington Baths and Wash House Glass Works Bedstead and Safe Works	Ancoats Hospital Unnamed Wharf
1931	Joinery Works	Saw Mill Galvanising Works	School New Islington Baths and Wash House Engineering Works	-
1948	Builders Yard	-	-	-
1968	Engineering Works	Engineering Works	Builders Yard Scrap Metal Yard	-
1979	Engineering Works	-	-	-
1988	Engineering Works	-	-	-
	NB. Hyphen indicates that a map for zone was not available			



Figure 2: Extract of '*A Plan of Manchester and Salford*', 1800, showing Waller's Mill (top centre) as a single rectangular range of buildings

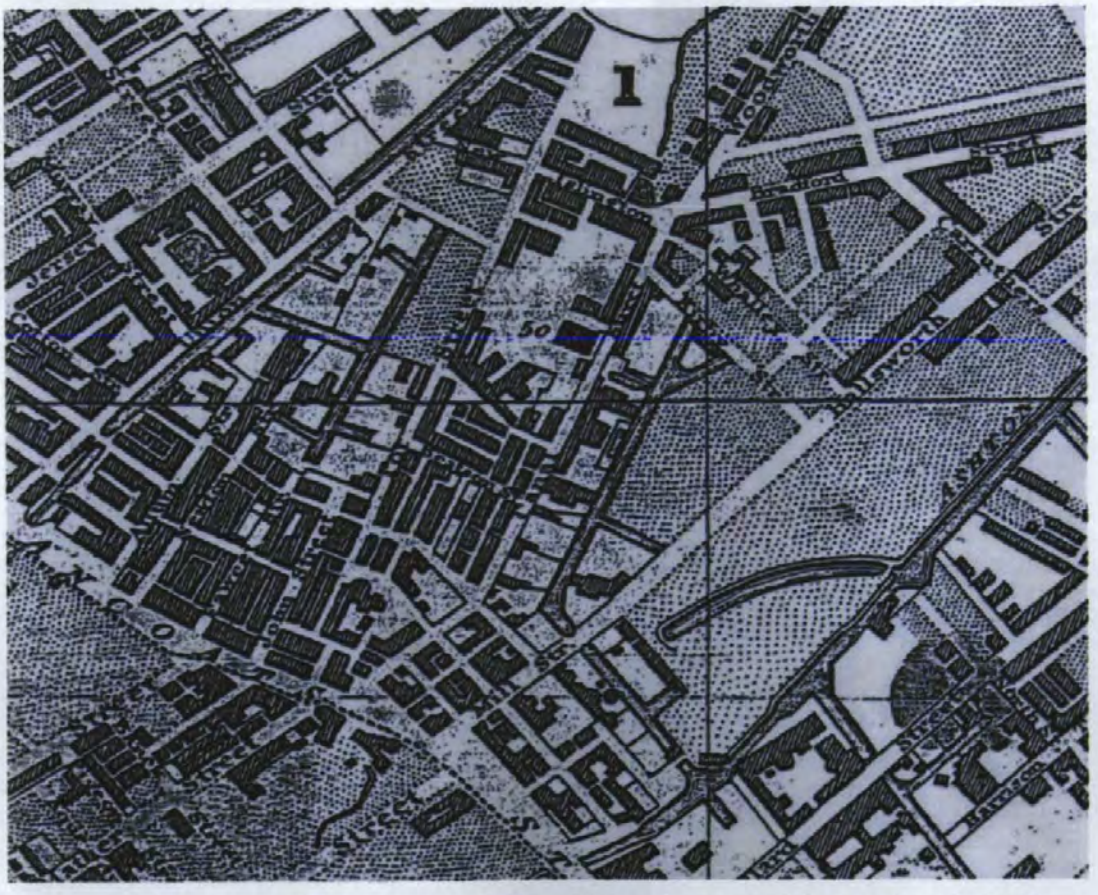


Figure 3: Extract of Thornton's 'Map of Manchester and its Environs', 1824

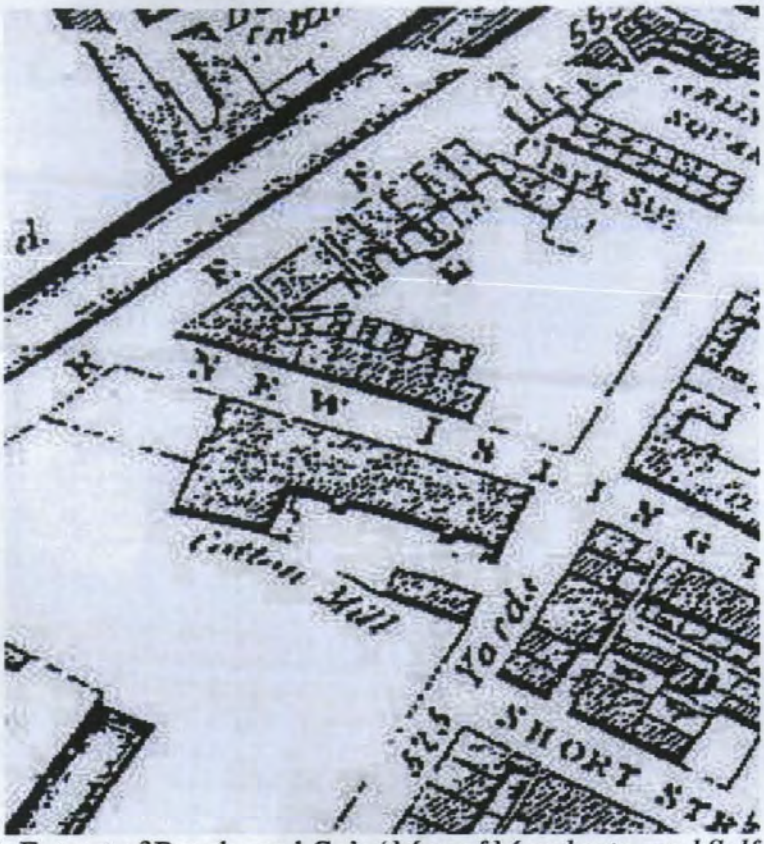


Figure 4: Extract of Bancks and Co's '*Map of Manchester and Salford*' 1831, showing the extension to the north-western part of the mill. Another small rectangular building is shown to have been erected within the south-eastern part of the site

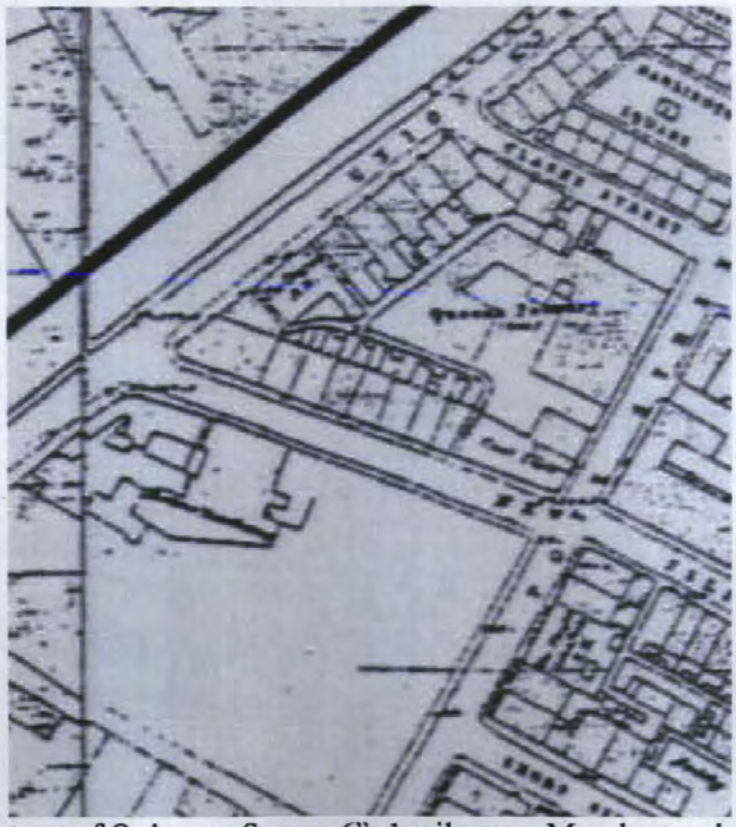


Figure 5: Extract of Ordnance Survey 6": 1 mile map, Manchester sheet 24, 1851

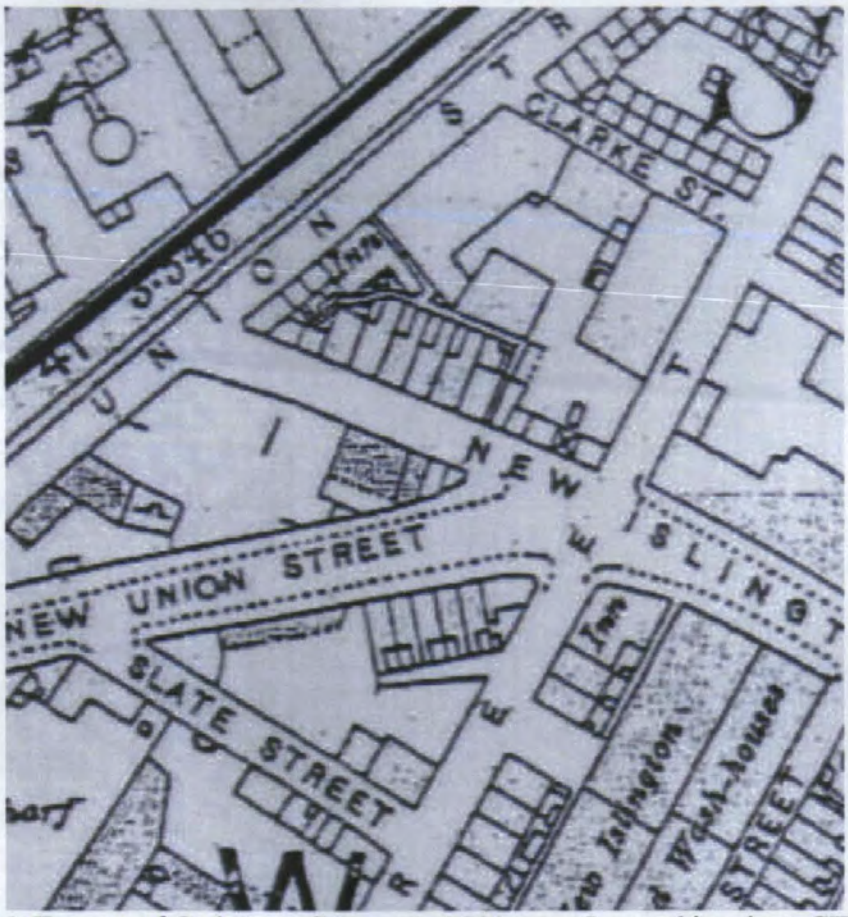
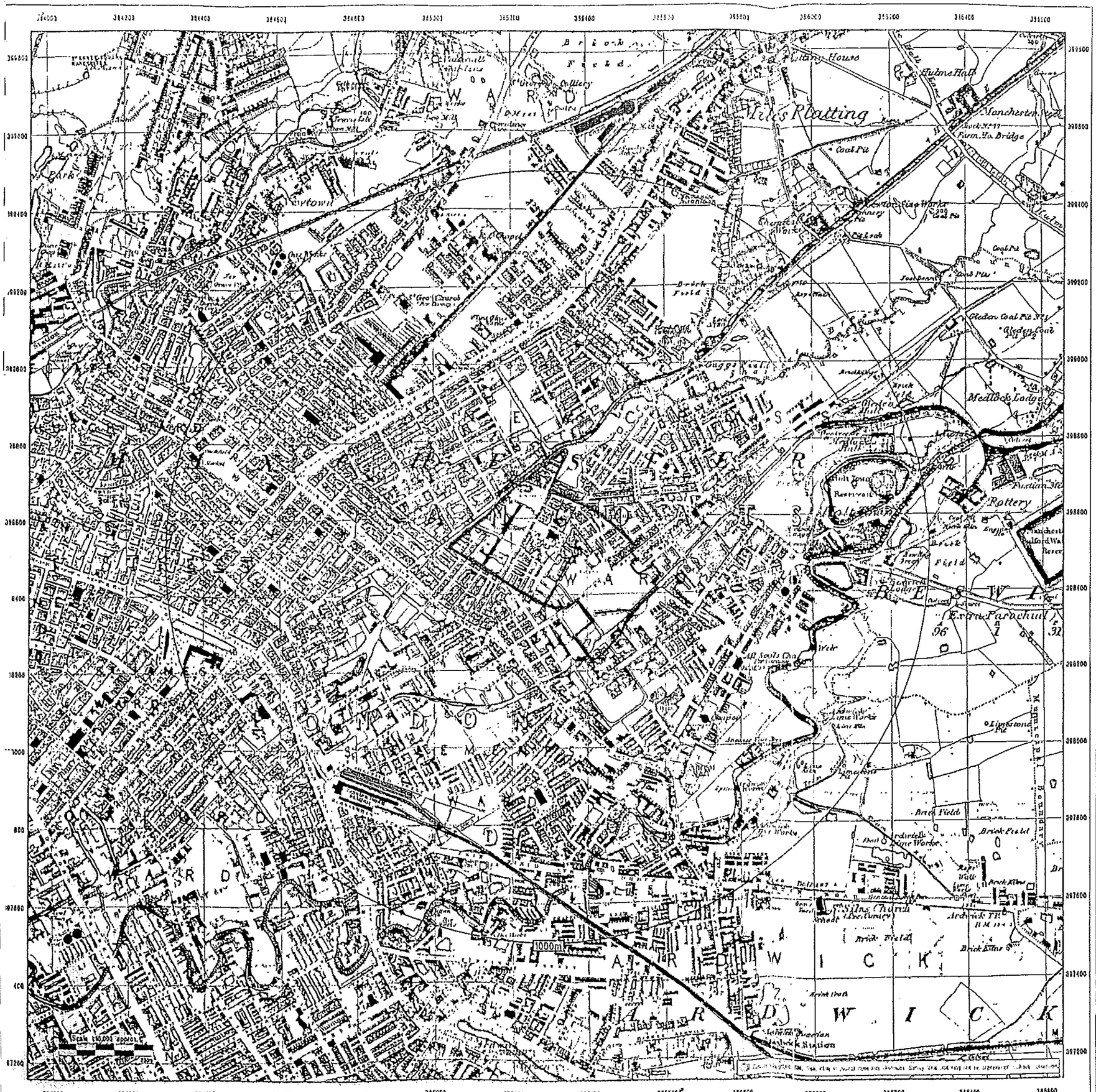


Figure 6: Extract of Ordnance Survey 1: 2500 map, Lancashire sheet CIV, 1893



Figure 7: Plan of the site based on Goad's Insurance Plan, 1928 Revision


Wilt's Platting
Manchester Road
Turn. To. Bridge
Coal Pit
Brick Field
Medlock Lodge
Rottery
Brick Field
Brick Field
Brick Field
Brick Kilns
Brick Kilns
Brick Field
Extra Parachial
Limestone
Limestone
Pit
Sand Pit
Sand Pit
Sand



EnviroCheck

Environmental Site Sensitivity Data

CLIENT DETAILS

Order No. EHA23281_1

Customer Ref: John Land, 500057/A-W
Pell Frischmann Consultants Ltd
Genesis Centre Birchwood Science Park
WARRINGTON
WA3 7BH

SITE DETAILS

Grid Reference 385300 398500

Cardroom Estate
Ancoats

MANCHESTER

Historical Map Legend

Quarry
Shingle
Railway over Road
Road over Railway
Railway over River
Gravel Pit
Sand Pit
Level Crossing
Other Pits
Road over River or Canal
Road over Stream
Mixed Wood
Rough Pasture
Road over Stream
Marsh
Sunken Road
Raised Road
Sketched Contour
Arrow denotes flow of water
Instrumental Contour

Lancashire And Furness

The historical maps shown were reproduced from maps predominantly sold at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1895 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given on the right is often some years later than the surveyed date. Before 1934, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in ratifying sheets.

1893

1893

Ordnance Survey
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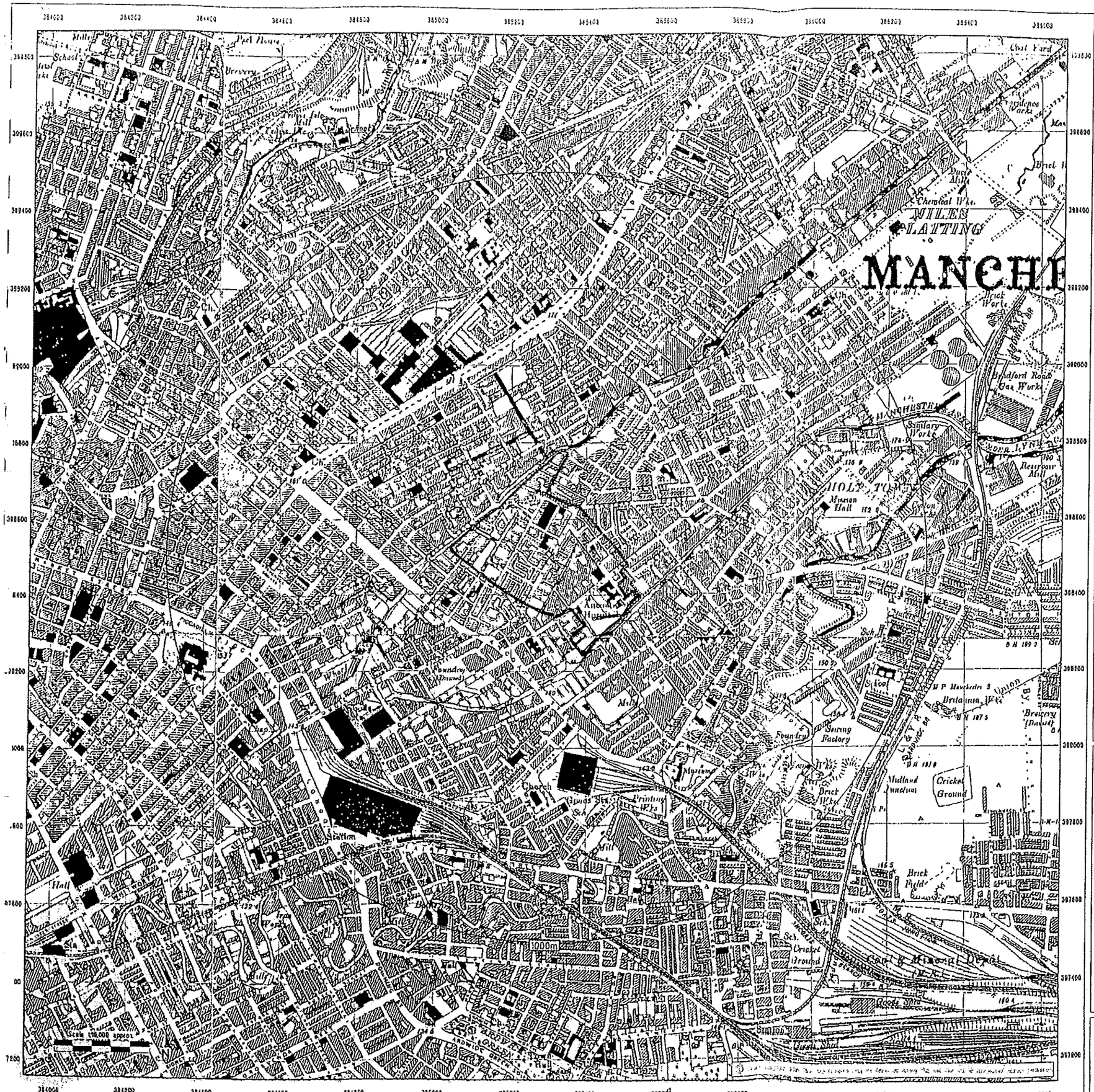

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LANCASHIRE AND FURNESS county

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In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1973, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

1895	1894
1896	1895

Date(s) of Publication

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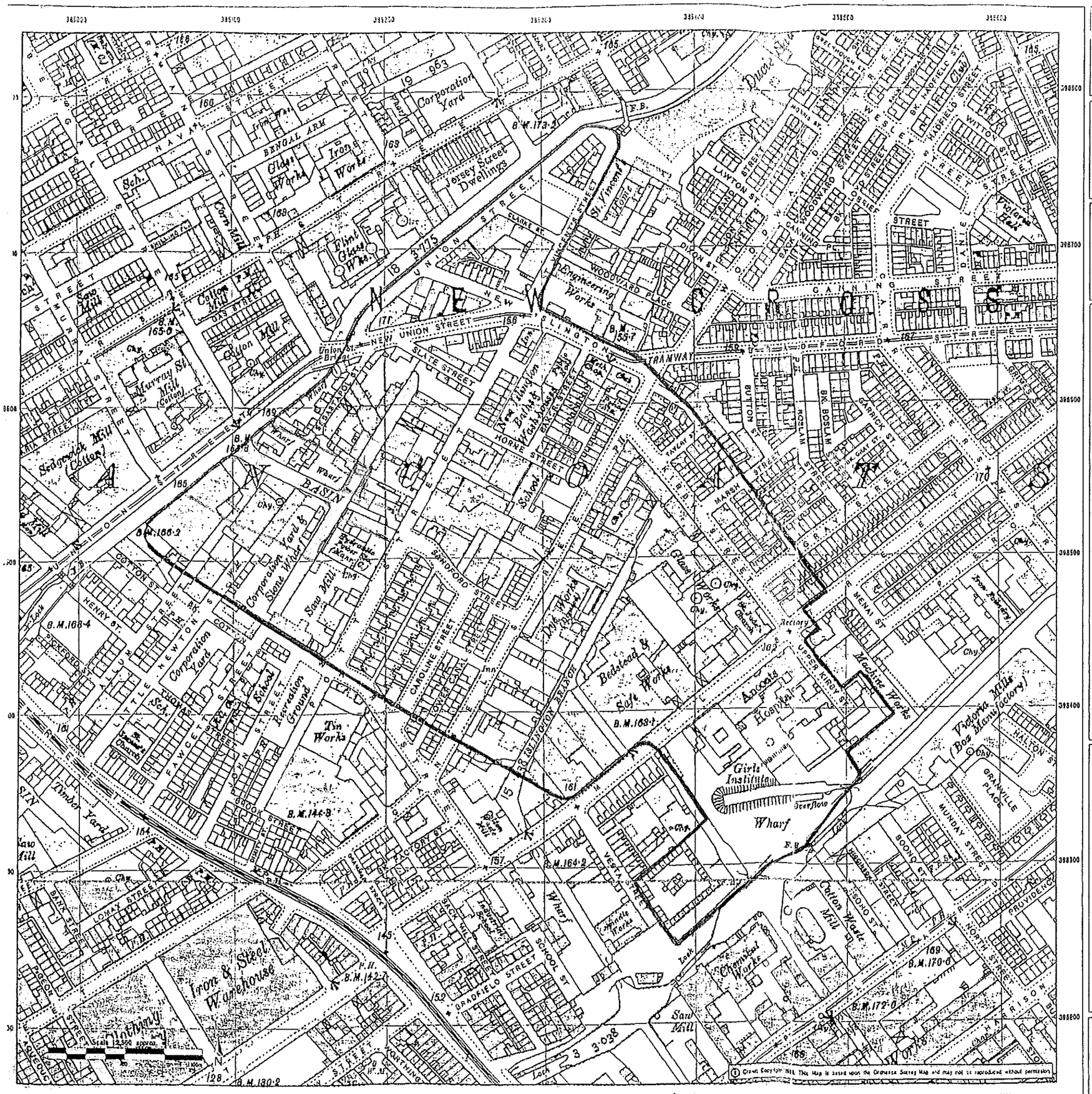

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Lancashire And Furness

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1900

1900

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1909	1909
1909	1909

Date(s) of Publication

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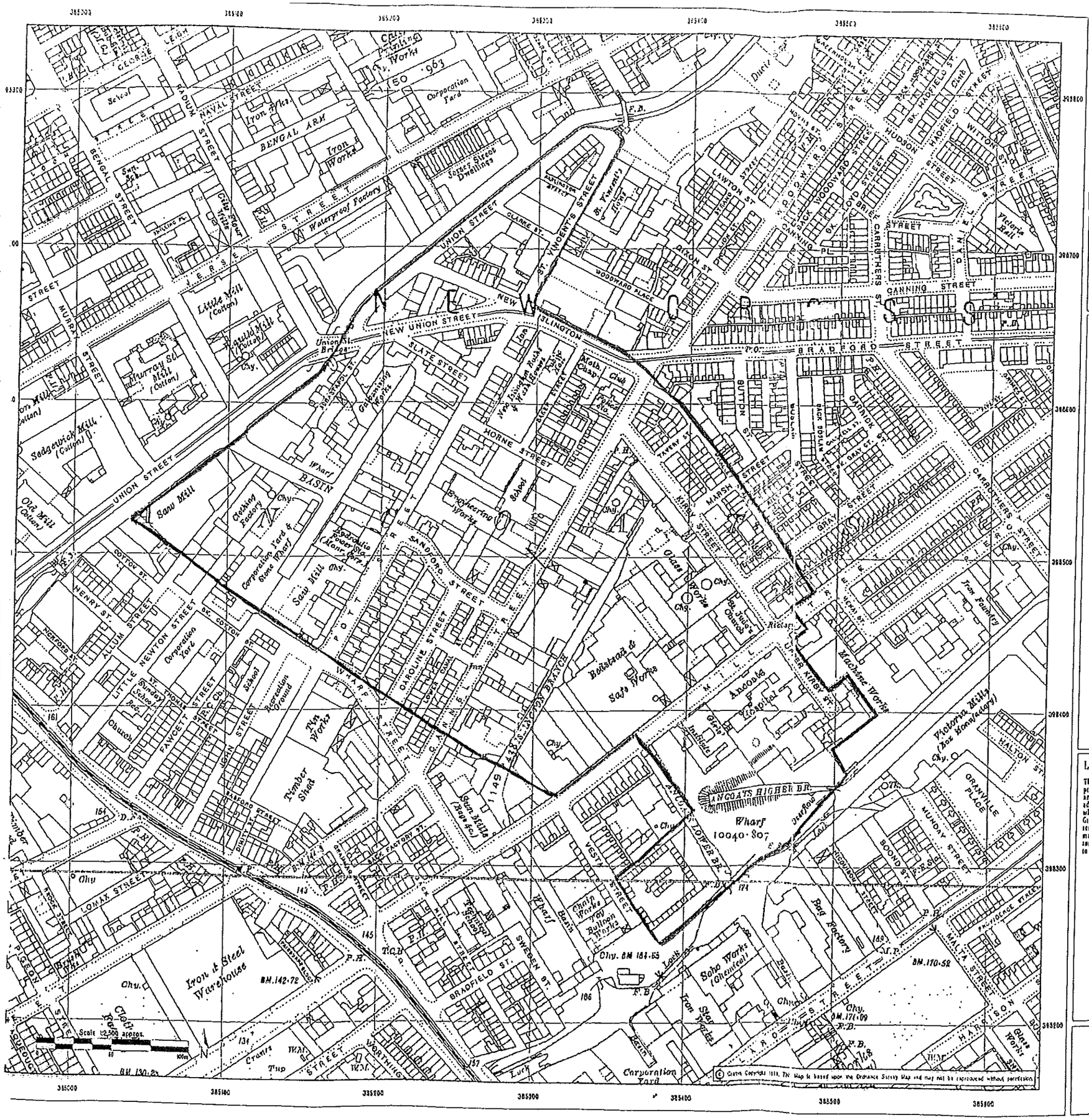

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Lancashire And Furness

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1922

1922

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7 Abbey Court, Eagle Way, Sowton
Exeter EX2 7HY
Telephone [illegible] Fax [illegible]



EnviroCheck

Environmental Site Sensitivity Data

CLIENT DETAILS

Order No. EH23281-1

Customer Ref: John Land, 500057/A-W
Pell Frischmann Consultants Ltd
Genesis Centre Birchwood Science Park
WARRINGTON
WA3 7BH

SITE DETAILS

Grid Reference 385300 398500

Cardroom Estate
Ancoats

MANCHESTER

Historical Map Legend

Quarry
Shingle
Railway over Road
Road over Railway
Railway over River
Gravel Pit
Sand Pit
Level Crossing
Other Pits
Road over River or Canal
Road over Stream
Mixed Wood
Rough Pasture
Road over Stream
Marsh
Sunken Road
Raised Road
Sketched Contour
Arrow denotes flow of water
Instrumental Contour

LANCASHIRE AND FURNESS county

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given on the right therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, were independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

In the late 1940's, a 'revisional' edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

1923	1923
1938	1923

Date(s) of Publication

Ordnance Survey
Value Added Reseller

Landmark Information Group Limited
7 Abbey Court Eagle Way Sandton
Bronx 1437
Telephone [illegible] Fax [illegible]



EnviroCheck

Environmental Site Sensitivity Data

CLIENT DETAILS

Order No. EH23281-1

Customer Ref: John Land, 500057/A-W
Pell Frischmann Consultants Ltd
Genesis Centre Birchwood Science Park
WARRINGTON
WA3 7BH

SITE DETAILS

Grid Reference 385300 398500

Cardroom Estate
Ancoats

MANCHESTER

Historical Map Legend

Quarry
Shingle
Railway over Road
Road over Railway
Railway over River
Gravel Pit
Sand Pit
Level Crossing
Other Pits
Road over River or Canal
Road over Stream
Mixed Wood
Rough Pasture
Road over Stream
Marsh
Sunken Road
Raised Road
Sketched Contour
Arrow denotes flow of water
Instrumental Contour

Ordnance Survey Plan

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1951 the 1:2,500 scale was adopted for mapping urban areas these maps were used to update the 1:10,560 maps. The published date given on the right therefore is from some years later than the surveyed date. Before 1930, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

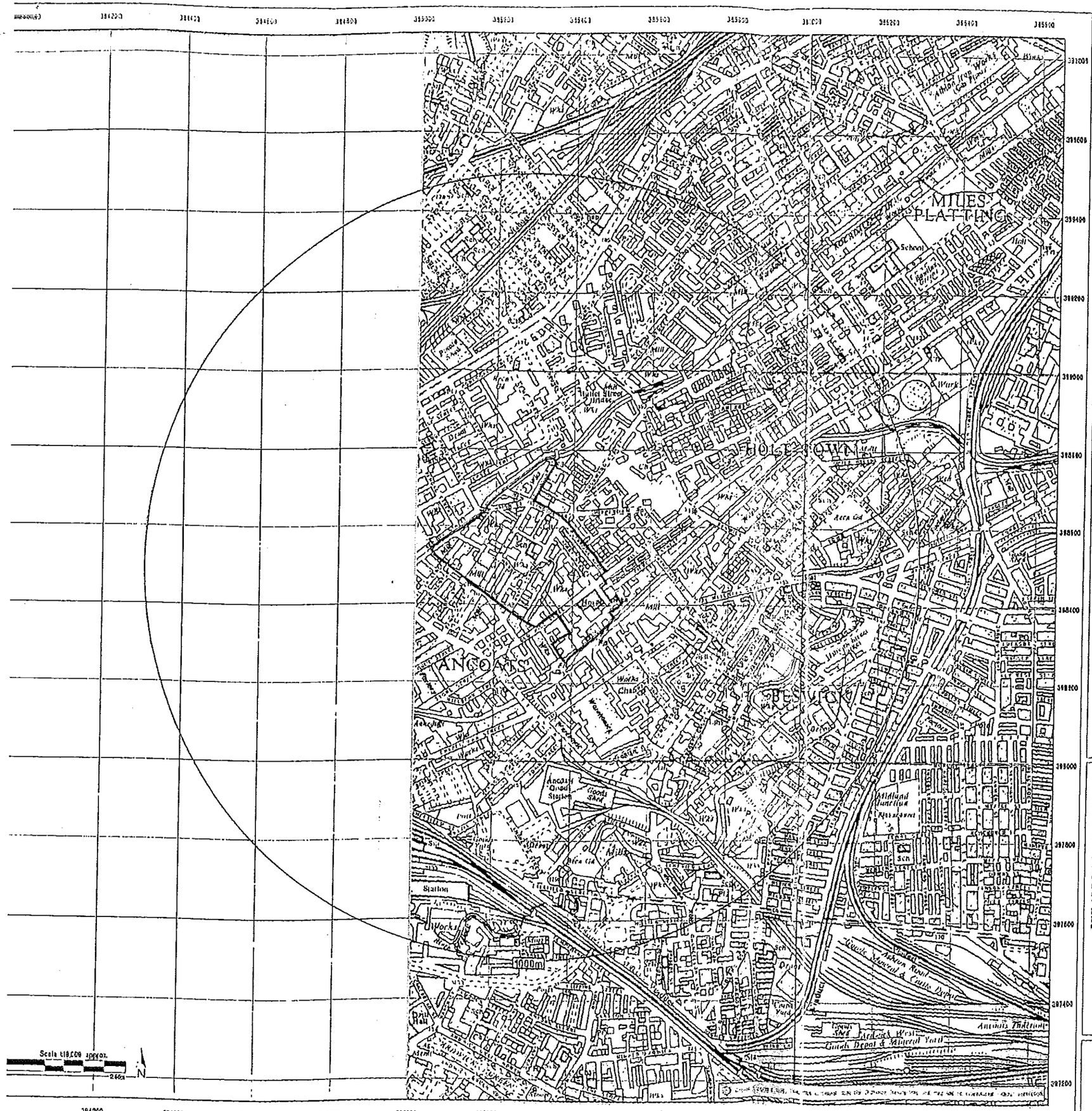
In the late 1940's a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - work on military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

1956	1956

Date(s) of Publication

Ordnance Survey
Value Added Reseller

Landmark Information Group Limited



EnviroCheck

Environmental Site Sensitivity Data

CLIENT DETAILS

Order No. EH23281-1

Customer Ref: John Land, 500057/A-W
Pell Frischmann Consultants Ltd
Genesis Centre Birchwood Science Park
WARRINGTON
WA3 7DH

SITE DETAILS

Grid Reference 385300 398500

Cardroom Estate
Ancoats

MANCHESTER

Historical Map Legend

Quarry
Shingle
Railway over Road
Road over Railway
Railway over River
Gravel Pit
Sand Pit
Level Crossing
Other Pits
Road over River or Canal
Road over Stream
Mixed Wood
Rough Pasture
Road over Stream
Marsh
Sunken Road
Raised Road
Sketched Contour
Instrumental Contour
Arrow denotes flow of water

Ordnance Survey Plan

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given on the right therefore is often some years later than the surveyed date. Before 1916, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1974, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

1968

Date(s) of Publication

Ordnance Survey
Value Added Reseller

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EnviroCheck

Environmental Site Sensitivity Data

CLIENT DETAILS

Order No. EH23281-1

Customer Ref: John Land, 500057/A-W
Pell Frischmann Consultants Ltd
Genesis Centre Birchwood Science Park
WARRINGTON
WA3 7BH

SITE DETAILS

Grid Reference 385300 398500

Cardroom Estate
Ancoats

MANCHESTER

Historical Map Legend

- Quarry
- Shingle
- Railway over Road
- Road over Railway
- Railway over River
- Gravel Pit
- Sand Pit
- Level Crossing
- Other Pits
- Road over River or Canal
- Road over Stream
- Mixed Wood
- Rough Pasture
- Road over Stream
- Marsh
- Sunken Road
- Raised Road
- Sketched Contour
- Arrow denotes flow of water
- Instrumental Contour

Ordnance Survey Plan

The historical maps shown were reproduced from maps predominantly 3rd or 4th scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 12,540 scale was adopted for mapping urban areas where maps were used to update the 1:10,560 scale. The published date given on the right therefore is often some years later than the surveyed date. Before 1854, all OS maps were based on the Cassini Projection, with topographical detail of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

In the late 1870's a revision & Edition was produced, which updated the 1:2,500 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were faithfully orientated with the National Grid. In 1879 the first 1:50,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

1972	1981

Date(s) of Publication

Ordnance Survey
Value Added Reseller

Groundsure Information Group Limited
7 Abbey Court, Eagle Way, Sandhill
Sevenoaks TN14 5HD
Telephone 0870 850 2410 Facsimile 01959 541054



EnviroCheck

Environmental Site Sensitivity Data

CLIENT DETAILS

Order No. EH23281-1

Customer Ref: John Land, 500057/A-W
Pell Frischmann Consultants Ltd
Genesis Centre Birchwood Science Park
WARRINGTON
WA3 7BH

SITE DETAILS

Grid Reference 385300 398500

Cardroom Estate
Ancoats

MANCHESTER

Historical Map Legend

Quarry
Shingle
Railway over Road
Road over Railway
Railway over River
Gravel Pit
Sand Pit
Level Crossing
Other Pits
Road over River or Canal
Road over Stream
Mixed Wood
Rough Pasture
Road over Stream
Marsh
Sunken Road
Raised Road
Sketched Contour
Instrumental Contour
Arrow denotes flow of water

Ordnance Survey Plan

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given on the right therefore is often some years later than the surveyed date. Before 1870, all 15 maps were based on the Cassini Projection, with subsequent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

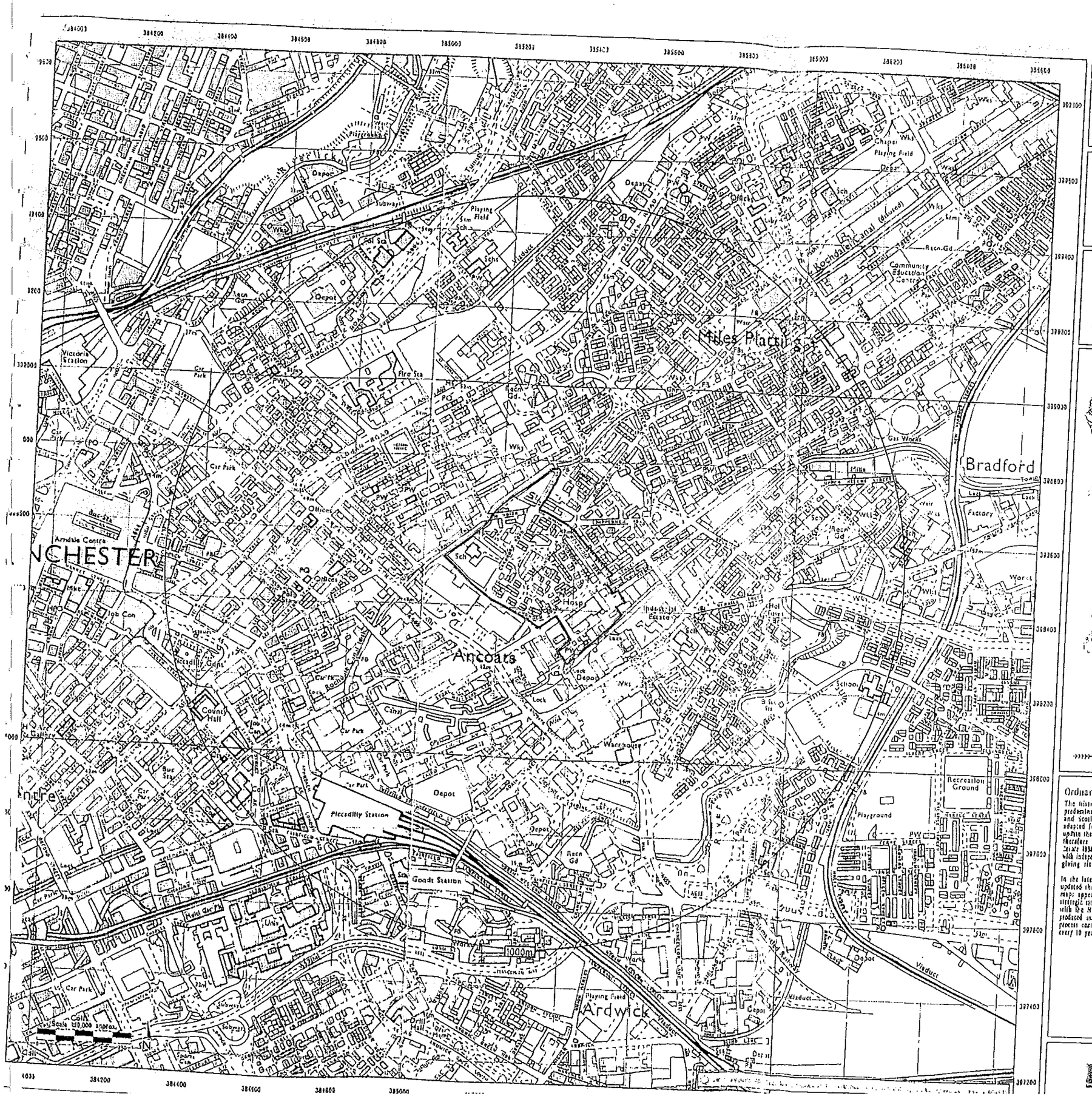
In the late 1880's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1910, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with most editions appearing every 10 years or so for urban areas.

1986 1987

Date(s) of Publication

Ordnance Survey
Value Added Reseller

Landmark Information Group Limited



EnviroCheck

Environmental Site Sensitivity Data

CLIENT DETAILS

Order No. EH23281-1

Customer Ref: John Land, 5000571A-W
Pell Frischmann Consultants Ltd
Genesis Centre Birchwood Science Park
WARRINGTON
WA3 7QH

SITE DETAILS

Grid Reference 385300 398500

Cardroom Estate
Ancoats

MANCHESTER

Historical Map Legend

Quarry
Shingle
Railway over Road
Road over Railway
Railway over River
Gravel Pit
Sand Pit
Level Crossing
Other Pits
Road over River or Canal
Road over Stream
Mixed Wood
Rough Pasture
Road over Stream
Marsh
Sunken Road
Raised Road
Sketched Contour
Arrow denotes flow of water
Instrumental Contour

Ordinance Survey Map

The historical maps shown were reproduced from maps predominantly 6in. to the mile adopted for England, Wales and Scotland in the 1840s, a 1854 the 1:2,500 scale was adopted for many urban areas. These maps were used to update the 1:10,560 maps. The published date given on the right therefore is often some years later than the surveyed date. Since 1938, all 1:2,500 maps were based on the Central Projection, with independent surveys of a whole county or group of counties, giving rise to significant discrepancies in overlapping areas.

In the late 1940's a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The result appears unrefined - with all military camps and other strategic sites removed. These maps were faithfully overprinted with the National Grid. In 1:0, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

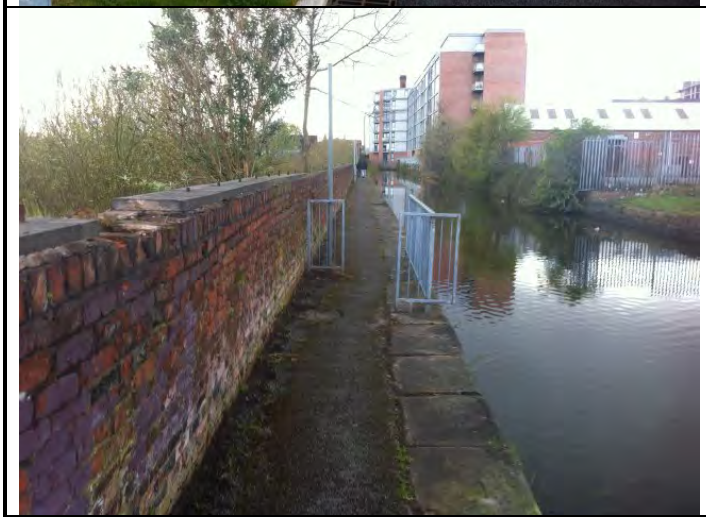
1994	1993

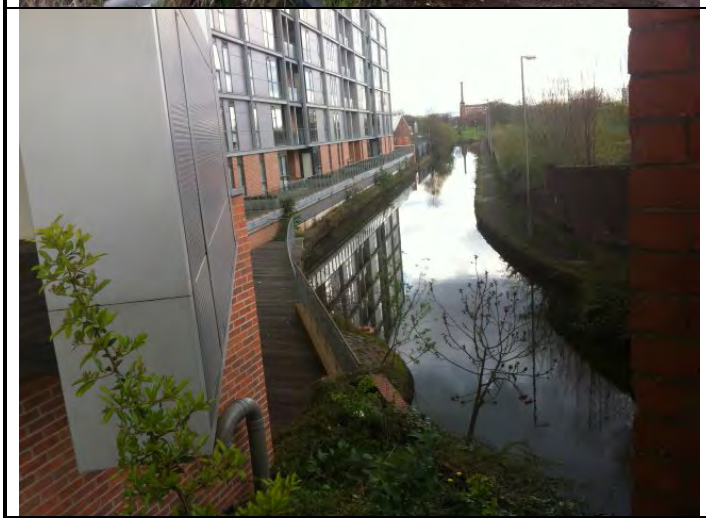
Date(s) of Publication

Ordnance Survey

APPENDIX B

SITE RECONNAISSANCE PHOTOGRAPHS (2012)

	**Photograph 1 (facing south east):** View along New Union Street.
	**Photograph 2 (facing north east):** View along St Vincents Street.
	**Photograph 3 (facing south west):** View along northern site boundary.

	**Photograph 4 (facing south):** View along northern site boundary. Site at lower level than Canal.
	**Photograph 5 (facing south west):** View along south western site boundary. Site levels increase away from camera.
	**Photograph 6 (facing north east):** Rochdale Canal at the New Union Street Bridge.

	**Photograph 7 (facing north):** Western extent of the site. Increase in site levels to New Union Street bridge and evidence of vegetation clearance.
	**Photograph 8 (facing north):** View across western site area to towards northern boundary. Evidence of increase in site levels to left of photograph and vegetation clearance. Stockpile visible.
	**Photograph 9 (facing north):** Evidence of vegetation clearance on central part of the site.

	**Photograph 10 (facing south west):** View across western part of the site.
	**Photograph 11 (facing west):** View towards western extent of site.
	**Photograph 12 (facing south west):** View across western part of the site with stockpile visible.

	**Photograph 13 (facing northwest):** View across central and eastern part of the site.
	**Photograph 14 (facing north west):** View across central and eastern part of the site.
	**Photograph 15 (facing north):** Flytipping at the eastern extent of the site. Wall denotes northern site boundary

	**Photograph 16 (facing north):** Flytipping at the eastern extent of the site. Wall denotes northern site boundary.
	**Photograph 17 (facing west):** Fly tipping and trees at the eastern extent of the site.
	**Photograph 18 (facing west):** Fly tipping and trees at the eastern extent of the site.





Photographs 19 and 20 (facing south): Ponded water at the base of the Canal retaining wall at the central northern site boundary.

APPENDIX C

BOREHOLE AND TRIAL PIT LOGS

PF1999

Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG - CABLE PERCUSSION

Hole ID.
BH1
Header

Contract No.	F11483	Method	Cable Percussion	Coordinates	1049.3 E
Project	Ancoates Zone 1, Victoria Works				3186.6 N
		Drilling Rig	Dando 150	Ground Level	50.53m AOD
Client	English Partnerships	Driller	TW	Orientation	Vertical
		Logged by	TR	Date Started	09/09/1999
Consultant	Pell Frischmann Consultants Ltd			Date Completed	09/09/1999

PROGRESS

Date	Time	Hole depth	Casing depth	Water depth	Remarks
09/09/1999	1800	10.00	4.50	Dry	

DRILLING DETAILS

Hardbore from depth	Hardbore to depth	Chiselling hours	Remarks
4.30	4.60	1.00	

CASING

Hole diam.	Max depth of hole at dia.	Casing diameter	Max depth of casing of dia.
150	10.00	150	4.50

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow

GENERAL NOTES

1. Inspection pit dug to 1.20m.

SPT DETAILS

Depth	Type	Incremental blow count/penetration in mm
1.20	C	N=11 (3,4,4,3,2,2)
2.20	S	N=4 (1,0,1,1,1,1)
3.20	S	N=4 (2,1,1,1,1,1)

* Seating blows only.

NB All depths in metres, all diameters in millimetres, water strike rise time in minutes, chiselling time in hours.

Form	ARIAL CP HEADER
Version	1.00
Revised	01/10/1998

Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG - CABLE PERCUSSION

Hole ID. **BH1** Sheet 1 of 1

Contract No.	F11483	Method	Cable Percussion	Coordinates	1049.3 E
Project	Ancoates Zone 1, Victoria Works				3186.6 N
		Drilling Rig	Dando 150	Ground Level	50.53m AOD
Client	English Partnerships	Driller	TW	Orientation	Vertical
		Logged by	TR	Date Started	09/09/1999
Consultant	Pell Frischmann Consultants Ltd			Date Completed	09/09/1999

Description of Strata	Legend	Depth Below G.L.	O.D. Level	Sampling	SPT N & (U blows)	SPT type & depth	Install-ation
MADE GROUND: Tarmac.		0.10	50.43				
MADE GROUND: Limestone hardcore. (Driller's description)		0.30	50.23	B 0.50 - 1.00			
MADE GROUND: Black silty sandy fine to coarse ash with some gravel size angular to subangular fragments of clinker and occasional gravel size pockets of sandy ashy clay.		1.40	49.13	B 1.50 - 2.00	C11	C 1.20 - 1.65	
MADE GROUND: Soft dark grey very silty organic ashy sandy clay with some gravel size angular to subangular clinker and brick fragments and occasional mixed gravel.					S4	S 2.20 - 2.65	
				B 3.00 - 3.50	S4	S 3.20 - 3.65	
		4.00	46.53	D 4.20			
Stiff brown occasionally fissured slightly sandy CLAY with occasional fine to coarse subangular to subrounded sandstone and mudstone gravel and occasional cobbles.				UF 4.20			
				U 4.70 - 5.20	(61)		
				D 5.20			
				D 5.90			
				U 6.20 - 6.70	(57)		
				D 6.70			
				D 7.40			
				U 7.70 - 8.20	(54)		
				D 8.20			
				D 8.90			
				U 9.20 - 9.70	(58)		
				D 9.70			
Cable Percussion boring complete at 10.00 m.		10.00	40.53	D 10.00			

NB All depths in metres, all diameters in millimetres.
See header sheet for details of drilling, progress and water strikes. See legend sheet for key to symbols.

Form	ARIAL CP LOG
Version	1.00
Revised	01/10/1998

Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG - CABLE PERCUSSION

Hole ID.
BH3
Header

Contract No.	F11483	Method	Cable Percussion	Coordinates	1142.9 E 3198.1 N
Project	Ancoates Zone 1, Victoria Works	Drilling Rig	Dando 150	Ground Level	47.80m AOD
Client	English Partnerships	Driller	TW	Orientation	Vertical
		Logged by	TR	Date Started	01/09/1999
Consultant	Pell Frischmann Consultants Ltd			Date Completed	03/09/1999

PROGRESS

Date	Time	Hole depth	Casing depth	Water depth	Remarks
01/09/1999	1800	3.70	3.70	Dry	
02/09/1999	1800	13.50	3.70	Dry	
03/09/1999	1200	18.90	3.70	NR	

DRILLING DETAILS

Hardbore from depth	Hardbore to depth	Chiselling hours	Remarks
10.90	11.40	1.50	
18.50	18.90	1.25	

CASING

Hole diam.	Max depth of hole at dia.	Casing diameter	Max depth of casing of dia.
200	1.50	200	1.50
150	18.90	150	3.70

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow

GENERAL NOTES

1. Inspection pit dug to 1.20m.

SPT DETAILS

Depth	Type	Incremental blow count/penetration in mm
1.20	C	N=10 (4,4,3,2,2,3)

* Seating blows only.

NB All depths in metres, all diameters in millimetres, water strike rise time in minutes, chiselling time in hours.

Form	ARIAL CP HEADER
Version	1.00
Revised	01/10/1998

Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG - CABLE PERCUSSION

Hole ID. **BH3** Sheet 2 of 2

Contract No.	F11483	Method	Cable Percussion	Coordinates	1142.9 E
Project	Ancoates Zone 1, Victoria Works				3198.1 N
		Drilling Rig	Dando 150	Ground Level	47.80m AOD
Client	English Partnerships	Driller	TW	Orientation	Vertical
		Logged by	TR	Date Started	01/09/1999
Consultant	Peil Frischmann Consultants Ltd			Date Completed	03/09/1999

Description of Strata	Legend	Depth Below G.L.	O.D. Level	Sampling	SPT N & (U blows)	SPT type & depth	Install-ation
Stiff brown occasionally fissured slightly sandy CLAY with occasional fine to medium subangular to subrounded mudstone and sandstone gravel.				U 10.00 - 10.50 D 10.50 D 11.50	(67)		
		12.50	35.30	D 12.50			
Stiff dark brown occasionally fissured thinly and thickly laminated CLAY. ...from 13.50m slightly sandy occasionally thinly and thickly laminated				D 13.50 D 14.50			
...from 14.50m brown sandy to very sandy with occasional fine to coarse mudstone gravel				D 15.50			
...from 15.50m brown to red brown very sandy with occasional laminations of fine to coarse sand				D 16.50			
...from 17.50m brown to red brown sandy to very sandy clay with some siliceous and mudstone gravel				D 17.50 D 18.50			
		18.90	28.90				
Cable Percussion boring complete at 18.90 m.							

NB All depths in metres, all diameters in millimetres.
See header sheet for details of drilling, progress and water strikes. See legend sheet for key to symbols.

Form	ARIAL CP LOG
Version	1.00
Revised	01/10/1998

Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG - CABLE PERCUSSION

Hole ID.
BH5
Header

Contract No.	F11483	Method	Cable Percussion	Coordinates	1198.5 E
Project	Ancoates Zone 1, Victoria Works				3289.6 N
		Drilling Rig	Dando 150	Ground Level	48.84m AOD
Client	English Partnerships	Driller	TW	Orientation	Vertical
		Logged by	TR	Date Started	06/09/1999
Consultant	Pell Frischmann Consultants Ltd			Date Completed	08/09/1999

PROGRESS

Date	Time	Hole depth	Casing depth	Water depth	Remarks
06/09/1999	1600	7.00	3.00	Dry	
07/09/1999	1600	13.00	10.50	Dry	
08/09/1999	1200	14.80	12.50	Dry	

DRILLING DETAILS

Hardbore from depth	Hardbore to depth	Chiselling hours	Remarks
5.10	5.40	0.75	
9.50	9.80	0.75	
10.40	10.80	1.25	
12.30	12.50	0.50	

CASING

Hole diam.	Max depth of hole at dia.	Casing diameter	Max depth of casing of dia.
200	1.40	200	1.40
150	14.80	150	12.80

WATER STRIKES

Date	Time	Strike at depth	Rise to depth	Time taken to rise	Flow	Casing depth at strike time	Casing depth to seal flow

GENERAL NOTES

1. Inspection pit dug to 1.20.

SPT DETAILS

Depth	Type	Incremental blow count/penetration in mm
1.20	C	N=17 (7,5,4,4,4,5)
8.70	C	N=55 (7,9,11,13,13,18)
10.20	C	40/75mm

* Seating blows only.

NB All depths in metres, all diameters in millimetres, water strike rise time in minutes, chiselling time in hours.

Form	ARIAL CP HEADER
Version	1.00
Revised	01/10/1998

Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG - CABLE PERCUSSION

Hole ID. **BH5** Sheet 1 of 2

Contract No.	F11483	Method	Cable Percussion	Coordinates	1196.5 E
Project	Ancoates Zone 1, Victoria Works				3289.6 N
		Drilling Rig	Dando 150	Ground Level	48.84m AOD
Client	English Partnerships	Driller	TW	Orientation	Vertical
		Logged by	TR	Date Started	08/09/1999
Consultant	Pell Frischmann Consultants Ltd			Date Completed	08/09/1999

Description of Strata	Legend	Depth Below G.L.	O.D. Level	Sampling	SPT N & (U blows)	SPT type & depth	Installation
MADE GROUND: Black to red brown ashy sandy fine to coarse angular brick fragments and mixed gravel and occasional gravel size angular fragments of glass and clinker and pockets of ashy clay.				B 0.50 - 1.00			
...from 1.20m clayey				B 1.20 - 1.70	C17	C 1.20	
		1.40	47.44			1.65	
Stiff dark brown occasionally fissured thinly and thickly laminated slightly sandy CLAY with occasional partings of light grey silty fine to medium sand.				U 2.20 - 2.70	(28)		
				D 2.70			
				U 3.20 - 3.70	(37)		
				D 3.70			
				U 4.20 - 4.70	(46)		
		4.70	44.14	D 4.70			
Stiff dark brown slightly sandy CLAY with occasional fine to coarse subangular to subrounded mudstone and sandstone gravel with occasional cobbles.				U 5.70 - 6.20	(66)		
...from 6.20m to 6.90m firm brown very silty				D 6.20			
				D 6.90			
				U 7.20 - 7.70	(60)		
				D 7.70			
				D 8.40			
		8.60	40.24	B 8.70 - 9.20	C55	C 8.70	
Very dense brown clayey to very clayey fine to coarse SAND with some to much fine to coarse subrounded to rounded siliceous gravel and occasional siliceous cobbles.						9.15	

NB All depths in metres, all diameters in millimetres.
See header sheet for details of drilling, progress and water strikes. See legend sheet for key to symbols.

Form	ARIAL CP LOG
Version	1.00
Revised	01/10/1998

Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG - CABLE PERCUSSION

Hole ID. **BH5** Sheet 2 of 2

Contract No.	F11483	Method	Cable Percussion	Coordinates	1196.5 E
Project	Ancoates Zone 1, Victoria Works				3289.6 N
		Drilling Rig	Dando 150	Ground Level	48.84m AOD
Client	English Partnerships	Driller	TW	Orientation	Vertical
		Logged by	TR	Date Started	06/09/1999
Consultant	Pell Frischmann Consultants Ltd			Date Completed	08/09/1999

Description of Strata	Legend	Depth Below G.L.	O.D. Level	Sampling		SPT N & (U blows)	SPT type & depth	Install-ation
Very dense brown clayey to very clayey fine to coarse SAND with some to much fine to coarse subrounded to rounded siliceous gravel and occasional siliceous cobbles.				B	10.70 - 11.20	C40/75mm	C 10.20 10.43	
		12.80	36.04	D	12.80			
Red brown moderately to highly weathered very silty MUDSTONE weak.				D	13.80			
		14.80	34.04	D	14.80			
Cable Percussion boring complete at 14.80 m.								

NB All depths in metres, all diameters in millimetres.
See header sheet for details of drilling, progress and water strikes. See legend sheet for key to symbols.

Form	ARIAL CP LOG
Version	1.00
Revised	01/10/1998

Norwest Holst Soil Engineering Ltd.

TRIAL PIT LOG

Hole ID. **TP37** Sheet 1 of 1

Contract No.	F11483	Method	Machine Excavated	Coordinates	1073.1 E 3182.3 N
Project	Ancoates Zone 1, Victoria Works	Equipment	JCB	Ground Level	50.24m AOD
Client	English Partnerships	Logged by	MNR	Date Started	31/08/1999
Consultant	Pell Frischmann Consultants Ltd			Date Completed	31/08/1999

Description of Strata	Legend	Depth Below G.L.	O.D. Level	Sampling		Notes
MADE GROUND: Light reddish grey tarmac.		0.04	50.20			
MADE GROUND: Yellowish brown sandy medium to coarse subangular gravel of limestone.		0.32	49.92	D	0.50	
MADE GROUND: Brown sandy slightly clayey gravel sized fragments of brick, ash and concrete with some bottles, glass and wire.		1.00	49.24	D	1.00	
MADE GROUND: Brown sandy clay with much fine subrounded to subangular gravel of various lithology.				D	1.50	
		1.90	48.34	D	2.00	
MADE GROUND: Grey very clayey sandy fine to medium angular gravel of various lithology.				D	2.50	Pungent odour noted at 2.80m.
		3.00	47.24	D	3.00	
Trial pit complete at 3.00 m.						

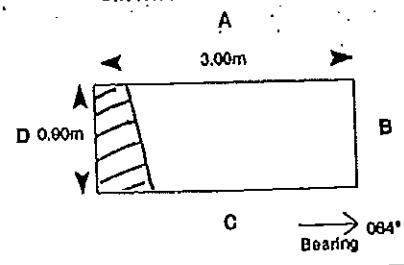
Stability: Stable

Shoring: None

Groundwater: Seepage noted at 2.90m. Contamination in seepage, pungent odour from 2.80m.

Remarks: 1. Concrete at 0.80m across width of pit.

Sketch Plan of Trial Pit



Hand Vane Test Readings

Depth	HV Peak	HV Remoulded	Remarks

REMARKS - All depths in metres, all soil strengths in KPa.
See legend sheet for key to symbols and abbreviations.
All bearings given relate to magnetic north

Form	ARIAL TP LOG
Version	2.00
Revised	01/10/1998

Norwest Holst Soil Engineering Ltd.

TRIAL PIT LOG

Hole ID. **TP38** Sheet 1 of 1

Contract No.	F11483	Method	Machine Excavated	Coordinates	1053.6 E
Project	Ancoates Zone 1, Victoria Works	Equipment	JCB		3192.0 N
				Ground Level	49.89m AOD
Client	English Partnerships	Logged by	MNR	Date Started	31/08/1999
				Date Completed	31/08/1999
Consultant	Pell Frischmann Consultants Ltd				

Description of Strata	Legend	Depth Below G.L.	O.D. Level	Sampling		Notes
MADE GROUND: Building rubble of bricks, concrete, slate and gravel sized fragments of sandstone blocks.		0.10	49.79			
MADE GROUND: Brown and black very sandy slightly clayey gravel of various lithology with much coarse gravel sized fragments of brick, ash and clinker.				D	0.50	
				D	1.00	
		1.20	48.69			
MADE GROUND: Grey mottled brown and locally black clay.				D	1.50	
				D	2.00	
				D	2.50	
---from 2.76m orangish yellow						
		3.00	46.89	D	3.00	
Trial pit complete at 3.00 m.						

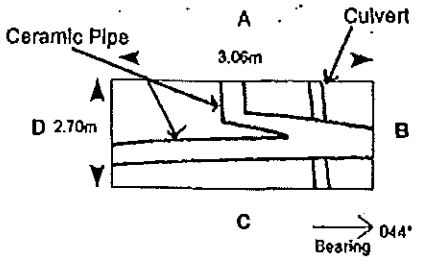
Stability: Potentially unstable

Shoring: None

Groundwater: Seepage at 1.00m

Remarks:
1. 6 inch ceramic pipe noted at 0.95m in side A.
2. Culvert noted at 2.90m brick with sandstone slates above <0.50m width (face A to face C.)

Sketch Plan of Trial Pit



Hand Vane Test Readings

Depth	HV Peak	HV Remoulded	Remarks

REMARKS - All depths in metres, all soil strengths in KPa.
See legend sheet for key to symbols and abbreviations.
All bearings given relate to magnetic north

Form	ARIAL TP LOG
Version	2.00
Revised	01/10/1998

Norwest Holst Soil Engineering Ltd.

TRIAL PIT LOG

Hole ID. **TP39** Sheet 1 of 1

Contract No.	F11483	Method	Machine Excavated	Coordinates	1108.9 E
Project	Ancoates Zone 1, Victoria Works	Equipment	JCB		3192.8 N
				Ground Level	48.25m AOD
Client	English Partnerships	Logged by	MNR	Date Started	31/08/1999
				Date Completed	31/08/1999
Consultant	Pell Frischmann Consultants Ltd				

Description of Strata	Legend	Depth Below G.L.	O.D. Level	Sampling		Notes
MADE GROUND: Light reddish grey tarmac.		0.04	48.21			
MADE GROUND: Yellowish brown sandy fine to coarse subangular to subrounded gravel of limestone.		0.31	47.94			
MADE GROUND: Concrete with many bricks.		0.50	47.75	D	0.50	
MADE GROUND: Dark brown slightly sandy clay with occasional to locally some fine subangular gravel sized fragments of brick, limestone, ash and coal.				D	1.00	
				D	1.50	
				D	2.00	
				D	2.50	Contamination noted in seepage at 2.50m.
Trial pit complete at 3.00 m.		3.00	45.25	D	3.00	

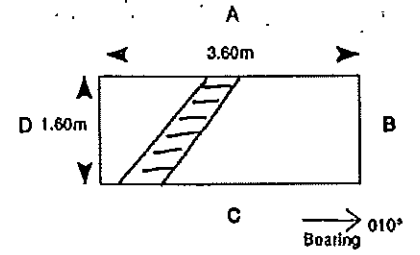
Stability: Stable

Shoring: None

Groundwater: Seepage at 2.50m

Remarks:
1. At 1.70m red brick wall.
2. Contamination noted in seepage water with a diesel smell.

Sketch Plan of Trial Pit



Hand Vane Test Readings

Depth	HV Peak	HV Remoulded	Remarks

REMARKS - All depths in metres, all soil strengths in KPa.
See legend sheet for key to symbols and abbreviations.
All bearings given relate to magnetic north

Form	ARIAL TP LOG
Version	2.00
Revised	01/10/1998

Norwest Holst Soil Engineering Ltd.

TRIAL PIT LOG

Hole ID.
TP40
Sheet 1 of 1

Contract No.	F11483	Method	Machine Excavated	Coordinates	1083.3 E
Project	Ancoates Zone 1, Victoria Works	Equipment	JCB		3207.1 N
				Ground Level	48.52m AOD
Client	English Partnerships	Logged by	MNR	Date Started	31/08/1999
				Date Completed	31/08/1999
Consultant	Pell Frischmann Consultants Ltd				

Description of Strata	Legend	Depth Below G.L.	O.D. Level	Sampling		Notes
MADE GROUND: Building rubble comprising of bricks and coarse gravel sized fragments of concrete, wood, and sandstone blocks in a sandy matrix.		0.40	48.12	D	0.50	
MADE GROUND: Yellowish grey mottled orange clay with occasional to some fine to medium angular gravel sized fragments of brick and ash.		0.87	47.65	D	1.00	
Stiff brown mottled grey closely fissured CLAY with occasional subrounded to rounded gravel of siltstone.				D	1.50	
---from 1.25m very stiff				D	2.00	
				D	2.50	
---from 2.72m locally sandy and thinly laminated		3.00	45.52	D	3.00	
Trial pit complete at 3.00 m.						

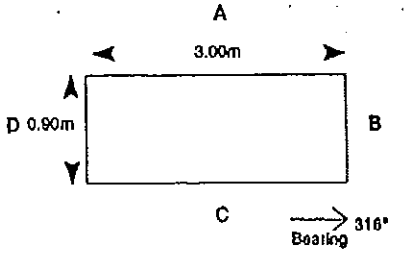
Stability: Stable

Shoring: None

Groundwater: None encountered

Remarks:

Sketch Plan of Trial Pit



Hand Vane Test Readings

Depth	HV Peak	HV Remoulded	Remarks

REMARKS - All depths in metres, all soil strengths in KPa.
See legend sheet for key to symbols and abbreviations.
All bearings given relate to magnetic north

Form	ARIAL TP LOG
Version	2.00
Revised	01/10/1998

Norwest Holst Soil Engineering Ltd.

TRIAL PIT LOG

Hole ID. **TP41** Sheet 1 of 1

Contract No.	F11483	Method	Machine Excavated	Coordinates	1148.0 E
Project	Ancoates Zone 1, Victoria Works	Equipment	JCB		3226.7 N
				Ground Level	47.93m AOD
Client	English Partnerships	Logged by	MNR	Date Started	01/09/1999
				Date Completed	01/09/1999
Consultant	Pell Frischmann Consultants Ltd				

Description of Strata	Legend	Depth Below G.L.	O.D. Level	Sampling		Notes
MADE GROUND: Loose bricks, concrete, ash and wood.		0.30	47.63			
Stiff grey mottled brown closely fissured CLAY.				D	0.50	
				D	1.00	
---from 1.31m brown mottled grey ---from 1.40m very thin layer of brown partially rotted vegetable matter.				D	1.50	
				D	2.00	
---from 2.18m very stiff				D	2.50	
				D	3.00	
---from 2.96 thinly interlaminated medium sand and clay				D	3.50	
		4.00	43.93	D	4.00	
Trial pit complete at 4.00 m.						

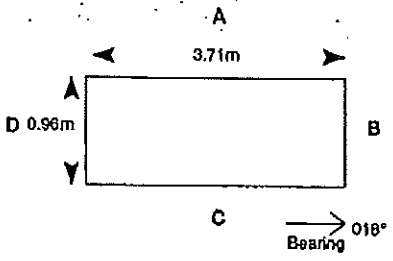
Stability: Stable

Shoring: None

Groundwater: None encountered

Remarks:

Sketch Plan of Trial Pit



Hand Vane Test Readings

Depth	HV Peak	HV Remoulded	Remarks

REMARKS - All depths in metres, all soil strengths in KPa.
See legend sheet for key to symbols and abbreviations.
All bearings given relate to magnetic north

Form	ARIAL TP LOG
Version	2.00
Revised	01/10/1999

Norwest Holst Soil Engineering Ltd.

TRIAL PIT LOG

Hole ID. **TP42** Sheet 1 of 1

Contract No.	F11483	Method	Machine Excavated	Coordinates	1121.9 E
Project	Ancoates Zone 1, Victoria Works	Equipment	JCB		3239.0 N
				Ground Level	48.57m AOD
Client	English Partnerships	Logged by	MNR	Date Started	01/09/1999
				Date Completed	01/09/1999
Consultant	Pell Frischmann Consultants Ltd				

Description of Strata	Legend	Depth Below G.L.	O.D. Level	Sampling		Notes
MADE GROUND: Concrete.		0.06	48.51			
Firm grey mottled brown closely fissured CLAY.				D	0.50	
---from 0.26m stiff				D	1.00	
				D	1.50	
---from 1.92m brown locally mottled grey locally thinly laminated				D	2.00	
				D	2.50	
				D	3.00	
---from 3.20m firm and with medium sand interlaminae				D	3.50	
		4.00	44.57	D	4.00	
Trial pit complete at 4.00 m.						

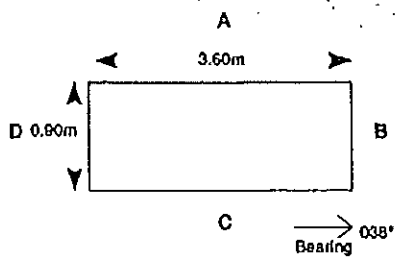
Stability: Stable

Shoring: None

Groundwater: None encountered

Remarks:

Sketch Plan of Trial Pit



Hand Vane Test Readings

Depth	HV Peak	HV Remoulded	Remarks

REMARKS - All depths in metres, all soil strengths in KPa.
See legend sheet for key to symbols and abbreviations.
All bearings given relate to magnetic north

Form	ARIAL TP LOG
Version	2.00
Revised	01/10/1998

Norwest Holst Soil Engineering Ltd.

TRIAL PIT LOG

Hole ID. **TP43** Sheet 1 of 1

Contract No.	F11483	Method	Machine Excavted	Coordinates	1159.7 E
Project	Ancoates Zone 1, Victoria Works	Equipment	JCB		3225.1 N
				Ground Level	48.10m AOD
Client	English Partnerships	Logged by	MNR	Date Started	01/09/1999
				Date Completed	01/09/1999
Consultant	Pell Frischmann Consultants Ltd				

Description of Strata	Legend	Depth Below G.L.	O.D. Level	Sampling		Notes
MADE GROUND: Concrete.		0.06	48.04			
MADE GROUND: Brown and red gravel and cobble sized fragments of brick and concrete.		0.20	47.90	D	0.50	
Stiff grey mottled brown closely fissured CLAY.				D	1.00	
---from 1.08m brown mottled grey				D	1.50	
				D	2.00	
---from 2.10m very stiff locally sandy				D	2.50	
---from 2.82m brown locally mottled grey		3.00	45.10	D	3.00	
Trial pit complete at 3.00 m.						

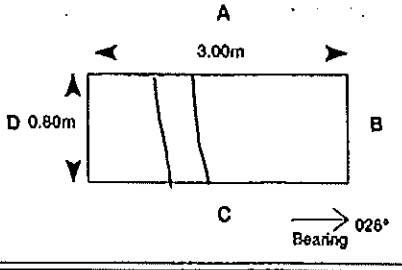
Stability: Stable

Shoring: None

Groundwater: None encountered

Remarks: 1. 6 inch lead pipe 0.50m north of face D.

Sketch Plan of Trial Pit



Hand Vane Test Readings

Depth	HV Peak	HV Remoulded	Remarks

REMARKS - All depths in metres, all soil strengths in KPa.
See legend sheet for key to symbols and abbreviations.
All bearings given relate to magnetic north

Form	ARIAL TP LOG
Version	2.00
Revised	01/10/1998

Norwest Holst Soil Engineering Ltd.

TRIAL PIT LOG

Hole ID. TP44
Sheet 1 of 1

Contract No.	F11483	Method		Coordinates	1154.8 E
Project	Ancoates Zone 1, Victoria Works	Equipment	JCB		3261.6 N
				Ground Level	48.73m AOD
Client	English Partnerships	Logged by	MNR	Date Started	01/09/1999
				Date Completed	01/09/1999
Consultant	Pell Frischmann Consultants Ltd				

Description of Strata	Legend	Depth Below G.L.	O.D. Level	Sampling		Notes
MADE GROUND: Concrete.		0.16	48.57			
MADE GROUND: Single course of red bricks.		0.25	48.48			
Firm to stiff grey mottled brown closely fissured CLAY.				D	0.50	
				D	1.00	
---from 1.23m locally thinly laminated						
---from 1.47m stiff				D	1.50	
---from 1.84m very stiff				D	2.00	
				D	2.50	
---from 2.87m thinly interlaminated clay and medium sand		3.00	45.73	D	3.00	
---at 3.00m brown						
Trial pit complete at 3.00 m.						

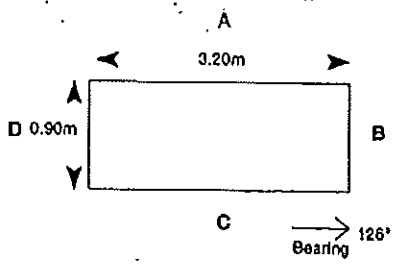
Stability: Stable

Shoring: None

Groundwater: None encountered

Remarks:

Sketch Plan of Trial Pit



Hand Vane Test Readings

Depth	HV Peak	HV Remoulded	Remarks

REMARKS - All depths in metres, all soil strengths in KPa.
See legend sheet for key to symbols and abbreviations.
All bearings given relate to magnetic north

Form	ARIAL TP LOG
Version	2.00
Revised	01/10/1998

Norwest Holst Soil Engineering Ltd.

TRIAL PIT LOG

Hole ID. **TP45** Sheet 1 of 1

Contract No.	F11483	Method	Machine Excavated	Coordinates	1188.6 E
Project	Ancoates Zone 1, Victoria Works	Equipment	JCB		3282.0 N
				Ground Level	48.43m AOD
Client	English Partnerships	Logged by	MNR	Date Started	01/09/1999
				Date Completed	01/09/1999
Consultant	Pell Frischmann Consultants Ltd				

Description of Strata	Legend	Depth Below G.L.	O.D. Level	Sampling		Notes
MADE GROUND: Sheet reinforced concrete.		0.27	48.16			
MADE GROUND: Dark brown sandy fine gravel with many bricks and cobble sized fragments of concrete.				D	0.50	
				D	1.00	
				D	1.50	
				D	2.00	
		2.22	46.21			
Firm brown mottled grey thinly laminated closely fissured CLAY.				D	2.50	
---from 2.44m very stiff				D	3.00	
---from 3.30m brown				D	3.50	
		4.00	44.43	D	4.00	
Trial pit complete at 4.00 m.						

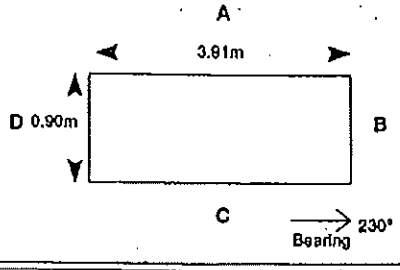
Stability Stable

Shoring None

Groundwater None encountered

Remarks

Sketch Plan of Trial Pit



Hand Vane Test Readings

Depth	HV Peak	HV Remoulded	Remarks

REMARKS - All depths in metres, all soil strengths in KPa.
See legend sheet for key to symbols and abbreviations.
All bearings given relate to magnetic north

Form	ARIAL TP LOG
Version	2.00
Revised	01/10/1998

Norwest Holst Soil Engineering Ltd.

TRIAL PIT LOG

Hole ID. **TP46** Sheet 1 of 1

Contract No.	F11483	Method		Coordinates	1184.4 E
Project	Ancoates Zone 1, Victoria Works	Equipment	JCB		3281.6 N
				Ground Level	48.64m AOD
Client	English Partnerships	Logged by	MNR	Date Started	01/09/1999
				Date Completed	01/09/1999
Consultant	Pell Frischmann Consultants Ltd				

Description of Strata	Legend	Depth Below G.L.	O.D. Level	Sampling		Notes
MADE GROUND: Dark brown sandy topsoil with some bricks.		0.43	48.21	D	0.50	
MADE GROUND: Yellowish brown and grey sandy clay.		0.98	47.66	D	1.00	
Stiff grey mottled brown closely fissured CLAY.				D	1.50	
				D	2.00	
				D	2.50	
---from 2.72m locally sandy and thinly laminated.		3.00	45.64	D	3.00	
Trial pit complete at 3.00 m.						

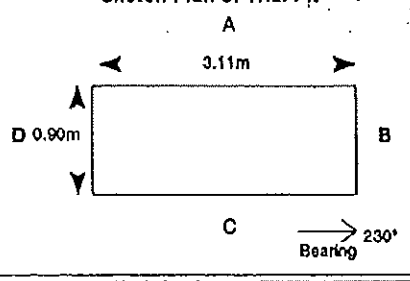
Stability: Stable

Shoring: None

Groundwater: None encountered

Remarks:

Sketch Plan of Trial Pit



Hand Vane Test Readings

Depth	HV Peak	HV Remoulded	Remarks

REMARKS - All depths in metres, all soil strengths in KPa.
See legend sheet for key to symbols and abbreviations.
All bearings given relate to magnetic north

Form	ARIAL TP LOG
Version	2.00
Revised	01/10/1998

Appendix B

Laboratory Test Results

2002

Borehole Log

Site	NEW ISLINGTON, MANCHESTER	Job No	7890
Client	Martin Stockley Associates	Date	JUNE 2002
Borehole No	116 sheet 1	Diameter	150mm
Grid Ref		Method	Cable-tool rig
Ground Level	existing	Scale	1:50

Description	Depth m	Legend	O.D. Level m	Samples and in situ tests: Depth m	Type	Test	Vane kN/m²	Triaxial kN/m	Groundwater
	0.00								
MADE GROUND: Tarmacadam	0.10								
MADE GROUND: Stone hardcore	0.40								
MADE GROUND: Bricks and concrete	0.90			0.50	D				
MADE GROUND: Soil, clay, silt and brick – moist	1.40			1.20	S	N 5			
Firm light brown/grey silty CLAY	1.60			1.65					
Firm to stiff brown/grey silty CLAY with occasional thin sand layer	2.50			2.20	U		140+	174	
Stiff brown/grey silty CLAY with thin lenses of moist brown silty sand from 4.00m to 8.00m, occasional gravel				2.65			140+		
				3.20	U		66		
				3.65			127		
				4.50	U		114		
				4.95			140+		
				6.00	U		114		
				6.45			140+		
				7.50	U		126		
	8.00			7.95			140+		
Continued on sheet 2									

Remarks
Hand excavating for services to 1.20m – 1.5 hrs
Monitoring pipe installed to 15.00m

Key U – undisturbed
B – bulk
D – disturbed
S – SPT SC – solid cone
C – core
W – water

Northern Foundations

Borehole Log

Site	NEW ISLINGTON, MANCHESTER	Job No	7890
Client	Martin Stockley Associates	Date	JULY 2002
Borehole No	110 sheet 4	Diameter	150mm
Grid Ref		Method	Rotary rockdrill
Ground Level	existing	Scale	1:50

Description	Depth m	Legend	O.D. Level m	core Depth m	core Type	TCR %	RQD %	Is MN/m² (50)	Groundwater
Continued from sheet 3	24.50								
Highly weathered hard broken red/grey MUDSTONE									
	32.00								No groundwater entries

Remarks

Northern Foundations

Borehole Log

Site	NEW ISLINGTON, MANCHESTER	Job No	7890
Client	Martin Stockley Associates	Date	JUNE 2002
Borehole No	116 sheet 2	Diameter	150mm
Grid Ref		Method	Cable-tool rig
Ground Level	existing	Scale	1:50

Description	Depth m	Legend	O.D. Level m	Samples and in situ tests: Depth m	Type	Test	Vane kN/m²		Groundwater
Continued from sheet 1	8.00								
Stiff brown/grey silty CLAY with occasional gravel				9.00	U		102		
				9.45			138		
				10.50	U		88		
	11.00			10.95			119		
Stiff dark brown silty CLAY with occasional lenses of brown sand									
	12.00								
Stiff dark brown silty CLAY with occasional lenses of brown sand and gravel, silt and occasional large cobbles				12.00	U		138		
				12.45			140+		
				13.50	IS	50/.125			
	15.20								No groundwater entries

Remarks

Key
U – undisturbed
B – bulk
D – disturbed
S – SPT SC – solid cone
C – core
W – water

Northern Foundations

Borehole Log

Site	NEW ISLINGTON, MANCHESTER	Job No	7890
Client	Martin Stockley Associates	Date	JUNE 2002
Borehole No	117 sheet 1	Diameter	150mm
Grid Ref		Method	Cable-tool rig
Ground Level	existing	Scale	1:50

Description	Depth m	Legend	O.D. Level m	Samples and in situ tests: Depth m	Type	Test	Vane kN/m²	Triaxial kN/m²	Groundwater
	0.00								
MADE GROUND: Tarmacadam	0.10								
MADE GROUND: Stone hardcore	0.30								
MADE GROUND: Stone setts	0.50			0.50	D				
MADE GROUND: Ash, soil, brick, stone - damp/wet, with sand, gravel, odorous becoming predominantly brown silty clay with depth	1.40			1.00 1.45	S	N 7			
Soft grey/brown mottled CLAY	1.80								
Firm/stiff mid brown/grey silty CLAY becoming stiff with depth, with occasional gravel				2.00	U		74		
				2.45			140+		
				3.00	U		140+	166	
				3.45			140+		
				4.30	U		140+		
				4.75			140+		
				6.00	U		140+		
				6.45			140+		
				7.50	U		125		
	8.00			7.95			122		
Continued on sheet 2									

Remarks

Hand excavating for services to 1.00m - 1 hr

Key
U - undisturbed
B - bulk
D - disturbed
S - SPT SC - solid cone
C - core
W - water

Northern Foundations

Borehole Log

Site	NEW ISLINGTON, MANCHESTER	Job No	7890
Client	Martin Stockley Associates	Date	JUNE 2002
Borehole No	117 sheet 2	Diameter	150mm
Grid Ref		Method	Cable-tool rig
Ground Level	existing	Scale	1:50

Description	Depth m	Legend	O.D. Level m	Samples and in situ tests			Vane kN/m²		Groundwater
				Depth m	Type	Test			
Continued from sheet 1	8.00								
Firm/stiff mid brown silty CLAY, with occasional gravel	8.70								
Stiff to very stiff, brown sandy silty CLAY with wet sand lenses, occasional gravel				9.00	S	N 38			
				9.45					
				10.50	U		140+		
	11.00			10.95			140+		
Very stiff reddish brown very sandy CLAY with large boulders				12.00	S	50/.200			
	13.30								
Very stiff brown/grey very silty CLAY				13.50	S	N 32			
	14.00			13.95					
Firm grey/brown SILT	14.30								
Stiff brown silty sandy CLAY with pockets of dry sand				14.50	U		*		
	15.00			14.95			45**		No groundwater entries

Remarks

* Sample not suitable for shear vane test
** Measurement may have been affected by high sand and gravel content

Key U – undisturbed
B – bulk
D – disturbed
S – SPT SC – solid cone
C – core
W – water

Northern Foundations

Borehole Log

Site	NEW ISLINGTON, MANCHESTER	Job No	7890
Client	Martin Stockley Associates	Date	JUNE 2002
Borehole No	118 sheet 1	Diameter	150mm
Grid Ref		Method	Cable-tool rig
Ground Level	existing	Scale	1:50

Description	Depth m	Legend	O.D. Level m	Samples and in situ tests			Vane kN/m²	Triaxial kN/m²	Groundwater
				Depth m	Type	Test			
	0.00								
MADE GROUND: Loose dark grey cinder and bricks, sand, gravel, clay, concrete fragments, plastic, fine roots	1.50			0.50 1.00 1.45	D S	N 12			
MADE GROUND: Bricks, hardcore – possible old drain	1.80								
MADE GROUND: Loose clay cinder and bricks with silty clay, gravel	2.50			2.00 2.00 2.45	D S	N 7			
Soft to firm grey/brown sandy silty CLAY	3.50			3.00 3.45	U		37 23		
Firm to stiff brown mottled sandy silty CLAY with laminations and silt lenses	5.50			4.50 4.95	U		118 73	112	
Stiff brown sandy silty CLAY with occasional gravel	6.70			6.00 6.45	U		118 140+		
Stiff brown sandy silty CLAY with wet sand lenses and occasional gravel	8.50			7.50 7.95	U		128 140+		

Continued on sheet 2

Remarks

Key U – undisturbed
B – bulk
D – disturbed
S – SPT SC – solid cone
C – core
W – water

Northern Foundations

Borehole Log

Site	NEW ISLINGTON, MANCHESTER	Job No	7890
Client	Martin Stockley Associates	Date	JUNE 2002
Borehole No	118 sheet 2	Diameter	150mm
Grid Ref		Method	Cable-tool rig
Ground Level	existing	Scale	1:50

Description	Depth m	Legend	O.D. Level m	Samples and in situ tests: Depth m	Type	Test	Vane kN/m²		Groundwater
Continued from sheet 1	8.50								
Stiff to very stiff brown sandy silty CLAY with occasional gravel				9.00	U		135		
				9.45			118		
				10.50	U		118		
				10.95			140+		
				12.00	U		93		
	12.50			12.45			103		
Firm to stiff brown sandy silty CLAY with thin lenses of wet sand				13.50	U		73		
				13.95			77		
	14.20								
Stiff brown mottled very silty CLAY				14.50	U		138		
	15.00			14.95			96		No groundwater entries

Remarks

Key
U – undisturbed
B – bulk
D – disturbed
S – SPT SC – solid cone
C – core
W – water

Northern Foundations

Borehole Log

Site	NEW ISLINGTON, MANCHESTER	Job No	7890
Client	Martin Stockley Assocciates	Date	June 2002
Borehole No	119 sheet 1	Diameter	200mm
Grid Ref		Method	Cable-tool rig
Ground Level	existing	Scale	1:50

Description	Depth m	Legend	O.D. Level m	Samples and in situ tests: Depth m	Type	Test	Vane kN/m²	Triaxial kN/m²	Groundwater
	0.00								
MADE GROUND: Compact cinder, bricks, soil and concrete, clay, sand, gravel, very occasional timber				0.50	D				
				1.00	S	N 11			
				1.45					
	1.80								
Soft to firm light grey/brown sandy silty CLAY, very occasional black inclusions, traces of sand -- possibly disturbed				2.00	U		72		
				2.45			36		
	2.85								
Firm to stiff grey/brown, very silty, CLAY				3.00	U		115	175	
	3.50			3.45			140		
Stiff brown sandy silty CLAY becoming very stiff with increasing depth				4.50	U		128		
				4.95			140+		
				6.00	U		140+		
				6.45			140+		
				7.50	U		140+		
	8.00			7.95			140+		
Continued on sheet 2									

Remarks

Monitoring pipe 1 instaled to 30.00m
Monitoring pipe 2 instaled to 17.00m

Key
U – undisturbed
B – bulk
D – disturbed
S – SPT SC – solid cone
C – core
W – water

Northern Foundations

Borehole Log

Site	NEW ISLINGTON, MANCHESTER	Job No	7890
Client	Martin Stockley Associates	Date	JUNE 2002
Borehole No	119 sheet 2	Diameter	150mm/200mm
Grid Ref		Method	Cable-tool rig
Ground Level	existing	Scale	1:50

Description	Depth m	Legend	O.D. Level m	Samples and in situ tests: Depth m	Type	Test	Vane kN/m²		Groundwater
Continued from sheet 1	8.00								
Very stiff brown sandy silty CLAY	8.70								
Very stiff brown sandy CLAY with gravel and sand bands	9.50			9.00 9.45	U		140+ *		
Dense corse grained grey/brown SAND and GRAVEL with large cobbles with clay inclusions	10.30			10.00	D				
Large boulder obstruction	10.40					50/			
Very dense claybound GRAVEL with large cobbles	11.00			10.50	⊥S	.062			
Very dense GRAVEL with cobble bands with bands of stiff to very stiff clay	13.50			12.00 13.50	⊥S D	50/0.50 50/			
Large dense claybound COBBLES with gravel bands, with silt	14.00			13.50	⊥S	0.175			
Highly weathered light grey/red MARL	16.50			14.50 15.00	D S	50/.188			

Continued on sheet 3

Remarks
*Sample not suitable for shear vane test

Chiselling techniques used through cobbles 13.50 – 14.00m – 1.5 hrs
Large boulder obstruction chiselling techniques used 10.30m – 10.40m – 1.5hrs. 200mm chisel required to break cobbles from 10.40m – 13.50m – 6.5 hrs

Key U – undisturbed
B – bulk
D – disturbed
S – SPT SC – solid cone
C – core
W – water

Northern Foundations

Borehole Log

Site	NEW ISLINGTON, MANCHESTER	Job No	7890
Client	Martin Stockley Associates	Date	JUNE 2002
Borehole No	119 sheet 3	Diameter	200mm/150mm
Grid Ref		Method	Cable-tool rig/Rotary rockdrill
Ground Level	existing	Scale	1:50

Description	Depth m	Legend	O.D. Level m	Samples and in situ tests Depth m	Type	Test	Vane kN/m²		Groundwater
Continued from sheet 2	16.50								
Weathered red MARL	21.50			16.50	1 S	50/.225			
Weathered red/grey SANDSTONE with pebble bands (driller's description)	25.00								

Continued on sheet 4

Remarks

Water added to facilitate drilling from 18.00m

Key U – undisturbed
B – bulk
D – disturbed
S – SPT SC – solid cone
C – core
W – water

Northern Foundations

Borehole Log

Site	NEW ISLINGTON, MANCHESTER	Job No	7890
Client	Martin Stockley Associates	Date	June 2002
Borehole No	119 sheet 4	Diameter	150mm
Grid Ref		Method	Rotary rockdrill
Ground Level	existing	Scale	1:50

Description	Depth m	Legend	O.D. Level m	Samples and in situ tests: Depth m	Type	Test	Vane kN/m²		Groundwater
Continued from sheet 3	25.00								
Weathered red/grey SANDSTONE with pebble bands (driller's description)				30.00	W				Water entry 27.00m
	31.50								

Remarks

Key
U – undisturbed
B – bulk
D – disturbed
S – SPT SC – solid cone
C – core
W – water

Northern Foundations

Borehole Log

Site	NEW ISLINGTON, MANCHESTER	Job No	7890
Client	Martin Stockley Associates	Date	June 2002
Borehole No	120 sheet 1	Diameter	200mm
Grid Ref		Method	Cable-tool rig
Ground Level	existing	Scale	1:50

Description	Depth m	Legend	O.D. Level m	Samples and in situ tests: Depth m	Type	Test	Vane kN/m²	Triaxial kN/m²	Groundwater
	0.00								
MADE GROUND: Topsoil	0.20								
MADE GROUND: Bricks, concrete, hardcore, sand, gravel, clay, very occasional fine roots				0.50	D				
				1.00	S	50/.237			
	1.50								
MADE GROUND: Red bricks and concrete	2.00								
Firm to stiff grey/brown silty CLAY, becoming stiff to very stiff with depth				2.00	U		102	168	
				2.45			140+		
				3.00	U		85		
	3.50			3.45			140+		
Firm to stiff brown silty CLAY with occasional gravel				4.50	U		126		
				4.95			114		
				6.00	U		90		
				6.45			112		
				7.50	U		98	156	
	8.00			7.95			122		
Continued on sheet 2									

Remarks

Hard boring through bricks and concrete – 1 hr
Monitoring pipe installed to 29.00m

Key U – undisturbed
B – bulk
D – disturbed
S – SPT SC – solid cone
C – core
W – water

Northern Foundations

Trialhole Log

Site	NEW ISLINGTON, MANCHESTER	Job No	7890
Client	Martin Stockley Associates	Date	JUNE 2002
Trialhole No	130	Diameter	
Grid Ref		Method	Machine excavated
Ground Level	existing	Scale	1:30

Description	Depth m	Legend	O.D. Level m	Samples and in situ tests: Depth m	Type	Vane kN/m²	Cu kN/m² unconfined		Groundwater
	0.00								
MADE GROUND: Tarmacadam	0.075								
MADE GROUND: Stone hardcore	0.30								
MADE GROUND: Soil, ash, brick and cinder				0.50	D				
				1.00	D				
	2.20			2.20	D				
MADE GROUND: Weak clay with damp soil and dark grey/black silt				3.00	D				
	4.20			4.20	D V	40			
Soft to firm light/mid brown mottled CLAY	4.50			4.50	D V	120			
Stiff mid brown/grey silty CLAY	4.60								No groundwater entries

Remarks

Key U – undisturbed
B – bulk
D – disturbed
W – water
V – vane

Northern Foundations

Trialhole Log

Site	NEW ISLINGTON, MANCHESTER	Job No	7890
Client	Martin Stockley Assaciates	Date	JUNE 2002
Trialhole No	131	Diameter	
Grid Ref		Method	Machine excavated
Ground Level	existing	Scale	1:30

Description	Depth m	Legend	O.D. Level m	Samples and in situ tests: Depth m	Type	Vane kN/m²	Qu kN/m² unconfined		Groundwater
	0.00								
MADE GROUND: Tarmacadam	0.100								
MADE GROUND: Stone hardcore	0.200								
MADE GROUND: Concrete, steel, asbestos sheets, brick, setts, tin cans, plastic and rubble. Side of old wall	1.00								
MADE GROUND: Concrete over stone setts and cobbles	1.50			1.50	D				
MADE GROUND: Soil and ash 1.80	1.80 1.90								Slow water seepage 1.90m
Very soft dark grey/black silty CLAY possibly disturbed/made ground	3.80			2.00 3.80	D D V	 120			
Stiff brown/grey mottled CLAY	4.30			4.00	D V	120			

Remarks

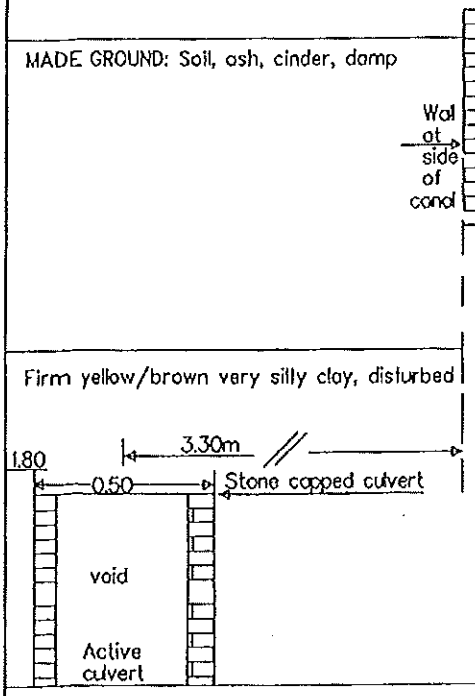
Key U – undisturbed
B – bulk
D – disturbed
W – water
V – vane

Northern Foundations

Trialhole Log

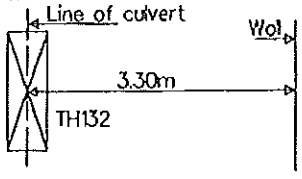
Site	NEW ISLINGTON, MANCHESTER	Job No	7890
Client	Martin Stockley Associates	Date	JUNE 2002
Trialhole No	132	Diameter	
Grid Ref		Method	Machine excavated
Ground Level	existing	Scale	1:30

Description	Depth m	Legend	O.D. Level m	Samples and in situ tests: Depth m	Type	Vane kN/m²	Cu kN/m² unconfined		Groundwater
	0.00								
MADE GROUND: Soil, ash, cinder, damp				0.50	D				
				1.00	D				
	1.30			1.30	D	V	40		
Firm yellow/brown very silty clay, disturbed									
				2.70	D	V	90		
Firm to stiff mid brown/grey mottled CLAY				2.80	D	V	120		
	3.00								No groundwater entries



Remarks

Sketch plan – not to scale



Key
U – undisturbed
B – bulk
D – disturbed
W – water
V – vane

Northern Foundations

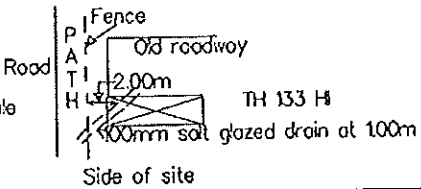
Trialhole Log

Site	NEW ISLINGTON, MANCHESTER	Job No	7890
Client	Martin Stockley Associates	Dote	AUGUST 2002
Trialhole No	133 H1	Diameter	
Grid Ref		Method	Machine excavated
Ground Level	existing	Scale	1:25

Description	Depth m	Legend	O.D. Level m	Samples and in situ tests: Depth m	Type	Vane kN/m²	Cu kN/m² unconfined		Groundwater
	0.00								
MADE GROUND: Soil, roots and clean stone	0.30								
MADE GROUND: Ash, soil, brick, -- possible old building with stone sink	0.50			0.50	D				
MADE GROUND: Brick foundation with glass	0.90			0.90	D	G			
MADE GROUND: Very sandy dry soil with slag waste- old salt glazed drain at 1.00m	1.30			1.30	D				
MADE GROUND: Clay and brick -- possible old basement	2.50			2.50	D				
MADE GROUND: Old mortar, lime and timber, dry	3.20			3.20	D				Water entry 3.30m
MADE GROUND: Disturbed dark grey/black organic silt	3.30			3.30	DWG	V	100		
Stiff mid brown/grey mottled CLAY	3.70								

Remarks

Sketch plan -- not to scale

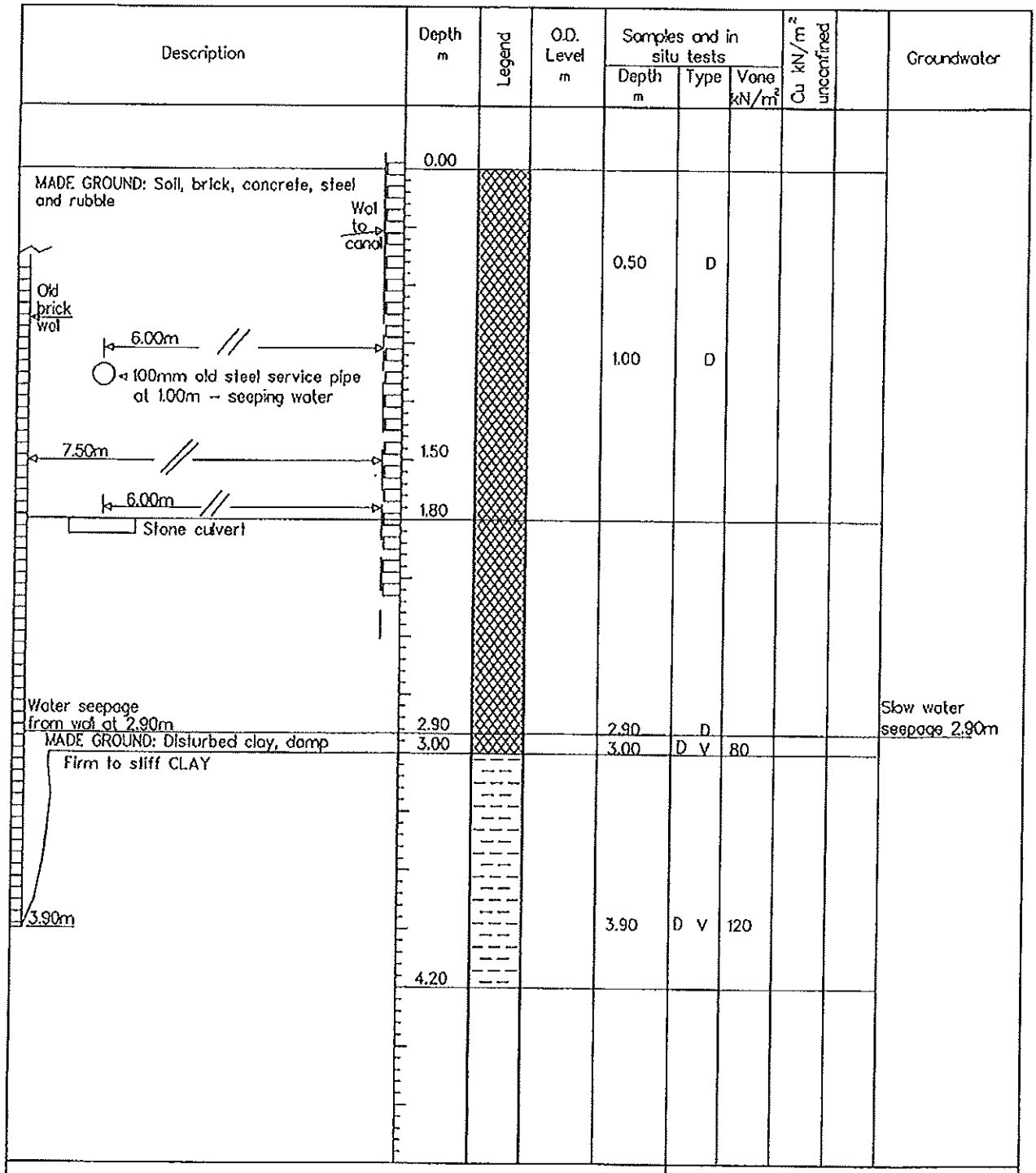


Key
U -- undisturbed
B -- bulk
D -- disturbed
W -- water
V -- vane

Northern Foundations

Trialhole Log

Site	NEW ISLINGTON, MANCHESTER	Job No	7890
Client	Martin Stockley Associates	Date	JUNE 2002
Trialhole No	134	Diameter	
Grid Ref		Method	Machine excavated
Ground Level	existing	Scale	1:30



Northern Foundations

Trialhole Log

Site	NEW ISLINGTON, MANCHESTER	Job No	7890
Client	Martin Stockley Associates	Date	JUNE 2002
Trialhole No	135	Diameter	
Grid Ref		Method	Machine excavated
Ground Level	existing	Scale	1:30

Description	Depth m	Legend	O.D. Level m	Samples and in situ tests: Depth m	Type	Vane kN/m²	Cu kN/m² unconfined		Groundwater
	0.00								
MADE GROUND: Clay, soil, brick, damp				0.50	D				
Possible old trial pit at rear of hole – disturbed materials to 1.70m – water seepage at 1.70m				1.00	D				
	1.50			1.50	D	V	100		
Firm to stiff mid brown/grey CLAY				1.70	W				Slow water seepage 1.70m
1.70m				2.50	D	V	120		
	2.70			2.70					

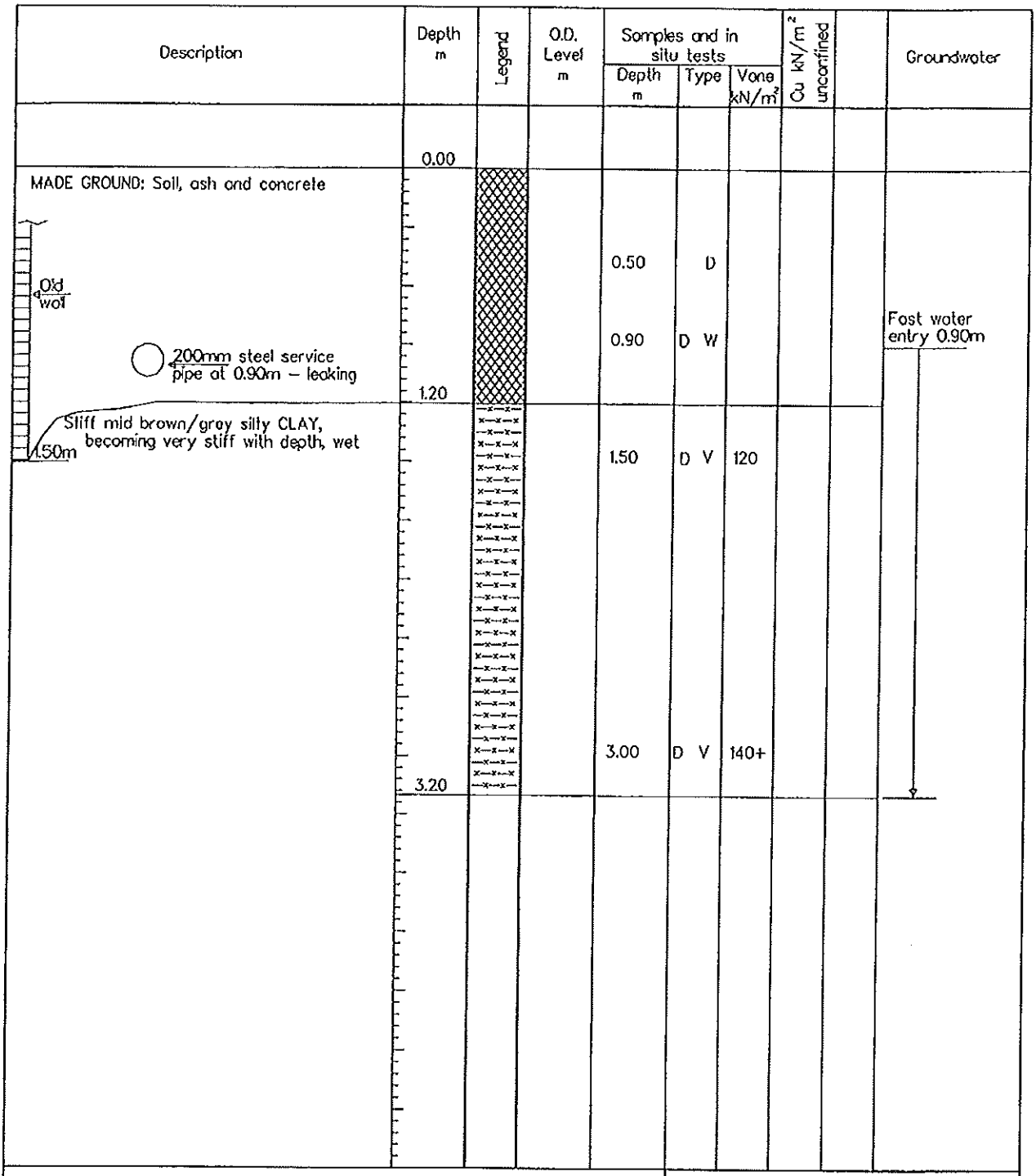
Remarks

Key
U – undisturbed
B – bulk
D – disturbed
W – water
V – vane

Northern Foundations

Trialhole Log

Site	NEW ISLINGTON, MANCHESTER	Job No	7890
Client	Martin Stockley Associates	Date	JUNE 2002
Trialhole No	136	Diameter	
Grid Ref		Method	Machine excavated
Ground Level	existing	Scale	1:30



Remarks

Key U – undisturbed
B – bulk
D – disturbed
W – water
V – vane

Northern Foundations

Trialhole Log

Site	NEW ISLINGTON, MANCHESTER	Job No	7890
Client	Martin Stockley Associates	Date	JUNE 2002
Trialhole No	137	Diameter	
Grid Ref		Method	Machine excavated
Ground Level	existing	Scale	1:30

Description	Depth m	Legend	O.D. Level m	Samples and in situ tests: Depth m	Type	Vane kN/m²	Cu kN/m² unconfined		Groundwater
	0.00								
MADE GROUND: Soil, clay, ash and cinder, damp				0.20	W				
Old wall and foundations	0.30			0.30	V	90			
Firm mid brown/grey silty CLAY				0.50	D				
0.70	0.70			0.70	D V	100			
Firm mid brown/grey mottled silty CLAY									
				2.00	D V	120			
	2.20								No groundwater entries

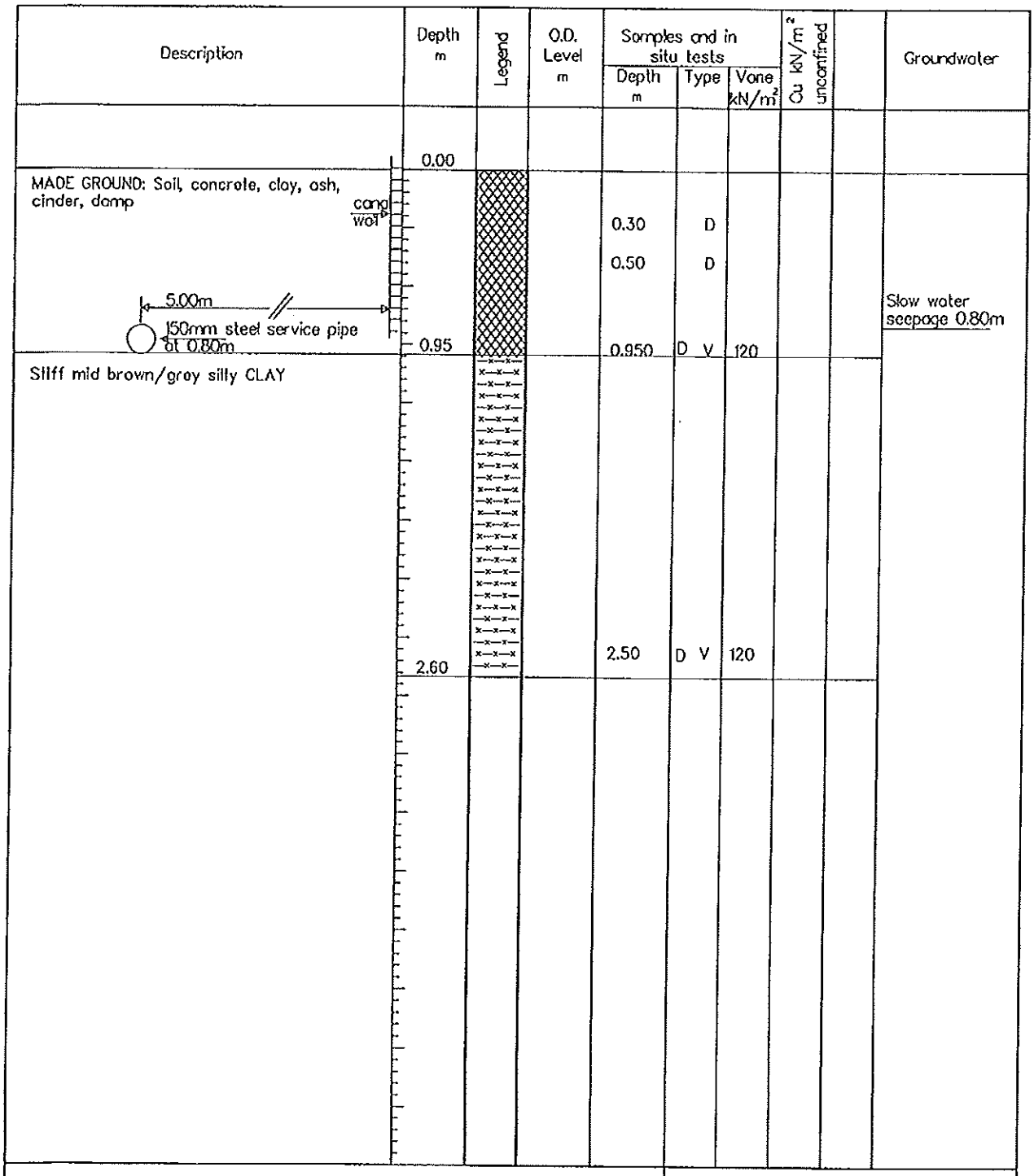
Remarks

Key
U – undisturbed
B – bulk
D – disturbed
W – water
V – vane

Northern Foundations

Trialhole Log

Site	NEW ISLINGTON, MANCHESTER	Job No	7890
Client	Martin Stockley Associates	Date	JUNE 2002
Trialhole No	138	Diameter	
Grid Ref		Method	Machine excavated
Ground Level	existing	Scale	1:30



Northern Foundations

Trialhole Log

Site	NEW ISLINGTON, MANCHESTER	Job No	7890
Client	Martin Stockley Associates	Date	JUNE 2002
Trialhole No	139	Diameter	
Grid Ref		Method	Machine excavated
Ground Level	existing	Scale	1:30

Description	Depth m	Legend	O.D. Level m	Samples and in situ tests: Depth m	Type	Vane kN/m²	Cu kN/m² unconfined		Groundwater
	0.00								
MADE GROUND: Soil, steel, glass, ash, brick timber, plastic				0.50	D				
				1.00	D				
	1.20			1.20	D				
MADE GROUND: Disturbed clay									
	1.80			1.80	D				
MADE GROUND: Bricks with clay	2.00			2.00	D	V	100		
Stiff mid brown silty CLAY									
				3.00	D	V	120		
	3.30								No groundwater entries

Remarks

Key
U – undisturbed
B – bulk
D – disturbed
W – water
V – vane

Northern Foundations

EC 2004

IAN FARMER ASSOCIATES

Site	Borehole Number
Manchester Millennium Village	BH201

Boring Method	Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion	150mm cased to 6.00m	48.51	Urban Splash/English Partnerships/Manchester City Council	4374
	Location	**Dates**	**Engineer**	**Sheet**
	385325.9 E 398764.7 N	28/11/2003	Edge Consultants	1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.50	D						MADE GROUND: Firm dark grey and brown sandy gravelly CLAY. Sand is fine to coarse including ash. Gravel is angular to subrounded, fine to coarse including brick fragments, sandstone, ash, glass and metal.			
1.00-1.45 1.00-1.50	CPT N=14 B	1.00	Dry	2,3/3,2,2,7		(1.80)				
2.00-2.50	U 0.45	2.00	Dry	72 blows	46.71	1.80	Stiff brown sandy, locally slightly sandy, slightly gravelly CLAY. Gravel is subangular to rounded, fine and medium of various lithologies.			
2.50	D									
3.00-3.45 3.00-3.50 3.00-3.50	SPT N=14 B D	3.00	Dry	2,3/3,4,3,4						
4.00-4.50	U 0.45	3.00	Dry	56 blows						
4.50	D									
5.00-5.45 5.00-5.50 5.00-5.50	SPT N=18 D B	4.50	Dry	3,3/4,4,5,5		(8.20)				
6.50-7.00	U 0.45	6.00	Dry	48 blows						
7.00	D									
8.00-8.45 8.00-8.50 8.00-8.50	SPT N=16 B D	6.00	Dry	2,4/4,3,4,5						
9.50-10.00	U									
10.00	D				38.51	10.00				

Remarks
Standpipe installed. Slotted pipe in gravel filter from 1.00m to 3.00m Grouted from 3.00m to 10.00m.
Hand auguring from 1.50m to 1.80m for 0.75 hours. Excavating from 0.00m to 1.20m for 1 hour.

Figure No.	Scale (approx)	Logged By
4374.BH201	1:50	OR

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IAN FARMER ASSOCIATES

Site	Borehole Number
Manchester Millennium Village	BH202

Boring Method	Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion	150mm cased to 10.00m	50.16	Urban Splash/English Partnerships/Manchester City Council	4374
	Location	**Dates**	**Engineer**	**Sheet**
	385206.5 E 398665.9 N	27/11/2003	Edge Consultants	1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
					50.11	0.05	MADE GROUND: Tarmac.			
							MADE GROUND: Very dense black and dark grey slightly clayey sandy GRAVEL with some cobbles. Sand is fine to coarse including ash. Gravel is angular to subrounded, fine to coarse including limestone, concrete, sandstone, brick fragments, ash and clinker. Cobbles are angular and subangular limestone and concrete.			
1.00-1.23 1.00-1.50	CPT 21/75 B	1.00	Dry	13,22/21		(1.85)				
2.00 2.00-2.50	D B			Water strike(1) at 1.90m, rose to 1.90m in 20 mins, sealed at 3.80m.	48.26	1.90	MADE GROUND: Soft slightly organic and dark grey and grey mottled sandy, slightly gravelly SILT. Gravel is subangular to subrounded, fine and medium including ash, brick fragments and sandstone.		▼1	
.00-2.45 2.50	CPT N=5 D	1.00	Dry	4,3/1,2,1,1						
3.00-3.45 3.00-3.50 3.00-3.50	SPT N=4 B D	3.00	3.00	1/1,1,1,1		(1.90)				
					46.36	3.80	Firm laminated brown slightly sandy, slightly gravelly CLAY. Gravel is subangular to rounded, fine and medium of various laminations.			
4.00-4.50	U 0.45	3.00	Dry	97 blows						
4.50	D									
5.00-5.45 5.00-5.50 5.00-5.50	SPT N=12 D B	4.50	Dry	2,3/3,2,3,4						
6.50-7.00	U 0.45	6.00	Dry	57 blows		(6.20)				
7.00	D									
8.00-8.45 8.00-8.50 8.00-8.50	SPT N=19 B D	6.00	Dry	3,4/5,5,4,5						
9.50-10.00	U 0.45	6.00	Dry	58 blows						
10.00	D				40.16	10.00				

Remarks
Standpipe installed. Slotted pipe in gravel filter from 1.50m to 4.80m. Backfilled with grout 4.80m to 10.00m.
Chiselling from 0.50m to 1.40m for 1.50 hours. Excavating from 0.00m to 1.20m for 1 hour.

Figure No.	Scale (approx)	Logged By
4374.BH202	1:50	OR

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IAN FARMER ASSOCIATES

Site	Trial Pit Number
Manchester Millennium Village	TP202

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
JCB 3CX	2.70m x 0.90m x 2.10m	48.84	Urban Splash/English Partnerships/Manchester City Council	4374
	Location	**Dates**	**Engineer**	**Sheet**
	385294.6 E 398740.1 N	24/11/2003	Edge Consultants	1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.10	B					MADE GROUND: Dark grey very clayey, gravelly fine to coarse SAND. Gravel is angular to subrounded, fine to coarse including brick fragments, ash, slate and floor tile fragments.		
					(0.65)			
0.50	V							
				48.19	0.65	Stiff fissured brown with blue grey staining on fissures, slighlly sandy, slighlly gravelly CLAY. Gravel is subrounded to rounded, fine to coarse with various lithologies.		
1.00	V							
1.00	D							
					(1.45)			
				46.74	2.10			
						Complete at 2.10m		

Plan

Remarks

Trial pit remained dry and stable.

Scale (approx)	Logged By	Figure No.
1:25	OR	4374.TP202

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IAN FARMER ASSOCIATES

Excavation Method	Dimensions	Ground Level (mOD)	Site	Trial Pit Number
JCB 3CX	3.40m x 1.00m x 3.70m	46.05	Manchester Millennium Village	TP204
	Location	Dates	Client	Job Number
	385291.6 E 398698.9 N	24/11/2003	Urban Splash/English Partnerships/Manchester City Council	4374
			Engineer	Sheet
			Edge Consultants	1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.10-0.50	B					MADE GROUND: Soft brown very sandy, gravelly CLAY with some cobbles. Gravel is angular to subrounded, fine to coarse including brick fragments, sandstone, concrete, glass, metal, timber, pottery fragments. Cobbles are angular and subangular of bricks, sandstone and concrete.		
0.30	V				(0.80)			
0.50-1.00	B							
				47.25	0.80	MADE GROUND: Brown and grey clayey, cobbly fine to coarse SAND and angular to subrounded, fine to coarse GRAVEL including brick fragments, concrete, ash, sandstone and pottery fragments. Cobbles are angular and subangular of bricks.		
1.00	D				(1.00)			
				46.25	1.80	MADE GROUND: Brown and dark grey, slightly clayey sandy, locally very sandy, angular to subrounded, fine to coarse GRAVEL including clinker, brick fragments, concrete and metal. Occasional angular to subangular cobbles of bricks.		
2.00	V							
2.00	D							
2.00	D				(0.70)			
				45.55	2.50	MADE GROUND: Very soft slightly organic black sandy slightly gravelly SILT. Gravel is angular and subangular, fine and medium of brick fragments, ash and timber. Oily sheen, hydrocarbon odour.		
2.60	V				(0.35)			
2.60	D		Standing(1) at 2.70m.					▽1
2.70	W							
				45.20	2.85	MADE GROUND: Firm brown sandy slightly gravelly CLAY with some cobbles of bricks. Sand is fine to coarse. Gravel is angular to rounded, fine to coarse including brick fragments and concrete. Strong hydrocarbon odour. Oily sheen on surface		
3.00	D				(0.85)			
				44.35	3.70			
						Complete at 3.70m		

Plan

Remarks

Standing water encountered at 2.70m
Some spalling from GL to 2.70m.
Trial pit terminated at 3.70m on engineers instruction due to contam polluting surface.

Scale (approx)	Logged By	Figure No.
1:25	OR	4374.TP204

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IAN FARMER ASSOCIATES

Site	Trial Pit Number
Manchester Millennium Village	TP205

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
JCB 3CX	1.00m x 2.50m x 2.30m	48.62	Urban Splash/English Partnerships/Manchester City Council	4374
	Location	**Dates**	**Engineer**	**Sheet**
	385268.2 E 398721.5 N	25/11/2003	Edge Consultants	1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.10-0.50	B				(0.65)	MADE GROUND: Firm grey very sandy, gravelly CLAY with occasional cobbles. Gravel is angular to subrounded fine to coarse of brick fragments, timber, metal, plastic and cloth.		
0.90 0.90	V D			47.77	0.65 (0.50)	MADE GROUND: Black silty slightly gravelly fine to coarse SAND. Gravel is angular to rounded fine to coarse of sandstone and brick fragments.		
1.50 1.50	HV 120kPa D		Slight seepage (1) at 1.35m. 120,120,120/Av. 120.00	47.27	1.35 (0.95)	Stiff fissured brown with grey staining on fissures, slightly sandy, slightly gravelly CLAY. Gravel is subrounded to rounded fine to medium of various lithologies.		▽1
				46.32	2.30	Complete at 2.30m		

Plan

Remarks

Slight groundwater seepage at 1.35m.
Slight spalling from ground level to 1.35m.
Maximum allowed reading on hand vane = 120

Scale (approx)	Logged By	Figure No.
1:50	OR	4374.TP205

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IAN FARMER ASSOCIATES

Site	Trial Pit Number
Manchester Millennium Village	TP206

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
JCB 3CX	0.90m x 4.00m	49.61	Urban Splash/English Partnerships/Manchester City Council	4374
	Location	**Dates**	**Engineer**	**Sheet**
	385180 E 398597.2 N	20/11/2003	Edge Consultants	1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.20-0.40	V				(0.40)	MADE GROUND: Dark brown slightly clayey, gravelly, locally very gravelly fine to coarse SAND. Gravel is angular to subrounded, fine to coarse including limestone, sandstone, brick fragments, metal, concrete and plastic.		
0.20-0.40	B							
				49.21	0.40			
0.50	D					MADE GROUND: Compact ash recovered as black and dark grey sandy GRAVEL. Sand is fine to coarse of ash. Gravel is angular to subrounded, fine to coarse including ash, clinker and coal.		
					(0.45)			
				48.76	0.85			
0.90	D				(0.15)	MADE GROUND: Yellow brown sandy GRAVEL with occasional cobbles. Gravel is angular to subangular, fine to coarse of sandstone.		
				48.61	1.00			
1.20	HV 65.33kPa		71,65,60/Av. 65.33			MADE GROUND: Stiff brown with some grey sandy, slightly gravelly CLAY. Gravel is angular to subrounded, fine to coarse including sandstone, coal and brick fragments.		
1.20	V							
1.20	D					Below 1.20m: locally firm.		
					(1.30)			
2.30	D			47.31	2.30	MADE GROUND: Dark grey slightly organic sandy, slightly gravelly CLAY. Gravel is subangular to rounded, fine to medium including brick fragments, sandstone and quartzite.		
				47.21	2.40			
2.50	HV 103.33kPa		90,120,100/Av. 103.33			Stiff fissured brown with grey staining on fissures, slightly sandy, locally sandy slightly gravelly CLAY. Gravel is subangular fine to medium of various lithologies.		
2.50	D							
					(1.60)			
3.50	HV							
				45.61	4.00			

Plan

Remarks

Trial pit remained dry.
Some spalling to 2.00m.
Maximum allowed reading on hand vane = 120

Scale (approx)	Logged By	Figure No.
1:25	OR	4374.TP206

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APPENDIX D

SOIL LABORATORY ANALYSIS RESULTS

PF 1999

Summary Of Results
Norwest Holst Soil Engineering Limited - Ancoates, Manchester. Zone 1

ANALYTES	UNITS	TP37 (0.50m)	TP37 (1.00m)	TP37 (1.50m)	TP37 (2.00m)	TP37 (2.50m)	TP37 (3.00m)	TP38 (0.50m)	TP38 (1.00m)	TP38 (1.50m)	TP38 (2.00m)	TP38 (2.50m)	TP38 (3.00m)
		S9920409	S9920411	S9920412	S9920413	S9920414	S9920415	S9920416	S9920418	S9920419	S9920420	S9920421	S9920422
Arsenic	mg/kg	91.5	100.1	55.1	44.2	42.6	16.1	27.5	13.4	7.9	6.0	13.6	9.6
Cadmium	mg/kg	3.3	1.0	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chromium (hexavalent)	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	1.4	1.7	<1.0	<1.0	<1.0	<1.0	<1.0
Chromium (total)	mg/kg	75.5	54.6	29.3	23.5	29.8	38.2	36.1	40.8	28.9	36.5	44.0	41.0
Lead	mg/kg	1919.6	1865.1	573.1	949.1	219.7	121.4	262.4	78.4	102.4	92.5	74.3	68.5
Mercury	mg/kg	1.5	<1.0	2.1	3.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Selenium	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Boron (water soluble)	mg/kg	<0.5	<0.5	<0.5	1.1	1.0	1.2	0.7	1.3	1.0	0.5	<0.5	<0.5
Copper	mg/kg	467.9	348.2	193.4	158.2	156.9	94.9	164.2	27.2	12.9	10.4	12.5	10.9
Nickel	mg/kg	71.6	74.3	50.7	52.3	43.1	40.9	56.4	30.8	16.9	18.3	21.0	16.9
Zinc	mg/kg	929.6	697.1	165.9	97.1	130.8	103.5	196.2	63.7	43.6	44.0	50.3	49.7
PAH (total)	mg/kg	487	218	21	14	11	22	799	11	<10	<10	<10	<10 †
Phenols	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	3.4	2.0	1.0	<1.0	<1.0	<1.0
Cyanide (free)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Cyanide (complex)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Cyanide (total)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Thiocyanate	mg/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Sulphate (total)	mg/kg	4892	3627	2970	<30	2672	682	1650	1370	915	219	343	389
Sulphide	mg/kg	<2.0	6.5	5.2	431.0	341.3	62.5	19.0	300.7	51.7	10.3	<2.0	<2.0
Sulphur (total)	mg/kg	2507	2476	1840	6674	10594	2151	2247	5879	3541	226	264	226

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

All
Metals
PAH (total)
Phenols
Cyanide Suite
TPH (DRO) + Mineralogic
Asbestos.

~~[illegible]~~ / TPH
TP37 x2

Water
A1-A3
R1-R4.

Report No. R99/1928

45
TP37 - TP42
Varais depths
+ SPOIL A-E

Summary Of Results
Norwest Holst Soil Engineering Limited - Ancoates, Manchester. Zone 1

ANALYTES	UNITS	TP37 (0.50m)	TP37 (1.00m)	TP37 (1.50m)	TP37 (2.00m)	TP37 (2.50m)	TP37 (3.00m)	TP38 (0.50m)	TP38 (1.00m)	TP38 (1.50m)	TP38 (2.00m)	TP38 (2.50m)	TP38 (3.00m)	
		S9920409	S9920411	S9920412	S9920413	S9920414	S9920415	S9920416	S9920418	S9920419	S9920420	S9920421	S9920422	
pH	N/A	9.0	7.7	7.7	7.6	7.5	7.5	6.6	7.4	7.2	7.6	8.0	8.0	
Ammonia	mg/kg	<4.0	5.3	#	#	#	#	65.9	152.0	#	#	#	#	†
TPH	mg/kg	926	131	#	#	21	#	#	#	43	11	#	#	
PCBs	mg/kg	<0.1	#	#	#	#	#	#	#	#	#	#	#	†
Asbestos	N/A	Y	N	#	#	#	#	N	N	#	#	#	#	
DRO	mg/kg	#	#	22.8	126.9	#	#	1884.0	10.2	#	#	#	#	†
Mineral Oils	mg/kg	#	#	9.0	80.9	#	#	1156.6	6.8	#	#	#	#	†

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

Summary Of Results
Norwest Holst Soil Engineering Limited - Ancoates, Manchester. Zone 1

ANALYTES	UNITS	TP39 (0.50m)	TP39 (1.00m)	TP39 (1.50m)	TP39 (2.00m)	TP39 (2.50m)	TP40 (0.50m)	TP40 (1.00m)	TP40 (1.50m)	TP40 (2.00m)	TP41 (0.50m)	TP41 (1.00m)	TP41 (1.50m)
		S9920423	S9920424	S9920425	S9920426	S9920427	S9920428	S9920429	S9920430	S9920431	S9920432	S9920433	S9920434
Arsenic	mg/kg	9.0	13.9	15.5	17.3	15.6	10.9	10.0	8.3	8.0	8.8	7.6	8.0
Cadmium	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chromium (hexavalent)	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chromium (total)	mg/kg	35.1	34.0	35.2	43.2	38.9	48.5	43.7	30.2	31.4	35.5	29.5	25.9
Lead	mg/kg	54.0	156.4	167.5	122.4	95.3	136.0	64.8	38.2	35.9	40.0	36.2	34.1
Mercury	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Selenium	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Boron (water soluble)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Copper	mg/kg	32.2	111.7	54.2	64.6	59.6	22.6	26.1	21.1	23.0	23.0	19.4	19.0
Nickel	mg/kg	36.5	38.1	40.1	47.5	41.8	35.3	45.8	40.8	41.1	40.3	36.0	34.8
Zinc	mg/kg	62.1	127.1	76.2	134.3	121.0	62.9	67.8	56.9	64.3	62.3	57.5	56.2
PAH (total)	mg/kg	<10	<10	<10	13	148	<10	<10	<10	<10	<10	<10	<10 †
Phenols	mg/kg	<1.0	1.4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Cyanide (free)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Cyanide (complex)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Cyanide (total)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Thiocyanate	mg/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Sulphate (total)	mg/kg	614	716	441	1034	1046	1647	1110	701	482	418	315	277
Sulphide	mg/kg	2.0	<2.0	<2.0	<2.0	19.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Sulphur (total)	mg/kg	933	448	338	575	1306	620	451	278	238	205	158	165

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

Summary Of Results
Norwest Holst Soil Engineering Limited - Ancoates, Manchester. Zone 1

ANALYTES	UNITS	TP39 (0.50m)	TP39 (1.00m)	TP39 (1.50m)	TP39 (2.00m)	TP39 (2.50m)	TP40 (0.50m)	TP40 (1.00m)	TP40 (1.50m)	TP40 (2.00m)	TP41 (0.50m)	TP41 (1.00m)	TP41 (1.50m)
		S9920423	S9920424	S9920425	S9920426	S9920427	S9920428	S9920429	S9920430	S9920431	S9920432	S9920433	S9920434
pH	N/A	8.2	8.0	8.1	8.0	8.0	7.3	7.6	8.0	8.2	8.2	8.3	8.2
Ammonia	mg/kg	21.6	8.8	#	#	#	.7	20.5	#	#	6.8	8.8	#
Asbestos	N/A	N	N	#	#	#	N	N	#	#	N	N	#
TPH	mg/kg	#	12	#	#	#	#	<1	#	#	#	<1	#

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

Summary Of Results
Norwest Holst Soil Engineering Limited - Ancoates, Manchester. Zone 1

ANALYTES	UNITS	TP41 (2.00m)	TP42 (0.50m)	TP42 (1.00m)	TP42 (1.50m)	TP42 (2.00m)							
		S9920435	S9920436	S9920437	S9920438	S9920439							
Arsenic	mg/kg	8.7	8.4	9.7	9.2	8.6	#	#	#	#	#	#	#
Cadmium	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	#	#	#	#	#	#	#
Chromium (hexavalent)	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	#	#	#	#	#	#	#
Chromium (total)	mg/kg	31.0	34.4	37.7	36.3	35.9	#	#	#	#	#	#	#
Lead	mg/kg	37.6	37.9	47.0	44.0	42.2	#	#	#	#	#	#	#
Mercury	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	#	#	#	#	#	#	#
Selenium	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	#	#	#	#	#	#	#
Boron (water soluble)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	#	#	#	#	#	#	#
Copper	mg/kg	23.1	20.9	22.7	23.0	22.4	#	#	#	#	#	#	#
Nickel	mg/kg	39.4	38.5	42.4	43.0	40.5	#	#	#	#	#	#	#
Zinc	mg/kg	60.5	59.5	63.2	65.3	64.3	#	#	#	#	#	#	#
PAH (total)	mg/kg	<10	<10	<10	<10	<10	#	#	#	#	#	#	#
Phenols	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	#	#	#	#	#	#	#
Cyanide (free)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	#	#	#	#	#	#	#
Cyanide (complex)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	#	#	#	#	#	#	#
Cyanide (total)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	#	#	#	#	#	#	#
Thiocyanate	mg/kg	<10	<10	<10	<10	<10	#	#	#	#	#	#	#
Sulphate (total)	mg/kg	510	197	185	194	210	#	#	#	#	#	#	#
Sulphide	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	#	#	#	#	#	#	#
Sulphur (total)	mg/kg	200	118	108	124	127	#	#	#	#	#	#	#

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

Summary Of Results
Norwest Holst Soil Engineering Limited - Ancoates, Manchester. Zone 1

ANALYTES	UNITS	TP41 (2.00m)	TP42 (0.50m)	TP42 (1.00m)	TP42 (1.50m)	TP42 (2.00m)							
		S9920435	S9920436	S9920437	S9920438	S9920439							
pH	N/A	8.1	8.4	8.4	8.4	8.4	#	#	#	#	#	#	#
Ammonia	mg/kg	#	13.8	16.8	#	#	#	#	#	#	#	#	# †
Asbestos	N/A	#	N	N	#	#	#	#	#	#	#	#	#
TPH	mg/kg	#	#	<1	#	#	#	#	#	#	#	#	#

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

0618
0618 S1

ECOS ENVIRONMENTAL

Low Moor Business Park
Common Road
Bradford
BD12 0NB

Telephone: 01274 691122
Fax: 01274 608100

Our ref: RW/RMOW

15th September, 1999

Mr M Baldwin
Norwest Holst Soil Engineering Limited
Parkside Lane
Dewsbury Road
LEEDS
West Yorkshire
LS11 5SX

Dear Mr Baldwin

Herewith report on analysis of bulk material submitted for examination on 10th September, 1999.
Samples taken by Norwest Holst Soil Engineering Limited personnel and analysed by ECOS Environmental, Bradford.

ASBESTOS BULK MATERIAL ANALYSIS

Samples analysed using polarised light optical microscopy with dispersion staining in accordance with a documented in-house procedure based on HSE Method MDHS 77 - Asbestos in Bulk Materials.

The standard analytical method used for asbestos identification cannot give an accurate quantitative value for percentage asbestos content. The following values however may be used to assess the approximate quantity of asbestos present in the sample as submitted to the laboratory.

None Detected - no fibres detected (based on a detection limit of 0.01% by volume)
1 - more than 0.01% but less than 2% by volume
2 - more than 2% but less than 50% by volume
3 - more than 50% by volume

SAMPLE REF:	TYPE OF ASBESTOS FIBRE DETECTED				NON-ASBESTOS FIBRES
	CHRYSOTILE (WHITE)	AMOSITE (BROWN)	CROCIDOLITE (BLUE)	OTHER AMPHIBOLE ASBESTOS FIBRES	
TP37 (0.50M) ECOS ref: S9920409	None Detected	Present[1]	None Detected	None Detected	Present
TP37 (1.00M) ECOS ref: S9920411	None Detected	None Detected	None Detected	None Detected	Present
TP38 (0.50M) ECOS ref: S9920416	None Detected	None Detected	None Detected	None Detected	Present

SAMPLE REF:	TYPE OF ASBESTOS FIBRE DETECTED				NON-ASBESTOS FIBRES
	CHRYSOTILE (WHITE)	AMOSITE (BROWN)	CROCIDOLITE (BLUE)	OTHER AMPHIBOLE ASBESTOS FIBRES	
TP38 (1.00M) ECOS ref: S9920418	None Detected	None Detected	None Detected	None Detected	Present
TP39 (0.50M) ECOS ref: S9920423	None Detected	None Detected	None Detected	None Detected	None Detected
TP39 (1.00M) ECOS ref: S9920424	None Detected	None Detected	None Detected	None Detected	None Detected
TP40 (0.50M) ECOS ref: S9920428	None Detected	None Detected	None Detected	None Detected	None Detected
TP40 (1.00M) ECOS ref: S9920429	None Detected	None Detected	None Detected	None Detected	None Detected
TP41 (0.50M) ECOS ref: S9920432	None Detected	None Detected	None Detected	None Detected	None Detected
TP41 (1.00M) ECOS ref: S9920433	None Detected	None Detected	None Detected	None Detected	None Detected
TP42 (0.50M) ECOS ref: S9920436	None Detected	None Detected	None Detected	None Detected	Present
TP42 (1.00M) ECOS ref: S9920437	None Detected	None Detected	None Detected	None Detected	None Detected

Yours sincerely,

R. Webster

Note: Any opinions or interpretation of test results expressed herein are outside the scope of the testing laboratorys NAMAS accreditation. The testing laboratory does not accept responsibility for the competency of personnel other than its own staff or for the condition or suitability of test samples submitted to the laboratory by a third party.

Analytical Test Report
For

NORWEST HOLST SOIL ENGINEERING LIMITED
Parkside Lane
Dewsbury Road
LEEDS
West Yorkshire
LS11 5SX

PROJECT ID: ANCOATS

Report No.: R99/1945

Copies To:
Mr M Baldwin
File

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What's so special about a NAMAS report or certificate?
- NAMAS is the acronym for National Accreditation of Measurement and Sampling.
- Accreditation of NAMAS testing is granted by the United Kingdom Accreditation Service (UKAS).
- It's your assurance that the work has been carried out to the highest standards.
- The laboratory issuing the test report has been stringently assessed by independent experts.
- You are assured that the agreed or specified methods and procedures have been followed.
- Measurements are traceable to national and international standards.

Comments:
Tests marked † in this report are not included in the NAMAS Accreditation Schedule for the testing laboratory. However, with the continuing development of our QC protocols, these tests will be included in the near future.
Any opinions and interpretations expressed herein are outside the scope of the testing laboratory's NAMAS Accreditation.
Coefficient of Variation (CV_T) is better than 15%

Date submitted for analysis : 10/09/99

Your Job/Order Number : F11483

Analyst(s) : NB NSP AA MB ELS DS AW ML RDB

Approved signatories: J R Brown, G Ewbank, E Sharp

Signature : R. Brown

Report date : 20 September 1999

QA APPROVED
SIGNED.. [signature]
DATE.: 20/9/99

SOIL

ANALYTE	METHOD OF DETECTION	LIMIT OF DETECTION
Arsenic	ICP-OES	1.0 mg/kg
Cadmium	ICP-OES	0.2 mg/kg
Chromium (hexavalent)	ICP-OES	1.0 mg/kg
Chromium (total)	ICP-OES	0.2 mg/kg
Lead	ICP-OES	0.5 mg/kg
Mercury	ICP-OES	1.0 mg/kg
Selenium	ICP-OES	1.0 mg/kg
Boron (water soluble)	Colorimetry	0.5 mg/kg
Copper	ICP-OES	0.2 mg/kg
Nickel	ICP-OES	0.2 mg/kg
Zinc	ICP-OES	0.2 mg/kg
PAH (total)	HPLC-UV	10 mg/kg
Phenols	Colorimetry	1.0 mg/kg
Cyanide (free)	Colorimetry	2.0 mg/kg
Cyanide (complex)	Colorimetry	2.0 mg/kg
Cyanide (total)	Colorimetry	2.0 mg/kg
Thiocyanate	Colorimetry	10 mg/kg
Sulphate (total)	ICP-OES	30 mg/kg
Sulphide	Colorimetry	2.0 mg/kg
Sulphur (total)	ICP-OES	10 mg/kg
pH	pH-meter	N/A
Ammonia	Colorimetry	4.0 mg/kg
TPH	Infra-red	1 mg/kg
PCBs	GC-ECD	0.1 mg/kg

Details of Asbestos analysis contained in report R991945a (appended).
Y - Asbestos detected
N - Asbestos not detected

Summary Of Results
Norwest Holst Soil Engineering Limited - Ancoats

ANALYTES	UNITS	Spoil A	Spoil B	Spoil C	Spoil D	Spoil E							
		S9920742	S9920743	S9920745	S9920746	S9920747							
Arsenic	mg/kg	42.4	14.1	22.5	28.8	25.0	#	#	#	#	#	#	#
Cadmium	mg/kg	2.2	1.1	2.1	3.9	2.3	#	#	#	#	#	#	#
Chromium (hexavalent)	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	#	#	#	#	#	#	#
Chromium (total)	mg/kg	27.1	10.8	26.1	28.3	16.1	#	#	#	#	#	#	#
Lead	mg/kg	642.9	243.9	558.4	723.9	466.2	#	#	#	#	#	#	#
Mercury	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	#	#	#	#	#	#	#
Selenium	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	#	#	#	#	#	#	#
Boron (water soluble)	mg/kg	1.5	1.1	2.0	1.1	2.2	#	#	#	#	#	#	#
Copper	mg/kg	278.9	183.7	253.9	185.3	96.5	#	#	#	#	#	#	#
Nickel	mg/kg	34.0	19.6	35.7	46.8	31.1	#	#	#	#	#	#	#
Zinc	mg/kg	745.0	285.5	739.0	3012.0	1560.5	#	#	#	#	#	#	#
PAH (total)	mg/kg	2570	302	33	58	213	#	#	#	#	#	#	# †
Phenols	mg/kg	5.7	<1.0	1.1	<1.0	<1.0	#	#	#	#	#	#	#
Cyanide (free)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	#	#	#	#	#	#	#
Cyanide (complex)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	#	#	#	#	#	#	#
Cyanide (total)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	#	#	#	#	#	#	#
Thiocyanate	mg/kg	<10	<10	<10	<10	<10	#	#	#	#	#	#	#
Sulphate (total)	mg/kg	17042	32297	22067	22247	10740	#	#	#	#	#	#	#
Sulphide	mg/kg	10.3	6.1	10.9	131.1	48.2	#	#	#	#	#	#	#
Sulphur (total)	mg/kg	6830	11695	9450	8755	4771	#	#	#	#	#	#	#

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

Summary Of Results
Norwest Holst Soil Engineering Limited - Ancoats

ANALYTES	UNITS	Spoil A	Spoil B	Spoil C	Spoil D	Spoil E							
		S9920742	S9920743	S9920745	S9920746	S9920747							
pH	N/A	9.1	8.4	8.7	10.2	8.9	#	#	#	#	#	#	#
Ammonia	mg/kg	<4.0	<4.0	<4.0	11.4	<4.0	#	#	#	#	#	#	# †
TPH	mg/kg	6956	5390	1243	451	473	#	#	#	#	#	#	#
PCBs	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	#	#	#	#	#	#	# †
Asbestos	N/A	Y	N	Y	Y	Y	#	#	#	#	#	#	#

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

0618
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ECOS ENVIRONMENTAL

Low Moor Business Park
Common Road
Bradford
BD12 0NB

Telephone: 01274 691122
Fax: 01274 608100

Our ref: RW/CB

16th September, 1999

Mr M Baldwin
Norwest Holst Soil Engineering Limited
Parkside Lane
Dewsbury Road
LEEDS
West Yorkshire
LS11 5SX

Dear Mr Baldwin

Herewith report on analysis of bulk material submitted for examination on 13th September, 1999.
Samples taken by Norwest Holst Soil Engineering Limited personnel and analysed by ECOS Environmental, Bradford.

ASBESTOS BULK MATERIAL ANALYSIS

Samples analysed using polarised light optical microscopy with dispersion staining in accordance with a documented in-house procedure based on HSE Method MDHS 77 - Asbestos in Bulk Materials.

The standard analytical method used for asbestos identification cannot give an accurate quantitative value for percentage asbestos content. The following values however may be used to assess the approximate quantity of asbestos present in the sample as submitted to the laboratory.

None Detected - no fibres detected (based on a detection limit of 0.01% by volume)
1 - more than 0.01% but less than 2% by volume
2 - more than 2% but less than 50% by volume
3 - more than 50% by volume

SAMPLE REF:	TYPE OF ASBESTOS FIBRE DETECTED				NON-ASBESTOS FIBRES
	CHRYSOTILE (WHITE)	AMOSITE (BROWN)	CROCIDOLITE (BLUE)	OTHER AMPHIBOLE ASBESTOS FIBRES	
ANCOATS MANCHESTER - SPOIL 'A' ECOS ref: S9920742	Present[2]	None Detected	None Detected	None Detected	Present
ANCOATS MANCHESTER - SPOIL 'B' ECOS ref: S9920743	None Detected	None Detected	None Detected	None Detected	Present
ANCOATS MANCHESTER - SPOIL 'C' ECOS ref: S9920745	Present[2]	None Detected	None Detected	None Detected	Present

SAMPLE REF:	TYPE OF ASBESTOS FIBRE DETECTED				NON-ASBESTOS FIBRES
	CHRYSOTILE (WHITE)	AMOSITE (BROWN)	CROCIDOLITE (BLUE)	OTHER AMPHIBOLE ASBESTOS FIBRES	
ANCOATS MANCHESTER - SPOIL 'D' ECOS ref: S9920746	Present[2]	None Detected	None Detected	None Detected	Present
ANCOATS MANCHESTER - SPOIL 'E' ECOS ref: S7920747	Present[2]	None Detected	None Detected	None Detected	Present

Yours sincerely,

R. Webster

Note: Any opinions or interpretation of test results expressed herein are outside the scope of the testing laboratorys NAMAS accreditation. The testing laboratory does not accept responsibility for the competency of personnel other than its own staff or for the condition or suitability of test samples submitted to the laboratory by a third party.

Analytical Test Report
For

NORWEST HOLST SOIL ENGINEERING LIMITED
Parkside Lane
Dewsbury Road
LEEDS
West Yorkshire
LS11 5SX

PROJECT ID: ANCOATS

Report No.: R99/1929

Copies To:
Mr M Baldwin
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What's so special about a NAMAS report or certificate?

- NAMAS is the acronym for National Accreditation of Measurement and Sampling.
- Accreditation of NAMAS testing is granted by the United Kingdom Accreditation Service (UKAS).
- It's your assurance that the work has been carried out to the highest standards.
- The laboratory issuing the test report has been stringently assessed by independent experts.
- You are assured that the agreed or specified methods and procedures have been followed.
- Measurements are traceable to national and international standards.

Comments:
Tests marked † in this report are not included in the NAMAS Accreditation Schedule for the testing laboratory. However, with the continuing development of our QC protocols, these tests will be included in the near future.
Any opinions and interpretations expressed herein are outside the scope of the testing laboratory's NAMAS Accreditation.
Coefficient of Variation (CV_T) is better than 15%

Date submitted for analysis : 09/09/99

Your Job/Order Number : F11483

Analyst(s) : NB NSP AA MB ELS DS AW ARC RDB PRK

Approved signatories: J R Brown, G Ewbank, E Sharp

Signature : R. Brown

Report date : 22 September 1999

QA APPROVED
SIGNED.. Fraser Ogilvie
DATE.. 22/9/99

SOIL

ANALYTE	METHOD OF DETECTION	LIMIT OF DETECTION
Arsenic	ICP-OES	1.0 mg/kg
Cadmium	ICP-OES	0.2 mg/kg
Chromium (hexavalent)	ICP-OES	1.0 mg/kg
Chromium (total)	ICP-OES	0.2 mg/kg
Lead	ICP-OES	0.5 mg/kg
Mercury	ICP-OES	1.0 mg/kg
Selenium	ICP-OES	1.0 mg/kg
Boron (water soluble)	Colorimetry	0.5 mg/kg
Copper	ICP-OES	0.2 mg/kg
Nickel	ICP-OES	0.2 mg/kg
Zinc	ICP-OES	0.2 mg/kg
PAH (total)	HPLC-UV	10 mg/kg
Phenols	Colorimetry	1.0 mg/kg
Cyanide (free)	Colorimetry	2.0 mg/kg
Cyanide (complex)	Colorimetry	2.0 mg/kg
Cyanide (total)	Colorimetry	2.0 mg/kg
Thiocyanate	Colorimetry	10 mg/kg
Sulphate (total)	ICP-OES	30 mg/kg
Sulphide	Colorimetry	2.0 mg/kg
Sulphur (total)	ICP-OES	10 mg/kg
pH	pH-meter	N/A
Ammonia	Colorimetry	4.0 mg/kg
DRO	GC-FID	0.1 mg/kg
Mineral Oils	GC-FID	0.1 mg/kg
TPH	Infra-red	1 mg/kg
PCBs	GC-ECD	0.1 mg/kg
Loss on Ignition	Gravimetry	0.01 %
Calorific Value	Bomb Calorimetry	0.100 MJ/kg

Details of Asbestos analysis contained in report R991929a (appended).
Y - Asbestos detected
N - Asbestos not detected

Please note Calorific Value analysis was sub-contracted.

Summary Of Results
Norwest Holst Soil Engineering Limited - Ancoats

ANALYTES	UNITS	TP43 (0.50m)	TP43 (1.00m)	TP43 (1.50m)	TP43 (2.00m)	TP43 (2.50m)	TP44 (0.50m)	TP44 (1.00m)	TP44 (1.50m)	TP44 (2.00m)	TP45 (0.50m)	TP45 (1.00m)	TP45 (1.50m)
		S9920442	S9920443	S9920444	S9920445	S9920446	S9920447	S9920448	S9920449	S9920450	S9920451	S9920452	S9920454
Arsenic	mg/kg	8.8	9.5	9.0	7.3	8.9	8.4	10.3	8.8	8.2	48.2	45.0	49.0
Cadmium	mg/kg	<0.2	<0.2	0.2	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.4	<0.2	0.4
Chromium (hexavalent)	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chromium (total)	mg/kg	36.3	34.8	38.4	45.5	38.2	45.6	54.1	42.9	44.1	36.7	28.7	43.2
Lead	mg/kg	35.0	98.1	112.3	78.4	100.7	41.2	48.8	40.1	105.6	1066.4	600.4	638.4
Mercury	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Selenium	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Boron (water soluble)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.1	2.4	1.3
Copper	mg/kg	21.5	22.3	22.6	23.1	21.3	23.7	26.2	23.8	22.3	133.9	93.1	136.7
Nickel	mg/kg	38.7	37.6	38.7	40.3	36.6	43.4	45.4	42.4	39.1	42.5	34.5	43.9
Zinc	mg/kg	57.4	56.7	58.8	60.5	55.2	59.2	65.3	62.8	58.4	378.3	764.3	517.3
PAH (total)	mg/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10	28	38	23 †
Phenols	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Cyanide (free)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Cyanide (complex)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Cyanide (total)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Thiocyanate	mg/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Sulphate (total)	mg/kg	501	420	461	400	328	334	380	339	384	25099	39799	22759
Sulphide	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.9	8.1	6.2
Sulphur (total)	mg/kg	226	164	214	171	133	135	178	150	130	9055	15520	10600

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

Summary Of Results
Norwest Holst Soil Engineering Limited - Ancoats

ANALYTES	UNITS	TP43 (0.50m)	TP43 (1.00m)	TP43 (1.50m)	TP43 (2.00m)	TP43 (2.50m)	TP44 (0.50m)	TP44 (1.00m)	TP44 (1.50m)	TP44 (2.00m)	TP45 (0.50m)	TP45 (1.00m)	TP45 (1.50m)	
		S9920442	S9920443	S9920444	S9920445	S9920446	S9920447	S9920448	S9920449	S9920450	S9920451	S9920452	S9920454	
pH	N/A	7.8	7.9	7.9	8.0	8.0	8.0	8.1	8.1	8.1	9.5	8.6	9.0	
Ammonia	mg/kg	9.7	11.8	#	#	#	13.0	13.8	#	#	<4.0	<4.0	#	†
TPH	mg/kg	1	#	#	#	#	<1	#	#	#	#	31	#	
Asbestos	N/A	N	N	#	#	#	N	N	#	#	N	N	#	
PCBs	mg/kg	#	#	#	#	#	#	#	#	#	#	<0.1	#	†

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

Summary Of Results
Norwest Holst Soil Engineering Limited - Ancoats

ANALYTES	UNITS	TP45 (2.00m)	TP46 (0.50m)	TP46 (1.00m)	TP46 (1.50m)	TP46 (2.00m)	TP47 (0.50m)	TP47 (1.00m)	TP47 (1.50m)	TP47 (2.00m)	TP48 (0.50m)	TP48 (1.00m)	TP48 (1.50m)
		S9920455	S9920456	S9920457	S9920458	S9920459	S9920460	S9920461	S9920462	S9920463	S9920465	S9920466	S9920467
Arsenic	mg/kg	64.6	14.6	8.4	7.5	9.4	30.2	28.0	24.1	43.6	47.3	86.3	107.3
Cadmium	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	2.8	<0.2	0.2	2.8	<0.2	0.9	2.0
Chromium (hexavalent)	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.9	3.6
Chromium (total)	mg/kg	40.1	52.2	38.6	42.2	45.1	261.1	105.5	109.7	100.1	68.1	114.2	52.9
Lead	mg/kg	633.4	107.8	35.4	38.6	40.1	449.5	212.2	180.3	507.9	616.9	392.1	581.9
Mercury	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.9	<1.0
Selenium	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Boron (water soluble)	mg/kg	2.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	0.8	1.7
Copper	mg/kg	217.0	38.2	21.8	21.7	23.7	132.2	152.9	106.4	2[illegible]6	301.2	599.5	362.4
Nickel	mg/kg	47.0	44.6	38.5	37.6	39.4	47.5	46.6	42.2	[illegible]	61.6	114.1	46.1
Zinc	mg/kg	653.8	78.2	56.4	55.4	60.0	423.3	215.6	220.9	1431.8	405.0	294.9	1965.3
PAH (total)	mg/kg	87	<10	<10	<10	<10	969	375	321	1205	[illegible]68	854	262 †
Phenols	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	[illegible].0	14.0	1[illegible]3	<1.0	1.2
Cyanide (free)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Cyanide (complex)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	n2.0	7.2	2.9	2.3	85.7
Cyanide (total)	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	7.2	2.9	[illegible]3	85.7
Thiocyanate	mg/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Sulphate (total)	mg/kg	32194	800	184	161	119	996	960	1042	2503	1466	4551	495
Sulphide	mg/kg	3.7	<2.0	<2.0	<2.0	<2.0	<2.0	7.5	3.2	1042.1	33.7	34.9	1[illegible].7
Sulphur (total)	mg/kg	12730	294	69	66	51	971	969	969	8330	1349	9355	3287

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

Summary Of Results
Norwest Holst Soil Engineering Limited - Ancoats

ANALYTES	UNITS	TP45 (2.00m)	TP46 (0.50m)	TP46 (1.00m)	TP46 (1.50m)	TP46 (2.00m)	TP47 (0.50m)	TP47 (1.00m)	TP47 (1.50m)	TP47 (2.00m)	TP48 (0.50m)	TP48 (1.00m)	TP48 (2.00m)	
		S9920455	S9920456	S9920457	S9920458	S9920459	S9920460	S9920461	S9920462	S9920463	S9920465	S9920466	S9920467	
pH	N/A	8.5	7.7	8.2	8.3	8.2	8.0	7.9	7.9	8.0	7.8	7.0	7.4	
Ammonia	mg/kg	#	9.0	16.3	#	#	18.6	4.1	#	#	6.1	115.4	#	†
TPH	mg/kg	#	1	#	#	#	#	#	#	#	#	#	<1	
Asbestos	N/A	#	N	N	#	#	N	#	#	#	N	#	#	
DRO	mg/kg	#	#	#	#	#	#	#	#	4330.4	#	#	#	†
Mineral Oils	mg/kg	#	#	#	#	#	#	#	#	2894.4	#	#	#	†
Loss on Ignition	%	#	#	#	#	#	#	#	#	#	#	#	14.22	†
Calorific Value	MJ/kg	#	#	#	#	#	#	#	#	#	#	#	4.21	†

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

0618
0618 SI

ECOS ENVIRONMENTAL

Low Moor Business Park
Common Road
Bradford
BD12 0NB

Telephone: 01274 691122
Fax: 01274 608100

Our ref: RW/RMOW

15th September, 1999

Mr M Baldwin
Norwest Holst Soil Engineering Limited
Parkside Lane
Dewsbury Road
LEEDS
West Yorkshire
LS11 5SX

Dear Mr Baldwin

Herewith report on analysis of bulk material submitted for examination on 10th September, 1999.
Samples taken by Norwest Holst Soil Engineering Limited personnel and analysed by ECOS Environmental, Bradford.

ASBESTOS BULK MATERIAL ANALYSIS

Samples analysed using polarised light optical microscopy with dispersion staining in accordance with a documented in-house procedure based on HSE Method MDHS 77 - Asbestos in Bulk Materials.

The standard analytical method used for asbestos identification cannot give an accurate quantitative value for percentage asbestos content. The following values however may be used to assess the approximate quantity of asbestos present in the sample as submitted to the laboratory.

None Detected - no fibres detected (based on a detection limit of 0.01% by volume)
1 - more than 0.01% but less than 2% by volume
2 - more than 2% but less than 50% by volume
3 - more than 50% by volume

SAMPLE REF:	TYPE OF ASBESTOS FIBRE DETECTED				NON-ASBESTOS FIBRES
	CHRYSOTILE (WHITE)	AMOSITE (BROWN)	CROCIDOLITE (BLUE)	OTHER AMPHIBOLE ASBESTOS FIBRES	
TP43 (0.50M) ECOS ref: S9920442	None Detected	None Detected	None Detected	None Detected	None Detected
TP43 (1.00M) ECOS ref: S9920443	None Detected	None Detected	None Detected	None Detected	None Detected
TP44 (0.50M) ECOS ref: S9920447	None Detected	None Detected	None Detected	None Detected	None Detected

SAMPLE REF:	TYPE OF ASBESTOS FIBRE DETECTED				NON-ASBESTOS FIBRES
	CHRYSOTILE (WHITE)	AMOSITE (BROWN)	CROCIDOLITE (BLUE)	OTHER AMPHIBOLE ASBESTOS FIBRES	
TP44 (1.00M) ECOS ref: S9920448	None Detected	None Detected	None Detected	None Detected	None Detected.
TP45 (0.50M) ECOS ref: S9920451	None Detected	None Detected	None Detected	None Detected	Present
TP45 (1.00M) ECOS ref: S9920452	None Detected	None Detected	None Detected	None Detected	Present
TP46 (0.50M) ECOS ref: S9920456	None Detected	None Detected	None Detected	None Detected	None Detected
TP46 (1.00M) ECOS ref: S9920457	None Detected	None Detected	None Detected	None Detected	None Detected
TP47 (0.50M) ECOS ref: S9920460	None Detected	None Detected	None Detected	None Detected	Present
TP48 (0.50M) ECOS ref: S9920465	None Detected	None Detected	None Detected	None Detected	Present

Yours sincerely,

R. Webster

Note: Any opinions or interpretation of test results expressed herein are outside the scope of the testing laboratorys NAMAS accreditation. The testing laboratory does not accept responsibility for the competency of personnel other than its own staff or for the condition or suitability of test samples submitted to the laboratory by a third party.

Site: NEW ISLINGTON, MANCHESTER

Job No: SI 7890

Client: Martin Stockley Associates

Date: July 2002

CONTAMINATION TEST RESULTS - SOILS

DETERMINAND	Depth (m)	TH130 1.00	TH130 3.00	TH131 1.50	TH131 2.00	TH132 0.50	TH132 1.30	TH134 0.50	TH134 2.90
Arsenic	mg/Kg	66	40	-	20	26	8	44	8
Cadmium	mg/Kg	<1.0	<1.0	-	<1.0	<1.0	<1.0	<1.0	<1.0
Chromium	mg/Kg	19	15	-	13	12	20	19	14
Chromium VI	mg/Kg	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1
Copper	mg/Kg	245	154	-	88	149	6	225	18
Lead	mg/Kg	933	344	-	138	102	13	462	8
Mercury	mg/Kg	3.3	1.2	-	0.32	0.24	<0.10	1.1	<0.10
Nickel	mg/Kg	54	40	-	33	45	14	52	27
Selenium	mg/Kg	<3	<3	-	<3	<3	<3	<3	<3
Water Soluble Boron	mg/Kg	1.5	2.2	-	1.1	0.4	0.4	0.5	0.3
Zinc	mg/Kg	170	93	-	78	63	40	276	53
Ammonia as NH4	mg/Kg	-	-	-	-	-	-	-	-
Chloride	mg/Kg	-	-	-	-	-	-	-	-
Complex Cyanide	mg/Kg	<1	<1	-	<1	<1	<1	<1	<1
Electrical Conductivity	uS/cm	-	-	-	-	-	-	-	-
Free Cyanide	mg/Kg	<1	<1	-	<1	<1	<1	<1	<1
pH		7.6	7.5	-	7.6	7.8	7.5	7.9	8.2
Sulphide	mg/Kg	91	4.2	-	91	2.6	1.4	2.5	0.6
Thiocyanate	mg/Kg	<20	<20	-	<20	<20	<20	<20	<20
Total Cyanide	mg/Kg	<1	<1	-	<1	<1	<1	<1	<1
Total Sulphate	% SO4	0.26	0.25	-	0.08	0.05	<0.01	0.13	0.06
Total Sulphur	% S	0.26	0.46	-	0.26	0.18	0.06	0.21	0.08
Water Soluble Sulphate	g/L SO4	0.64	0.63	-	0.17	0.06	0.04	0.25	0.07
Monohydric Phenols	mg/Kg	<1	<1	-	<1	<1	<1	<1	<1
PAHs (16 by GC)	mg/Kg	64	11	-	<10	<10	<10	69	<10
Total PCBs(GC)	mg/Kg	<3	-	-	-	-	-	-	-
TPH/GC	mg/kg	*236	-	*1260	-	-	-	-	-
TPH/GC Characterisation		*No characteristic profile - possibly includes PAH's							

NORTHERN FOUNDATIONS

2002

Site: NEW ISLINGTON, MANCHESTER

Job No: SI 7890

Client: Martin Stockley Associates

Date: July 2002

CONTAMINATION TEST RESULTS - SOILS

DETERMINAND	Depth (m)	TH135 0.50	TH135 1.50	TH136 0.50	TH136 1.50	TH137 0.50	TH138 0.50	TH138 0.30	TH139 0.50
Arsenic	mg/Kg	20	6	11	6	9	8	-	47
Cadmium	mg/Kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	<1.0
Chromium	mg/Kg	33	25	26	21	30	20	-	28
Chromium VI	mg/Kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1
Copper	mg/Kg	100	25	27	16	24	15	-	236
Lead	mg/Kg	361	9	12	6	7	14	-	674
Mercury	mg/Kg	0.62	<0.10	<0.10	<0.10	<0.10	<0.10	-	1.5
Nickel	mg/Kg	46	47	49	34	47	21	-	39
Selenium	mg/Kg	<3	<3	<3	<3	<3	34	-	<3
Water Soluble Boron	mg/Kg	0.7	0.1	0.5	0.1	0.1	0.5	-	1.0
Zinc	mg/Kg	299	71	66	51	62	59	-	484
Ammonia as NH4	mg/Kg	-	-	-	-	-	-	-	-
Chloride	mg/Kg	-	-	-	-	-	-	-	-
Complex Cyanide	mg/Kg	<1	<1	<1	<1	<1	<1	-	<1
Electrical Conductivity	uS/cm	-	-	-	-	-	-	-	-
Free Cyanide	mg/Kg	<1	<1	<1	<1	<1	<1	-	<1
pH		8.2	8.4	8.0	8.4	8.2	8.0	-	7.9
Sulphide	mg/Kg	2.0	0.5	0.7	0.6	0.5	0.5	-	1.3
Thiocyanate	mg/Kg	<20	<20	<20	<20	<20	<20	-	<20
Total Cyanide	mg/Kg	<1	<1	<1	<1	<1	<1	-	<1
Total Sulphate	% SO4	0.22	0.05	0.04	0.05	0.04	0.03	-	0.53
Total Sulphur	% S	0.13	0.06	0.05	0.08	0.07	0.05	-	0.26
Water Soluble Sulphate	g/L SO4	0.30	0.03	0.04	0.06	0.07	0.04	-	1.4
Monohydric Phenols	mg/Kg	<1	<1	<1	<1	<1	<1	-	<1
PAHs (16 by GC)	mg/Kg	26	<10	<10	<10	<10	<10	-	91
Total PCBs(GC)	mg/Kg	-	-	-	-	-	<0.30	-	-
TPH/GC	mg/kg	-	-	-	-	-	-	<10	*420
TPH/GC Characterisation	*No characteristic profile - possibly includes PAH's								

NORTHERN FOUNDATIONS

Site: NEW ISLINGTON, MANCHESTER

Job No: SI 7890

Client: Martin Stockley Associates

Date: July 2002

CONTAMINATION TEST RESULTS - SOILS

DETERMINAND	Depth (m)	TH139 1.80	BH116 0.50	BH116 3.20-3.65	BH117 0.50	BH118 2.00
Arsenic	mg/Kg	18	20	13	19	22
Cadmium	mg/Kg	<1.0	<1.0	<1.0	<1.0	<1.0
Chromium	mg/Kg	31	9	38	14	30
Chromium VI	mg/Kg	<0.1	<0.1	<0.1	<0.1	<0.1
Copper	mg/Kg	57	195	26	127	50
Lead	mg/Kg	76	382	11	180	53
Mercury	mg/Kg	0.66	0.39	<0.10	0.56	0.14
Nickel	mg/Kg	50	21	55	25	47
Selenium	mg/Kg	<3	<3	<3	<3	<3
Water Soluble Boron	mg/Kg	0.9	0.2	0.2	0.5	0.6
Zinc	mg/Kg	105	136	75	97	80
Ammonia as NH4	mg/Kg	1.30	-	-	-	-
Chloride	mg/Kg	10.70	-	-	-	-
Complex Cyanide	mg/Kg	<1	<1	<1	<1	<1
Electrical Conductivity	uS/cm	2890	-	-	-	-
Free Cyanide	mg/Kg	<1	<1	<1	<1	<1
pH		7.9	8.1	8.4	8.2	8.3
Sulphide	mg/Kg	<0.5	3.5	0.5	1.4	0.6
Thiocyanate	mg/Kg	<20	<20	<20	<20	<20
Total Cyanide	mg/Kg	<1	<1	<1	<1	<1
Total Sulphate	% SO4	0.16	0.12	0.07	0.09	0.11
Total Sulphur	% S	0.13	0.14	0.07	0.16	0.16
Water Soluble Sulphate	g/L SO4	0.41	0.04	0.10	0.10	0.11
Monohydric Phenols	mg/Kg	<1	<1	<1	9	<1
PAHs (16 by GC)	mg/Kg	<10	16	<10	2,428	11
Total PCBs(GC)	mg/Kg	-	-	-	-	-
TPH/GC	mg/kg	-	-	-	*16200	-
TPH/GC Characterisation		*No characteristic profile - possibly includes PAH's				

NORTHERN FOUNDATIONS

Edge 2004

IAN FARMER ASSOCIATES
Geotechnical & Environmental Specialists

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Ian Farmer Associates
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Deeside
Flintshire
CH5 3DJ

14th January 2004

FAO Tim Downes

TEST REPORT - 8448

Site	Manchester Millenium Village
Your ref	4374
Samples received	37 soils, 2 waters
Date received	16th December 2003
Authorised by	B. Dainter **B Dainter BSc (Hons) Technical Manager**

constructionline

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AGS ASSOCIATION OF GEOTECHNICAL & GEOENVIRONMENTAL SPECIALISTS

UKAS TESTING
No. 1464

Soil Report 8448 **Site** Manchester Mil ium Village 4374

				Sample type	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil
				Laboratory reference	1	2	3	4	5	6	7	8	9	10
				Borehole/trial pit	BH201	BH202	BH203	BH204	BH207	BH208	BH212	BH213	BH214	TP202
				Depth (m)	0.50	3.00	1.00	2.00	2.00	2.00	1.20	0.00	1.00	0.50
Test	**Units**	**Method**	**As**											
Asbestos	presence	137			-	-	-	-	-	-	-	-	-	-
Arsenic (total)	mg/kg	122	As		42	60	15	27	9	12	14	24	18	-
Boron (water sol	mg/kg	124	B		2.3	2.9	0.26	0.78	0.29	0.91	1.2	0.32	1.1	-
Cadmium (total)	mg/kg	122	Cd		<0.50	0.71	0.57	1.6	<0.50	1.2	0.59	1.1	0.69	-
Chromium (total	mg/kg	122	Cr		25	21	18	34	35	16	26	36	23	-
Chromium (VI)*	mg/kg	127	Cr		-	-	-	0.28	<0.10	-	<0.10	<0.10	-	-
Copper (total)	mg/kg	122	Cu		66	280	66	140	46	150	74	110	99	-
Lead (total)	mg/kg	122	Pb		220	440	410	250	21	790	320	1200	320	-
Mercury (total)	mg/kg	122	Hg		<1.0	3.6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Nickel (total)	mg/kg	122	Ni		36	55	23	43	50	22	37	23	32	-
Selenium (total)	mg/kg	122	Se		1.1	1.6	<1.0	1.4	<1.0	<1.0	1.2	<1.0	<1.0	-
Zinc (total)	mg/kg	122	Zn		130	130	120	1000	64	740	150	280	250	-
Cyanide (total)	mg/kg	125	CN		<1.0	1.4	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.2	-
Cyanide (free)	mg/kg	125	CN		-	-	-	-	-	-	-	-	-	-
Cyanide (complex)	mg/kg	125	CN		-	-	-	-	-	-	-	-	-	-
Thiocyanate	mg/kg	132	SCN		-	-	-	-	-	-	-	-	-	-
Phenol (total)	mg/kg	120	PhOH		<0.5	2.5	1.9	<0.5	<0.5	<0.5	<0.5	0.51	<0.5	-
pH	pH units	119	pH		8.1	8.2	8.8	8.7	8.8	10.1	9.5	8.8	8.3	-
Sulphate (total)	mg/kg	123	SO4		6000	1600	250	560	350	6800	1200	690	748	-
Sulphide (total)	mg/kg	121	S2-		<10	21	<10	<10	<10	<10	<10	<10	<10	-
PAH (total)	mg/kg	126			<5.0	32	170	49	<5.0	19	<5.0	450	20	-
Sulphur (free)	mg/kg	sub	S		<100	7000	<100	140	<100	<100	130	<100	140	-
TPH (C10-40)	mg/kg	133	TPH		-	-	-	-	-	-	-	-	-	-
PCB	mg/kg	sub	PCB		-	-	-	-	-	-	-	-	-	0.28

* test not UKAS accredited

Checked and Issued By B. Dainter B Dainter Technical Manager

Date 11/2/04

Soil Report 8448 Site Manchester Mil ium Village 4374

				Sample type	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil
				Laboratory reference	11	12	13	14	15	16	17	18	19	20
				Borehole/trial pit	TP202	TP204	TP204	TP204	TP204	TP205	TP206	TP207	TP208	TP208
				Depth (m)	1.00	0.30	2.00	2.60	3.00	0.90	0.50	0.60	0.15	2.30
Test	Units	Method	As											
Asbestos	presence	137		-	-	-	-	-	-	-	-	-	-
Arsenic (total)	mg/kg	122	As	6.7	-	140	-	13	6	10	33	25	130
Boron (water sol	mg/kg	124	B	0.24	-	2	-	1.4	1.8	2.1	1.5	0.44	1.8
Cadmium (total)	mg/kg	122	Cd	<0.50	-	2.4	-	<0.50	<0.50	0.63	0.96	1.0	3.9
Chromium (total	mg/kg	122	Cr	32	-	28	-	42	11	17	16	26	48
Chromium (VI)*	mg/kg	127	Cr	<0.10	-	<0.10	-	<0.10	-	-	-	<0.10	5.4
Copper (total)	mg/kg	122	Cu	36	-	220	-	62	21	92	240	120	580
Lead (total)	mg/kg	122	Pb	18	-	510	-	79	39	130	850	310	800
Mercury (total)	mg/kg	122	Hg	<1.0	-	<1.0	-	<1.0	<1.0	<1.0	<1.0	<1.0	2.3
Nickel (total)	mg/kg	122	Ni	42	-	110	-	54	14	32	86	39	59
Selenium (total)	mg/kg	122	Se	<1.0	-	4.1	-	<1.0	<1.0	1.1	<1.0	<1.0	3.3
Zinc (total)	mg/kg	122	Zn	55	-	390	-	72	52	59	94	190	3200
Cyanide (total)	mg/kg	125	CN	1.0	-	1.0	-	1.4	1.0	3.8	<1.0	<1.0	13
Cyanide (free)	mg/kg	125	CN	-	-	-	-	-	-	-	-	-	-
Cyanide (complex)	mg/kg	125	CN	-	-	-	-	-	-	-	-	-	-
Thiocyanate	mg/kg	132	SCN	-	-	-	-	-	-	-	-	-	-
Phenol (total)	mg/kg	120	PhOH	<0.5	-	<0.5	-	0.98	<0.5	1.0	<0.5	0.56	3.1
pH	pH units	119	pH	8.8	-	8.3	-	8.3	7.7	6.7	-	8.3	7.0
Sulphate (total)	mg/kg	123	SO4	230	-	2600	-	1100	230	2000	<200	<200	1500
Sulphide (total)	mg/kg	121	S2-	<10	-	<10	-	13	16	<10	<10	<10	43
PAH (total)	mg/kg	126		<5.0	<5.0	<5.0	14	<5.0	<5.0	<5.0	250	180	1000
Sulphur (free)	mg/kg	sub	S	<100	-	<100	-	190	<100	2000	-	<100	1400
TPH (C10-40)	mg/kg	133	TPH	-	<50	<50	2000	-	-	-	5400	-	
PCB	mg/kg	sub	PCB	-	-	-	<0.10	-	-	-	-	-	-

* test not UKAS accredited

Checked and Issued By B. Dainter B Dainter Technical Manager

Date 11/2/04

APPENDIX E

ATRISK SSVs

Author	Atkins
Revision	3
Date	31/03/2011
Title	**SSVs derived using CLEA for 1% SOM, sand soil type, Residential without the consumption of homegrown produce land use**

PLEASE NOTE
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Compound	SSV mg/kg	Notes
1,1,1-Trichloroethane	2.25	
1,1,1,2-Tetrachloroethane	0.379	
1,1,2,2-Tetrachloroethane	0.951	
1,1,2-Trichloroethane	0.302	
1,1-Dichloroethane	0.839	
1,1-Dichloroethene	0.0861	
1,2-Dichloroethane	0.00204	
1,2,4-Trimethylbenzene	1.42	
1,2-Dichloropropane	0.00785	
2,4-Dichloro-o-cresol	1500	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 861 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
2,4-Dimethylphenol	123	The dermal approach published by EIC has been followed. In the phenol SGV report, additional consideration was given to localised dermal effects. This may be applicable to phenol derivatives but has not been considered.
2,4-Dinitrotoluene	167	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 132 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
2,6-bis(1,1-dimethyl)-4-(1-methylpropyl)-phenol	72.3	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 18.7 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
2,6-Dinitrotoluene	74.5	
2-Chloronaphthalene	1.42	
2-Methylphenol	3310	The dermal approach published by EIC has been followed. In the phenol SGV report, additional consideration was given to localised dermal effects. This may be applicable to phenol derivatives but has not been considered. Users must consider total exposure from all methylphenol isomers and not consider them in isolation. In line with the approach published by EIC when assessing total cresols, the lowest SSV of each methylphenol isomer may be chosen to compare to the total methylphenol concentration.
3-Methylphenol	4220	The dermal approach published by EIC has been followed. In the phenol SGV report, additional consideration was given to localised dermal effects. This may be applicable to phenol derivatives but has not been considered. Users must consider total exposure from all methylphenol isomers and not consider them in isolation. In line with the approach published by EIC when assessing total cresols, the lowest SSV of each methylphenol isomer may be chosen to compare to the total methylphenol concentration.
4-Methylphenol	3400	The dermal approach published by EIC has been followed. In the phenol SGV report, additional consideration was given to localised dermal effects. This may be applicable to phenol derivatives but has not been considered. Users must consider total exposure from all methylphenol isomers and not consider them in isolation. In line with the approach published by EIC when assessing total cresols, the lowest SSV of each methylphenol isomer may be chosen to compare to the total methylphenol concentration.
Acenaphthene	4710	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 157 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Anthracene	22000	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 3.48 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Antimony	394	
Arsenic	35.0	Derived considering comparison of the oral and dermal exposure routes with the oral index dose as per information within the Environment Agency Arsenic SGV report published in May 2009.
Barium	1340	
Benzene	0.0925	Based on information within Environment Agency benzene SGVs published in March 2009.

Author	Atkins
Revision	3
Date	31/03/2011
Title	**SSVs derived using CLEA for 1% SOM, sand soil type, Residential without the consumption of homegrown produce land use**

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Compound	SSV mg/kg	Notes
Benzo(a)anthracene	5.42	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 1.71 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Benzo(a)pyrene	0.989	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 0.911 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Benzo(b)fluoranthene	9.68	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 1.22 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Benzo(g,h,i)perylene	102	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 0.0187 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Benzo(k)fluoranthene	99.7	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 0.686 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Beryllium	94.7	
Biphenyl	3240	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 34.1 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Bis (2-ethylhexyl) phthalate	2670	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 8.66 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value. In line with the EIC report section 3.7, where the toxicity effects are the same, the potential additivity of phthalates should be considered by assessors when using the SSV for these substances. Guidance on additivity is provided in the Environment Agency for England and Wales SR2 document.
Bromobenzene	0.324	
Bromodichloromethane	0.00637	
Bromoform	1.82	
Butyl benzyl phthalate	42100	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 26.1 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value. In line with the EIC report section 3.7, where the toxicity effects are the same, the potential additivity of phthalates should be considered by assessors when using the SSV for these substances. Guidance on additivity is provided in the Environment Agency for England and Wales SR2 document.
Cadmium	83.6	Based on information within the Environment Agency Cadmium SGV report published in July 2009. This assumes a lifetime exposure.

Author Atkins
Revision 3
Date 31/03/2011

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Compound	SSV mg/kg	Notes
Carbon disulphide	0.0740	
Carbon tetrachloride	0.00658	
Chlorobenzene	3.71	
Chloroethane	3.06	
Chloroform / Trichloromethane	0.332	
Chloromethane	0.00304	
Chromium III	15500	
Chromium VI	38.2	
Chrysene	852	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 0.440 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Cis-1,2-dichloroethene	0.0403	
Copper	8370	
Cyanide	34.0	Based on acute exposure for a 0-6 year old child, using 5th percentile bodyweight from CLR10. Information is not available in SR3 and supporting documents regarding the 5th percentile bodyweight of SR3 bodyweight data. It is not considered likely that new data would significantly affect the SSV.
DDD	43.4	
Dibenz(a,h)anthracene	0.949	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 0.00393 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Dibromochloromethane	0.0657	
Dichloromethane	0.686	
Diethyl phthalate	17300	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 12.8 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value. In line with the EIC report section 3.7, where the toxicity effects are the same, the potential additivity of phthalates should be considered by assessors when using the SSV for these substances. Guidance on additivity is provided in the Environment Agency for England and Wales SR2 document.
Di-n-butyl phthalate	445	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated by CLEA, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 4.62 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value. In line with the approach published by the EIC, the lower of the oral and inhalation assessment criteria has been selected. In line with the EIC report section 3.7, where the toxicity effects are the same, the potential additivity of phthalates should be considered by assessors when using the SSV for these substances. Guidance on additivity is provided in the Environment Agency for England and Wales SR2 document.
Di-n-octyl phthalate	3390	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 32.6 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value. In line with the EIC report section 3.7, where the toxicity effects are the same, the potential additivity of phthalates should be considered by assessors when using the SSV for these substances. Guidance on additivity is provided in the Environment Agency for England and Wales SR2 document.
Dinoseb	0.0611	
Ethylbenzene	59.7	Based on information within Environment Agency ethylbenzene SGVs published in March 2009.

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Compound	SSV mg/kg	Notes
Fluoranthene	3110	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 18.9 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Fluorene	3180	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 125 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Formaldehyde	2.39	
Hexachloroethane	0.0767	
Indeno(1,2,3-c,d)pyrene	9.53	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 0.0614 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Iso-propylbenzene	41.0	
Lead	383	
Mercury (elemental)	0.0607	Based on inhalation exposure only as per information within the Environment Agency Mercury SGV report published in March 2009.
Mercury (inorganic)	238	Based on information within the Environment Agency Mercury SGV report published in March 2009.
Mercury (methyl)	7.00	Based on information within the Environment Agency Mercury SGV report published in March 2009.
Methyl tert-butyl ether	23.4	
Molybdenum	673	
m-Xylene	19.7	Based on information within Environment Agency xylene SGVs published in March 2009. Users must consider total exposure from all xylene isomers and not consider them in isolation. The lowest SSV of each isomer may be chosen to compare to the total xylene concentration.
Naphthalene	0.598	
Nickel	130	The value presented is the Environment Agency Nickel SGV for residential with homegrown produce published in May 2009 which is the same as the rounded SSV derived for residential without homegrown produce. The oral assessment criterion is based on all routes of exposure compared to the oral HCV and the inhalation assessment criterion is based on inhalation exposure compared to the inhalation HCV. The lowest assessment criterion is chosen as the SSV. In line with the rounding presented by the Environment Agency for the Cadmium SGV, the derived value of 1.27E+02 mg/kg is rounded to 1.30E+2 mg/kg to avoid the residential without homegorwn produce appearing to have a lower SSV than the residential with homegrown produce SGV. The SGV is based on inhalation exposure only and will not change with soil type or SOM.
Nicotine	17.2	
o-Xylene	21.1	Based on information within Environment Agency xylene SGVs published in March 2009. Users must consider total exposure from all xylene isomers and not consider them in isolation. The lowest SSV of each isomer may be chosen to compare to the total xylene concentration.
Phenol	262	Based on information within the Environment Agency Phenol SGV report published in July 2009. Derived by comparing oral exposure to the oral HCV and inhalation and dermal exposure to the inhalation HCV.
Prochloraz	296	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 0.116 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
Propylbenzene	139	
p-Xylene	18.9	Based on information within Environment Agency xylene SGVs published in March 2009. Users must consider total exposure from all xylene isomers and not consider them in isolation. The lowest SSV of each isomer may be chosen to compare to the total xylene concentration.
Pyrene	2330	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the combined assessment criterion calculated by the CLEA software, assuming that free phase product is not present. The inhalation of vapour pathway contributes less than 10% of total exposure which is unlikely to significantly affect the SSV. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 2.20 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.

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Compound	SSV mg/kg	Notes
Selenium	595	Based on information within the Environment Agency Selenium SGV report published in March 2009.
Styrene	115	
Sum of PCDDs, PCDFs and dioxin-like PCBs	No SSV. Due to publication of the Dioxins, Furans and Dioxin-like PCB SGVs in September 2009, please see the Frequently Asked Questions for more information.	
Tetrachloroethene	0.476	
Toluene	219	Based on information within Environment Agency toluene SGVs published in March 2009.
TPH aliphatic C10-C12	1750	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 49.9 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
TPH aliphatic C12-C16	5210	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 21.0 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value
TPH aliphatic C16-C35	146000	This fraction is not considered volatile and the inhalation of vapour pathways have not been considered (TPHCWG, 1997).
TPH aliphatic C5-C6	30.2	
TPH aliphatic C6-C8	70.0	
TPH aliphatic C8-C10	9.80	
TPH aromatic C10-C12	97.7	
TPH aromatic C12-C16	1800	The lower of the aqueous or vapour based saturation limits has been exceeded in the calculation. The SSV presented is the assessment criterion calculated using the approach outlined within SR4, assuming that free product is not present. Users may wish to consider the fact that the lower of the aqueous or vapour based saturation limits is 155 mg/kg and should confirm that free phase product is not observed where measured concentrations exceed this value.
TPH aromatic C16-C21	1330	This fraction is not considered volatile and the inhalation of vapour pathways have not been considered (TPHCWG, 1997).
TPH aromatic C21-C35	1330	This fraction is not considered volatile and the inhalation of vapour pathways have not been considered (TPHCWG, 1997).
TPH aromatic C5-C7	0.0925	Benzene is the only consituent of this fraction (TPHCWG 1997). Based on information within the Environment Agency benzene SGVs published in March 2009.
TPH aromatic C7-C8	219	Toluene is the only consituent of this fraction (TPHCWG 1997). Based on information within the Environment Agency toluene SGVs published in March 2009.
TPH aromatic C8-C10	16.0	
Trans-1,2-dichloroethene	0.0678	
Tributyl tin oxide	1.52	
Trichloroethene	0.0387	
Trichloromethylbenzene	0.000206	
Vanadium	352	
Vinyl chloride	0.000215	
Zinc	46800	

Note:
All values provided are rounded to 3 significant figures.
It is noted for some compounds that the SR4 calculated assessment criterion is sufficiently high that free product is likely to be encountered.
In some instances the risk based value may be lower than the laboratory detection limit. Please see the Frequently Asked Questions for more advice.

APPENDIX F

WATER/LEACHING TEST LABORATORY ANALYSIS RESULTS

PF 1999

Analytical Test Report
For

NORWEST HOLST SOIL ENGINEERING LIMITED
Parkside Lane
Dewsbury Road
LEEDS
West Yorkshire
LS11 5SX

PROJECT ID: ANCOATS - ASHTON & ROCHDALE CANALS.

Report No.: R99/1953

Copies To:
Mr M Baldwin
File

ECOS ENVIRONMENTAL

0618
0618 SI

What's so special about a NAMAS report or certificate?

- NAMAS is the acronym for National Accreditation of Measurement and Sampling.
- Accreditation of NAMAS testing is granted by the United Kingdom Accreditation Service (UKAS).
- It's your assurance that the work has been carried out to the highest standards.
- The laboratory issuing the test report has been stringently assessed by independent experts.
- You are assured that the agreed or specified methods and procedures have been followed.
- Measurements are traceable to national and international standards.

Comments:
Tests marked † in this report are not included in the NAMAS Accreditation Schedule for the testing laboratory. However, with the continuing development of our QC protocols, these tests will be included in the near future.
Any opinions and interpretations expressed herein are outside the scope of the testing laboratory's NAMAS Accreditation.
Coefficient of Variation (CV_T) is better than 15%

Date submitted for analysis : 13/09/99

Your Job/Order Number : F11483

Analyst(s) : MRH NB NSP ELS DS AA AW MB RDB NAA

Approved signatories: J R Brown, G Ewbank, E Sharp

Signature : R. Brown

Report date : 27 September 1999

QA APPROVED
SIGNED.. Fraser Clydesdale
DATE.. 27/9/99

WATER

ANALYTE	METHOD OF DETECTION	LIMIT OF DETECTION
Arsenic	AAS-HYDRIDE	1.0 ug/l
Cadmium	GF-AAS	0.1 ug/l
Chromium	ICP-OES	0.01 mg/l
Chromium (hexavalent)	ICP-OES	0.01 mg/l
Lead	ICP-OES	0.03 mg/l
Mercury	AAS-HYDRIDE	0.1 ug/l
Selenium	AAS-HYDRIDE	1.0 ug/l
Boron	ICP-OES	0.01 mg/l
Copper	ICP-OES	0.01 mg/l
Nickel	ICP-OES	0.01 mg/l
Zinc	ICP-OES	0.01 mg/l
Phenols	Colorimetry	0.01 mg/l
Cyanide (free)	Colorimetry	0.01 mg/l
Cyanide (complex)	Colorimetry	0.01 mg/l
Cyanide (total)	Colorimetry	0.01 mg/l
Thiocyanate	Colorimetry	0.1 mg/l
Sulphate	HPLC-IC	1 mg/l
Sulphide	Colorimetry	0.1 mg/l
Sulphur	HPLC-UV	10 mg/l
pH	pH-meter	N/A
Chloride	HPLC-IC	1 mg/l
Ammoniacal Nitrogen	Colorimetry	0.5 mg/l
Nitrate Nitrogen	HPLC-IC	1.0 mg/l
TOC	Colorimetry	0.1 %
TPH	GC-FID	0.01 mg/l
Acenaphthene	GC-FID	0.01 mg/l
Acenaphthylene	GC-FID	0.01 mg/l
Anthracene	GC-FID	0.01 mg/l
Benz(a)anthracene	GC-FID	0.01 mg/l
Benzo(b)fluoranthene	GC-FID	0.01 mg/l
Benzo(k)fluoranthene	GC-FID	0.01 mg/l
Benzo(g,h,i)perylene	GC-FID	0.01 mg/l
Benzo(a)pyrene	GC-FID	0.01 mg/l
Chrysene	GC-FID	0.01 mg/l
Dibenz(a,h)anthracene	GC-FID	0.01 mg/l
Fluoranthene	GC-FID	0.01 mg/l
Fluorene	GC-FID	0.01 mg/l
Indeno(1,2,3-cd)pyrene	GC-FID	0.01 mg/l
Naphthalene	GC-FID	0.01 mg/l
Phenanthrene	GC-FID	0.01 mg/l
Pyrene	GC-FID	0.01 mg/l
TBT	GC-MS	0.01 mg/l

Summary Of Results
Norwest Holst Soil Engineering Limited - Ancoats - Ashton & Rochdale Canals.

ANALYTES	UNITS	A1	A2	A3	R1	R2	R3	R4						
		S9920898	S9920899	S9920901	S9920902	S9920903	S9920904	S9920905						
Chloride	mg/l	13	16	14	32	28	29	28	#	#	#	#	#	
Ammoniacal Nitrogen	mg/l	0.7	<0.5	<0.5	<0.5	<0.5	0.5	0.5	#	#	#	#	#	†
Nitrate Nitrogen	mg/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	#	#	#	#	#	†
TOC	%	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	#	#	#	#	#	†
TPH	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	#	#	#	#	#	†
Acenaphthene	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	#	#	#	#	#	†
Acenaphthylene	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	#	#	#	#	#	†
Anthracene	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	#	#	#	#	#	†
Benz(a)anthracene	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	#	#	#	#	#	†
Benzo(b)fluoranthene	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	#	#	#	#	#	†
Benzo(k)fluoranthene	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	#	#	#	#	#	†
Benzo(g,h,i)perylene	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	#	#	#	#	#	†
Benzo(a)pyrene	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	#	#	#	#	#	†
Chrysene	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	#	#	#	#	#	†
Dibenz(a,h)anthracene	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	#	#	#	#	#	†
Fluoranthene	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	#	#	#	#	#	†
Fluorene	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	#	#	#	#	#	†
Indeno(1,2,3-cd)pyrene	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	#	#	#	#	#	†
Naphthalene	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	#	#	#	#	#	†
Phenanthrene	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	#	#	#	#	#	†

diff to soil

Special PAH.
Inorganic Suite

Water samples analysed as received
: Analyte not requested

Summary Of Results
Norwest Holst Soil Engineering Limited - Ancoats - Ashton & Rochdale Canals.

ANALYTES	UNITS	A1	A2	A3	R1	R2	R3	R4					
		S9920898	S9920899	S9920901	S9920902	S9920903	S9920904	S9920905					
Arsenic	ug/l	2.0	1.8	1.6	1.2	1.0	2.2	<1.0	#	#	#	#	#
Cadmium	ug/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	#	#	#	#	#
Chromium	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	#	#	#	#	#
Chromium (hexavalent)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	#	#	#	#	#
Lead	mg/l	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	#	#	#	#	#
Mercury	ug/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	#	#	#	#	#
Selenium	ug/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	#	#	#	#	#
Boron	mg/l	0.03	0.03	0.03	0.02	0.02	0.02	0.02	#	#	#	#	#
Copper	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	#	#	#	#	#
Nickel	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	#	#	#	#	#
Zinc	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	#	#	#	#	#
Phenols	mg/l	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	#	#	#	#	#
Cyanide (free)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	#	#	#	#	#
Cyanide (complex)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	0.10	<0.01	#	#	#	#	#
Cyanide (total)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	0.10	<0.01	#	#	#	#	#
Thiocyanate	mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	#	#	#	#	#
Sulphate	mg/l	23	24	24	23	21	26	21	#	#	#	#	#
Sulphide	mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	#	#	#	#	#
Sulphur	mg/l	<10	<10	<10	<10	<10	<10	<10	#	#	#	#	#
pH	N/A	7.0	7.3	7.5	7.5	7.4	7.6	7.5	#	#	#	#	#

Water samples analysed as received
: Analyte not requested

Summary Of Results
Norwest Holst Soil Engineering Limited - Ancoats - Ashton & Rochdale Canals.

ANALYTES	UNITS	A1	A2	A3	R1	R2	R3	R4						
		S9920898	S9920899	S9920901	S9920902	S9920903	S9920904	S9920905						
Pyrene	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	#	#	#	#	#	†
TBT	mg/l	#	#	#	#	<0.01	#	#	#	#	#	#	#	†

Water samples analysed as received
: Analyte not requested

0618
0618 SI

What's so special about a NAMAS report or certificate?

- NAMAS is the acronym for National Accreditation of Measurement and Sampling.
- Accreditation of NAMAS testing is granted by the United Kingdom Accreditation Service (UKAS).
- It's your assurance that the work has been carried out to the highest standards.
- The laboratory issuing the test report has been stringently assessed by independent experts.
- You are assured that the agreed or specified methods and procedures have been followed.
- Measurements are traceable to national and international standards.

Comments:
Tests marked † in this report are not included in the NAMAS Accreditation Schedule for the testing laboratory. However, with the continuing development of our QC protocols, these tests will be included in the near future.
Any opinions and interpretations expressed herein are outside the scope of the testing laboratory's NAMAS Accreditation.
Coefficient of Variation (CV_T) is better than 15%

Date submitted for analysis : 09/09/99

Your Job/Order Number : F11483

Analyst(s) : MRH ELS NB AA NSP DS ML AW

Approved signatories: J R Brown, G Ewbank, E Sharp

Signature : G Ewbank

Report date : 16 September 1999

QA APPROVED
SIGNED.. Fraser Aydenbell
DATE.. 16/9/99

SOIL

ANALYTE	METHOD OF DETECTION	LIMIT OF DETECTION
Arsenic (leachable)	AAS-HYDRIDE	1.0 ug/l
Cadmium (leachable)	GF-AAS	0.1 ug/l
Chromium (hexa) (leachable)	Colorimetry	0.01 mg/l
Chromium (total) (leachable)	ICP-OES	0.01 mg/l
Lead (leachable)	ICP-OES	0.03 mg/l
Mercury (leachable)	AAS-HYDRIDE	0.1 ug/l
Selenium (leachable)	AAS-HYDRIDE	1.0 ug/l
Boron (leachable)	ICP-OES	0.01 mg/l
Copper (leachable)	ICP-OES	0.01 mg/l
Nickel (leachable)	ICP-OES	0.01 mg/l
Zinc (leachable)	ICP-OES	0.01 mg/l
PAH (total) (leachable)	HPLC-UV	1.0 mg/l
Phenols (leachable)	Colorimetry	0.01 mg/l
Cyanide (free) (leachable)	Colorimetry	0.01 mg/l
Cyanide (complex) (leachable)	Colorimetry	0.01 mg/l
Cyanide (total) (leachable)	Colorimetry	0.01 mg/l
Thiocyanate (leachable)	Colorimetry	0.1 mg/l
Sulphate (leachable)	HPLC-IC	1 mg/l
Sulphur (leachable)	HPLC-UV	10 mg/l
Sulphide (leachable)	Colorimetry	0.1 mg/l
pH (leachable)	pH-Meter	N/A

Summary Of Results
Norwest Holst Soil Engineering Limited - Ancoats Manchester, Zone 1

ANALYTES	UNITS	TP37 (0.50m)	TP40 (0.50m)	TP43 (0.50m)	TP45 (1.00m)	TP46 (0.50m)	TP47 (1.00m)	TP50 (0.50m)	TP51 (0.50m)	TP53 (1.00m)				
		S9920501	S9920503	S9920504	S9920505	S9920506	S9920507	S9920508	S9920509	S9920510				
Arsenic (leachable)	ug/l	6.4	4.6	4.9	10.7	2.2	1.6	2.7	3.5	<1.0	#	#	#	
Cadmium (leachable)	ug/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1.2	#	#	#	
Chromium (hexa) (leachable)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	#	#	#	†
Chromium (total) (leachable)	mg/l	<0.01	0.38	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	#	#	#	
Lead (leachable)	mg/l	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	#	#	#	
Mercury (leachable)	ug/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	#	#	#	
Selenium (leachable)	ug/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	#	#	#	
Boron (leachable)	mg/l	0.01	0.04	<0.01	0.06	<0.01	<0.01	<0.01	<0.01	<0.01	#	#	#	
Copper (leachable)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	#	#	#	
Nickel (leachable)	mg/l	<0.01	0.32	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	#	#	#	
Zinc (leachable)	mg/l	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	#	#	#	
PAH (total) (leachable)	mg/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	#	#	#	†
Phenols (leachable)	mg/l	0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	#	#	#	
Cyanide (free) (leachable)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	#	#	#	
Cyanide (complex) (leachable)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	#	#	#	
Cyanide (total) (leachable)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	#	#	#	
Thiocyanate (leachable)	mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	#	#	#	
Sulphate (leachable)	mg/l	78	80	33	1049	2	8	4	3	1	#	#	#	
Sulphur (leachable)	mg/l	<10	<10	<10	<10	<10	<10	<10	<10	<10	#	#	#	†
Sulphide (leachable)	mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	#	#	#	

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

Summary Of Results
Norwest Holst Soil Engineering Limited - Ancoats Manchester, Zone 1

ANALYTES	UNITS	TP37 (0.50m)	TP40 (0.50m)	TP43 (0.50m)	TP45 (1.00m)	TP46 (0.50m)	TP47 (1.00m)	TP50 (0.50m)	TP51 (0.50m)	TP53 (1.00m)			
		S9920501	S9920503	S9920504	S9920505	S9920506	S9920507	S9920508	S9920509	S9920510			
pH (leachable)	N/A	6.8	6.9	7.6	7.7	7.3	7.6	7.6	7.5	7.8	#	#	#

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

2002 (addendum)

Chemical Testing - VOC's - Waters

New Islington
Your Reference:- 7890
Date : March 2003

Sample Ref			BH100	BH119	BH120	BH121	BH122
Detname	Method	Units					
vinyl chloride*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10
11-dichloroethene*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10
dichloromethane*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10
trans-12-dichloroethene*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10
11-dichloroethane*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10
2,2-dichloropropane*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10
cis-12-dichloroethene*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10
bromochloromethane*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10
chloroform*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10
111-trichloroethane*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10
carbon tetrachloride*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10
1,1-dichloropropene*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10
benzene*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10
12-dichloroethane*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10
trichloroethylene*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10
12-dichloropropane*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10
dibromomethane*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10
bromodichloromethane*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10
trans-13-dichloropropene*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10
toluene*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10
cis-13-dichloropropene*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10
112-trichloroethane*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10
tetrachloroethylene*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10
13-dichloropropane*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10
dibromochloromethane*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10
12-dibromoethane*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10
chlorobenzene*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10
1112-tetrachloroethane*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10
ethylbenzene*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10
mp-xylene*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10
o-xylene*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10
styrene*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10
bromoform*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10
isopropylbenzene*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10
bromobenzene*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10
123-trichloropropane*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10
1122-tetrachloroethane*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10
n-propylbenzene*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10
2-chlorotoluene*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10
4-chlorotoluene*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10
135-trimethylbenzene*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10
tert-butylbenzene*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10
124-trimethylbenzene*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10
sec-butylbenzene*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10
13-dichlorobenzene*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10
14-dichlorobenzene*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10
p-isopropyltoluene*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10
12-dichlorobenzene*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10
n-butylbenzene*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10
12-dibromo3chloropropane*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10
135-trichlorobenzene*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10
124-trichlorobenzene*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10
hexachlorobutadiene*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10
123-trichlorobenzene*	VOCW1	µg/l	< 10	< 10	< 10	< 10	< 10

Chemical Testing - Water Analysis

New Islington
Your Reference:- 7890
Date: March 2003

Sample Ref			BH100	BH119	BH120	BH121	BH122
Detname	**Method**	**Units**					
Arsenic (Soluble)*	25C	µg/l	< 10	< 10	< 10	< 10	< 10
Boron (Soluble)*	53	mg/l	0.25	0.10	0.12	0.22	0.13
Cadmium (Soluble)	53	µg/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Chromium (Soluble)	53	µg/l	< 10	< 10	12	< 10	14
Copper (Soluble)	53	µg/l	< 10	< 10	< 10	< 10	< 10
Iron (Soluble)	53	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Lead (Soluble)	53	µg/l	< 10	16	< 10	< 10	< 10
Mercury (Soluble)*	25C	µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Nickel (Soluble)	53	µg/l	< 10	< 10	22	< 10	21
Selenium (Soluble)*	25C	µg/l	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Zinc (Soluble)	53	µg/l	< 10	30	290	< 10	12
Cyanide (Total)*	14A	mg/l	< 0.10	< 0.05	< 0.05	< 0.05	< 0.05
Phenols (Total)	32	mg/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Sulphate as SO4	37	g/l	0.22	< 0.20	0.70	0.37	< 0.20
Sulphide as S	38A	mg/l	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
pH	31	pH units	7.9	7.7	7.3	8.0	7.1
>> TPH SUITE <<*			.	.	.	.	.
TPH by GC (>C6 - C10)*	TPHW2	µg/l	< 100	< 100	< 100	< 100	< 100
TPH by GC (>C10 - C20)*	TPHW2	µg/l	< 100	< 100	< 100	< 100	< 100
TPH by GC (>C20 - C40)*	TPHW2	µg/l	< 100	< 100	< 100	< 100	< 100
TPH by GC (>C6 - C40)*	TPHW2	µg/l	< 100	< 100	< 100	< 100	< 100
PAH (Total)*	PAHW1	µg/l	< 20.00	< 20.00	< 20.00	< 20.00	< 20.00

NORTHERN FOUNDATIONS

Site New Islington, Manchester Job No SI 7890

Client Martin Stockley Associates Date March 2003

WATER LEVEL MONITORING RESULTS

Borehole No.	Response zone (m)	Measured water level	Approximate aOD level	Date of measurement
BH100	24.0 – 36.0	24.00	26.07	13/08/02
(50.07m aOD)		23.99	26.08	21/08/02
		24.00	26.07	22/08/02
		24.00	26.07	03/09/02
		24.00	26.07	23/02/03
		24.00	26.07	01/03/03
BH119	22.0 – 30.0	18.81	29.84	13/08/02
(48.65m aOD)		18.82	29.83	21/08/02
		18.83	29.82	22/08/02
		18.80	29.85	03/09/02
		18.81	29.84	19/09/02
		18.82	29.83	15/02/03
		18.60	30.05	23/02/03

* aOD are approximations based on survey data of nearby S.I. locations

Site: NEW ISLINGTON, MANCHESTER

Job No: SI 7890

Client: Martin Stockley Associates

Date: July 2002

LEACHATE TEST RESULTS

		TH130	TH134	TH136	TH139			
DETERMINAND	Depth (m)	1.00	0.50	0.50	1.80			
Arsenic	mg/L	<0.01	<0.01	<0.01	<0.01			
Boron	mg/L	0.08	<0.07	<0.07	<0.07			
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001			
Chromium	mg/L	<0.01	<0.01	<0.01	<0.01			
Copper	mg/L	<0.01	<0.01	<0.01	<0.01			
Iron	mg/L	0.08	<0.08	<0.08	0.08			
Lead	mg/L	<0.01	<0.01	<0.01	<0.01			
Mercury	mg/L	<0.001	<0.001	<0.001	<0.001			
Nickel	mg/L	<0.01	<0.01	<0.01	<0.01			
Selenium	mg/L	<0.01	<0.01	<0.01	<0.01			
Zinc	mg/L	<0.01	<0.01	<0.01	<0.01			
Ammonia as NH4	mg/L	<0.1	<0.1	<0.1	<0.1			
Chemical Oxygen Demand	mg/L O2	<5.0	<5.0	<5.0	<5.0			
Chloride	mg/L	1.90	0.63	3.10	3.30			
Electrical Conductivity	uS/cm	162	142	502	495			
Free Cyanide	mg/L	<0.050	<0.050	<0.050	<0.050			
pH		7.9	7.9	7.9	7.8			
Sulphate	mg/L	37	22	133	132			
Sulphide	mg/L	<0.05	<0.05	<0.05	<0.05			
Total Cyanide	mg/L	-	-	-	-			
Phenol	ug/L	<0.5	<0.5	<0.6	<0.5			
Cresols	ug/L	<0.5	<0.5	<0.6	<0.5			
Xylenols & Ethylphenols	ug/L	<0.5	<0.5	<0.6	<0.5			
Naphthols	ug/L	<0.5	<0.5	<0.6	<0.5			
Trimethylphenols	ug/L	<0.5	<0.5	<0.6	<0.5			
Total Phenols	ug/L	<2.5	<2.5	<3.0	<2.5			
Benz(b)fluoranthene	ng/L	2.20	3.10	1.20	<1.00			
Benz(k)fluoranthene	ng/L	<1.00	<1.00	<1.00	<1.00			
Benz(a)pyrene	ng/L	2.10	2.70	1.10	<1.00			
Benzo(g,h,i)perylene	ng/L	4.30	3.30	<1.00	<1.00			
Fluoranthene	ng/L	23.00	19.00	21.00	26.00			
Indeno(1,2,3,c,d)pyrene	ng/L	1.90	2.00	<1.00	<1.00			

Site: NEW ISLINGTON, MANCHESTER

Job No: SI 7890

Client: Martin Stockley Associates

Date: July 2002

CONTAMINATION TEST RESULTS - WATER

DETERMINAND	Depth (m)	TH136 0.90	TH135 1.70						
Arsenic	mg/L	0.02	<0.01						
Boron	mg/L	0.07	0.34						
Cadmium	mg/L	<0.002	<0.002						
Chromium	mg/L	<0.01	<0.01						
Chromium VI	mg/L	<0.01	<0.01						
Copper	mg/L	0.02	<0.010						
Lead	mg/L	<0.01	<0.01						
Mercury	mg/L	<0.001	<0.001						
Nickel	mg/L	<0.01	<0.01						
Selenium	mg/L	<0.01	0.03						
Zinc	mg/L	<0.01	0.01						
Complex Cyanide	mg/L	<0.05	<0.05						
Electrical Conductivity	uS/cm	-	-						
Free Cyanide	mg/L	<0.05	<0.05						
pH		8.4	7.4						
Sulphate	mg/L	321.0	1209.0						
Sulphide	mg/L	<0.05	<0.05						
Thiocyanate	mg/L	<0.50	<0.50						
Total Cyanide	mg/L	<0.05	<0.05						
Total Sulphur	mg/L	94	IS						
Monohydric Phenols	mg/L	<0.05	<0.05						
PAHs (16 by GC)	mg/L	<0.04	<0.04						

Site: NEW ISLINGTON, MANCHESTER

Job No: SI 7890

Client: Martin Stockley Associates

Date: August 2002

CONTAMINATION TEST RESULTS - WATER

DETERMINAND	Depth (m)	BH116	BH118	BH119
Arsenic	mg/L	<0.01	<0.01	<0.01
Boron	mg/L	0.09	0.19	<0.07
Cadmium	mg/L	<0.002	<0.002	<0.002
Chromium	mg/L	<0.01	<0.01	<0.01
Copper	mg/L	<0.010	<0.010	<0.010
Lead	mg/L	<0.01	<0.01	<0.01
Mercury	mg/L	<0.001	<0.001	<0.001
Nickel	mg/L	<0.01	<0.01	<0.01
Selenium	mg/L	0.03	0.03	0.01
Zinc	mg/L	<0.01	<0.01	<0.01
Ammoniacal Nitrogen	mg/L	<0.1	<0.1	0.1
Electrical Conductivity	uS/cm	1354	1102	903
pH	-	7.2	7.3	7.1
Sulphate	mg/L	262.0	204.0	105.0
Total Cyanide	mg/L	<0.05	<0.05	<0.05
Target PAHs				
Naphthalene	ug/L	-	<4.0	-
Acenaphthylene	ug/L	-	<4.0	-
Acenaphthene	ug/L	-	<4.0	-
Fluorene	ug/L	-	<4.0	-
Phenanthrene	ug/L	-	<4.0	-
Anthracene	ug/L	-	<4.0	-
Fluoranthene	ug/L	-	<4.0	-
Pyrene	ug/L	-	<4.0	-
Benz(a)anthracene	ug/L	-	<4.0	-
Chrysene	ug/L	-	<4.0	-
Benz(b)fluoranthene	ug/L	-	<4.0	-
Benz(k)fluoranthene	ug/L	-	<4.0	-
Benz(a)pyrene	ug/L	-	<4.0	-
Indeno(1,2,3,c,d)pyrene	ug/L	-	<4.0	-
Dibenz(a,h)anthracene	ug/L	-	<4.0	-
Benzo(g,h,i)perylene	ug/L	-	<4.0	-
TPH/GC	ug/L	-	<50	-

Raised detection limit of PAHs due to dilution.

NORTHERN FOUNDATIONS

Site: NEW ISLINGTON, MANCHESTER

Job No: SI 7890

Client: Martin Stockley Associates

Date: August 2002

CONTAMINATION TEST RESULTS - WATER VOC'S

DETERMINAND	Depth (m)	BH116 -	BH118 -	BH119 -
Dichloromethane	ug/L	<50	<50	<50
Chloroform	ug/L	<2	<2	5
1,1,1-Trichloroethane	ug/L	<2	<2	<2
Carbon tetrachloride	ug/L	<2	<2	<2
Benzene	ug/L	<2	<2	<2
1,2-Dichloroethane	ug/L	<5	<5	<5
Trichloroethene	ug/L	<5	<5	<5
Bromodichloromethane	ug/L	<5	<5	<5
Dibromochloromethane	ug/L	<5	<5	<5
1,1,2,2-Tetrachloroethane	ug/L	<20	<20	<20
Toluene	ug/L	<10	<10	<10
1,1,2-Trichloro-1,2,2-trifluoethane	ug/L	<5	<5	<5
Tetrachloroethene	ug/L	<2	<2	<2
Chlorobenzene	ug/L	<2	<2	<2
Ethylbenzene	ug/L	<2	<2	<2
M/p-Xylene	ug/L	<2	<2	<2
o-Xylene	ug/L	<2	<2	<2
Hexachloro-1,3-butadiene	ug/L	<5	<5	<5
1-Chloro-4-methylbenzene	ug/L	<5	<5	<5
1-Chloro-2-methylbenzene	ug/L	<5	<5	<5
Isopropylbenzene	ug/L	<2	<2	<2
Bromoform	ug/L	<10	<10	<10
Styrene	ug/L	<5	<5	<5
1,2,3-Trichlorobenzene	ug/L	<5	<5	<5
1,2,4-Trichlorobenzene	ug/L	<10	<10	<10
1,2-Dichlorobenzene	ug/L	<2	<2	<2
1,3-Dichlorobenzene	ug/L	<2	<2	<2
1,4-Dichlorobenzene	ug/L	<5	<5	<5
a-Methylstyrene	ug/L	<5	<5	<5
1,1-Dichloroethane	ug/L	<2	<2	<2
1,1,2-Trichloroethane	ug/L	<10	<10	<10
1,1-Dichloroethene	ug/L	<5	<5	<5
trans-1,2-Dichloroethene	ug/L	<5	<5	<5
cis-1,2-Dichloroethene	ug/L	<2	<2	<2
MTBE	ug/L	<2	<2	<2
Vinyl Chloride	ug/L	<5	<5	<5

Site: NEW ISLINGTON, MANCHESTER Job No: SI 7890

Client: Martin Stockley Associates Date: August 2002

CONTAMINATION TEST RESULTS - WATER VOC'S

DETERMINAND	Depth (m)	BH100 -	BH119 -	BH120 -				
Dichloromethane	ug/L	<50	<50	<50				
Chloroform	ug/L	<2	<2	<2				
1,1,1-Trichloroethane	ug/L	<2	<2	<2				
Carbon tetrachloride	ug/L	<2	<2	<2				
Benzene	ug/L	<2	<2	<2				
1,2-Dichloroethane	ug/L	<5	<5	<5				
Trichloroethene	ug/L	<5	<5	<5				
Bromodichloromethane	ug/L	<5	<5	<5				
Dibromochloromethane	ug/L	<5	<5	<5				
1,1,2,2-Tetrachloroethane	ug/L	<20	<20	<20				
Toluene	ug/L	<10	<10	<10				
1,1,2-Trichloro-1,2,2-trifluoethane	ug/L	<5	<5	<5				
Tetrachloroethene	ug/L	<2	<2	<2				
Chlorobenzene	ug/L	<2	<2	<2				
Ethylbenzene	ug/L	<2	<2	<2				
M/p-Xylene	ug/L	<2	<2	<2				
o-Xylene	ug/L	<2	<2	<2				
Hexachloro-1,3-butadiene	ug/L	<5	<5	<5				
1-Chloro-4-methylbenzene	ug/L	<5	<5	<5				
1-Chloro-2-methylbenzene	ug/L	<5	<5	<5				
Isopropylbenzene	ug/L	<2	<2	<2				
Bromoform	ug/L	<10	<10	<10				
Styrene	ug/L	<5	<5	<5				
1,2,3-Trichlorobenzene	ug/L	<5	<5	<5				
1,2,4-Trichlorobenzene	ug/L	<10	<10	<10				
1,2-Dichlorobenzene	ug/L	<2	<2	<2				
1,3-Dichlorobenzene	ug/L	<2	<2	<2				
1,4-Dichlorobenzene	ug/L	<5	<5	<5				
a-Methylstyrene	ug/L	<5	<5	<5				
1,1-Dichloroethane	ug/L	<2	<2	<2				
1,1,2-Trichloroethane	ug/L	<10	<10	<10				
1,1-Dichloroethene	ug/L	<5	<5	<5				
trans-1,2-Dichloroethene	ug/L	<5	<5	<5				
cis-1,2-Dichloroethene	ug/L	<2	<2	<2				
MTBE	ug/L	<2	<2	<2				
Vinyl Chloride	ug/L	<5	<5	<5				

.te: NEW ISLINGTON, MANCHESTER

Job No: SI 7890

.nt: Martin Stockley Associates

Date: August 2002

CONTAMINATION TEST RESULTS - WATER VOC'S

DETERMINAND	Depth (m)	BH100	BH119	BH120				
			-	-				
Dichloromethane	ug/L	<50	<50	<50				
Chloroform	ug/L	<2	<2	<2				
1,1,1-Trichloroethane	ug/L	<2	<2	<2				
Carbon tetrachloride	ug/L	<2	<2	<2				
Benzene	ug/L	<2	<2	<2				
1,2-Dichloroethane	ug/L	<5	<5	<5				
Trichloroethene	ug/L	<5	<5	<5				
Bromodichloromethane	ug/L	<5	<5	<5				
Dibromochloromethane	ug/L	<5	<5	<5				
1,1,2,2-Tetrachloroethane	ug/L	<20	<20	<20				
Toluene	ug/L	<10	<10	<10				
1,1,2-Trichloro-1,2,2-trifluoethane	ug/L	<5	<5	<5				
Tetrachloroethene	ug/L	<2	<2	<2				
Chlorobenzene	ug/L	<2	<2	<2				
Ethylbenzene	ug/L	<2	<2	<2				
M/p-Xylene	ug/L	<2	<2	<2				
o-Xylene	ug/L	<2	<2	<2				
Hexachloro-1,3-butadiene	ug/L	<5	<5	<5				
1-Chloro-4-methylbenzene	ug/L	<5	<5	<5				
1-Chloro-2-methylbenzene	ug/L	<5	<5	<5				
Isopropylbenzene	ug/L	<2	<2	<2				
Bromoform	ug/L	<10	<10	<10				
Styrene	ug/L	<5	<5	<5				
1,2,3-Trichlorobenzene	ug/L	<5	<5	<5				
1,2,4-Trichlorobenzene	ug/L	<10	<10	<10				
1,2-Dichlorobenzene	ug/L	<2	<2	<2				
1,3-Dichlorobenzene	ug/L	<2	<2	<2				
1,4-Dichlorobenzene	ug/L	<5	<5	<5				
a-Methylstyrene	ug/L	<5	<5	<5				
1,1-Dichloroethane	ug/L	<2	<2	<2				
1,1,2-Trichloroethane	ug/L	<10	<10	<10				
1,1-Dichloroethene	ug/L	<5	<5	<5				
trans-1,2-Dichloroethene	ug/L	<5	<5	<5				
cis-1,2-Dichloroethene	ug/L	<2	<2	<2				
MTBE	ug/L	<2	<2	<2				
Vinyl Chloride	ug/L	<5	<5	<5				

NORTHERN FOUNDATIONS

Site: NEW ISLINGTON, MANCHESTER

Job No: SI 7890

Client: Martin Stockley Associates

Date: August 2002

CONTAMINATION TEST RESULTS - WATER VOC'S

DETERMINAND	Depth (m)	BH116 -	BH118 -	BH119 -
Trichloromonofluoromethane	ug/L	<5	<5	<5
1,1-Dichloro-1-propene	ug/L	<10	<10	<10
1,2-Dibromoethane	ug/L	<10	<10	<10
1,2-Dichloropropane	ug/L	<5	<5	<5
1,3-Dichloropropane	ug/L	<5	<5	<5
2,2-Dichloropropane	ug/L	<2	<2	<2
cis-1,3-Dichloro-1-propene	ug/L	<5	<5	<5
trans-1,3-Dichloro-1-propene	ug/L	<5	<5	<5
1,1,1,2-Tetrachloroethane	ug/L	<20	<20	<20
1,2,3-Trichloropropane	ug/L	<10	<10	<10
Bromobenzene	ug/L	<5	<5	<5
Dibromomethane	ug/L	<10	<10	<10

NORTHERN FOUNDATIONS

Water Report 8448

Site Manchester Millenium Village 4374

			Sample type	water	water
			Laboratory reference	38	39
			Borehole/trial pit	TP204	TP208
			Sample reference		
			Depth (m)	2.70	2.20
Test	**Units**	**Method**	**As**		
Arsenic	µg/l	sub	As	<10	<10
Boron	mg/l	142	B	0.38	0.08
Cadmium	µg/l	142	Cd	<0.50	<0.50
Chromium	µg/l	142	Cr	<2.5	<2.5
Copper	µg/l	142	Cu	<3.0	<3.0
Lead	µg/l	142	Pb	<10	<10
Mercury	µg/l	sub	Hg	<1.0	<1.0
Nickel	µg/l	142	Ni	<2.0	2.4
Selenium	µg/l	142	Se	<10	<10
Zinc	µg/l	142	Zn	<5.0	<5.0
Cyanide (total	mg/l	145	CN	!	!
Phenol	mg/l	140	PhOH	<0.05	<0.05
pH	pH units	139	pH	7.4	7.8
Sulphate	mg/l	143	SO4	1800	880
Sulphide	mg/l	141	S2-	!	!
PAH (tota)*	µg/l	146	PAH	!	!
TPH (C10-40)	µg/l	153	TPH	!	!
VOC	µg/l	sub	VOC	!	!

! Insufficient sample

* test not UKAS accredited

Checked and Issued by B Dainter Technical Manager

Date 11/2/04

Leachate Report 8448

Site Manchester Millenium Village 4374

			Sample type	leach	leach	leach	leach	leach
			Laboratory reference	40	41	42	43	44
			Borehole/trial pit	TP207	TP208	TP209	TP227a	TP204
			Sample reference					
			Depth (m)	0.60	2.50	0.60	0.50	3.00
Test	**Units**	**Method**	**As**					
pH	pH units	139	pH	7.8	7.9	8.2	7.7	7.5
Electrical Conductivity	µs/cm	154	EC	0.07	0.08	0.07	0.11	0.23
COD	mg/l	sub	COD	<10	<10	<10	<10	<10
Ammonia	mg/l	sub	NH_4	<0.10	0.39	<0.10	0.31	0.38
Arsenic	µg/l	sub	As	<10	<10	<10	<10	<10
Cadmium	µg/l	142	Cd	<0.50	<0.50	<0.50	<0.50	<0.50
Chromium	µg/l	142	Cr	<2.5	<2.5	<2.5	<2.5	<2.5
Lead	µg/l	142	Pb	<10	<10	<10	<10	<10
Mercury	µg/l	sub	Hg	<1.0	<1.0	<1.0	<1.0	<1.0
Selenium	µg/l	142	Se	<10	<10	<10	<10	<2.0
Boron	mg/l	142	B	<0.05	<0.05	<0.05	0.07	0.07
Copper	µg/l	142	Cu	<3.0	<3.0	<3.0	<3.0	<3.0
Nickel	µg/l	142	Ni	<2.0	<2.0	<2.0	<2.0	<2.0
Zinc	µg/l	142	Zn	<5.0	<5.0	<5.0	<5.0	<5.0
Cyanide free	mg/l	sub	CN	<1.0	<1.0	<1.0	<1.0	<0.05
Sulphate	mg/l	143	SO_4	21	<20	<20	27	67
Sulphide	mg/l	141	S_2	<0.20	<0.20	<0.20	<0.20	<0.20
Phenol	mg/l	sub	PhOH	<0.10	<0.10	<0.10	<0.10	<0.50
Iron	mg/l	142	Fe	58	<10	22	15	<10
Chloride	mg/l	sub	Cl	<2.0	<2.0	<2.0	<2.0	7.4
PAH	µg/l	sub	PAH	<0.20	1.4	<0.20	0.24	0.65

* test not UKAS accredited

Checked and Issued by B. Dainter B Dainter Technical Manager

Date 11/2/04

APPENDIX G

GAS MONITORING RESULTS

Site · CARVERS WAREHOUSE, PICCADILLY BASIN, MANCHESTER **Job No** SI 7890

Client Martin Stockley Associates **Date** August 2002

GAS CONTAMINATION TESTS

BH	Methane %volume	Carbon Dioxide %volume	Carbon Monoxide ppm	Hydrogen Sulphide ppm	Oxygen %volume	Flow l/hr High	Flow l/hr Low	Absolute Atmospheric Pressure (mbar)
	Date:	**22/8/02**						
~~102~~	~~0.0~~	~~0.0~~	-	-	~~19.9~~	~~0.0~~	-	~~1011/12~~
118	0.0	0.8	-	-	19.6	-0.1	-0.4	1011/12
	Date:	**30/8/02**						
~~102~~	~~0.0~~	~~5.5~~	-	-	~~4.8~~	~~1.3~~	~~0.0~~	~~1005~~
118	0.0	0.8	-	-	19.8	0.0	-1.8	1005
	Date:	**19/9/02**						
~~102~~	~~0.0~~	~~7.5~~	-	-	~~5.6~~	~~0.0~~	~~0.0~~	~~1011~~
118	0.0	0.4	-	-	20.3	0.0	0.0	1011

NORTHERN FOUNDATIONS

IAN FARMER ASSOCIATES
Geotechnical and Environmental Investigations

Record of Monitoring

Site : Manchester Millenium Villiage
Client : Urban Splash, Manchester City Council
Engineer : EDGE Consultants

Contract No : W03 4374

Sheet Number **1 of 4**

Borehole Number	Date	Water Level (mbgl)	Pressure mB	Oxygen Percent	Methane Percent	Carbon Dioxide Percent	LEL Percent	Flow (l/hr)
BH201 - 1 Minute	18/12/2003	1.65	1012	18.5	0.0	0.8	0.0	0.0
BH201 - 2 Minutes				18.2	0.0	1.0	0.0	
BH201 - 3 Minutes				16.8	0.0	2.1	0.0	
BH201 - 4 Minutes				15.5	0.0	2.7	0.0	
BH201 - 5 Minutes				15.2	0.0	2.9	0.0	
BH202 - 1 Minute	18/12/2003	1.50	1011	19.6	0.0	0.0	0.0	0.0
BH202 - 2 Minutes				19.6	0.0	0.0	0.0	
BH202 - 3 Minutes				19.6	0.0	0.0	0.0	
BH202 - 4 Minutes				19.6	0.0	0.0	0.0	
BH202 - 5 Minutes				19.6	0.0	0.0	0.0	
BH203 - 1 Minute	18/12/2003	1.27	1011	18.7	0.0	0.7	0.0	0.0
BH203 - 2 Minutes				18.7	0.0	0.7	0.0	
BH203 - 3 Minutes				18.6	0.0	0.8	0.0	
BH203 - 4 Minutes				18.6	0.0	0.8	0.0	
BH203 - 5 Minutes				18.5	0.0	0.6	0.0	

Weather: Calm, overcast, dry and cold

IAN FARMER ASSOCIATES
Geotechnical and Environmental Investigations

Record of Monitoring

Site : Manchester Millenium Villiage
Client : Urban Splash, Manchester City Council
Engineer : EDGE Consultants

Contract No : W03 4374

Sheet Number 1 of 1

Borehole Number	Date	Water Level (mbgl)	Pressure mB	Oxygen Percent	Methane Percent	Carbon Dioxide Percent	DP	Flow (l/hr)
BH201	11/12/2003	2.45	1000	19.1	0.0	0.6	0.4	0.0
BH202		1.47	999	19.6	0.0	0.0	0.3	0.0
BH203		24.03						
BH205		Dry	1000	20.1	0.0	0.2	0.0	0.0
BH206		2.75	1000	18.2	0.0	1.7	0.2	0.0
BH208		2.28	1000	15.5	0.0	3.4	0.2	0.0
BH209		2.97	1000	18.2	0.0	2.2	0.2	0.0
BH210		Dry	1000	19.9	0.0	0.0	0.2	0.0
BH212		2.42	1000	18.2	0.0	1.4	0.2	0.0
BH214		3.64	1000	11.1	0.0	4.9	0.6	0.0

IAN FARMER ASSOCIATES
Geotechnical and Environmental Investigations

Record of Monitoring

Site : Manchester Millenium Villiage
Client : Urban Splash, Manchester City Council
Engineer : EDGE Consultants

Contract No : W03 4374

Sheet Number **1 of 4**

Borehole Number	Date	Water Level (mbgl)	Pressure mB	Oxygen Percent	Methane Percent	Carbon Dioxide Percent	LEL Percent	Flow (l/hr)
BH201 - 1 Minute	12/01/2004	1.94	988	20.7	0.0	0.0	0.0	0.0
BH201 - 2 Minutes				20.5	0.0	0.0	0.0	
BH201 - 3 Minutes				18.4	0.0	1.6	0.0	
BH201 - 4 Minutes				16.5	0.0	3.0	0.0	
BH201 - 5 Minutes				16.3	0.0	3.1	0.0	
BH202 - 1 Minute	12/01/2004	1.38	988	19.8	0.0	0.0	0.0	0.0
BH202 - 2 Minutes				19.8	0.0	0.0	0.0	
BH202 - 3 Minutes				19.8	0.0	0.0	0.0	
BH202 - 4 Minutes				19.9	0.0	0.0	0.0	
BH202 - 5 Minutes				20.0	0.0	0.0	0.0	
BH203 - 1 Minute	12/01/2004	Dry	988	19.1	0.0	0.7	0.0	0.0
BH203 - 2 Minutes				19.4	0.0	0.6	0.0	
BH203 - 3 Minutes				19.7	0.0	0.5	0.0	
BH203 - 4 Minutes				19.7	0.0	0.5	0.0	
BH203 - 5 Minutes				19.7	0.0	0.5	0.0	

Weather: Calm, overcast, dry and cold

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Kay Street, Bury BL9 6BU

Tel: 0161 763 7200
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