09/5512

SITE INVESTIGATION AT S.NORTON & CO LTD, TENAX ROAD, TRAFFORD PARK

FOR

AXION RECYCLING LTD / S.NORTON & CO LTD

JULY 2009

CC Geotechnical

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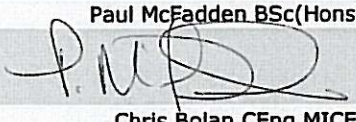
Signature:	
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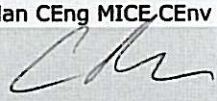
Signature:	
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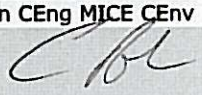
Signature	
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TABLE OF CONTENTS

1.0 INTRODUCTION AND OBJECTIVES

CC GEOTECHNICAL LTD is providing consultancy services ***S.Norton & Co Ltd*** on behalf of ***Axion Recycling Ltd***, in connection with proposals to establish a pre-treatment waste recycling plant, sited within the existing grounds of S. Norton & Co Ltd premises at Tenax Road, Trafford Park, Manchester.

It is proposed that a purpose designed 'shredder waste advanced processing plant' (SWAPP) be constructed to remove recyclables from fragmentiser waste. The SWAPP is intended to improve existing plant capability to pre-treat non-ferrous waste, providing a greater efficiency in the recovery of valuable recyclables including non-ferrous metals, alloys, plastics and glass, consequently reducing volumes of non value wastes requiring landfill disposal.

The SWAPP is proposed to be sited in the north western quadrant of the existing recycling centre. Whilst this report includes a historical review of the entire S.Norton & Co Ltd, the scope of intrusive investigation was limited to the area of the facility on which the SWAPP is to be sited.

This combined desk study and intrusive ground investigation report was required as a preliminary to planning and advancing the development philosophy of the project.

The report was devised to generally comply with the relevant principles and requirements of a wide range of guidance including BS5930:1999 as amended 2007: "Code of Practice for Site Investigations", BS10175: 2001 "Investigation of Potentially Contaminated Sites - Code of Practice", and the DEFRA/Environment Agency Report CLR11 "Model Procedures for the Management of Land Contamination".

This report must be read in conjunction with the Notes on Limitations are presented in Appendix A.

1.1 Purpose and Aims of Phase I Desk Study

As a matter of due diligence a Phase I Desk Study was undertaken. The primary aim of the Desk Study was to assess whether the site is likely to be affected by chemical and/or gas contamination to an extent that may pose a risk to human health, and/or the built environment, and/or the wider natural environment. Specific objectives of the desk study were as follows:

- To review available information including Environment Agency Data, Commercial Environmental Databases and Historical Mapping
- To undertake a site walkover
- To develop a Preliminary Conceptual Model
- To plan the scope of an intrusive phase of investigation, to be focused at the location of the proposed SWAPP

1.2 Purpose and Scope of Phase 2 Intrusive Investigation

The primary purpose of the Phase 2 Intrusive Investigation was to undertake the planned intrusive investigation, and to interpret the findings in respect of the following principal objectives:

- The refinement of the preliminary conceptual model postulated at desk study stage, according to the findings of the intrusive investigation
- The assessment of the nature and extent of soil and groundwater contamination in relation to risks posed to humans and/or the built environment, and/or environmental receptors
- The provision of advice on any ground remediation actions or building design features which may be required to mitigate the potential effects of identified contamination
- The provision of advice on potential abnormal costs associated with remedial works
- The provision of advice on selection and design of foundations and pavements

It should be noted that the scope of the Phase II intrusive investigation focused on the area of the site on which the proposed new SWAPP was to be sited. Intrusive investigation of site beyond the location on which the SWAPP is to be sited was beyond the remit of this study.

2.0 SITE DATA

2.1 Site Description

The site is located Tenax Road, Trafford Park Manchester at approximate National Grid Reference 378727E, 397268N, as shown on Drawing 09/5512/1 and Aerial Photograph 09/5512/2 in Appendix B.

It can be seen that the site comprises an `L` shaped area of land, formed by a spur of land projecting westward to Tenax Road from a larger, approximately square area on which most of the process activity of the premises is conducted.

The site is adjoined to the north and south by industrial premises and to the east by Mellors Road. At the northern end of the west boundary the site is bound by Tenax Road, whilst the southern end of the west boundary adjoins further industrial premises.

The site is accessed from Tenax Road at the western boundary. The main site area is occupied by heavy metal shearing, shredding and processing plant, and associated stockpiles of pre-treat waste metal, processed graded metal, non metallic recyclables and non recyclable waste.

The gated entrance from Tenax Road leads to a concrete access road which leads easterly in between the non-ferrous metal warehouse (north of access road), and further warehouses (south of access road and outside of the site curtilage). The access road opens to the larger expanse of the site at the reception and weighbridge office. A warehouse and office unit are located to the rear of the reception office, on the western boundary, extending to the south west corner of the site.

A further warehouse identified as the 'non-ferrous warehouse' is present at the north western quadrant of the site (immediately north of the site access road).

The site is generally covered by concrete hardstanding. At the north west tip of the site (former car parking area), ground cover is bitumen macadam. Immediately east of this, the ground cover is granular hardcore. The area of hardcore surfacing extends to the west face of the non-ferrous metal warehouse. A narrow strip of ground adjoining the western half of the northern boundary is also covered with granular hardcore, whilst elsewhere ground cover was of concrete hardstanding.

Internal inspection of the 'non-ferrous' warehouse was undertaken and revealed the building to be occupied by extensive fixed plant installations, and stockpiled product associated with the processing of non-ferrous waste for the recovery of recyclable metals. The building is of brick construction with retrofitted metal cladding and panel roofing. Ground cover is provided by a concrete slab.

Access to the non-ferrous warehouse is via a gated entrance at its eastern elevation. Immediately east of the warehouse the site opens to further metal recovery process plant and associated product stockpiles. A concrete access road runs parallel to the northern elevation of the non-ferrous warehouse and extends westerly across the site, north of an area of open hardstanding. Several waste skips are present at the western end of the northern boundary. The western tip of the site is occupied by numerous stockpiles of waste product, stored within a former car parking area covered by bitumen macadam; the perimeter of this former car park is delineated from the remainder of the site by wire mesh fencing, open for vehicular access at its southern and eastern perimeter.

No stored fuels or liquids and/or above/below ground tanks were identified within the north west quadrant of the site (this area of the site being of particular interest as it is proposed for the siting of the SWAPP).

The context setting of the site may be summarised as hereunder:

Table 1: Summary of Walkover Survey

SUBJECT MATTER		OBSERVATION
Current use and site context		Metal recycling centre
Site area and shape		`L` shaped extending to an approximate area of 5.7Ha
Site surface		Concrete hardstanding across majority of site. Area of bitumen macadam surfacing to northwestern tip, granular hardstanding west of non-ferrous warehouse and also adjacent to western half of north boundary
Site topography		Generally flat
Site access		East boundary is secured by welded mesh fencing, gated entrance from Tenax Road leads to site access road
Current building layout & other structures		Warehousing and office unit at the western site boundary, extending from a central position to the south west corner of the site. A further warehouse identified as the 'non-ferrous' warehouse is present within the north western quadrant. Various process plant on site.
Storage tanks		None identified to be present within the north western quadrant (area of study)
Services		Unknown - presume that extensive service network of drains and electricity cables are present
Waste disposal / materials storage		Extensive stockpiling of metals, recovered recyclables and waste product
Ecology		No specifically sensitive features observed
What are the uses of neighbouring land?	North	Industrial Works
	East	Mellors Road
	South	Industrial Works
	West	Warehousing / Tenax Road
Evidence of potential on site contamination		Possible that site soils and/or water have acquired contamination as a consequence of recycling processes. Ground cover and site management indicate underlying site soils to have been afforded a certain degree of protection from the potentially contaminative activities undertaken.
Evidence of potential off site contamination		None

Photographs of the site and the photograph key plan are presented in Appendix C.

2.2 Site Development History

The site development history was researched by reference to historical maps, and street plans. These are presented in Appendix D, and the principal observations are summarised hereunder:

Table 2: Review of Historical O.S Maps

YEAR	SCALE	DISTANCE FROM SITE	DESCRIPTION	POTENTIALLY CONTAMINATIVE USES
1876 1890 1889-1894	1:2500 1:2500 1:10560	On Site	Site is within Trafford Park (Deer Park). Old Deer Shed Wood runs through site centre	-
		Adjacent To Site	Open Parkland	-
		<250m from site	Generally open parkland, numerous ponds identifiable to the east/north east, nearest being approx 120m east	-
1905-1906 1908	1:10560 1:2500	On Site	Old Deer Shed Wood no longer present	-
		Adjacent To Site	No significant change	-
		<250m from site	Railway is identifiable approx 50m north east	-

Table 3: Review of Historical O.S Maps (continued)

YEAR	SCALE	DISTANCE FROM SITE	DESCRIPTION	POTENTIALLY CONTAMINATIVE USES
1929 1927-1932 1938	1:2500 1:10560 1:10560	On Site	Site has undergone development and Anaconda Mills occupies a central position within the site. Two buildings are identifiable to the centre of the site. A sewage tank is identified at a central position along the north boundary. A further three smaller buildings are present at the eastern boundary one of which is identified as a cold storage warehouse. A rail and tram link is identifiable and runs from a central position along the east boundary into the site	Mills Sewage Tank Railway
		Adjacent To Site	Wood Fibre Works is adjacent to the eastern half of the south boundary. Mellors Road runs adjacent and parallel to the east boundary. Ocean Iron Works is identifiable to the eastern half of the north boundary, open land to the west	Iron Works Wood Fibre Works
		<250m from site	Surrounding area has undergone significant industrial development. Numerous unspecified Works and Warehouses are present, identifiable premises include: Roofing Felt Works at 12m east Trussed Concrete Steel Works at 12m east Rubber Regenerating Works 12m east Lead Works at approx 15m north east Chemical Works 70m east Margarine Works 70m east Chemical works 80m south east Engineering Works at approx 85m south east Timber Sheds 115m north east Engineering Works 126m Concrete product works 150m west Engineering Works 160m south west Carborundum Works 210m south east Wire Works 250m south east Ford Motor Works approx 260m south east Pond at 120m east is no longer present	Infilled Pond Numerous Works
1937 1938	1:2500 1:10560	On Site	Anaconda Mills is identified as a Copper and Bronze Wire producer. The site has been further developed and is dominated by one large structure north to south and occupying a central position within the site. A tramway and rail cargo link is identifiable. Sewage tank no longer identifiable	Copper/Wire Works
		Adjacent To Site	No significant changes	-
		<250m from site	No significant changes	-
1953 1953-1954 1956	1:1250 1:2500 1:10560	On Site	The site has undergone further development; numerous ancillary buildings are identified both to the east and west of the main structure. An electrical substation is identifiable at the north east corner of the site. Further rail links are identifiable	Electrical Substation
		Adjacent To Site	Further development at the northern boundary has been undertaken; a structural engineering works is now present adjacent to the western half of the north boundary.	Engineering Works
		<250m from site	Tenax Road is now identifiable approximately 5m to the west of the site. Land 18m west of the site is now shown as a refuse heap. Trafford Park lake at a distance of approximately 160m east has been partially infilled.	Refuse Heap Infilled Pond

Table 4: Review of Historical O.S Maps (continued)

YEAR	SCALE	DISTANCE FROM SITE	DESCRIPTION	POTENTIALLY CONTAMINATIVE USES
1968-1969 1977 1969	1:1250 1:10000 1:2500	On Site	Site has undergone further development. Main building has been extended west, and now extends beyond the western site boundary. A building is now present at the north west quadrant tanks are identified at the north east corner of this building	Tanks
		Adjacent To Site	Anaconda Mills main building now extends off site at the southern half of the west boundary	-
		<250m from site	Surrounds have undergone further development. A chemical works is now identifiable at approximately 30m north, a further chemical works is identifiable at a distance of approximately 50m south. Disused workings are identifiable at site of infilling at Trafford Park Lake	Chemical Works Disused Workings
1984-1987 1989	1:2500 1:10000	On Site	Main building has been largely demolished. Site is now marked as a Scrap Yard	Scrap Yard
		Adjacent To Site	No significant changes	-
		<250m from site	No significant changes	-
1993-1995	1:1250	On Site	Four unidentified structures now occupy a position south east of the site centre	-
		Adjacent To Site	Tenax Road now adjoins the northern half of the west boundary	-
		<250m from site	No significant changes	-
2002 2008 2008	1:10000 1:10000 1:2500	On Site	Buildings at the east boundary have been demolished. Building north of site centre has been demolished. Further structures are now identifiable south of the site centre	-
		Adjacent To Site	No significant changes	-
		<250m from site	No significant changes	-

The potential of sources of contamination identified in the above review were considered with regard to their potential to impact upon that part of the facility on which the SWAPP facility is to be sited. Pertinent potential contamination sources are discussed below:

Table 5: Summary of Potential Contamination Sources Pertinent to SWAPP location

POTENTIAL SOURCE OF CONTAMINATION	DISTANCE FROM SITE	CAN SOURCE AFFECT THE SWAPP LOCATION?	JUSTIFICATION
Metal Scrapyard	On site	Yes	Potentially contaminative land use
Former Anaconda Mills – Copper / Wire works	On site	Yes	Potentially contaminative land use
Former Tanks	On site	Yes	Specific contents of the tanks are unknown, potentially contaminative
Former Railway Infrastructure	On site	Yes	The rail link extends across the main site into the eastern sector of the SWAPP site
Former Sewage Tank	On site	Unlikely	Whilst the sewage tank is noted to be within the main site, it is not within the SWAPP site, given its distance it is considered unlikely that contaminant migration has impacted the SWAPP site
Electrical substation	On site	Unlikely	Whilst the electrical substation is positioned within the main site, it is not within the SWAPP site, given its distance it is considered unlikely that contaminant migration has impacted the SWAPP site
Structural Engineering works	Adjacent to north boundary (western sector)	Possibly	It is possible that contamination arising from activities undertaken at these premises have migrated to the site due to its close proximity
Iron works	Adjacent to the north boundary (eastern sector)	Possibly	It is possible that contamination arising from activities undertaken at these premises have migrated to the site due to its close proximity
Wood fibre works	Adjacent to the southern boundary (eastern sector)	Unlikely	The SWAPP site does not adjoin these premises, given its distance it is unlikely that contaminant migration has impacted the SWAPP site.
Refuse Heap	18m west	Possibly	Refuse Heap may be considered as a source of gas generation
Infilled pond	120m east	Possibly	Infilled pond may be considered as a source of gas generation
Disused Workings / Infilled Lake	160m east	Possibly	Disused workings used to infill Lake may be considered as a source of gas generation

3.0 ENVIRONMENTAL SETTING

3.1 Published Geology

The 1:50,000 scale British Geological Survey Sheet 85 Drift Edition Manchester indicates that the surficial drift soils are Late Glacial Flood-Gravels, which are underlain by Laminated Clay of Glacial origin. The Solid Edition documents the underlying solid geology as Bunter Sandstone of Triassic origin.

Considering the history of development of the site and its surrounds, it is highly likely that made ground deposits are present at the surface.

Information on geological data obtained from a Groundsure Environmental Report, presented in Appendix E, is summarised hereunder:

Table 4: Summary of Geological Data from Groundsure Report

GEOLOGY, HYDROGEOLOGY AND HYDROLOGY		
DATA	**DISTANCE**	**COMMENTS**
Artificial Ground and Made Ground	N/A	No data
Permeability of Artificial Ground	N/A	No data
Superficial Deposits / Drift Geology	On-site	Sand and Gravel
Permeability of Superficial Ground	On-site	Intergranular flow of with a maximum permeability rating of Very high, and a minimum permeability rating of High
Landslip	>500m	No data
Landslip Permeability	On-site	No data
Bedrock and Solid Geology	N/A	Sandstone
Permeability of Bedrock	On-site	Mixed flow type with high permeability
Faults	<500m	No data
Radon Affected Area	On-site	<1% above the action level
Radon Protection	On-site	No radon protective measures required
Historical Surface Ground Workings	On Site	None
	<50m	23m W– Refuse Heap
	<250m	131m N – Sewage Tanks 150m NE – Sewage Tank 160m E – Pond 163m E – Pond 207m E – Refuse Heap 217m E – Fish Pond / Lake 240m E – Refuse Heap
Historical Underground Workings	<1000m	No data
Current Ground Workings	<250m	No data
Historical Mining	<1000m	No data
Are there any coal mining areas within 1000m of the study site?	<1000m	Yes – site is located within the specified search distance of an identified mining area
Shallow Mining	<150m	Negligible
Non-Coal Mining Cavities	<1000m	No data
Natural Cavities	<1000m	No data
Brine Extraction	<1000m	No data
Gypsum Extraction	<1000m	No data
Tin Mining	<1000m	No data
Clay Mining	<1000m	No data
Maximum Shrink-Swell hazard rating	On site	Negligible
Maximum Landslide hazard rating	On site	Very low
Maximum Soluble Rocks hazard rating	On site	Null-negligible
Maximum Compressible Ground hazard rating	On site	High
Maximum Collapsible Rocks hazard rating	On site	Null-negligible
Maximum Running Sand hazard rating	On site	Very low

3.2 Mining

A search of the 'The Coal Authority Gazetteer' indicates that the site is in an area where a mining search is required. On the basis of this, a Coal and Brine Report was procured from the Coal Authority. The principal elements of this report are summarised hereunder and the report is presented in Appendix F.

Table 5: Summary of Ground Stability Report

QUESTION	ANSWER	COMMENTS
Is the property within the zone of likely physical influence from past Underground Workings?	No	-
Is the property within the zone of likely physical influence from present Underground Workings?	No	-
Is the property within the zone of likely physical influence from Future Underground Workings?	No	However, reserves of coal exist in the local area which could be worked at some time in the future
Are there any mine entries within / within 20m of the property?	No	-
At the surface, are there any known faults or other weaknesses due to coal mining that have made the property unstable?	No	-
Is the property within the geographical boundary of a past opencast site, from which coal has been removed?	No	-
Is the property within 200m of a present opencast site, from which coal is being removed?	No	-
Is the property within 800m of a proposed opencast site, from which coal is proposed to be removed?	No	-
Are there are records relating to Subsidence?	No	-
Does the property lie in an area in which a notice of entitlement to withdraw support has been published?	No	-
Are there any records of mine gas emissions requiring action by the Coal Authority within the property boundary?	No	-
Has the property been subject to remedial works carried out by or on behalf of the Coal Authority?	No	-

The report indicates that the site is not at risk of being underlain by coal workings at depths which may influence surface stability.

3.3 Radon

Applying the method of assessment recommended by the National Radiological Protection Board, it can be determined that the site lies in an area where protective measures are not required.

3.4 Hydrology and Hydrogeology

Information on hydrology and hydrogeology obtained from a Groundsure Environmental Report is presented in Appendix E, and summarised hereunder:

Table 6: Summary of Hydrology and Hydrogeological Data from Groundsure Report

HYDROGEOLOGY AND HYDROLOGY			
Major Aquifer	On site	Yes	
Soil Classification	On site	High leaching potential	
Groundwater Abstraction licenses	<2000m	Yes – Boreholes providing 6 abstractions for multiple purposes. The closest being 299m E	
Surface water abstraction licenses	<2000m	812m E – Abstraction from Manchester ship canal for the purpose of Hydraulic Testing	
Source Protection Zones	<500m	No data	
Potable Water Abstraction Licences	<2000m	229m E – Borehole at Trafford Park, abstraction for the purposes of drinking, cooking, sanitary, washing 1129m NW – Borehole at Bentcliffe Works, Salters Lane, Eccles – Abstraction for the purposes of drinking, cooking, sanitary, washing	
Main Rivers	<500m	No data	
FLOODING			
Environment Agency indicative Zone 2 floodplains		<250m	No
Environment Agency indicative Zone 3 floodplains		<250m	No
Areas benefiting from Flood Defences		<250m	No
Are there any areas used for Flood Storage		<250m	No
What is the maximum BGS groundwater flooding susceptibility?		<50m	Moderately High
What is the BGS confidence rating for the groundwater flooding susceptibility areas?		-	Moderate

For simplified interpretation, the geological succession underlying the site may be regarded as a series of discrete units in terms of their hydrogeological significance, as illustrated hereunder:

Table 7: Hydrogeological Interpretation

UNIT	PROPERTIES	HYDROGEOLOGICAL DESIGNATION
Made Ground	Likely to be generally granular and permeable and will permit vertical and lateral transmission of groundwater. Where underlain by an aquitard perched groundwater may be present in depressions at the interface	N/A
Late Glacial Flood-Gravels (Sand and Gravels)	Important for the recharge of watercourses	Minor Aquifer
Laminated Clay	Will act as an aquitard, inhibiting the ingress of rainwater through it and providing protection to any underlying aquifers	Non Aquifer
Bunter Sandstone	Highly permeable formation with a known presence of significant fracturing. Highly productive and able to support large abstractions for public water supply and other purposes.	Major Aquifer

The nearest surface watercourse is Trafford Park Lake at a distance of approximately 200m north east of the site. Beyond this lake, Manchester Ship Canal is present at an approximate distance of 420m north east of the site.

3.5 Data from Environmental Information Sources

An Environmental Data Report was procured from Groundsure.

Groundsure reports contain a broad spectrum of environmental data collated from many sources, including the Environment Agency and the relevant local authority. The report is contained in Appendix E.

Relevant environmental data within the report, covering an area within a potentially influential radius of the site is summarised hereunder:

Table 8: Summary of Groundsure Environmental Data

DATA	DISTANCE	COMMENTS
AUTHORISATIONS, INCIDENTS AND REGISTERS		
Authorisations, Incidents and Registers	On Site	No data
	<50m	No data
Records from Environment Agency landfill data	<1000m	No data
Records of operational landfill sites sourced from Landmark	<1000m	No data
Records of Environment Agency historic landfill sites	<500m	154m E – Trafford Ecology Park and Aidleys Transport; British Steel Corp; Industrial
Records of non-operational landfill sites sourced from landmark	<500m	No data
Records of BGS/DoE non-operational landfill sites	<150m	117m E – The Hives, Mossley Road; Chemical (site closed)Treatment 121m E – Unit 1 Mosley Road; Chemical Treatment (now exempt)
Records of Local Authority landfill sites	<500m	206m E – Refuse Tip
Records of operational waste treatment, transfer or disposal sites	On site	S.Norton & Co Ltd Waste Type: Difficult Rating: Difficult Scrapyard Category: Scrapyard Size: Very Large >250000 tonnes/year
	<500m	487m E Waste Type: Putrescible Rating: Putrescible Transfer Category; Transfer Size: Medium <750000 tonnes/year
Records of non-operational waste treatment, transfer or disposal sites	On site	No data
	<100m	No data
	<500m	117m E – Waste Type: Difficult, Category: Chemical Treatment 121m E – Waste Type; Inert, Category: Chemical Treatment 166m SW – Waste Type: Difficult, Category: Storage 364m S – Waste Type: Non-hazardous, Category: Treatment 487m E Waste Type: Putrescible, Category: Transfer

Table 8: Summary of Groundsure Environmental Data (continued)

DATA	DISTANCE	COMMENTS
AUTHORISATIONS, INCIDENTS AND REGISTERS		
Records of Environment Agency (REGIS) waste sites	On site	S Norton & Co Type: Metal recycling sites (mixed MSRs) Size: >75000 tonnes Annual Tonnage: 300000 tonnes
	<100m	95m NE – Britannia Import Export Ltd Type: Metal recycling sites (mixed MSRs) 121m E – Lubrichem Ltd Type: Physical Treatment Facilities 121m E – Lanstar Ltd Type: Household, Commercial and Industrial transfer stations
	<500m	427m E – Lavelle & Sons Ltd Type: Household Commercial and Industrial transfer stations
Records of Water Industry Referrals	<50m	No data
Records of Red List Discharge Consents	<50m	No data
Records of List 1 Dangerous Substances Inventory Sites	<50m	No data
Records of List 1 Dangerous Substances Inventory Sites	<50m	No data
Records of LAPPC Authorisations	<50m	No data
Records of Category 3 or 4 Radioactive Substances Licences	<50m	No data
Records of Licensed Discharge Consents	<500m	No data
Records of Planning Hazardous Substance Consents	<500m	11m W – Great Lakes Manufacturing (uk) Ltd
COMAH and NIHHS sites	<100m	24m W – fmc corporation; COMAH and NIHHS
Environment Agency Recorded Pollution Incidents	<100m	29mE – Dust; Minor/No impact 34m E – Stem; Minor/No impact 40m E – Dust; Minor/No impact
Sites Determined as Contaminated Land under Part IIA EPA 1990	<500m	No data
Records of planning hazardous enforcements	<500m	No data
Current Industrial Site Data – Records of potentially contaminative industrial sites	On Site	S Norton & Co – Scrap metal merchants Electricity sub-station
	<50m	0m (adjacent to south tip of east boundary) – Collier & Henry Concrete Ltd – unspecified works/factories 23m S – Unspecified works/factory 31m W – Alan Provisor Ltd – Ropes, Nets and Cordage 34m S – Electricity sub-station 37m W – Unspecified works/factory 37m E – Unspecified works/factory 40m E – Bergen Transport Ltd – Distribution and Haulage 41m N – Electricity sub-station 47m E – Warehouse – Container and storage
Records of Petrol and Fuel Sites	<500m	None
Underground High Pressure Oil and Gas Pipelines	On Site	None
	<50m	9m W – 3m Pipelines 12m W – Mainline pipelines
ECOLOGICAL DESIGNATED SITES		
Presence of designated environmentally sensitive sites	<500m	None

4.0 PRELIMINARY RISK ASSESSMENT

4.1 Introduction

The risk assessment methodologies adopted by ***CC GEOTECHNICAL LTD*** are based on current available guidance from a number of sources, and are included in Appendix G.

The information discussed in the desk study was used to develop a Preliminary Conceptual Model of the site, identifying where potential pollution linkages may exist. The development of the Preliminary Conceptual Model is discussed hereunder.

The preliminary risk assessment was based on the following assumptions:

- The site is to remain as an active industrial facility operating as a metal recycling centre
- Drinking water will be from a mains supply

4.2 Assessment of Land Uses with Potential to Impact on the Site

The desk study identified a number of potentially contaminative land uses on or within 250m of the site, and/or natural geological sources of contamination. Potential sources considered pertinent to the SWAPP site are considered further and are hereunder.

Table 9: Summary of Sources / Potential Contaminants of Concern

SOURCE	LOCATION	METALS	NON METALS	ORGANICS	GASES	OTHERS
Metal Recycling Centre	On site (SWAPP)	Ba, Cd, Cr, Cu, Pb, Hg, Ni, Zn	As, CN^-, SO_4^{2-}, S^{2-}	Hydrocarbons		Asbestos Acidic/alkaline soils
Copper and Bronze wire Works	On site (SWAPP)	Cd, Cr, Cu, Pb, Ni, V,	B, S^{2-}	Hydrocarbons PAH's		Asbestos
Made Ground	On site (SWAPP)	Cd, Cr, Cu, Pb, Hg, Ni, Zn	As, B, Se, CN^-, SO_4^{2-}	Hydrocarbons	CO_2 H_2S CH_4 CO	Asbestos Acidic/alkaline soils
Unspecified Tank	On site (SWAPP)			PAH's Hydrocarbons VOC's		
Rail Cargo Link	On site (SWAPP)			PAH's		
Structural Engineering Works	Adjacent to north boundary of SWAPP site	Cd, Cr, Cu, Pb, Hg, Ni, Zn	As, B, Se, CN^-, SO_4^{2-}	Hydrocarbons		Asbestos Acidic/alkaline soils
Iron Works	Adjacent to north east corner of SWAPP site	Cr, Pb, Ni, V, Zn	As, S_0, CN^-, SO_4^{2-}, S^{2-}	Hydrocarbons PAH's		Asbestos Acidic/alkaline soils
Refuse Heap	23m east	-	-	-	CO_2 H_2S CH_4 CO	-
Infilled ponds	120m east	-	-	-	CO_2 H_2S CH_4 CO	-
Historic Landfill Site: Disused Workings at Infilled Lake	154m east	-	-	-	CO_2 H_2S CH_4 CO	-

4.3 Potential Receptors

Potential receptors of contamination on this site may be represented as tabulated hereunder:

Table 10: Potential Receptors

RECEPTOR	IS RECEPTOR PRESENT?
Human beings (construction workers)	Yes – construction workers will be exposed during the plant installation phase of the development
Human beings (future residents)	No – development is commercial
Human beings (future worker occupants)	Yes – the site will be occupied by staff
Human beings (trespassers / transient users)	Yes – members of the public will use the site
Human beings (worker occupants of adjacent properties)	Yes – site is adjoined by industrial units
Human beings (residents of adjacent properties)	No – the site is not adjoined by any residential dwellings
Designated ecological systems	No – no sensitive systems within 250m
Property in the form of buildings (on site)	Yes – site will be covered by concrete hardstanding and includes an existing warehouse unit
Property in the form of buildings (off site)	Yes – site is adjoined by industrial units
Property in the form of crops/livestock (on site)	No – none on the site
Property in the form of crops/livestock (adjacent)	No – none adjacent to the site
Potable water mains (on site)	Possibly - potable water mains may be installed
Potable water mains (off site)	No – services for adjacent properties should not run through the site
Perched soil water (underlying site)	Possibly – perched water may be present at the sand and gravel / clay interface
Groundwater (underlying aquifer)	Possibly – the underlying sandstone is a major aquifer and contaminant migration must be considered

Table 10: Potential Receptors (continued)

RECEPTOR	IS RECEPTOR PRESENT?
Groundwater abstractions	Yes – closest potable abstraction being 229m east
Surface water bodies	Yes – closest water body is Trafford Park Lake at approximately 200m north east
Surface water abstractions	Yes – closest is 812m east (Manchester Ship Canal) – Purpose: hydraulic testing
Local flora and fauna during and post construction	No – no sensitive species on site

4.4 Potential Pollution Linkages

Taking account of the intended use of the site, the pathways by which the above sources and receptors may be linked may be summarised as follows:

Table 11: Potential Pollution Linkages

RECEPTOR	PATHWAY	SOURCE
Humans beings (construction workers) – acute exposure	Ingestion of soil / soil dust Inhalation of soil dust Dermal contact with soil / soil dust	• Metal Recycling Centre • Copper and Bronze wire Works • Made Ground • Unspecified Tank • Structural Engineering Works • Iron Works
Human beings (future worker occupants)	Ingestion of soil / soil dust Dermal contact with soil / soil dust outdoors Dermal contact with soil dust indoors Inhalation of soil dust indoors Inhalation of soil dust outdoors Inhalation of soil vapours indoors Inhalation of soil vapours outdoors Inhalation of water vapours indoors Inhalation of water vapours outdoors	• Metal Recycling Centre • Copper and Bronze wire Works • Made Ground • Unspecified Tank • Structural Engineering Works • Iron Works • Refuse Heap • Infilled Pond • Historic Landfill (Disused Workings at Infilled Lake)
Human beings (trespassers / transient users)	Ingestion of soil / soil dust Dermal contact with soil / soil dust outdoors Dermal contact with soil dust indoors Inhalation of soil dust indoors Inhalation of soil dust outdoors Inhalation of soil vapours indoors Inhalation of soil vapours outdoors Inhalation of water vapours indoors Inhalation of water vapours outdoors	• Metal Recycling Centre • Copper and Bronze wire Works • Made Ground • Unspecified Tank • Structural Engineering Works • Iron Works • Refuse Heap • Infilled Pond • Historic Landfill (Disused Workings at Infilled Lake)
Human beings (worker occupants of adjacent properties)	Ingestion of soil / soil dust Dermal contact with soil / soil dust outdoors Dermal contact with soil dust indoors Inhalation of soil dust indoors Inhalation of soil dust outdoors Inhalation of soil vapours indoors Inhalation of soil vapours outdoors Inhalation of water vapours indoors Inhalation of water vapours outdoors	• Metal Recycling Centre • Copper and Bronze wire Works • Made Ground • Unspecified Tank

Table 11: Potential Pollution Linkages (continued)

RECEPTOR	PATHWAY	SOURCE
Property in the form of buildings (on site)	Direct contact with aggressive ground conditions	• Metal Recycling Centre • Copper and Bronze wire Works • Made Ground • Unspecified Tank • Structural Engineering Works • Iron Works
Property in the form of buildings (adjacent)	Direct contact with aggressive ground conditions	• Metal Recycling Centre • Copper and Bronze wire Works • Made Ground • Unspecified Tank
Potable water mains (on site)	Direct contact with organic / toxic / corrosive contamination	• Metal Recycling Centre • Copper and Bronze wire Works • Made Ground • Unspecified Tank • Structural Engineering Works • Iron Works
Perched soil water (underlying site)	Direct contact with leachable contamination Infiltration of rainwater through made ground	• Metal Recycling Centre • Copper and Bronze wire Works • Made Ground • Unspecified Tank • Structural Engineering Works • Iron Works
Groundwater (underlying aquifer)	Infiltration of impacted water from contaminated soils Migration of perched soil water	• Metal Recycling Centre • Copper and Bronze wire Works • Made Ground • Unspecified Tank • Structural Engineering Works • Iron Works
Groundwater abstractions	Migration of impacted groundwater through aquifer	• Metal Recycling Centre • Copper and Bronze wire Works • Made Ground • Unspecified Tank • Structural Engineering Works • Iron Works
Surface water bodies	Migration of impacted groundwater through aquifer / perched water	• Metal Recycling Centre • Copper and Bronze wire Works • Made Ground • Unspecified Tank • Structural Engineering Works • Iron Works
Surface water abstractions	Migration of perched soil water	• Metal Recycling Centre • Copper and Bronze wire Works • Made Ground • Unspecified Tank • Structural Engineering Works • Iron Works

4.5 Preliminary Conceptual Model

In accordance with BS10175 a cross sectional model of the site was developed using data and observations collated in this report, as presented as Drawing 09/5512/4 within Appendix B.

The model shows the predicted geology and topography, the major potential

contamination sources, and potentially vulnerable receptors.

Drawing 09/5512/4 is a pictorial representation of an initial conceptual model. It must be borne in mind that this model is subject to revision, based on the findings of an intrusive investigation. The ground model and proposed end use should be considered broadly representative of the commercial and industrial land use as defined in the Environment Agency Science Report – SC050021/SR3 – 'Updated Technical Background to the CLEA model' for the purposes of this report.

5.0 FIELDWORK

5.1 Introduction

A programme of fieldwork investigation was undertaken in May 2009. The programme comprised:

- The drilling of four cable percussion boreholes to 12mbgl
- The installation and monitoring of standpipes in each of the cable percussion boreholes, for ground gas flow rate and composition, and for groundwater levels

The layout of the investigation is illustrated on Drawing 09/5512/3 in Appendix B.

The fieldwork was planned in accordance with BS10175: 2001, and carried out in accordance with BS10175: 2001 and BS5930: 1999, and the sampling and monitoring methodologies employed by ***CC GEOTECHNICAL LTD*** as presented in Appendix G, insofar as they related to the scope of the investigation.

5.2 Cable Percussion Boreholes

Boring tools were decontaminated prior to commencement, and between borehole moves.

Four cable percussion boreholes were drilled by a Dando 150 rig, the boreholes terminating within stiff clay at a depth of 12mbgl.

Standard Penetration Tests were carried out at regular intervals throughout the borehole depths. Undisturbed samples were recovered from cohesive strata, and bulk and small disturbed samples were recovered at regular incremental depths.

Subsamples of soils taken from the top 1m of each borehole were subjected to PID headspace analysis for evidence of the presence of volatile organic compounds. The results of the headspace analyses are annotated on the borehole logs.

The logs of the boreholes, annotated with sampling details, standpipe construction details, undrained cohesion values and `N` values are given in Appendix H.

5.3 Monitoring Installations

Standpipes comprising 50mm diameter HDPE plain and slotted welltube were installed in all four of the cable percussion boreholes. Each of the standpipes was fitted with a gas valve connection, and was protected by a flush cover set in concrete. Standpipe details are illustrated on the borehole logs in Appendix H.

The standpipe installations were periodically monitored for flow rate and composition of ground gas using a Geotechnical Instruments GA 2000 infra red analyser. The installations were also monitored for standing water levels using an electronic dipmeter.

The results of the gas and groundwater monitoring, together with calibration certificates of the instruments used, are given in Appendix I.

6.0 GROUND CONDITIONS

6.1 Observed Stratigraphy

The boreholes and trial pits generally confirmed the documented geology.

Beneath the superficial pavement layers, the succession may be generalised as follows:

Table 12: Summary of Documented Geology

STRATA	DESCRIPTION
Made ground	Made ground deposits detected at each location, of thickness varying from 1.0-1.6m. Made ground deposits were generally loose and found to comprise of a heterogeneous mixture of broken brick and coal ash in a brown/black silty sand matrix. Occasionally clayey with inclusions of broken concrete.
Natural drift soils	Loose/medium dense fine and medium silty gravely sand observed to a depth of typically 4.2mbgl. Thereafter the succession continued into firm tending to stiff brown silty sandy gravelly clay. Clay was proven to the point of boring termination at 12mbgl.
Bedrock	Bedrock not encountered

6.2 Groundwater

Perched soil water was encountered at a typical depth of 2.5mbgl, generally in sand deposits resting on the clay. These accumulations are likely to be significantly affected by variations in rainfall and seasonal weather. Within the depth investigated, there was a consistent groundwater profile, and standing levels recorded in monitoring visits are summarised hereunder:

Table 13: Observed Water Levels in Monitoring Programme

INSTALLATION LOCATION	DEPTH TO STANDING WATER (MBGL)				
Date of Visit	27/05/09	02/06/09	12/06/09	19/06/09	03/07/09
BH1	2.68	2.63	2.66	2.67	2.74
BH2	2.64	2.61	2.61	2.60	2.64
BH3	2.44	2.42	2.42	2.40	2.44
BH4	2.52	2.51	2.52	2.53	2.59

7.0 LABORATORY TESTING

7.1 Soil Engineering Laboratory Testing

The following programme of soil engineering laboratory testing was undertaken:

- Determination of moisture content in accordance with BS1377: Part 2:1990
- Determination of the liquid limit and plastic limit in accordance with BS1377: Part 2:1990
- Determination of undrained shear strength of clay soils in triaxial compression

with multistage loading and without measurement of pore pressure in accordance with BS1377: Part 7:1990

- Determination of particle size analysis by wet sieving in accordance with BS1377: Part 2: 1990

The soil engineering test results are presented in Appendix J.

7.2 Chemical Analyses

The following programme of chemical analyses was undertaken:

- Four samples of made ground soils were subjected to a broad spectrum chemical analysis suite including metals, non-metals, speciated PAH's, speciated TPH's and asbestos
- One soil sample obtained from close proximity to the former above ground tank was additionally subjected to VOC analysis
- One soil water sample obtained from a monitoring installation was subjected to a broad spectrum chemical analysis suite including metals, non-metals, speciated PAH's and total TPH's

The soil and soil water contamination test results are presented in Appendix K.

8.0 ASSESSMENT OF RISKS TO THE BUILT ENVIRONMENT

8.1 Assessment of Risk to Water Supply Mains

Based on the criteria specified in Paper 9-04-03: Oct 2002 published by the Water Regulations Advisory Scheme for pipe materials selection, the soil concentrations determined for a number of contaminants exceed their respective WRAS threshold criteria. Soil pH is locally alkaline and exceeds the threshold pH of 8.

In this circumstance, the guidance recommends the adoption of PE/Al/PE (Protectaline) mains laid in a remediated alignment comprising of clean granular fill extending to 1m + pipe diameter and to 300mm below pipe underside.

The assessment table is presented in Appendix M.

8.2 Specification of Buried Concrete

The data obtained in the investigations was assessed against the guidance given in BRE Special Digest 1: 2005, as summarised hereunder:

Table 14: Design Chemical Class Based on Soil Data

CONCRETE SPECIFICATION DATA SHEET		
Is the site Brownfield or Greenfield?	Brownfield	
Is the water table static or mobile?	Static	
Highest Water Soluble Sulphate result	1525 mg/l	Design Sulphate Class of DS-2 and ACEC Class of AC-1s
Lowest pH result	6.0	
Intended Working Life	50 years	**Adopt Design Chemical Classification of DC-1**

Table 15: Design Chemical Class Based on Soil Water Data

CONCRETE SPECIFICATION DATA SHEET		
Is the site Brownfield or Greenfield?	Brownfield	
Is the water table static or mobile?	Static	
Highest water soluble Sulphate result	335mg/l	Design Sulphate Class of DS-1 and ACEC Class of AC-1s
Lowest pH result	7.0	
Intended Working Life	50 years	**Adopt Design Chemical Classification of DC-1**

On the basis of the foregoing assessments, concrete in the ground should be specified to conform to the compositional requirements of Design Chemical Class DC 1, as defined in BRE Special Digest 1: 2005.

9.0 HUMAN HEALTH RISK ASSESSMENT

9.1 Legislative Background to Contaminated Land Assessment

Current approaches (CLR11- 'Model Procedures for the Management of Land Contamination' and Part IIA of the Environmental Protection Act 1990) to risk assessment of contaminated land suggest the construction of a Preliminary Conceptual Model. The purpose of this model is to define all possible complete pollution linkages, where the requisite source – pathway – target elements are present, these elements being defined as:

- a contaminant (source) is a hazardous substance or agent, present at levels that have the potential to cause harm or damage a receptor

- a pathway is the means by or through which a contaminant comes into contact with, or otherwise affects, the receptor

- a receptor (target) is an entity (human being, aquatic environment, flora and fauna etc) that is vulnerable to the adverse effects of the contaminant

This relationship is termed a "pollution linkage". It should be recognised that for a health or environmental risk to exist, all three elements of the relationship or linkage must be present, i.e.

- if there is no contaminant, or contaminant present at levels below those considered to be harmful or damaging to a receptor, then there can be no adverse effect on a receptor

- if there is no receptor present that can be adversely affected by a contaminant, no harm or damage can arise

- even where both a contaminant and a receptor are present, no harm or damage will occur if there is no pathway by or through which a linkage between the two can be established

9.2 Risk Assessment Methodologies

The risk assessment methodologies employed by ***CC GEOTECHNICAL LTD*** are based on the use of CLEA 1.04 and are detailed in Appendix G.

CLEA 1.04 GAC derivation worksheets are given in Appendix L. The input data and toxicological data will be provided to regulatory bodies on request.

The assessments of the soil contamination data are given in Appendix M.

9.3 Basis of Assessment of Risk to Human Health

It is proposed that a shredder waste advanced processing plant be sited at the existing waste recycling centre premises. For this land use scenario, it is appropriate to base the human health risk assessment on criteria derived for commercial / industrial land use, as defined in EA Science Report SC050021/SR3 issued in support of CLEA 1.04.

9.4 Assessment of Soil Contamination Data

An assessment of the soil contamination data in relation to risks to human health was undertaken by direct comparison of observed chemical concentration against derived generic assessment criteria. The findings are summarised hereunder.

9.5 Metals, Semi Metals and Non Metals:

Determined soil lead concentrations were in exceedance of the GAC and as such the results indicate a potential risk to human health.

All other determined concentrations of metals, semi-metals and non-metals were below their respective GAC and as such the results do not indicate a risk to human health.

9.6 Polycyclic Aromatic Hydrocarbons:

All detectable concentrations of PAH's were below their respective GAC and as such the results do not indicate a risk to human health.

9.7 Petroleum Hydrocarbons

All detectable concentrations of hydrocarbon fractions were below their respective GAC and as such the results do not indicate a risk to human health.

9.8 VOC's

One soil sample was subjected to speciated VOC analysis. Analysis did not confirm the presence of any VOC species and all determinands were reported below the limit of detection. As such the results do not indicate a risk to human health.

9.9 Asbestos:

Asbestos was not detected within any of the samples analysed. As such the results do not indicate a risk to human health.

10.0 ENVIRONMENTAL RISK ASSESSMENT

10.1 Assessment of Water Data

Following purging of the standpipes installed in the boreholes, one soil water sample was taken from BH2 and analysed for a broad range of contaminants.

Analysis results were then directly assessed against Environmental Quality Standards (EQS) and UK Drinking Water Standards (UK DWS). All concentrations of contaminants were within both the EQS and UK DWS criteria, and as such are not considered to pose a risk to the wider aquatic environment.

The summary assessment table is presented in Appendix M.

11.0 ASSESSMENT OF RISK FROM (LAND)FILL GASES

11.1 Introduction

The development of the Preliminary Conceptual Model has identified several off-site sources of potential ground gas including a historical landfill, a refuse heap and an infilled pond. However, it should be noted that each of these potential sources are off-site, at considerable distance from the site, and the on-site made ground source is likely to be the most significant source of ground gas. As such the ground gassing monitoring programme, in accordance with guidance provided in CIRIA C665, was designed on the basis of a commercial/industrial development (low sensitivity), and an inert made ground source (very low gassing potential).

Following completion of the monitoring programme a risk assessment was undertaken in accordance with the methodology given in Appendix G, which accords with current guidance on the assessment of risks posed by ground gases.

11.2 Measured Gas Concentrations

Each of the four installed monitoring installations was monitored for ground gas composition and flow on a total of five occasions. The results of the gas monitoring undertaken are summarised hereunder:

Table 16: Summary of Gas Monitoring Data

POSITION	BH1	BH2	BH3	BH4
No Monitoring Visits	5	5	5	5
CH_4 (%)	NIL	NIL	NIL	NIL
CO_2 (%)	4.1-4.8	NIL-0.7	NIL	0.3-0.5
O_2 (%)	12.2-16.1	19.0-20.9	20.4-21.1	19.2-20.2
H_2S (ppm)	NIL	NIL	NIL	NIL
CO (ppm)	NIL	NIL	NIL	NIL
Flow (l/hr)	<0.1	<0.1	<0.1	<0.1
Water Levels (mbgl)	2.63-2.74	2.60-2.64	2.40-2.44	2.51-2.59
Pressure Range (mb)	1006-1027	1006-1027	1006-1027	1006-1027

11.3 Ground Gas Risk Assessment

Monitoring was undertaken at a range of atmospheric pressures, including periods of rapidly falling pressure.

Applying the guidance given in Table 8.5 CIRIA C665 the worst case Characteristic Situation measured at the site may be summarised as below:

Table 17: Summary of Gas Characteristic Situation

Position	Flow (l/hr)	CH_4			CO_2		
		%v/v	GSV(l/hr)	Characteristic Situation	%v/v	GSV(l/hr)	Characteristic Situation
BH1	<0.1	<0.1	<0.0001	1	4.8	0.0048	1
BH2	<0.1	<0.1	<0.0001	1	0.7	0.0007	1
BH3	<0.1	<0.1	<0.0001	1	0.1	0.0001	1
BH4	<0.1	<0.1	<0.0001	1	0.4	0.0004	1

This assessment indicates that the site complies with Characteristic Situation 1, for developments falling under Situation A as defined in CIRIA C665, and hence protective measures are not required.

12.0 REFINED CONCEPTUAL MODEL & REMEDIAL RECOMMENDATIONS

Based on the findings of the investigation, a conceptual model was constructed illustrating proven pollution linkages and refining the pre investigation model. Conceptual remediation recommendations are proposed against each proven linkage as tabulated hereunder.

Table 18: Conceptual model

SOURCE	PATHWAY	RECEPTOR	REMEDIAL OPTIONS
Arsenic, Cadmium, Chromium, Lead, pH, Total Sulphate, Total TPH, Total PAH's widespread across site above WRAS thresholds	Contamination leaching into water mains. Direct contact with water mains	Potable water consumers Degradation of fabric of water mains	Any proposed new water mains to be specified as PE/AL/PE and laid in a clean remediated alignment comprising of granular fill placed to 1m width and to 300mm below pipe underside
Elevated concentrations of Lead widespread across site soils	Direct soil ingestion Inhalation of dust	Human worker occupants Construction workers	Site is to be covered with hardstanding. No soft landscaping is proposed. In the post construction state, the presence of hardstanding across the site will break all pertinent pathways of exposure to human worker occupants, and transient users / trespassers Construction workers should be advised of good practice and equipped with the necessary PPE to mitigate risk

Given that the site at present is largely covered by concrete hardstanding, and that following the construction of the SWAPP the entirety of the site will be covered by concrete, contaminant migration via infiltration of rainwater will be effectively eliminated. As such the concentrations of Lead determined within the site soils are not considered to pose a significant risk to off-site receptors.

13.0 SITE WASTE MANAGEMENT PLAN & PRELIMINARY WASTE CLASSIFICATION

From April 2008, SWMP Regulations 2008 came into force requiring that all construction projects costing over £300k have a Site Waste Management Plan (SWMP). The purpose of the plan is to ensure that:

- Building materials are managed efficiently
- Waste is disposed of legally
- Material recycling, reuse and recovery is maximised.

Pre construction, this may be a person on the Client side, although at construction stage, the contractor must appoint a person with overall responsibility for production and implementation of the plan

In preparing the SWMP for this site, it may be assumed on the basis of soil contamination data obtained in this investigation, that all site soils have the potential for reuse on site. It is important of course, to further assess the specific engineering properties of soils and/or site generated fill (crushed pavements / crushed brick etc), where they are proposed for use in structural applications such as road capping or engineered fill, since they may not be suitable for such applications. Such assessments can only realistically be carried out on bulk stockpiles of materials.

With regard to the offsite disposal of surplus spoil, in July 2004, the Landfill Directive 1999/31/EC was invoked, and from this date, spoil for disposal arising from site construction works, must be assessed in accordance with Waste Acceptance Criteria (WAC) and EA Document RGN18 Waste Acceptance Criteria for Landfills for Non Hazardous Waste.

Based on the methodology discussed in Environment Agency publication "Framework for the Classification of Contaminated Soils as Hazardous Waste", the soil contamination data has been analysed and spoil removed from the site will likely classify as 'Non Hazardous' waste. The methodology for the classification of waste is presented in Appendix G, and the waste classification assessment is presented in Appendix M.

Furthermore, to achieve optimal economy of disposal costs, if significant quantities of 'Non Hazardous' spoil are to be carted offsite, it is recommended that the spoil be stockpiled, pending performance of Waste Acceptance Criteria analyses. It is possible subject to the outcome of WAC analysis that 'Non Hazardous' waste may classify as suitable for disposal as 'Inert Waste', thus allowing for substantial cost savings.

14.0 HEALTH AND SAFETY DURING CONSTRUCTION WORKS

Notwithstanding the above human health risk assessment, during the construction works there will be a risk from dust to site workers and nearby occupants of industrial/commercial properties. Appropriate risk assessment should be carried out by the contractor to allow appropriate controls for the risk to health of construction workers / nearby site users to be implemented. This risk can be controlled to within acceptable limits by:

- Control of dust generation
- Use of suitable Personal Protective Equipment (PPE)
- Provision of adequate hygiene facilities for workers
- Prohibition of smoking and eating on site

15.0 FOUNDATIONS

15.1 Introduction

It is proposed that heavy process machinery foundations be constructed. Such foundations must spread the load of installed machinery on the ground such that excessive settlement or tilting of the foundation block, relative to other fixed installations, will not occur. Furthermore, the foundations must possess sufficient rigidity to prevent fracture or excessive bending under heavy concentrated loadings, and should absorb or damp down vibrations which may induce settlement, particularly in granular soils.

15.2 Raft Foundations

With these objectives in mind, careful consideration must be given as to the suitability of the observed stratigraphy to support a heavy raft foundation. Under no circumstances should the made ground be loaded by foundations. The underlying sand exhibits variable density as evidenced by the "medium dense" `N` values obtained at BH3 and BH4, and the "loose" `N` values obtained at BH1 and BH2. These results are probably good enough for normal static loadings under a heavy raft, but may indicate a susceptibility to differential settlement under dynamic loading. If a raft foundation is to be adopted, then it is recommended that

the made ground be removed over the raft slab footprint, and the ground be reconstructed with durable, well graded granular fill (DTp Type 1 or equivalent), placed and compacted in 200mm layers to a completed thickness of 1m. A geotextile separation layer should be placed between the granular fill and the sand.

15.3 Piled Foundations

It may be preferable to consider a series of individually piled foundation supporting the various elements of the process layout. In this location, noise and vibrations are probably not significant considerations, and hence consideration may be given to use of driven piles – precast concrete or steel tube.

For the purposes of preliminary design it is recommended that no shaft friction is attributed to the made ground and sand deposits. The designer should base pile carrying capacity on a shaft friction in the clay stratum of 36kN/m^2. At 12m depth, end bearing may be calculated on an Allowable Bearing Pressure of 300kN/m^2. Thus the carrying capacities of single isolated precast concrete piles installed to 12mbgl, may be estimated as follows:

Pile Section mm x mm	Carrying Capacity kN
200 x 200	250
250 x 250	310
275 x 275	345

Piling contractors must be required to verify these estimates and/or provide estimates for their own proprietary piles in isolation and in groups as appropriate to the design.

16.0 CONSTRUCTION CONSIDERATIONS

16.1 Excavations

The superficial soils on parts of the site above the clay stratum lack cohesion, and some instability of excavation sides should be anticipated. Provision should be made for support of all excavations in excess of 1.2m depth.

16.2 Groundwater Control

Whilst large inflows are unlikely in relation to the foreseeable depth of foundation and service excavations, the observed perched water table suggests that water ingress is likely to significantly hamper any excavations undertaken to a depth beyond 2.3mbgl. Where excavations beyond this depth are proposed, provision should be allowed for pumping to develop and maintain dry working conditions.

17.0 CONCLUSIONS & RECOMMENDATIONS

The conclusions and recommendations hereunder are based on the salient sections of the report and should not be referred to in isolation of the relevant sections of the text. All recommendations are subject to Regulatory Authority review.

Table 19: Summary of Conclusions

SOIL CONTAMINATION
Elevated Lead has been identified as widespread across the site.
In order to mitigate risk to construction workers during the construction/plant installation phase appropriate guidance on good practice and the necessary PPE should be provided.
In the post construction state, the presence of hardstanding across the site will break all pertinent pathways of exposure to human worker occupants, and transient users / trespassers
GAS PROTECTION
The results of monitoring of gas flow / composition at standpipes has determined the gassing regime prevailing at the site to conform to characteristic situation 1 and in line with guidance provided in CIRIA C665 gas protection measures will not be required for buildings.
MINING
The site is an area local to coal reserves, but the evidence of a Mining Report is that the site is not affected by shallow mining works.
RADON
The site is not in an area which is at risk from radon.
CONCRETE SPECIFICATION
Concrete should be specified to conform to the compositional requirements of Design Chemical Class DC-1 as defined in BRE Special Digest 1: 2005.
WATER MAINS
Potable water mains should be specified as PE/Al/PE, and should be laid in a remediated alignment comprising a channel of clean imported granular fill of 1m width and extending to 300m below underside of main.
WASTE CLASSIFICATION
Soil contamination data has been analysed and spoil removed from the site will likely classify as 'Non Hazardous' waste. The performance of WAC analysis may determine waste to be suitable for disposal to an inert landfill
ENVIRONMENTAL RISK
Perched water was analysed and assessed against DWS and EQS criteria. Concentrations of contaminants were within both the EQS and UK DWS criteria, and as such are not considered to pose a risk to the wider aquatic environment.

Table 19: Summary of Conclusions (continued)

FOUNDATIONS
If a raft foundation is to be adopted, then it is recommended that the made ground be removed over the raft slab footprint, and the ground be reconstructed with durable, well graded granular fill (DTp Type 1 or equivalent), placed and compacted in 200mm layers to a completed thickness of 1m. A geotextile separation layer should be placed between the granular fill and the sand. Alternatively, it may be preferable to consider a series of individually piled foundation supporting the various elements of the Plant. In this location, noise and vibrations are unlikely to be prohibitive, and consideration may be given to use of driven piles – precast concrete or steel tube.
EXCAVATIONS
The superficial soils above the clay stratum lack cohesion, and some instability of excavation sides should be anticipated. Provision should be made for support of all excavations in excess of 1.2m depth.
GROUNDWATER CONTROL
Whilst large inflows are unlikely in relation to the foreseeable depth of foundation and service excavations, the observed lithology suggests that accumulations of water may perch on the clay stratum and flow in to excavations beyond 2.3mbgl, and hence some provision should be allowed for minor pumping to develop and maintain dry working conditions.

APPENDIX A

NOTES ON LIMITATIONS

Standard Terms and Conditions of Engagement
Notes on Limitations
For
Geoenvironmental and Geotechnical Consultancy Services

General

CC GEOTECHNICAL LTD has prepared this report solely for the use of the Client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought form CC GEOTECNICAL and a charge may be levied against such approval.

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1. the consequences of this document being used for any purpose or project other than for which it was commissioned

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Phase I Environmental Audits / Desk Studies

The work undertaken to provide the basis of a Phase 1 Desk Study report comprises a study of available documented information from a variety of sources (including the client), together with (where appropriate) a brief walk over inspection of the site and meetings and discussions with relevant authorities and other interested parties. The opinions given in a Desk Study report have been dictated by finite data on which they are based and are relevant only to the purpose for which the report was commissioned. The information reviewed should not be considered exhaustive and has been accepted in good faith as providing true and representative data pertaining to site conditions. Should additional information become available which may affect the opinions expressed in the report, CC GEOTECHNICAL LTD reserves the right to review such information and to modify the opinions accordingly.

It should be noted that any risks identified in this report are perceived risks based on the information reviewed; actual risks can only be assessed following a physical investigation of the site.

Phase II Environmental Audits

The investigation of the site has been carried out with the intention of providing sufficient information concerning the type and degree of contamination, and ground and groundwater conditions to allow a reasonable risk assessment to be made. The objectives of the investigation have been limited to establishing the risks associated to potential human targets, building materials, the environment (including adjacent land), and surface and groundwater.

The amount of exploratory work and chemical testing undertaken may have been restricted by the timescale available, and the locations of the exploratory holes may have been restricted to areas unoccupied by the building(s) on the site, and further restricted by the existence of buried services. A more comprehensive investigation may be required if the site is to be redeveloped as, in addition to risk assessment, a number of important engineering and environmental issues may need to be resolved.

For those reasons, if costs have been included in relation to site remediation these must be considered as tentative only and must, in any event, be confirmed by a qualified quantity surveyor.

The exploratory holes undertaken, investigate only a small volume of the ground in relation to the size of the site, and can only provide a general indication of site conditions. The number of sampling points and the methods of sampling and testing do not preclude the existence of localised “hotspots” of contamination where concentrations may be significantly higher than those actually encountered.

Geoenvironmental Ground Investigations

The investigation of the site has been carried out to provide sufficient information within the agreed scope of the investigation, under the general headings of type and degree of contamination, geotechnical characteristics, and ground and groundwater conditions, to provide a reasonable assessment of the environmental risks together with engineering and development implications.

If costs have been included in relation to the site remediation, these must be confirmed by a qualified quantity surveyor.

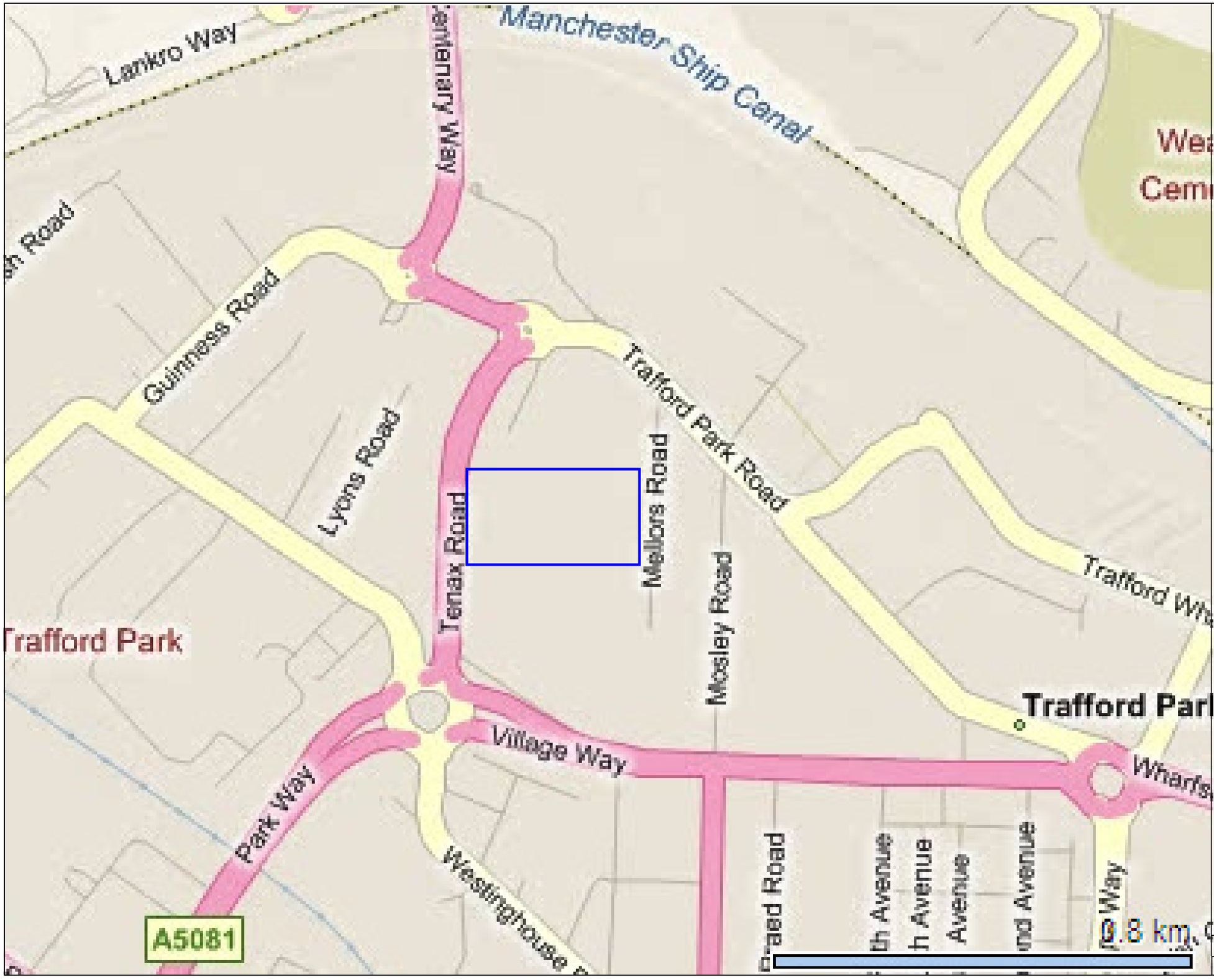
The exploratory holes undertaken, investigate only a small volume of the ground in relation to the size of the site, and can only provide a general indication of the site conditions. The opinions provided and recommendations given in this report are based on the ground conditions apparent at the site of each of the exploratory holes. There may be ground conditions present on the site which have not been disclosed by this investigation, and which have therefore not been taken into account in this report.

The comments made on groundwater conditions are based on observations made at the time that site work was carried out. It should be noted that groundwater levels will vary owing to seasonal, tidal, weather, or other effects.

The risk assessment and opinions provided, inter alia, take into consideration currently available guidance relating to acceptable contamination concentrations; no liability can be accepted for the retrospective effects of any future changes or amendments to these values.

APPENDIX B

DRAWINGS



CC Geotechnical
Essex House
Bridle Road
Bootle
Liverpool
L30 4UE
Tel: 0151 523 0202
Fax: 0151 523 0252
Email:
enquiries@ccgeotechnical.co.uk

Site Location Plan

Drawing Number: 09/5434/1

CC Geotechnical

Essex House
Bridle Road
Bootle
Liverpool
L30 4UE
Tel: 0151 523 0202
Fax: 0151 523 0252
Email:
enquiries@ccgeotechnical.co.uk

Aerial Plate

Drawing Number: 09/5512/2

N

AREA TO BE OCCUPIED BY PROPOSED
SHREDDER WASTE ADVANCED
PROCESSING PLANT 'SWAPP'

BH1

BH2

BH3

BH4

90 PE

90 PE

90 PE

125 PE

90 PE

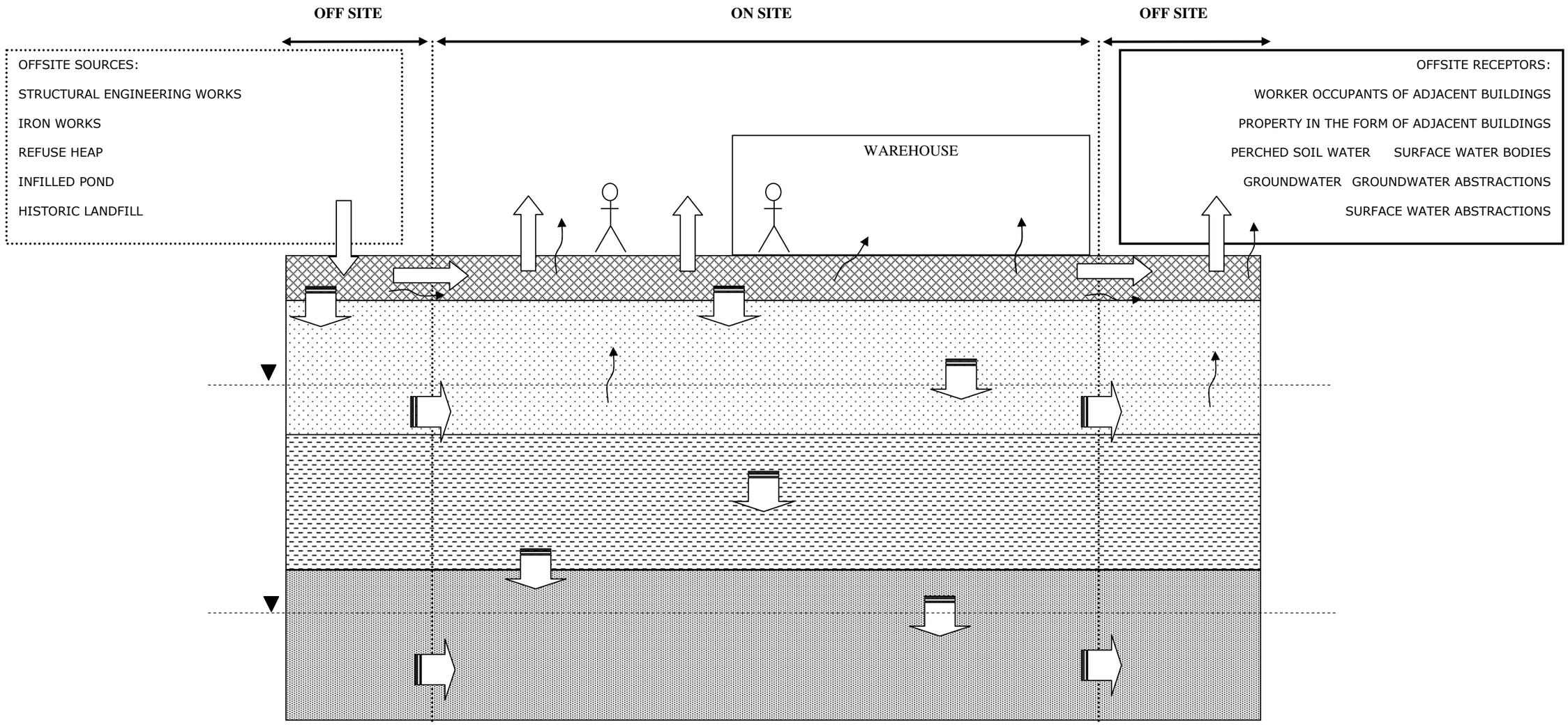
125 PE

90 PE

SCALE

50M

Project:	S.NORTON, TENAX ROAD
Drawing Number:	09/5512/3 SITE INVESTIGATION LAYOUT



HORIZONTAL DIRECTION ASSIGNED TO CONTAMINANT MIGRATION ARE NOTIONAL ONLY

Key:

- Made Ground
- Sand and Gravel
- Glacial Till
- Sandstone
- Perched water / Groundwater level
- Human health / direct contact pathway
- Surface water / groundwater pathway
- Vapour exposure / pathway
- Off site receptor
- Off site source

Project:	S.NORTON, TENAX ROAD
Drawing Number:	09/5512/4 PICTORIAL PRELIMINARY CONCEPTUAL MODEL

APPENDIX C

PHOTOGRAPHS AND KEY PLAN

N

AREA TO BE OCCUPIED BY PROPOSED
SHREDDER WASTE ADVANCED
PROCESSING PLANT 'SWAPP'

BH1
BH2
BH3
BH4
1
2
3
4
5
6
7
8
9
10

90 PE
125 PE
Tenax Road
Scrap Yard
Works

SCALE
50M

Project:	S.NORTON, TENAX ROAD
Drawing Number:	PHOTOGRAPH KEY PLAN

CC Geotechnical

Essex House Bridle Road Bootle Merseyside L30 4UE
TEL: 0151 523 0202 FAX: 0151 523 0252

PhotographNumber:	1
Project:	Tenax Road, S.Norton & Co Ltd
View:	Looking east across site from north boundary

CC Geotechnical

Essex House Bridle Road Bootle Merseyside L30 4UE
TEL: 0151 523 0202 FAX: 0151 523 0252

PhotographNumber:	2
Project:	Tenax Road, S.Norton & Co Ltd
View:	Looking north east across site from access road

CC Geotechnical

Essex House Bridle Road Bootle Merseyside L30 4UE
TEL: 0151 523 0202 FAX: 0151 523 0252

PhotographNumber:	3
Project:	Tenax Road, S.Norton & Co Ltd
View:	Looking east across site access road

CC Geotechnical

Essex House Bridle Road Bootle Merseyside L30 4UE
TEL: 0151 523 0202 FAX: 0151 523 0252

PhotographNumber:	4
Project:	Tenax Road, S.Norton & Co Ltd
View:	Looking west at entrance to ‘non-ferrous’ warehouse

CC Geotechnical

Essex House Bridle Road Bootle Merseyside L30 4UE
TEL: 0151 523 0202 FAX: 0151 523 0252

PhotographNumber:	5
Project:	Tenax Road, S.Norton & Co Ltd
View:	Stockpiled recovered metals at position east of ‘non-ferrous’ warehouse

CC Geotechnical

Essex House Bridle Road Bootle Merseyside L30 4UE
TEL: 0151 523 0202 FAX: 0151 523 0252

PhotographNumber:	6
Project:	Tenax Road, S.Norton & Co Ltd
View:	Looking west inside entrance of 'non-ferrous' warehouse. View of existing plant and stockpiled product

CC Geotechnical

Essex House Bridle Road Bootle Merseyside L30 4UE
TEL: 0151 523 0202 FAX: 0151 523 0252

PhotographNumber:	7
Project:	Tenax Road, S.Norton & Co Ltd
View:	Looking west inside at rear of ‘non-ferrous’ warehouse. View of stockpiled product

CC Geotechnical

Essex House Bridle Road Bootle Merseyside L30 4UE
TEL: 0151 523 0202 FAX: 0151 523 0252

PhotographNumber:	8
Project:	Tenax Road, S.Norton & Co Ltd
View:	Looking west across site from northern boundary

CC Geotechnical

Essex House Bridle Road Bootle Merseyside L30 4UE
TEL: 0151 523 0202 FAX: 0151 523 0252

PhotographNumber:	9
Project:	Tenax Road, S.Norton & Co Ltd
View:	Looking west across site from northern boundary

CC Geotechnical

Essex House Bridle Road Bootle Merseyside L30 4UE
TEL: 0151 523 0202 FAX: 0151 523 0252

PhotographNumber:	10
Project:	Tenax Road, S.Norton & Co Ltd
View:	View east across site form former car park area at north west corner

APPENDIX D

HISTORICAL O.S. MAPS

Ordnance Survey® Historical Mapping Extract

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Site Details:

S. Norton & Co Ltd, Tenax Road,
Trafford Park, M17 1JT

Client Ref: 4165
Report Ref: CMAPS-CM-29165-4165-140509HIS
Grid Ref: 378727, 397268

Map Name: MasterMap

Map date: **2008**

Scale: 1:2,500

Printed at: 1:2,500

2008

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Trafford Park, M17 1JT

Client Ref: 4165
Report Ref: CMAPS-CM-29165-4165-140509HIS
Grid Ref: 378727, 397268

Map Name: National Grid

Map date: **1993-1995**

Scale: 1:1,250

Printed at: 1:2,500

Surveyed 1993 Revised 1993 Edition NA Copyright 1993 Levelled NA	Surveyed 1994 Revised 1994 Edition NA Copyright 1994 Levelled NA	Surveyed 1995 Revised 1995 Edition NA Copyright 1995 Levelled NA
Surveyed 1995 Revised 1995 Edition NA Copyright 1995 Levelled NA	Surveyed ? Revised ? Edition NA Copyright NA Levelled NA	Surveyed 1994 Revised 1994 Edition NA Copyright 1994 Levelled NA
		Surveyed 1994 Revised 1994 Edition NA Copyright 1994 Levelled NA

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Client Ref: 4165
Report Ref: CMAPS-CM-29165-4165-140509HIS
Grid Ref: 378727, 397268

Map Name: National Grid

Map date: **1984-1987**

Scale: 1:1,250

Printed at: 1:2,500

Surveyed 1958
Revised 1985
Edition NA
Copyright 1985
Levelled 1958

Surveyed ?
Revised ?
Edition NA
Copyright 1986
Levelled 1958

Surveyed 1958
Revised 1984
Edition NA
Copyright 1984
Levelled 1958

Surveyed 1958
Revised 1986
Edition NA
Copyright 1986
Levelled 1958

Surveyed 1958
Revised 1987
Edition NA
Copyright 1987
Levelled 1958

Surveyed 1958
Revised 1986
Edition NA
Copyright 1986
Levelled 1958

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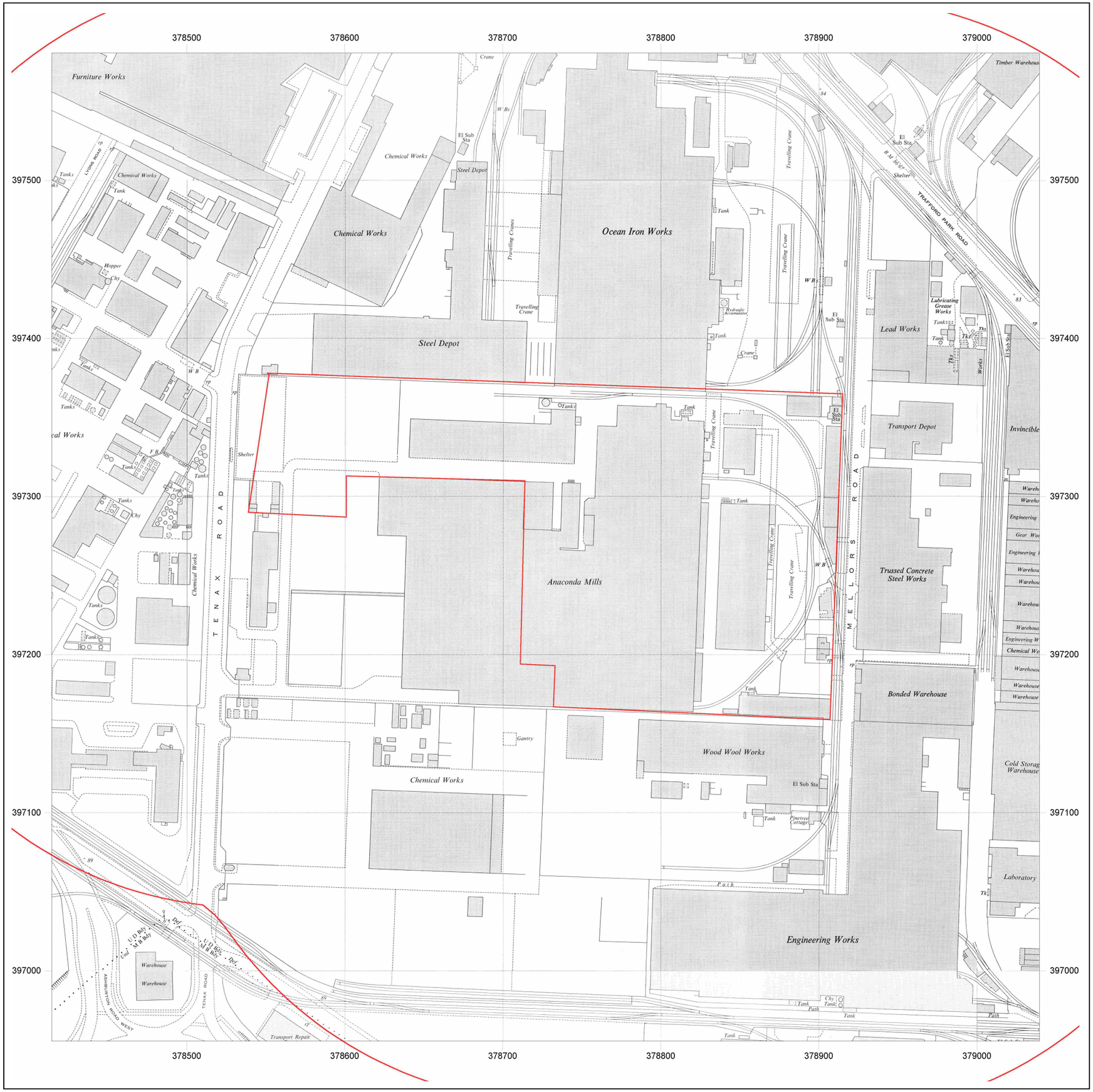

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S. Norton & Co Ltd, Tenax Road,
Trafford Park, M17 1JT

Client Ref: 4165
Report Ref: CMAPS-CM-29165-4165-140509HIS
Grid Ref: 378727, 397268

Map Name: National Grid

Map date: **1968-1969**

Scale: 1:1,250

Printed at: 1:2,500

Surveyed 1953 Revised 1968 Edition NA Copyright 1968 Levelled 1958	Surveyed 1953 Revised 1968 Edition NA Copyright 1968 Levelled 1958	Surveyed 1953 Revised 1967 Edition NA Copyright 1968 Levelled 1958
Surveyed 1953 Revised 1968 Edition NA Copyright 1968 Levelled 1958	Surveyed 1953 Revised 1968 Edition NA Copyright 1968 Levelled 1958	Surveyed 1953 Revised 1967 Edition NA Copyright 1968 Levelled 1958
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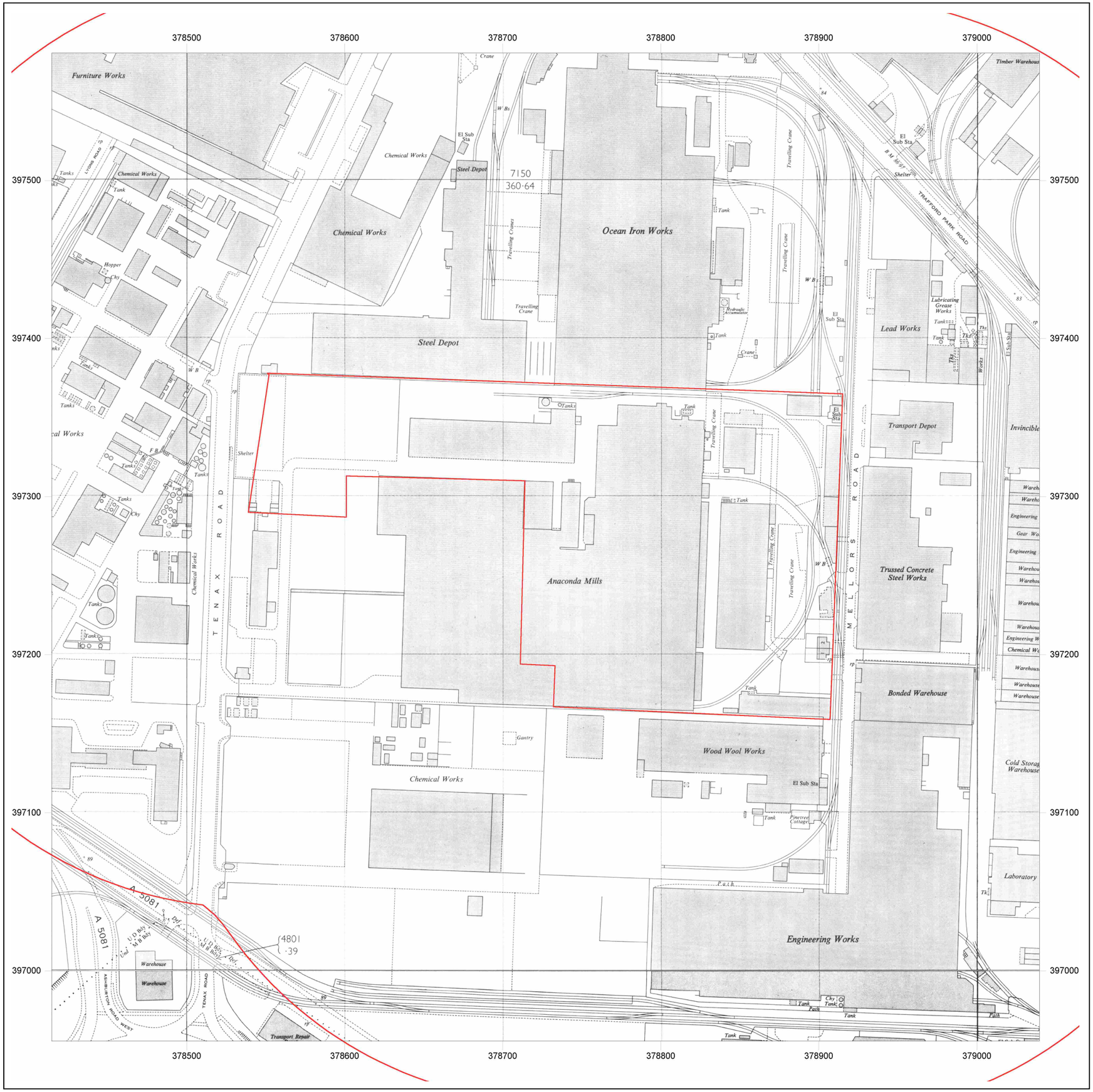
Production date:14 May 2009



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Client Ref: 4165
Report Ref: CMAPS-CM-29165-4165-140509HIS
Grid Ref: 378727, 397268

Map Name: National Grid

Map date: **1969**

Scale: 1:2,500

Printed at: 1:2,500

Surveyed 1969
Revised 1969
Edition NA
Copyright 1970
Levelled 1958

Surveyed 1969
Revised 1969
Edition NA
Copyright 1971
Levelled 1958

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Client Ref: 4165
Report Ref: CMAPS-CM-29165-4165-140509HIS
Grid Ref: 378727, 397268

Map Name: National Grid

Map date: **1953-1954**

Scale: 1:2,500

Printed at: 1:2,500

Surveyed 1953
Revised 1953
Edition 1955
Copyright NA
Levelled 1948

Surveyed 1953
Revised 1953
Edition 1954
Copyright NA
Levelled 1949

Surveyed 1954
Revised 1954
Edition 1955
Copyright NA
Levelled 1948

Surveyed 1953
Revised 1953
Edition 1955
Copyright NA
Levelled 1949

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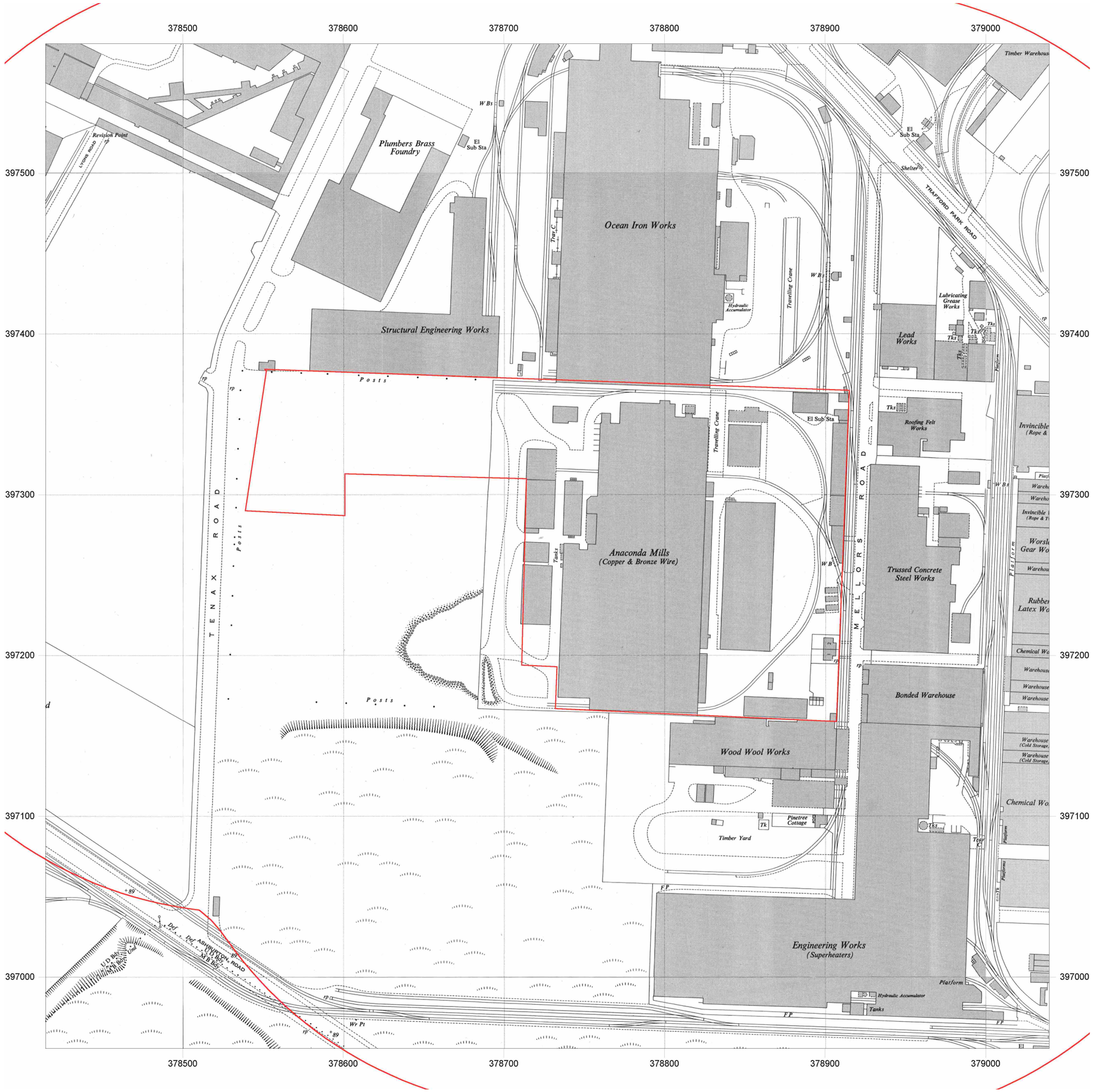

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Client Ref: 4165
Report Ref: CMAPS-CM-29165-4165-140509HIS
Grid Ref: 378727, 397268

Map Name: National Grid

Map date: **1953**

Scale: 1:1,250

Printed at: 1:2,500

Surveyed 1953 Revised 1953 Edition NA Copyright NA Levelled 1948	Surveyed 1953 Revised 1953 Edition NA Copyright NA Levelled 1948	Surveyed 1953 Revised 1953 Edition NA Copyright NA Levelled 1948
Surveyed 1953 Revised 1953 Edition NA Copyright NA Levelled 1948	Surveyed 1953 Revised 1953 Edition NA Copyright NA Levelled 1948	Surveyed 1953 Revised 1953 Edition NA Copyright NA Levelled 1949
Surveyed 1953 Revised 1953 Edition NA Copyright NA Levelled 1948	Surveyed 1953 Revised 1953 Edition NA Copyright NA Levelled 1948	Surveyed 1953 Revised 1953 Edition NA Copyright NA Levelled 1949

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Client Ref: 4165
Report Ref: CMAPS-CM-29165-4165-140509HIS
Grid Ref: 378727, 397268

Map Name: County Series

Map date: **1937**

Scale: 1:2,500

Printed at: 1:2,500

Surveyed 1937
Revised 1937
Edition NA
Copyright NA
Levelled NA

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Client Ref: 4165
Report Ref: CMAPS-CM-29165-4165-140509HIS
Grid Ref: 378727, 397268

Map Name: County Series

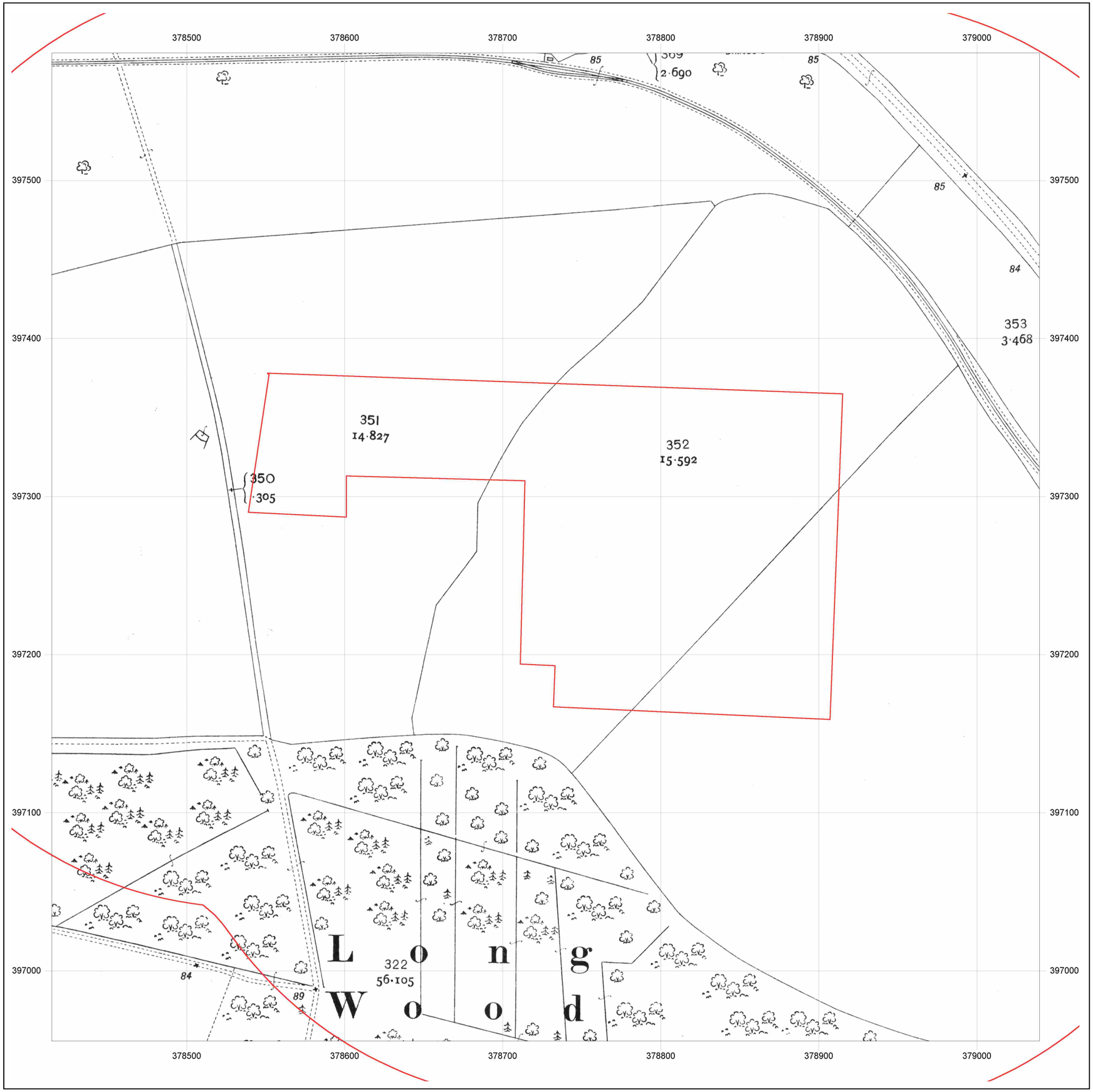
Map date: **1929**

Scale: 1:2,500

Printed at: 1:2,500

Surveyed 1929
Revised 1929
Edition NA
Copyright NA
Levelled NA

Production date:14 May 2009



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Client Ref: 4165
Report Ref: CMAPS-CM-29165-4165-140509HIS
Grid Ref: 378727, 397268

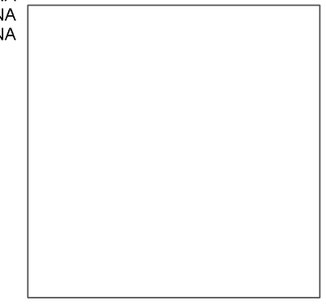
Map Name: County Series

Map date: **1908**

Scale: 1:2,500

Printed at: 1:2,500

Surveyed 1908
Revised 1908
Edition NA
Copyright NA
Levelled NA



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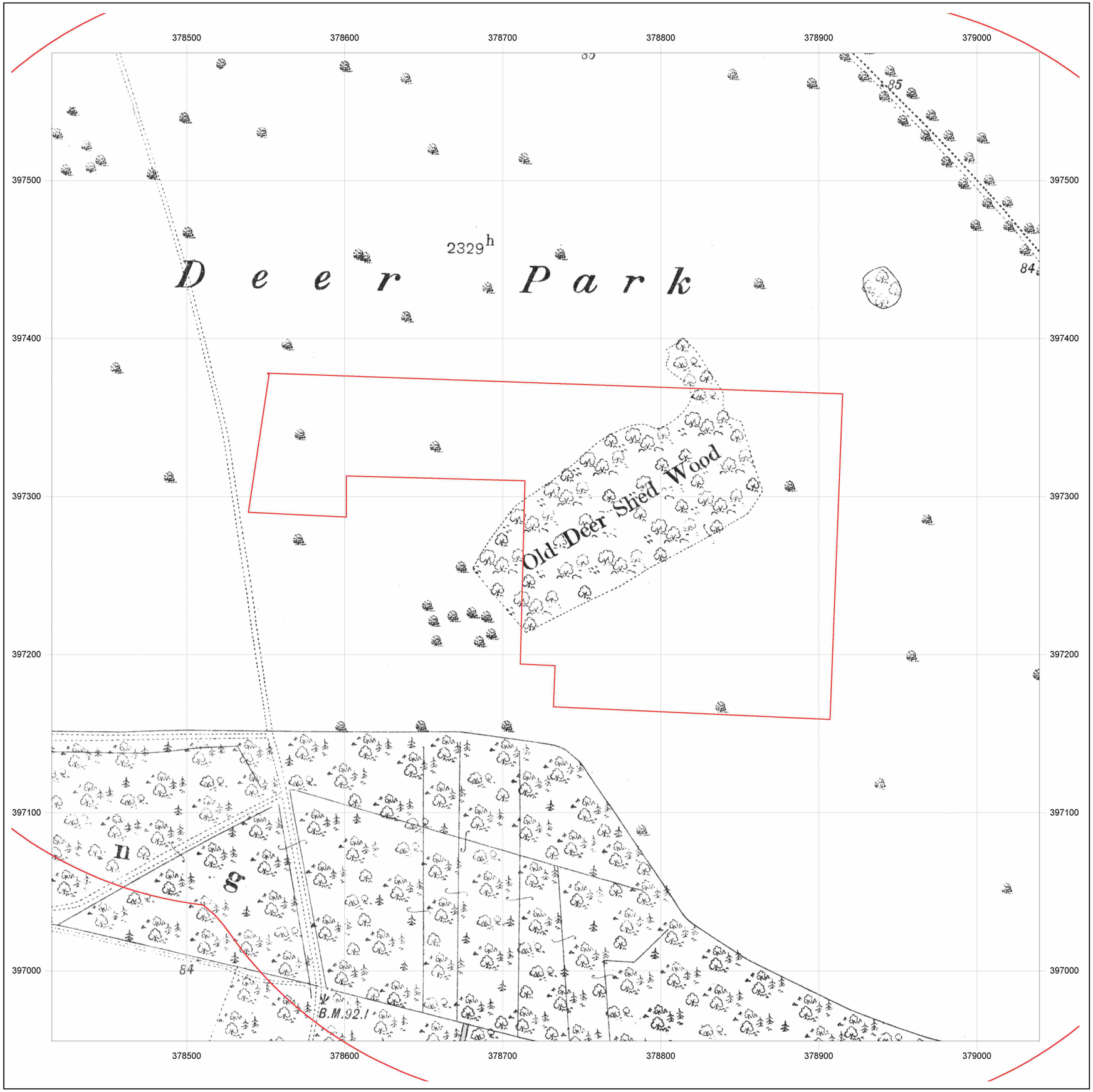

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Client Ref: 4165
Report Ref: CMAPS-CM-29165-4165-140509HIS
Grid Ref: 378727, 397268

Map Name: County Series

Map date: **1890**

Scale: 1:2,500

Printed at: 1:2,500

Surveyed 1890
Revised 1890
Edition NA
Copyright NA
Levelled NA

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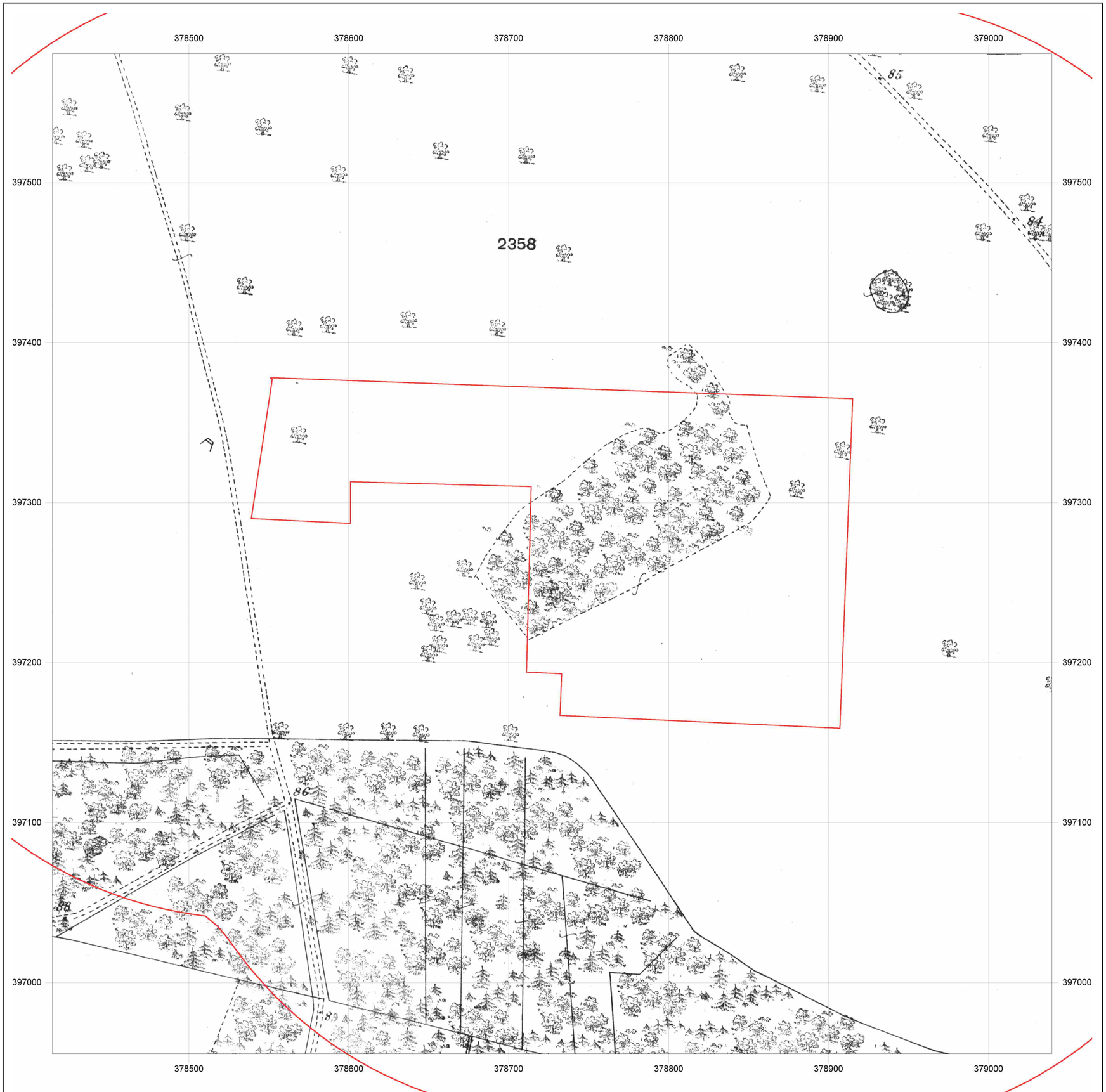

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Trafford Park, M17 1JT

Client Ref: 4165
Report Ref: CMAPS-CM-29165-4165-140509HIS
Grid Ref: 378727, 397268

Map Name: County Series

Map date: **1876**

Scale: 1:2,500

Printed at: 1:2,500

Surveyed 1876
Revised 1876
Edition NA
Copyright NA
Levelled NA

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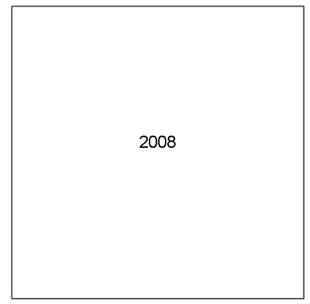
Client Ref: 4165
Report Ref: CMAPS-CM-29165-4165-140509HIS
Grid Ref: 378727, 397268

Map Name: National Grid

Map date: **2008**

Scale: 1:10,000

Printed at: 1:10,000



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Client Ref: 4165
Report Ref: CMAPS-CM-29165-4165-140509HIS
Grid Ref: 378727, 397268

Map Name: 1:10,000 Raster

Map date: **2002**

Scale: 1:10,000

Printed at: 1:10,000

2002

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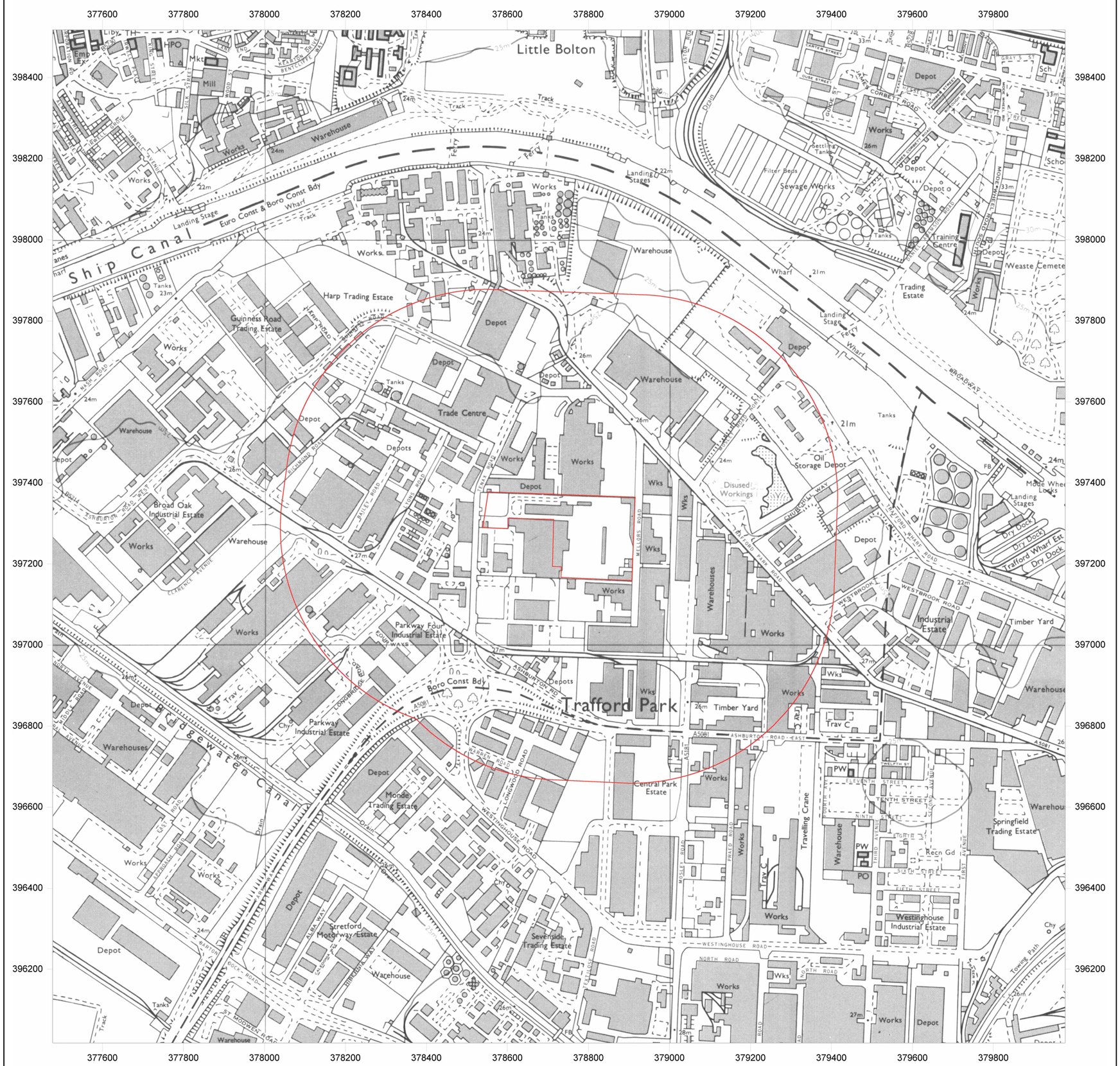
Production date:14 May 2009



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Trafford Park, M17 1JT

Client Ref: 4165
Report Ref: CMAPS-CM-29165-4165-140509HIS
Grid Ref: 378727, 397268

Map Name: National Grid

Map date: **1989**

Scale: 1:10,000

Printed at: 1:10,000

Surveyed 1988
Revised 1989
Edition NA
Copyright NA
Levelled NA

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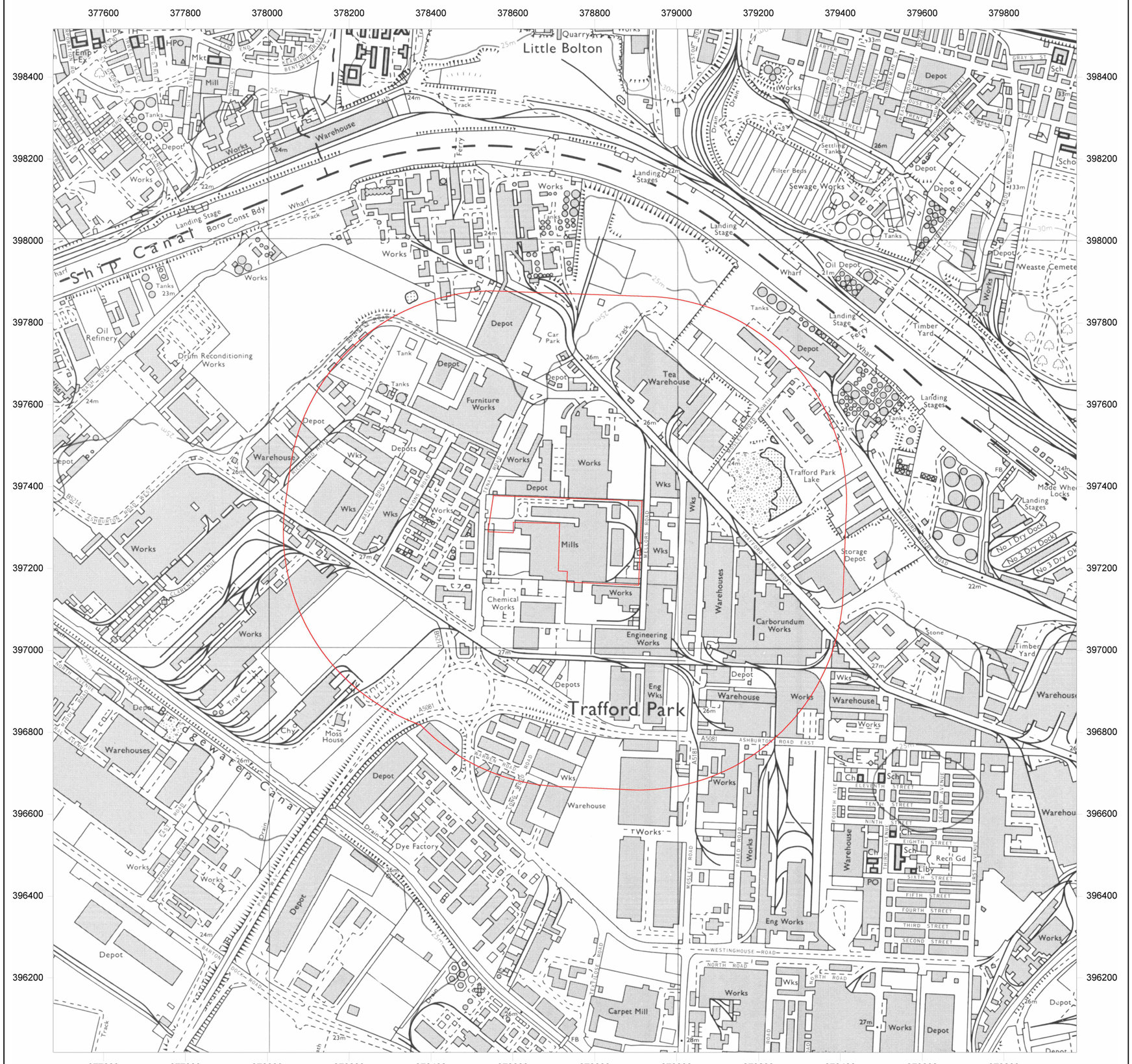
Production date:14 May 2009



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Site Details:

S. Norton & Co Ltd, Tenax Road,
Trafford Park, M17 1JT

Client Ref: 4165
Report Ref: CMAPS-CM-29165-4165-140509HIS
Grid Ref: 378727, 397268

Map Name: National Grid

Map date: **1977**

Scale: 1:10,000

Printed at: 1:10,000

Surveyed 1976
Revised 1977
Edition NA
Copyright NA
Levelled NA

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Client Ref: 4165
Report Ref: CMAPS-CM-29165-4165-140509HIS
Grid Ref: 378727, 397268

Map Name: Provisional

Map date: **1956**

Scale: 1:10,560

Printed at: 1:10,560

Surveyed 1956
Revised 1956
Edition NA
Copyright NA
Levelled NA

Surveyed 1956
Revised 1956
Edition NA
Copyright NA
Levelled NA

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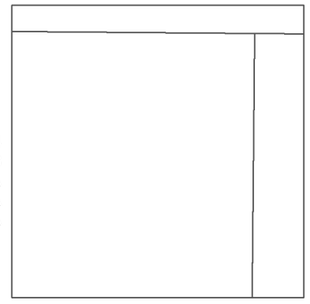
Client Ref: 4165
Report Ref: CMAPS-CM-29165-4165-140509HIS
Grid Ref: 378727, 397268

Map Name: County Series

Map date: **1938**

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1844
Revised 1938
Edition NA
Copyright NA
Levelled NA

Surveyed 1844
Revised 1938
Edition NA
Copyright NA
Levelled NA

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Trafford Park, M17 1JT

Client Ref: 4165
Report Ref: CMAPS-CM-29165-4165-140509HIS
Grid Ref: 378727, 397268

Map Name: County Series

Map date: **1927-1932**

Scale: 1:10,560

Printed at: 1:10,560

Surveyed 1844
Revised 1927
Edition NA
Copyright NA
Levelled NA

Surveyed 1844
Revised 1931
Edition NA
Copyright NA
Levelled NA

Surveyed 1844
Revised 1927
Edition NA
Copyright NA
Levelled NA

Surveyed 1844
Revised 1932
Edition NA
Copyright NA
Levelled NA

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Production date:14 May 2009

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Historical Mapping Extract

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Site Details:

S. Norton & Co Ltd, Tenax Road,
Trafford Park, M17 1JT

Client Ref: 4165
Report Ref: CMAPS-CM-29165-4165-140509HIS
Grid Ref: 378727, 397268

Map Name: County Series

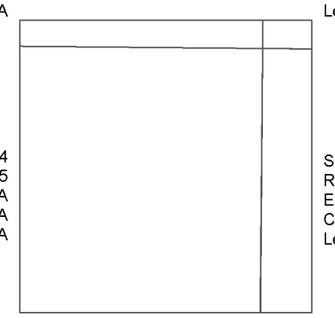
Map date: **1905-1906**

Scale: 1:10,560

Printed at: 1:10,560

Surveyed 1844
Revised 1905
Edition NA
Copyright NA
Levelled NA

Surveyed 1844
Revised 1906
Edition NA
Copyright NA
Levelled NA



Surveyed 1844
Revised 1905
Edition NA
Copyright NA
Levelled NA

Surveyed 1844
Revised 1905
Edition NA
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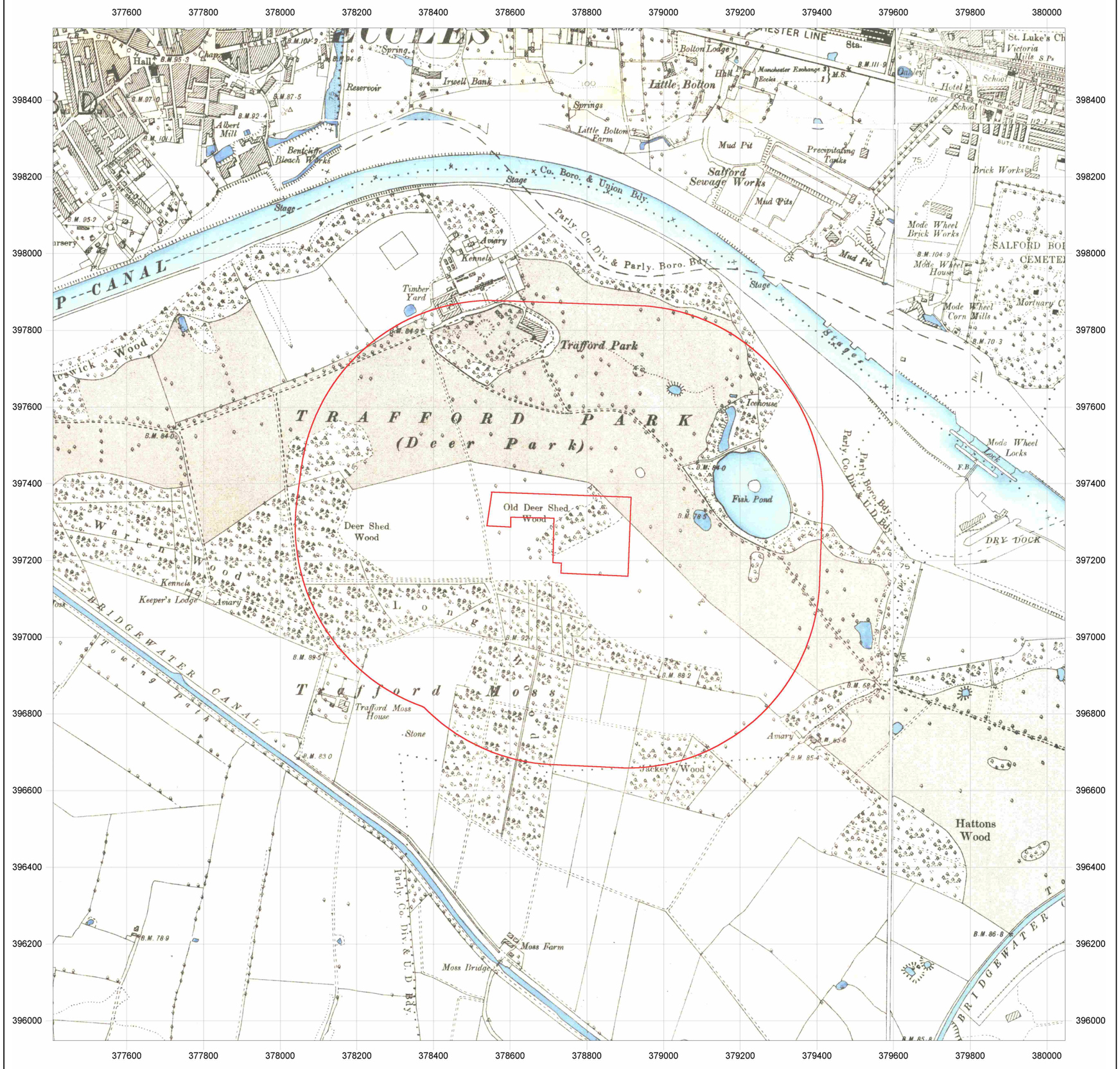

Ordnance Survey® Historical Mapping Extract

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Site Details:

S. Norton & Co Ltd, Tenax Road,
Trafford Park, M17 1JT

Client Ref: 4165
Report Ref: CMAPS-CM-29165-4165-140509HIS
Grid Ref: 378727, 397268

Map Name: County Series

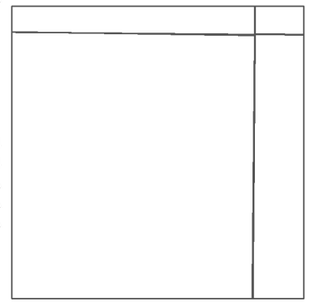
Map date: **1889-1894**

Scale: 1:10,560

Printed at: 1:10,560

Surveyed 1889
Revised 1889
Edition NA
Copyright NA
Levelled NA

Surveyed 1889
Revised 1889
Edition NA
Copyright NA
Levelled NA



Surveyed 1894
Revised 1894
Edition NA
Copyright NA
Levelled NA

Surveyed 1894
Revised 1894
Edition NA
Copyright NA
Levelled NA

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Production date:14 May 2009

APPENDIX E

GROUNDSURE REPORT

centremapslive.com
the mapping portal from Laser Surveys

GroundSure

GroundSure EnviroInsight

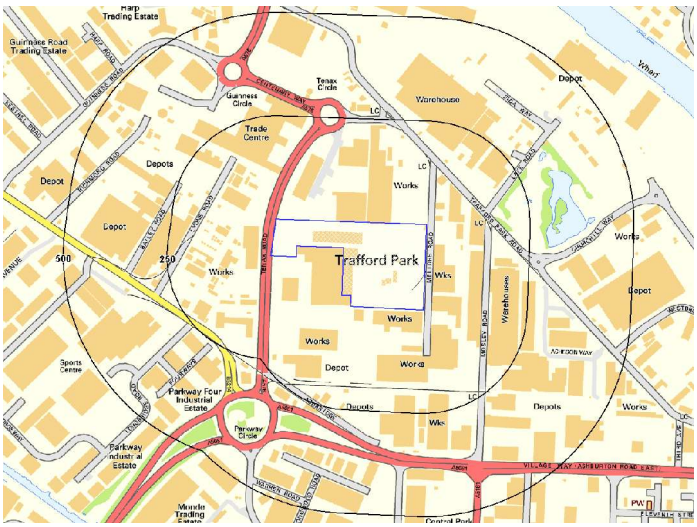
Address: S. Norton & Co Ltd, Tenax Road, Trafford Park, M17 1JT

Date: May 14, 2009

GroundSure Reference: CMAPS-CM-29165-4165-140509EDR

Your Reference: 4165

Client: CENTREMAPS



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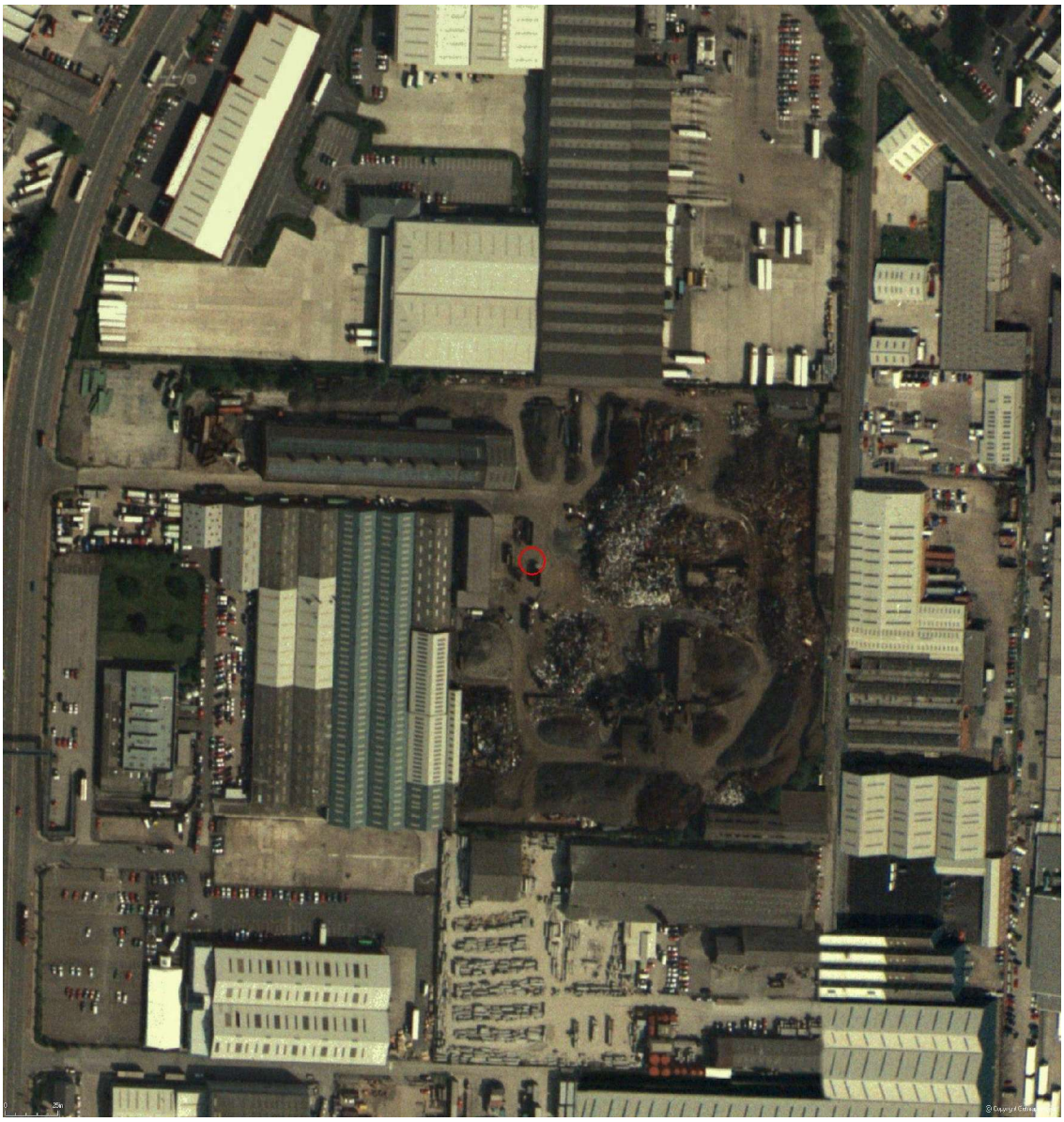
If you would like any further assistance regarding this report then please contact
CENTREMAPS on (T) 01886 832972, (F) 01883 833485, email: groundsure@centremaps.co.uk

Aerial Photograph of Study Site

NW ▲ N NE

◄W E►



SW ▼ S SE

Site Name: S. Norton & Co Ltd, Tenax Road, Trafford Park, M17 1JT
Grid Reference: 378727,397268

Overview of Findings

For further details on each dataset, please refer to each individual section in the main report as listed. Where the database has been searched a numerical result will be recorded. Where the database has not been searched '-' will be recorded.

Report Section	Number of records found within (X) m of the study site boundary					
1. Authorisations, Incidents and Registers	on-site	0-50	51-250	251-500	501-1000	1000-1500
1.1 Industrial Sites Holding Licences and/or Authorisations						
Records of IPC Authorisations	0	0	9	2	-	-
Records of IPPC Authorisations	0	0	16	9	-	-
Records of Water Industry Referrals (potentially harmful discharges to the public sewer)	0	0	0	0	-	-
Records of Red List Discharge Consents (potentially harmful discharges to controlled waters)	0	0	0	0	-	-
Records of List 1 Dangerous Substances Inventory sites	0	0	1	1	-	-
Records of List 2 Dangerous Substances Inventory sites	0	0	0	0	-	-
Records of LAPPC Authorisations	0	0	3	13	-	-
Records of Category 3 or 4 Radioactive Substances Authorisations	0	0	10	6	-	-
Records of Licensed Discharge Consents	0	0	0	0	-	-
Records of Planning Hazardous Substance Consents	0	1	0	0		
1.2 Records of COMAH and NIHHS sites	0	2	3	2	-	-
1.3 Environment Agency Recorded Pollution Incidents						
National Incidents Recording System, List 2	0	3	2	-	-	-
National Incidents Recording System, List 1	0	0	0	-	-	-
1.4 Sites Determined as Contaminated Land under Part IIA EPA 1990	0	0	0	0	-	-
1.5 Planning Hazardous Substance Enforcements	0	0	0	0	-	-
2. Landfill and Other Waste Sites	on-site	0-50	51-250	251-500	501-1000	1000-1500
2.1 Landfill Sites						
Environment Agency Registered landfill Sites	0	0	0	0	0	-
Landfill Data – Operational Landfill Sites	0	0	0	0	0	-
Environment Agency Historic Landfill Sites	0	0	1	0	5	9
Landfill Data – Non-Operational Landfill Sites	0	0	0	0	1	-
BGS/DoE Landfill Site Survey	0	0	0	1	0	0
GroundSure Local Authority Landfill Sites Data	0	0	2	0	4	0
2.2 Landfill and Other Waste Sites Findings						
Operational Waste Treatment, Transfer and Disposal Sites	1	0	0	1	-	-
Non-Operational Waste Treatment, Transfer and Disposal Sites	0	0	3	2	-	-
Environment Agency (REGIS) Waste Sites	1	0	3	2	23	17
3. Current Land Uses	on-site	0-50	51-250	251-500	501-1000	1000-1500
3.1 Current Industrial Sites Data	3	9	80	-	-	-
3.2 Records of Petrol and Fuel Sites	0	0	0	0	-	-

3.3 Underground High Pressure Oil and Gas Pipelines	0	2	0	0	-	-

4. Geology

	Description
4.1 Are there any records of Artificial Ground and Made Ground present beneath the study site? *	No
4.2 Are there any records of Superficial Ground and Drift Geology present beneath the study site? *	Yes
4.3 For records of Bedrock and Solid Geology beneath the study site* see the detailed findings section.	
Source: Scale: 1:50,000 BGS Sheet 085	

* This includes an automatically generated 50m buffer zone around the site.

5. Hydrogeology and Hydrology

	on-site	0-50	51-250	251-500	501-1000	1001-2000
5.1 Environment Agency Groundwater Vulnerability and Soil Classification						
Is a Minor Aquifer present on site?	No	-	-	-	-	-
Is a Major Aquifer present on site?	Yes	-	-	-	-	-
Are there any Soil Classification records present on site?	Yes	-	-	-	-	-
5.2 Groundwater Abstraction Licences (within 1000m of the study site).	0	0	0	8	14	-
5.3 Surface Water Abstraction Licences (within 1000m of the study site).	0	0	0	0	2	-
5.4 Potable Water Abstraction Licences (within 2000m of the study site).	0	0	0	2	0	4
5.5 Are there any Source Protection Zones within 500m of the study site?			No			
5.6 River Quality						
Is there any Environment Agency information on river quality within 500m of the study site?	No	No	No	No	-	-
5.7 Main Rivers within 500m of the study site.	0	0	0	0	-	-
5.8 Surface water features within 250m of the study site	No	No	Yes	-	-	-

6. Flooding

6.1 Are there any Environment Agency indicative Zone 2 floodplains within 250m of the study site?	No
6.2 Are there any Environment Agency indicative Zone 3 floodplains within 250m of the study site?	No
6.3 Are there any Flood Defences within 250m of the study site?	No
6.4 Are there any areas benefiting from Flood Defences within 250m of the study site?	No
6.5 Are there any areas used for Flood Storage within 250m of the study site?	No
6.6 What is the maximum BGS Groundwater Flooding susceptibility within 50m of the study site?	Moderately High
6.7 What is the BGS confidence rating for the Groundwater Flooding susceptibility areas?	Moderate

7. Designated Environmentally Sensitive Sites

	on-site	0-50	51-250	251-500	501-1000	1001-1500
7.1 Records of Sites of Special Scientific Interest (SSSI)	0	0	0	0	-	-
7.2 Records of National Nature Reserves (NNR)	0	0	0	0	-	-
7.3 Records of Local Nature Reserves (LNR)	0	0	0	0	-	-
7.4 Records of Special Areas of Conservation (SAC)	0	0	0	0	-	-
7.5 Records of Special Protection Areas (SPA)	0	0	0	0	-	-
7.6 Records of Ramsar sites	0	0	0	0	-	-
7.7 Records of World Heritage Sites	0	0	0	0	-	-
7.8 Records of Environmentally Sensitive Areas	0	0	0	0	-	-
7.9 Records of Areas of Outstanding Natural Beauty (AONB)	0	0	0	0	-	-
7.10 Records of National Parks	0	0	0	0	-	-

7.1 Records of Sites of Special Scientific Interest (SSSI)	0	0	0	0	-	-
7.11 Records of Nitrate Sensitive Areas	0	0	0	0	-	-
7.12 Records of Nitrate Vulnerable Zones	0	0	0	0	-	-

8. Natural Hazards

8.1 What is the maximum risk of natural ground subsidence?	High

9. Mining

9.1 Are there any coal mining areas within 75m of the study site?	Yes
9.2 What is the risk of subsidence relating to shallow mining within 150m of the study site?	Negligible
9.3 Are there any brine affected areas within 75m of the study site?	No

Using this Report

The following report is designed by Environmental Consultants for Environmental Professionals bringing together the most up-to-date market leading environmental data. This report is provided under and subject to the Terms & Conditions agreed between GroundSure and the Client. The document contains the following sections:

1. Authorisations, Incidents and Registers

Provides information on Regulated Industrial Activities and Pollution Incidents as recorded by Regulatory Authorities, and sites determined as Contaminated Land. This search is conducted using radii up to 500m.

2. Landfills and Other Waste Sites

Provides information on landfills and other waste sites that may pose a risk to the study site. This search is conducted using radii up to 1500m.

3. Current Land Uses

Provides information on current land uses that may pose a risk to the study site in terms of potential contamination from activities or processes. These searches are conducted using radii of up to 500m. This includes information on potentially contaminative industrial sites, petrol stations and fuel sites as well as high pressure underground oil and gas pipelines.

4. Geology

Provides information on artificial and superficial deposits and bedrock beneath the study site.

5. Hydrogeology and Hydrology

Provides information on groundwater vulnerability, soil leaching potential, abstraction licenses, Source Protection Zones (SPZ) and river quality. These searches are conducted using radii of up to 2000m.

6. Flooding

Provides information on surface water flooding, flood defences, flood storage areas and groundwater flood areas. This search is conducted using radii of up to 250m.

7. Designated Environmentally Sensitive Sites

Provides information on the Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar sites, Local Nature Reserves (LNR), Areas of Outstanding Natural Beauty (AONB), National Parks (NP), Environmentally Sensitive Areas, Nitrate Sensitive Areas, Nitrate Vulnerable Zones and World Heritage Sites. These searches are conducted using radii of up to 500m.

8. Natural Hazards

Provides information on a range of natural hazards that may pose a risk to the study site. These factors include natural ground subsidence.

9. Mining

Provides information on areas of coal and shallow mining.

10. Contacts

This section of the report provides contact points for statutory bodies and data providers that may be able to provide further information on issues raised within this report. Alternatively, GroundSure provide a free Technical Helpline (01273 819700) for further information and guidance.

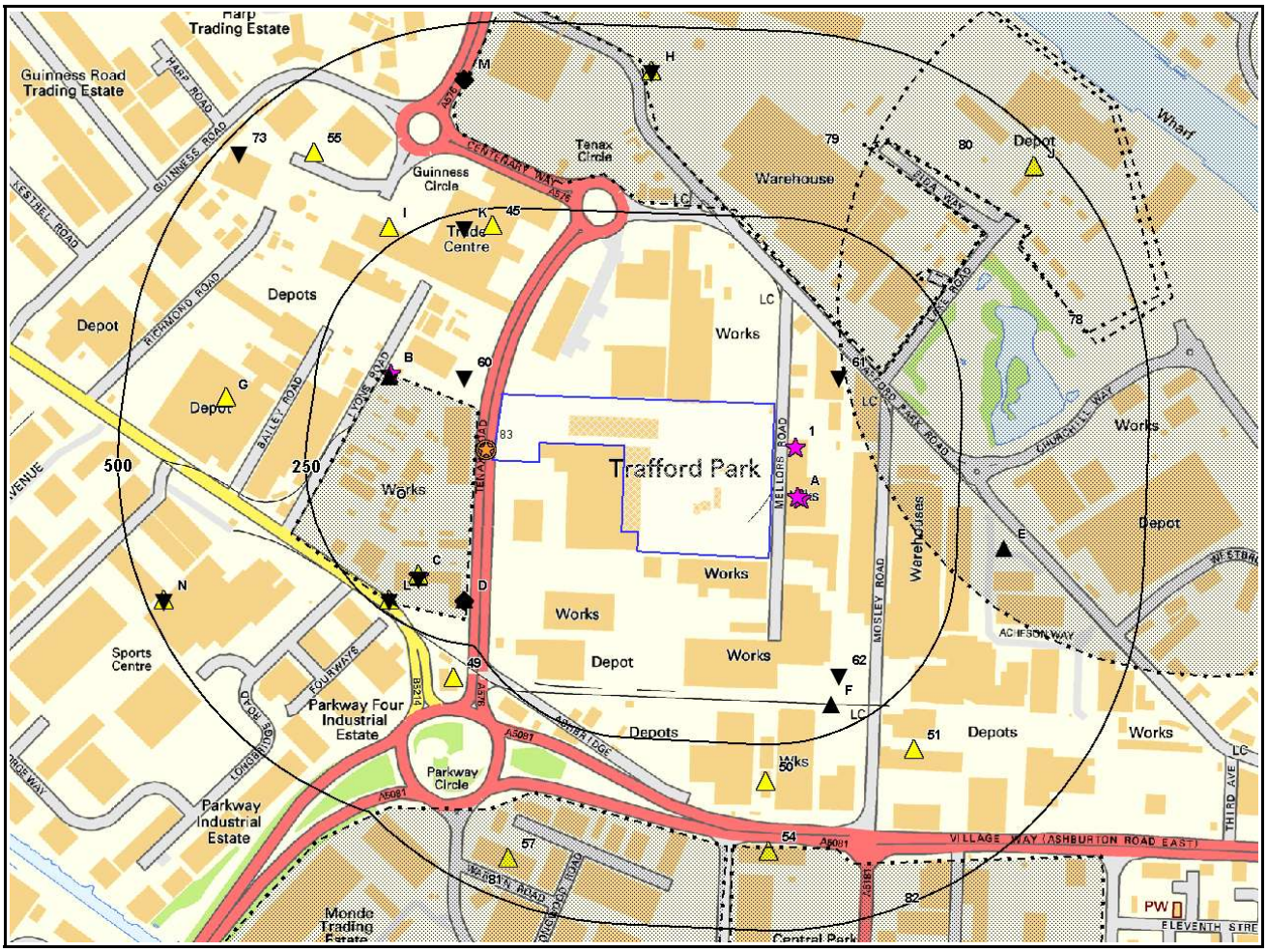
Note: Maps

Only certain features are placed on the maps within the report. All features represented on maps found within this search are given an identification number. This number identifies the feature on the mapping and correlates it to the additional information provided below. This identification number precedes all other information and takes the following format -Id: 1, Id: 2, etc. Where numerous features on the same map are in such close proximity that the numbers would obscure each other a letter identifier is used instead to represent the features. (e.g. Three features which overlap may be given the identifier "A" on the map and would be identified separately as features 1A, 3A, 10A on the data tables provided).

Where a feature is reported in the data tables to a distance greater than the map area, it is noted in the data table as "Not Shown".

All distances given in this report are in Metres (m). Directions are given as compass headings such as N: North, E: East, NE: North East from the nearest point of the study site boundary.

1. Authorisations, Incidents and Registers Map



Authorisations,Incidents and Registers Legend

Enabled by Ordnance Survey

- Site Outline
- 250 / 500 — Search Buffers (m)
- Recorded Pollution Incident
- Dangerous Substances (List 1)
- Dangerous Substances (List 2)
- Water Industry Referrals
- Licenced Discharge Consents
- Red List Discharge Consents
- RAS 3 & 4 Authorisations
- IPPC & IPC Authorisations
- LAPPC Authorisations
- COMAH / NIHHS Sites
- Sites Determined as Contaminated Land
- Hazardous Substance Consents
- Hazardous Substance Enforcements

1.Authorisations, Incidents and Registers

1.1 Industrial Sites Holding Licences and/or Authorisations

Searches of information provided by the Environment Agency and Local Authorities reveal the following information:

Records of IPC Authorisations within 500m of the study site: **11**

The following IPC Authorisations are represented as points on the Authorisations, Incidents and Registers map:

ID	Distance	Direction	NGR	Details	
8B	153.0	W	378400, 397400	Operator: Chemtura Manufacturing UK Ltd Address: Room 204, 2nd Floor Tenax Road, Trafford Park, Manchester, Greater Manchester, M17 1WT Process: Manufacture And Use Of Organic Chemicals	Permit Number: AK6624 Original Permit Number: IPCAIRAPP Date Approved: 16-3-1994 Effective Date: 16-3-1994 Status: Superseded By Variation
9B	153.0	W	378400, 397400	Operator: Chemtura Manufacturing UK Ltd Address: Room 204, 2nd Floor Tenax Road, Trafford Park, Manchester, Greater Manchester, M17 1WT Process: Manufacture And Use Of Organic Chemicals	Permit Number: BR8735 Original Permit Number: IPCMINVAR Date Approved: 17-4-2002 Effective Date: 18-4-2002 Status: Revoked - Now Ippc
10B	153.0	W	378400, 397400	Operator: Chemtura Manufacturing UK Ltd Address: Room 204, 2nd Floor Tenax Road, Trafford Park, Manchester, Greater Manchester, M17 1WT Process: Manufacture And Use Of Organic Chemicals	Permit Number: AZ3470 Original Permit Number: IPCMINVAR Date Approved: 25-7-1997 Effective Date: 26-7-1997 Status: Superseded By Variation
11B	153.0	W	378400, 397400	Operator: Chemtura Manufacturing UK Ltd Address: Room 204, 2nd Floor Tenax Road, Trafford Park, Manchester, Greater Manchester, M17 1WT Process: Manufacture And Use Of Organic Chemicals	Permit Number: BE0511 Original Permit Number: IPCMINVAR Date Approved: 24-11-1998 Effective Date: 30-11-1998 Status: Superseded By Variation
12C	188.0	SW	378440, 397130	Operator: Chemtura Manufacturing UK Ltd Address: Tenax Road, Trafford Park, Manchester, M17 1WT Process: Manufacture And Use Of Organic Chemicals	Permit Number: AK6659 Original Permit Number: IPCAPP Date Approved: 16-3-1994 Effective Date: 16-3-1994 Status: Superseded By Variation
13C	188.0	SW	378440, 397130	Operator: Chemtura Manufacturing UK Ltd Address: Tenax Road, Trafford Park, Manchester, M17 1WT Process: Manufacture And Use Of Organic Chemicals	Permit Number: AK6632 Original Permit Number: IPCAIRAPP Date Approved: 16-3-1994 Effective Date: 16-3-1994 Status: Superseded By Variation
14C	188.0	SW	378440, 397130	Operator: Chemtura Manufacturing UK Ltd Address: Tenax Road, Trafford Park, Manchester, M17 1WT Process: Manufacture And Use Of Organic Chemicals	Permit Number: BC6900 Original Permit Number: IPCMINVAR Date Approved: 24-11-1998 Effective Date: 30-11-1998 Status: Revoked
15C	188.0	SW	378440, 397130	Operator: Chemtura Manufacturing UK Ltd Address: Tenax Road, Trafford Park, Manchester, M17 1WT Process: Manufacture And Use Of Organic Chemicals	Permit Number: BC6896 Original Permit Number: IPCMINVAR Date Approved: 24-11-1998 Effective Date: 30-11-1998 Status: Revoked - Now Ippc
16D	194.0	S	378500, 397100	Operator: Fmc Chemicals Ltd Address: Tenax Road, Trafford Park, Manchester, M17 1WT Process: Combustion Processes	Permit Number: AA2313 Original Permit Number: IPCAPP Date Approved: 18-5-1992 Effective Date: 18-5-1992 Status: Revoked
17E	312.0	E	379220, 397170	Operator: Carborundum Abrasives Gb Ltd Address: Trafford Park Road, Trafford Park, Manchester, Greater Manchester, M17 1HP Process: Manufacture And Use Of Organic Chemicals	Permit Number: AK7710 Original Permit Number: IPCAPP Date Approved: 22-3-1994 Effective Date: 22-3-1994 Status: Superseded By Variation
18E	312.0	E	379220, 397170	Operator: Carborundum Abrasives Gb Ltd Address: Trafford Park Road, Trafford Park, Manchester, Greater Manchester, M17 1HP Process: Manufacture And Use Of Organic Chemicals	Permit Number: BC7035 Original Permit Number: IPCMINVAR Date Approved: 24-11-1998 Effective Date: 30-11-1998 Status: Revoked

Records of IPPC Authorisations within 500m of the study site: **25**

The following IPPC Authorisations are represented as points on the Authorisations, Incidents and Registers map:

ID	Distance	Direction	NGR	Details	
19C	188.0	SW	378440, 397130	Operator: Exel Europe Ltd Installation Name: - Process: Organic Chemicals; Phosphorus Containing Compounds Eg Substituted Phosphines	Permit Number: BU5828 Original Permit Number: BU5828 Issue Date: 24-10-2003 0:00:00 Effective Date: 24-10-2003 0:00:00 Status: Superseded By Pas
20C	188.0	SW	378440, 397130	Operator: Exel Europe Ltd Installation Name: - Process: Organic Chemicals; Oxygen Containing Compounds Eg Alcohols	Permit Number: BU5828 Original Permit Number: BU5828 Issue Date: 24-10-2003 0:00:00 Effective Date: 24-10-2003 0:00:00 Status: Superseded By Pas
21C	188.0	SW	378440, 397130	Operator: Dalkia Utilities Services Plc Installation Name: - Process: Organic Chemicals; Phosphorus Containing Compounds Eg Substituted Phosphines	Permit Number: BU5836 Original Permit Number: BU5836 Issue Date: 24-10-2003 0:00:00 Effective Date: 24-10-2003 0:00:00 Status: Superseded By Pas
22C	188.0	SW	378440, 397130	Operator: Dalkia Utilities Services Plc Installation Name: - Process: Organic Chemicals; Oxygen Containing Compounds Eg Alcohols	Permit Number: BU5836 Original Permit Number: BU5836 Issue Date: 24-10-2003 0:00:00 Effective Date: 24-10-2003 0:00:00 Status: Superseded By Pas
23C	188.0	SW	378440, 397130	Operator: Great Lakes Manufacturing (uk) Ltd Installation Name: Great Lakes Trafford Park Process: Organic Chemicals; Phosphorus Containing Compounds Eg Substituted Phosphines	Permit Number: BM0273IJ Original Permit Number: BM0273IJ Issue Date: 24-10-2003 0:00:00 Effective Date: 1-6-2004 0:00:00 Status: Superceded
24C	188.0	SW	378440, 397130	Operator: Exel Europe Limited Installation Name: Great Lakes Trafford Park Process: Organic Chemicals; Phosphorus Containing Compounds Eg Substituted Phosphines	Permit Number: BU5828IC Original Permit Number: BU5828IC Issue Date: 24/10/2003 Effective Date: 24/10/2003 Status: Effective
25C	188.0	SW	378440, 397130	Operator: Exel Europe Limited Installation Name: Great Lakes Trafford Park Process: Organic Chemicals; Oxygen Containing Compounds Eg Alcohols	Permit Number: BU5828IC Original Permit Number: BU5828IC Issue Date: 24/10/2003 Effective Date: 24/10/2003 Status: Effective
26C	188.0	SW	378440, 397130	Operator: Dalkia Utilities Services Plc Installation Name: Great Lakes Trafford Park Process: Organic Chemicals; Phosphorus Containing Compounds Eg Substituted Phosphines	Permit Number: BU5836IT Original Permit Number: BU5836IT Issue Date: 24/10/2003 Effective Date: 24/10/2003 Status: Effective
27C	188.0	SW	378440, 397130	Operator: Dalkia Utilities Services Plc Installation Name: Great Lakes Trafford Park Process: Organic Chemicals; Oxygen Containing Compounds Eg Alcohols	Permit Number: BU5836IT Original Permit Number: BU5836IT Issue Date: 24/10/2003 Effective Date: 24/10/2003 Status: Effective
28D	194.0	S	378500, 397100	Operator: Chemtura Manufacturing Uk Ltd Installation Name: Chemtura Trafford Park Process: Organic Chemicals; Oxygen Containing Compounds Eg Alcohols	Permit Number: BX7096IG Original Permit Number: BM0273IJ Issue Date: 28/5/2004 Effective Date: 1/6/2004 Status: Effective
29D	194.0	S	378500, 397100	Operator: Chemtura Manufacturing Uk Ltd Installation Name: Chemtura Trafford Park Process: Organic Chemicals; Phosphorus Containing Compounds Eg Substituted Phosphines	Permit Number: BX7096IG Original Permit Number: BM0273IJ Issue Date: 28/5/2004 Effective Date: 1/6/2004 Status: Effective
30D	194.0	S	378500, 397100	Operator: Great Lakes Manufacturing (uk) Ltd Installation Name: - Process: Organic Chemicals; Phosphorus Containing Compounds Eg Substituted Phosphines	Permit Number: BX7096 Original Permit Number: BM0273 Issue Date: 28-5-2004 0:00:00 Effective Date: 1-6-2004 0:00:00 Status: Superseded By Pas
31D	194.0	S	378500, 397100	Operator: Great Lakes Manufacturing (uk) Ltd Installation Name: - Process: Organic Chemicals; Oxygen Containing Compounds Eg Alcohols	Permit Number: BX7096 Original Permit Number: BM0273 Issue Date: 28-5-2004 0:00:00 Effective Date: 1-6-2004 0:00:00 Status: Superseded By Pas
32D	194.0	S	378500, 397100	Operator: Great Lakes Manufacturing (uk) Ltd Installation Name: - Process: Organic Chemicals; Phosphorus Containing Compounds Eg Substituted Phosphines	Permit Number: BM0273 Original Permit Number: BM0273 Issue Date: 24-10-2003 0:00:00 Effective Date: 24-10-2003 0:00:00 Status: Superseded By Variation

33F	216.0	SE	378990, 396960	Operator: Mercury Recycling Ltd Installation Name: Mercury Recovery Trafford Park Process: Non-ferrous Metals; Producing Etc Cadmium/mercury And Alloys Containing →0.05 Percent	Permit Number: MP3037UX Original Permit Number: YP3735SS Issue Date: 12/11/2007 Effective Date: 12/11/2007 Status: Effective
34F	216.0	SE	378990, 396960	Operator: Mercury Recycling Ltd Installation Name: Mercury Recovery Trafford Park Process: Non-ferrous Metals; Producing Etc Cadmium/mercury And Alloys Containing →0.05 Percent	Permit Number: YP3735SS Original Permit Number: YP3735SS Issue Date: 16/8/2005 Effective Date: 16/8/2005 Status: Superceded
35G	367.0	W	378180, 397370	Operator: Fw Farnsworth Ltd Installation Name: Trafford Park Bakeries Process: Animal Vegetable And Food; Treating Etc Animal Raw Materials (not Milk) For Food →75t/d	Permit Number: FP3634PP Original Permit Number: FP3634PP Issue Date: 28/4/2005 Effective Date: 28/4/2005 Status: Superceded
36G	367.0	W	378180, 397370	Operator: Fw Farnsworth Ltd Installation Name: Trafford Park Bakeries Process: Animal Vegetable And Food; Treating Etc Animal Raw Materials (not Milk) For Food →75t/d	Permit Number: XP3831UY Original Permit Number: FP3634PP Issue Date: 31/8/2007 Effective Date: 31/8/2007 Status: Surrender Effective
37H	439.0	N	378750, 397810	Operator: Procter And Gamble Product Supply (uk) Ltd Installation Name: - Process: Paper, Pulp & Board; Producing Pulp From Timber Etc	Permit Number: BW0312 Original Permit Number: BJ5210 Issue Date: 22-1-2004 0:00:00 Effective Date: 22-1-2004 0:00:00 Status: Superseded By Pas
38H	439.0	N	378750, 397810	Operator: Procter And Gamble Product Supply (uk) Ltd Installation Name: - Process: Paper, Pulp & Board; Producing Paper/board →20t/d	Permit Number: BW0312 Original Permit Number: BJ5210 Issue Date: 22-1-2004 0:00:00 Effective Date: 22-1-2004 0:00:00 Status: Superseded By Pas
39H	439.0	N	378750, 397810	Operator: Procter And Gamble Product Supply (uk) Ltd Installation Name: - Process: Paper, Pulp & Board; Producing Paper/board →20t/d	Permit Number: BJ5210 Original Permit Number: BJ5210 Issue Date: 3-12-2001 0:00:00 Effective Date: 3-12-2001 0:00:00 Status: Superseded By Variation
40H	439.0	N	378750, 397810	Operator: Procter & Gamble Product Supply (uk) Limited Installation Name: Trafford Park Tissue Towel Plant Ea/epr/bj5210it/t003 Process: Paper, Pulp And Board; Producing Paper/board →20t/d	Permit Number: BJ5210IT Original Permit Number: BJ5210IT Issue Date: 3/12/2001 Effective Date: 3/12/2001 Status: Superceded
41H	439.0	N	378750, 397810	Operator: Procter & Gamble Product Supply (uk) Limited Installation Name: Trafford Park Tissue Towel Plant Process: Paper, Pulp And Board; Producing Paper/board →20t/d	Permit Number: BW0312IC Original Permit Number: BJ5210IT Issue Date: 22/1/2004 Effective Date: 22/1/2004 Status: Effective
42H	439.0	N	378750, 397810	Operator: Procter & Gamble Product Supply (uk) Limited Installation Name: Trafford Park Tissue Towel Plant Process: Paper, Pulp And Board; Producing Pulp From Timber Etc	Permit Number: BW0312IC Original Permit Number: BJ5210IT Issue Date: 22/1/2004 Effective Date: 22/1/2004 Status: Effective
43J	467.0	NE	379260, 397680	Operator: Robert Wiseman & Sons Limited Installation Name: Lake Road, Trafford Park Process: Animal Vegetable And Food; Treating Etc Milk →200t/day	Permit Number: BS0060IQ Original Permit Number: BS0060IQ Issue Date: 4/11/2005 Effective Date: 4/11/2005 Status: Effective

Records of Water Industry Referrals (potentially harmful discharges to the public sewer) within 500m of the study site: **0**

Database searched and no data found.

Records of Red List Discharge Consents (potentially harmful discharges to controlled waters) within 500m of the study site: **0**

Database searched and no data found.

Records of List 1 Dangerous Substances Inventory Sites within 500m of the study site: **2**

The following List 1 Dangerous Substance Inventory Site records are represented as points on the Authorisations, Incidents and Registers map:

ID	Distance	Direction	NGR	Details

6D	194.0	S	378500, 397100	Name: Fmc Corporation Status: Active Receiving Water: Manchester Ship Canal	Authorised Substances: Mercury (other)
7M	425.0	N	378500, 397800	Name: Cerestar Uk Ltd Status: Not Active Receiving Water: Manchester Ship Canal	Authorised Substances: Mercury (other)

Records of List 2 Dangerous Substance Inventory Sites within 500m of the study site: **0**

Database searched and no data found.

Records of LAPPC Authorisations within 500m of the study site: **16**

The following LAPPC (LAPC) Authorisations are represented as points on the Authorisations, Incidents and Registers map:

ID	Distance	Direction	NGR	Details	
44C	185.0	SW	378439, 397134	Address: Great Lakes Manufacturing (uk), Tenax Road, Trafford Park, Manchester, M17 1wt Process: Organic Chemical Manufacture (polycarboxylic Acid, Aryl Phosphate, Esters & Polymers), Combustion Plant, Raw Material And Product Storage	Status: Revoked Date: 22-02-02
45	225.0	N	378538, 397603	Address: D Walton, Unit 4 Orion T/est, Tenax Road, Trafford Park, Manchester, M17 1jt Process: Coating & Enamelling Process	Status: Not Given Date: Not Given
46L	235.0	SW	378400, 397100	Address: Tilcon(south)ltd Ashburton Rd West Process: Cement/lime/mortar Process	Status: Unknown Date: 1999
47I	268.0	NW	378400, 397600	Address: Automet Ltd, Guiness Road, Trafford Park, Manchester, Process: Extraction Of Non Ferrous Metals	Status: Not Given Date: Not Given
48I	268.0	NW	378400, 397600	Address: Royal Nedalco (cerestar), Guinness Road, Trafford Park, Manchester, M17 1da Process: Food Processing	Status: Not Given Date: Not Given
49	299.0	S	378486, 396996	Address: Howard Basford Ltd, Unit 2/5 Trafford Dist Centre, Tenax Road, Trafford Park, Manchester, M17 1jt Process: Vehicle Spraying	Status: Not Given Date: Not Given
50	302.0	S	378903, 396857	Address: Illingworth Ingham Mcr Ltd, Trafford Park Sawmills, Ashburton Road East, Trafford Park, Manchester, M17 1ad Process: Timber Process	Status: Not Given Date: Not Given
51	323.0	SE	379100, 396900	Address: Ribble Vehicles Ltd Hattons Rd, M17 1ps Process: Coating & Enamelling Process	Status: Unknown Date: 1999
52G	364.0	W	378183, 397372	Address: Tenmat Ltd, Bowdon House, Ashburton Road West, Trafford Park, Manchester, M17 1qx Process: Process Involving Asbestos	Status: Revoked Date: Mar-04
53G	364.0	W	378183, 397372	Address: Trafford Park Bakery, Ashburton Road West, Trafford Park, Manchester, M17 1qx Process: Manufacture Of Food	Status: Not Given Date: Not Given
54	395.0	S	378907, 396764	Address: H & J Quick Ltd, Ashburton Road East, Trafford Park, Manchester, M17 1qg Process: Coating & Enamelling Process	Status: Not Given Date: Not Given
55	408.0	NW	378300, 397700	Address: Neville Johnson Kitchens Guiness Rd Trading Est, M17 1sd Process: Coating & Enamelling Process	Status: Unknown Date: 1999
56H	439.0	N	378751, 397810	Address: Procter & Gamble, Trafford Park Road , Trafford Park, Manchester, M17 1nx Process: Combustion Process	Status: Not Given Date: Not Given
57	448.0	SW	378559, 396754	Address: The Hulme Group Ltd, Warren Road, Trafford Park, Manchester, M17 1qr Process: Vehicle Spraying	Status: Not Given Date: Not Given
58J	469.0	NE	379260, 397682	Address: Robert Wiseman Dairies, Lake Road, Trafford Park, Manchester, M17 1tu Process: Milk Processing	Status: Not Given Date: Not Given
59N	478.0	SW	378100, 397100	Address: Adtranz Ashburton Rd, M17 1gu Process: Incineration & Furnace Process	Status: Unknown Date: 1999

Records of Category 3 or 4 Radioactive Substance Licences within 500m of the study site: **16**

The following RAS Licence (3 or 4) records are represented as points on the Authorisations, Incidents and Registers map:

ID	Distance	Direction	NGR	Details

60	56.0	NW	378500, 397400	Address: Ciba Geigy Plastics, Water Treatment Applications Laboratory,building 85 Tenax Road,trafford Park, Manchester, , Type: Keeping And Use Of Radioactive Materials (was Rsa60 Section 1). Permission Number: AQ5086 Original Permission Number:	Status: Revoked/cancelled Date Approved: 1-4-1991 Effective Date: 1-4-1991
61	92.0	E	379000, 397400	Address: Millington And Sheldrick Ltd, Invincible Works,mosley Road,trafford Park, Manchester, , Type: Keeping And Use Of Radioactive Materials (was Rsa60 Section 1). Permission Number: AQ5299 Original Permission Number:	Status: Revoked/cancelled Date Approved: 1-4-1991 Effective Date: 1-4-1991
62	184.0	SE	379000, 397000	Address: Robert Wiseman And Sons Ltd, Lake Road,trafford Park, Manchester, M17 1FW Type: Keeping And Use Of Radioactive Materials (was Rsa60 Section 1). Permission Number: BB0078 Original Permission Number:	Status: - Date Approved: - Effective Date: -
63C	188.0	SW	378440, 397130	Address: Great Lakes Manufacturing (uk) Ltd, Room 204,2nd Floor Tenax Road,trafford Park, Manchester, Greater Manchester, M17 1WT Type: Keeping And Use Of Radioactive Materials (was Rsa60 Section 1). Permission Number: BH1077 Original Permission Number:	Status: Revoked/cancelled Date Approved: 11-11-1999 Effective Date: 11-11-1999
64C	188.0	SW	378440, 397130	Address: Ciba Speciality Chemicals Water Treatments Ltd, Room 204,2nd Floor Tenax Road,trafford Park, Manchester, Greater Manchester, M17 1WT Type: Keeping And Use Of Radioactive Materials (was Rsa60 Section 1). Permission Number: AQ5094 Original Permission Number:	Status: Revoked/cancelled Date Approved: 1-4-1991 Effective Date: 1-4-1991
65C	188.0	SW	378440, 397130	Address: Great Lakes Manufacturing (uk) Ltd, Room 204,2nd Floor Tenax Road,trafford Park, Manchester, Greater Manchester, M17 1WT Type: Keeping And Use Of Radioactive Materials (was Rsa60 Section 1). Permission Number: AI6681 Original Permission Number:	Status: Superseded By Variation Date Approved: 7-7-1993 Effective Date: 7-7-1993
66C	188.0	SW	378440, 397130	Address: Great Lakes Manufacturing (uk) Ltd, Room 204,2nd Floor Tenax Road,trafford Park, Manchester, Greater Manchester, M17 1WT Type: - Permission Number: AI9559 Original Permission Number:	Status: Superseded By Variation Date Approved: 31-3-1991 Effective Date: 31-3-1991
67K	228.0	N	378500, 397600	Address: Gateway Autos (manchester) Ltd, Units 4 Trafford Distribution Centre,tenax Road,trafford Park, Manchester, M17 1JT Type: Keeping And Use Of Radioactive Materials (was Rsa60 Section 1). Permission Number: AX4556 Original Permission Number:	Status: Revoked/cancelled Date Approved: 5-3-1997 Effective Date: 5-3-1997
68K	228.0	N	378500, 397600	Address: D Walton, Units 4 Trafford Distribution Centre,tenax Road,trafford Park, Manchester, M17 1JT Type: Keeping And Use Of Radioactive Materials (was Rsa60 Section 1). Permission Number: AX4564 Original Permission Number:	Status: - Date Approved: - Effective Date: -
69L	235.0	SW	378400, 397100	Address: Stanger Testing Services Limited, Broadoak Business Park,ashburton Road West,trafford Park, Manchester, M17 1RW Type: Keeping And Use Of Mobile Radioactive Sources (was Rsa60 Section 3) Permission Number: BC2297 Original Permission Number:	Status: - Date Approved: - Effective Date: -
70M	425.0	N	378500, 397800	Address: Cerestar Uk Ltd, Trafford Park Road,trafford Park, Manchester, M17 1PA Type: Keeping And Use Of Radioactive Materials (was Rsa60 Section 1). Permission Number: AN1203 Original Permission Number:	Status: - Date Approved: - Effective Date: -
71H	439.0	N	378750, 397810	Address: Procter And Gamble Product Supply (uk) Limited, Trafford Park Road, Manchester, M17 1NX Type: Keeping And Use Of Radioactive Materials (was Rsa60 Section 1). Permission Number: BF8771 Original Permission Number:	Status: - Date Approved: - Effective Date: -

72H	439.0	N	378750, 397810	Address: Procter And Gamble Technical Centres Limited, Trafford Park Road, Manchester, M17 1NX Type: Keeping And Use Of Radioactive Materials (was Rsa60 Section 1). Permission Number: AQ5345 Original Permission Number:	Status: Revoked/cancelled Date Approved: 1-4-1991 Effective Date: 1-4-1991
73	476.0	NW	378200, 397700	Address: Nicholls Colton And Partners Ltd, Unit E3, The Court,kestrel Road,trafford Park, Manchester, M17 1WR Type: Keeping And Use Of Mobile Radioactive Sources (was Rsa60 Section 3) Permission Number: AQ9316 Original Permission Number:	Status: Revoked/cancelled Date Approved: 7-7-1995 Effective Date: 7-7-1995
74N	478.0	SW	378100, 397100	Address: Associated Electrical Industries Ltd, Trafford Park , Manchester, M17 Type: Keeping And Use Of Radioactive Materials (was Rsa60 Section 1). Permission Number: AE5918 Original Permission Number:	Status: Revoked/cancelled Date Approved: 31-3-1991 Effective Date: 31-3-1991
75N	478.0	SW	378100, 397100	Address: Associated Electrical Industries Ltd, Trafford Park , Manchester, M17 Type: Disposal Of Radioactive Waste (was Rsa60 Section 6). Permission Number: AE5900 Original Permission Number:	Status: Revoked/cancelled Date Approved: 31/3/1991 Effective Date: 31/3/1991

Records of Licensed Discharge Consents within 500m of the study site: 0

Database searched and no data found.

Records of Planning Hazardous Substance Consents within 500m of the study site 1

The following Planning Hazardous Substance Consents records are represented as points on the Authorisations, Incidents and Registers map:

ID	Distance	Direction	Application Reference Number	Application Status	Address	Details
83	11.0	W	H/HSD/48384	Deemed Consent	Great Lakes Manufacturing (uk) Ltd, Tenax Road, Trafford Park	Deemed Hazardous Substances Consent For The Presence Of Propylene, Phenol, Cresol, Xylenol, Isopropyl Phenol And Aryl Phosphates

1.2 Dangerous or Hazardous Sites

Records of COMAH & NIHHS sites within 500m of the study site: 7

The following COMAH & NIHHS Authorisation records provided by the Health and Safety Executive are represented as polygons or buffered points on the Authorisations, Incidents and Registers map:

ID	Distance	Direction	NGR	Address	Type	Update
76O	24.0	W	378400.0, 397300.0	fmc corporation uk ltd,tenax road,trafford park,m17 1wt	COMAH	2001
77O	24.0	W	378400.0, 397300.0	fmc corporation uk ltd,tenax road,trafford park,m17 1wt	NIHHS	2001
78	101.0	E	379500.0, 397500.0	esso petroleum company ltd,mossley road north,trafford,m17 1fu	NIHHS	2001
79	131.0	NE	378500.0, 397900.0	cerestar(uk) ltd,trafford park road	NIHHS	2001
80	135.0	NE	378600.0, 397900.0	procter&gamble ltd,trafford park road	NIHHS	2001
81	348.0	S	378800.0, 396400.0	hays chemicals ltd,westinghouse road,m17 1qb	NIHHS	2001
82	388.0	S	379100.0, 396300.0	calorgas ltd,mosley rd,trafford park	NIHHS	2001

1.3 Environment Agency Recorded Pollution Incidents

Records of National Incidents Recording System, List 2 within 250m of the study site: 5

The following NIRS List 2 records are represented as points on the Authorisations, Incidents and Registers Map:

ID	Distance	Direction	NGR	Details	
1	29.0	E	378942,397308	Incident Date: 4/10/2001 Incident Identification: 34681 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Dust	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
2A	34.0	E	378944,397241	Incident Date: 19/9/2001 Incident Identification: 31558 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Steam	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
3A	40.0	E	378950,397239	Incident Date: 24/5/2002 Incident Identification: 80971 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Dust	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
4B	152.0	W	378402,397406	Incident Date: 7/2/2002 Incident Identification: 57011 Pollutant: Organic Chemicals/Products Pollutant Description: Hydrocarbons	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
5C	185.0	SW	378439,397134	Incident Date: 23/3/2001 Incident Identification: 1548 Pollutant: Organic Chemicals/Products Pollutant Description: Phenols and Creosote	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)

Records of National Incidents Recording System, List 1 within 250m of the study site: 0

Database searched and no data found.

1.4 Sites Determined as Contaminated Land under Part IIA EPA 1990[1]

How many records of sites determined as contaminated land under Section 78R of the Environmental Protection Act 1990 are there within 500m of the study site? 0

Database searched and no data found.

1.5 Planning Hazardous Substance Enforcements

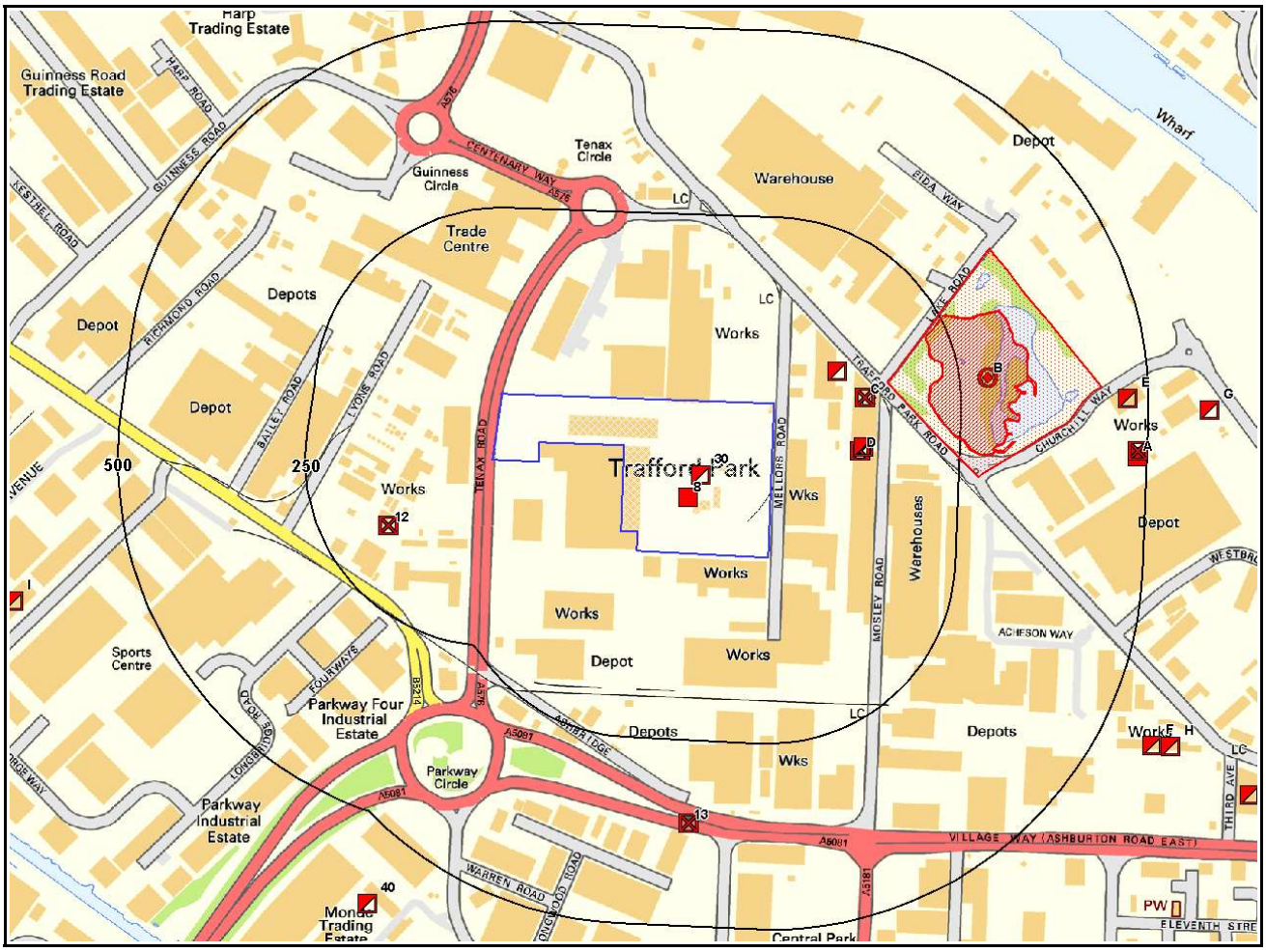
Records of planning hazardous substance enforcements within 500m of the study site: 0

Database searched and no data found.

[1]Further information on sites that have been determined under the Contaminated Land Regime is maintained by Local Authorities under Section 78R of the Environmental Protection Act 1990. Information should be available on both sites currently determined as Contaminated Land and Special Sites.

2. Landfill and Other Waste Sites Map

NW N NE



◄W E►

SW S SE

Landfill & Other Waste Sites Legend

Enabled by Ordnance Survey

- Site Outline
- Search Buffers (m): 250, 500
- E.A. Active Landfill
- E.A. Historic Landfill (Area Data)
- E.A. Historic Landfill (Point Data)
- BGS / DoE Survey Landfill
- Local Authority Landfill (Area Data)
- Local Authority Landfill (Point Data)
- Operational Waste Treatment Licence
- Closed Waste Treatment Licence
- REGIS Waste Licence
- Operational Landfill
- Closed Landfill

2. Landfill and Other Waste Sites

2.1 Landfill Sites

Records from Environment Agency landfill data within 1000m of the study site: **0**

Database searched and no data found.

Records of operational landfill sites sourced from Landmark within 1000m of the study site: **0**

Database searched and no data found.

Records of Environment Agency historic landfill sites within 1500m of the study site: **15**

The following landfill records are represented as either points or polygons on the Landfill and Other Waste Sites map:

ID	Distance	Direction	NGR	Details	
15B	154.0	E	379200,397400	Site Address: Trafford Ecology Park and Aidleys Transport, Greater Manchester Waste Licence: - Site Reference: H049 Waste Type: Industrial Regis Reference: -	Licence Issue: Licence Surrendered: Licence Hold Address: - Operator: British Steel Corporation
Not shown	799.0	SW	377900,396400	Site Address: Northern Side Of Barton Dock Road, Stretford, Manchester Waste Licence: Yes Site Reference: 0103, H079, RD/LIC/1033/93 Waste Type: Inert Regis Reference: -	Licence Issue: 22-Feb-1994 Licence Surrendered: Licence Hold Address: - Operator: -
Not shown	849.0	N	378600,398300	Site Address: Weaste Quarry, Eccles New Road, Salford, Greater Manchester Waste Licence: Yes Site Reference: E006, E011, 0226, 0251,RD/LIC/022/76, RD/LIC/035/76 Waste Type: Inert, Commercial, Household Regis Reference: -	Licence Issue: 13-Dec-1977 Licence Surrendered: 28-May-1991 Licence Hold Address: - Operator: -
Not shown	875.0	SW	377700,396800	Site Address: Central Avenue, Trafford Park, Greater Manchester Waste Licence: - Site Reference: H060 Waste Type: No data Regis Reference: -	Licence Issue: Licence Surrendered: Licence Hold Address: - Operator: -
Not shown	962.0	E	379900,397200	Site Address: Pomona Dock No 3, Trafford Wharf Estate, Trafford Wharf Road, Trafford Park, Manchester Waste Licence: Yes Site Reference: H005, RD/LIC/236/82 Waste Type: Inert, Industrial, Commercial, Household Regis Reference: -	Licence Issue: 08-Jul-1982 Licence Surrendered: Licence Hold Address: Port of Manchester, Ship Canal House, King Street, Manchester Operator: Manchester Ship Canal Company
Not shown	982.0	N	378500,398400	Site Address: Waste Tip, Salford, Greater Manchester Waste Licence: - Site Reference: - Waste Type: Commercial Regis Reference: -	Licence Issue: Licence Surrendered: Licence Hold Address: - Operator: Manchester Shop Canal Company
Not shown	1039.0	E	380100,397000	Site Address: BOCM - Silcocks Limited, Trafford Wharf Road, Old Trafford, Manchester Waste Licence: Yes Site Reference: WML/0366, RD/LIC/366/84, H035 Waste Type: Inert Regis Reference: -	Licence Issue: 02-Nov-1984 Licence Surrendered: 28-Feb-1985 Licence Hold Address: - Operator: -

Not shown	1055.0	NE	379400,398300	Site Address: Guide Street, Salford, Greater Manchester Waste Licence: - Site Reference: E097 Waste Type: No data Regis Reference: -	Licence Issue: Licence Surrendered: Licence Hold Address: - Operator: -
Not shown	1071.0	N	378400,398500	Site Address: Weaste Quarry, Eccles New Road, Salford, Greater Manchester Waste Licence: Yes Site Reference: E011, RD/LIC/226/81, 0251, RD/LIC/035/76, RD/LIC/022/76 Waste Type: Inert, Industrial, Commercial, Household, Special Regis Reference: -	Licence Issue: 02-Dec-1981 Licence Surrendered: 09-Aug-1990 Licence Hold Address: T/A Northern Metals, 650 Liverpool Road, Irlam, Manchester Operator: -
Not shown	1358.0	N	378900,398800	Site Address: Stott Lane, Tootal Grove, Eccles, Greater Manchester Waste Licence: - Site Reference: E076 Waste Type: No data Regis Reference: -	Licence Issue: Licence Surrendered: Licence Hold Address: - Operator: -
Not shown	1364.0	SE	380000,396300	Site Address: Canal Side North, Trafford Park, Greater Manchester Waste Licence: - Site Reference: WML/1138 Waste Type: No data Regis Reference: -	Licence Issue: Licence Surrendered: Licence Hold Address: - Operator: -
Not shown	1391.0	E	380200,396500	Site Address: Warfside Way - John Glibert Way, Old Trafford, Manchester Waste Licence: - Site Reference: WML/0721 Waste Type: No data Regis Reference: -	Licence Issue: Licence Surrendered: Licence Hold Address: - Operator: -
Not shown	1401.0	SE	380100,396000	Site Address: Former Rail Depot, Trafford Park Sidings, Old Trafford, Greater Manchester Waste Licence: - Site Reference: H072 Waste Type: No data Regis Reference: -	Licence Issue: Licence Surrendered: Licence Hold Address: - Operator: -
Not shown	1476.0	W	376900,397100	Site Address: Land South of Taylor Road, Trafford Park, Greater Manchester Waste Licence: - Site Reference: WML/1146 Waste Type: No data Regis Reference: -	Licence Issue: Licence Surrendered: Licence Hold Address: - Operator: -
Not shown	1484.0	E	380400,396700	Site Address: Opposite Trafford Wharf Enterprise Park, Trafford Wharf, Greater Manchester Waste Licence: - Site Reference: H074 Waste Type: No data Regis Reference: -	Licence Issue: Licence Surrendered: Licence Hold Address: - Operator: -

Records of non-operational landfill sites sourced from Landmark within 1000m of the study site: 1

The following landfill records are represented as points on the Landfill and Other Waste Sites map:

ID	Distance	Direction	NGR	Details	
Not shown	991.0	E	379900,397200	Site Address: No 3 Dry Dock, Trafford Wharf Estate, Trafford Park, MANCHESTER, Greater Manchester, Landfill Licence: 18IACYAL Agency Reference: Waste Type: Difficult Waste Description: Difficult Landfill Known Restrictions: No known restriction on source of waste	Record Date: 01-Aug-1982 Transfer Date: Modification Date: Status: Licence has completion certificate Category: LANDFILL Regulator: EA - North West Region - South Area (East - Sale) Size: Very Large (->250,000 tonnes/year)

Records of BGS/DoE non-operational landfill sites within 1500m of the study site: 1

The following landfill records are represented as points on the Landfill and Other Waste Sites map:

ID	Distance	Direction	NGR	Details	
7B	287.0	E	379200,397400	Address: Trafford Park Lake, Trafford Pk Rd, Manchester BGS Number: 1177.0	Risk: No risk to aquifer Waste Type: N/A

Records of Local Authority landfill sites within 1500m of the study site: **6**

The following landfill records are represented as points or polygons on the Landfill and Other Waste Sites map:

ID	Distance	Direction	Site Address	Source	Data Type
76B	206.0	E	Refuse Tip	1967 mapping	Polygon
77B	207.0	E	Refuse Tip	1969 mapping	Polygon
Not shown	860.0	W	Refuse Tip	1953 mapping	Polygon
Not shown	875.0	SW	Refuse Tip	1969 mapping	Polygon
Not shown	909.0	N	Refuse Tip	1970 mapping	Polygon
Not shown	960.0	N	Refuse Tip	1970 mapping	Polygon

2.2 Other Waste Sites

Records of operational waste treatment, transfer or disposal sites within 500m of the study site: **2**

The following waste treatment, transfer or disposal sites records are represented as points on the Landfill and Other Waste Sites map:

ID	Distance	Direction	NGR	Details	
8	0.0	On Site	378800,397240	Site Address: Tenax Road, Trafford Park, MANCHESTER, Greater Manchester, M17 1JT Landfill Licence: D31AETAL EA Reference: - Waste Type: Difficult Rating: Difficult Scrapyard Known Restrictions: No known restriction on source of waste	Record Date: 01-Jan-1999 Transfer Date: Modification Date: Status: Operational as far as is known Category: SCRAPYARD Regulator: EA - North West Region - South Area (East - Sale) Size: Very Large (→250,000 tonnes/year)
9A	487.0	E	379400,397295	Site Address: Trafford Wharf Road, Trafford Park, MANCHESTER, Greater Manchester, M17 1HB Landfill Licence: D31ACDAL EA Reference: - Waste Type: Putrescible Rating: Putrescible Transfer Known Restrictions: No known restriction on source of waste	Record Date: 01-Jun-1997 Transfer Date: Modification Date: Status: Operational as far as is known Category: TRANSFER Regulator: EA - North West Region - South Area (East - Sale) Size: Medium (← 75,000 tonnes/year)

Records of non-operational waste treatment, transfer or disposal sites within 500m of the study site: **5**

The following waste treatment, transfer or disposal sites records are represented as points on the Landfill and Other Waste Sites map:

ID	Distance	Direction	NGR	Details	
10D	117.0	E	379030,397300	Site Address: 10 The Hives, Mosley Road, Trafford Park, MANCHESTER, Greater Manchester, Landfill Licence: 18IACZAL EA Reference: - Waste Type: Difficult Waste Description: - Known Restrictions: No known restriction on source of waste	Record Date:01-Apr-1990 Transfer Date: Modification Date: Status: Site closed Category: TREATMENT - Chemical Regulator: EA - North West Region - South Area (East - Sale) Size: Undefined
11C	121.0	E	379036,397371	Site Address: Unit 1 Mosley Road, Trafford Park, MANCHESTER, Greater Manchester, Landfill Licence: 18IAZXAL EA Reference: - Waste Type: Inert Waste Description: - Known Restrictions: No known restriction on source of waste	Record Date:01-Nov-1992 Transfer Date: Modification Date: 01-May-1993 Status: Site now exempt from licencing Category: TREATMENT - Chemical Regulator: EA - North West Region - South Area (East - Sale) Size: Medium (← 75,000 tonnes/year)

12	166.0	SW	378400,397200	Site Address: Tenax Road, Trafford Park, MANCHESTER, Greater Manchester, Landfill Licence: 18IBAHAL EA Reference: - Waste Type: Difficult Waste Description: Difficult Known Restrictions: Waste produced/controlled by licence holder	Record Date:01-Jun-1993 Transfer Date: Modification Date: Status: Site now IPC authorised Category: STORAGE Regulator: EA - North West Region - South Area (East - Sale) Size: Undefined
13	364.0	S	378800,396800	Site Address: Ashburton Road East, Trafford Park, MANCHESTER, Greater Manchester, Landfill Licence: 18IBABAL EA Reference: - Waste Type: Non-Hazardous Waste Description: Non-Hazardous Known Restrictions: No known restriction on source of waste	Record Date:01-May-1992 Transfer Date: Modification Date: Status: Site now exempt from licencing Category: TREATMENT Regulator: EA - North West Region - South Area (East - Sale) Size: Large (← 250,000 tonnes/year)
14A	487.0	E	379400,397300	Site Address: Trafford Wharf Road, Trafford Park, MANCHESTER, Greater Manchester, M17 1HB Landfill Licence: 18IABZAL EA Reference: - Waste Type: Putrescible Waste Description: Putrescible Known Restrictions: No known restriction on source of waste	Record Date:01-Apr-1983 Transfer Date: Modification Date: 01-Apr-1990 Status: Record superseded Category: TRANSFER Regulator: EA - North West Region - South Area (East - Sale) Size: Medium (← 75,000 tonnes/year)

Records of Environment Agency (REGIS) waste sites within 1500m of the study site: 46

The following waste treatment, transfer or disposal sites records are represented as points on the Landfill and Other Waste Sites map:

ID	Distance	Direction	NGR	Details	
30	0.0	On Site	378817,397270	Site Address: Tenax Road, Trafford Park, Manchester, M17 1JT Type: Metal recycling sites (mixed MRSs) Size: →= 75000 tonnes Regis Licence Number: SNO003 Operator: S Norton & Co Ltd Surrendered Date: - Waste Management licence No: 53458 Annual Tonnage: 300000.0	Issue Date: 5/11/1999 Expiry Date: - Effective Date: - Status: Issued Modified: - Site Name: S Norton & Co Ltd Cancelled Date: - Correspondence Address: Bankfield House, Bankfield Mill, Regent Road, Liverpool, Merseyside, L20 8RQ
31C	95.0	NE	378999,397409	Site Address: Millington House, Millington Road, Trafford Park, Manchester, M17 Type: Metal recycling sites (mixed MRSs) Size: ← 25000 tonnes Regis Licence Number: BIE026 Operator: Britannia Import Export Ltd Surrendered Date: - Waste Management licence No: 50154 Annual Tonnage: 4999.0	Issue Date: 3/11/2003 Expiry Date: - Effective Date: - Status: Expired Modified: - Site Name: Britannia Import Export Ltd Cancelled Date: - Correspondence Address: Allen House, 1, Westmead Road, Sutton, Surrey, SM1 4LA
32D	121.0	E	379034,397308	Site Address: 10 The Hives, Mosley Road, Trafford Park, Manchester, M17 1HQ Type: Physical treatment facilities Size: ← 25000 tonnes Regis Licence Number: LLT002 Operator: Lubrichem Ltd Surrendered Date: - Waste Management licence No: 53918 Annual Tonnage: 0.0	Issue Date: 05/04/1982 Expiry Date: - Effective Date: - Status: Issued Modified: - Site Name: Lanstar Ltd Cancelled Date: - Correspondence Address: Liverpool Road, Cadishead, Manchester, M44 5DT
33D	121.0	E	379034,397308	Site Address: 10 The Hives, Mosley Road, Trafford Park, Manchester, M17 1HQ Type: Household, Commercial and Industrial transfer stations Size: ← 25000 tonnes Regis Licence Number: LLT002 Operator: Lanstar Ltd Surrendered Date: - Waste Management licence No: 53918 Annual Tonnage: 4999.0	Issue Date: 4/5/1982 Expiry Date: - Effective Date: - Status: Modified Modified: 3/15/2006 Site Name: Lanstar Ltd Cancelled Date: - Correspondence Address: Cleansing Services Group Limited, Grange Road, Botley, Southampton, Hampshire, SO30 2GD

34E	472.0	E	379387,397373	Site Address: Churchill Way, Trafford Park, Manchester, M17 1BS Type: Household, Commercial and Industrial transfer stations Size: →= 25000 tonnes ← 75000 tonnes Regis Licence Number: LSL001 Operator: Lavelle & Sons Ltd Surrendered Date: - Waste Management licence No: 53926 Annual Tonnage: 6250.0	Issue Date: 28/04/1983 Expiry Date: - Effective Date: - Status: Modified Modified: 27/11/2001 Site Name: Lavelle & Sons Ltd Cancelled Date: - Correspondence Address: Churchill Way, Trafford Park, Manchester, M17 1BS
35E	472.0	E	379387,397373	Site Address: Churchill Way, Trafford Park, Manchester, M17 1BS Type: Household, Commercial and Industrial transfer stations Size: →= 75000 tonnes Regis Licence Number: LSL001 Operator: Lavelle & Sons Ltd Surrendered Date: - Waste Management licence No: 53926 Annual Tonnage: 6250.0	Issue Date: 28/04/1983 Expiry Date: - Effective Date: - Status: Modified Modified: 27/11/2001 Site Name: Lavelle & Sons Ltd Cancelled Date: - Correspondence Address: Churchill Way, Trafford Park, Manchester, M17 1BS
36F	571.0	SE	379419,396907	Site Address: Albion Mills, Westinghouse Road, Trafford Park, Manchester, M17 Type: Material recycling treatment facilities Size: ← 25000 tonnes Regis Licence Number: MNC002 Operator: S John Joan & Michael D Barrett Surrendered Date: - Waste Management licence No: 53848 Annual Tonnage: 489.667	Issue Date: 15/06/1992 Expiry Date: - Effective Date: - Status: Issued Modified: - Site Name: M & N Containers Cancelled Date: - Correspondence Address: 30, Bradshaw Hall Drive, Bolton, Lancashire, BL2 4NY
37F	571.0	SE	379419,396907	Site Address: Albion Mills, Westinghouse Road, Trafford Park, Manchester, M17 1PY Type: Material recycling treatment facilities Size: ← 25000 tonnes Regis Licence Number: M&N002 Operator: M & N Containers Ltd Surrendered Date: - Waste Management licence No: 53848 Annual Tonnage: 490.0	Issue Date: 6/15/1992 Expiry Date: - Effective Date: 10/29/2004 Status: Transferred Modified: - Site Name: M & N Containers Ltd Cancelled Date: - Correspondence Address: Albion Mills, Westinghouse Road, Trafford Park, Manchester, M17 1PY
38G	581.0	E	379496,397357	Site Address: Trafford Wharf Road, Trafford Park, Manchester, M17 1BS Type: Household, Commercial and Industrial transfer stations Size: →= 75000 tonnes Regis Licence Number: LSL001 Operator: Lavelle & Sons Ltd Surrendered Date: - Waste Management licence No: 53926 Annual Tonnage: 6250.0	Issue Date: 28/04/1983 Expiry Date: - Effective Date: - Status: Modified Modified: 25/01/2005 Site Name: Lavelle & Sons Ltd Cancelled Date: - Correspondence Address: Trafford Wharf Road, Trafford Park, Manchester, M17 1BS
39G	581.0	E	379496,397357	Site Address: Trafford Wharf Road, Trafford Park, Manchester, M17 1BS Type: Household, Commercial and Industrial transfer stations Size: →= 75000 tonnes Regis Licence Number: LSL001 Operator: Lavelle & Sons Ltd Surrendered Date: - Waste Management licence No: 53926 Annual Tonnage: 6250.0	Issue Date: 4/28/1983 Expiry Date: - Effective Date: - Status: Modified Modified: 1/25/2005 Site Name: Lavelle & Sons Ltd Cancelled Date: - Correspondence Address: Trafford Wharf Road, Trafford Park, Manchester, M17 1BS
40	594.0	SW	378372,396695	Site Address: Monde Trading Estate, Unit 10, Westinghouse Road, Trafford Park, Manchester, M17 1LP Type: Clinical waste transfer stations or A20 or A15 Size: ← 25000 tonnes Regis Licence Number: RIL001 Operator: Rentokil Initial U K Ltd Surrendered Date: 2/5/2008 Waste Management licence No: 53519 Annual Tonnage: 0.0	Issue Date: 11/30/1992 Expiry Date: - Effective Date: - Status: Surrendered Modified: - Site Name: Rentokil Initial U K Ltd Cancelled Date: - Correspondence Address: 2, City Road, Beehive Ring Road, Gatwick Airport, West Sussex, RH6 0HA

41H	594.0	SE	379444,396905	Site Address: Avenue Works, Unit 2a, Trafford Park Road, Manchester, M17 1HU Type: Material recycling treatment facilities Size: ← 25000 tonnes Regis Licence Number: M&N001 Operator: M & N Containers Ltd Surrendered Date: - Waste Management licence No: 53460 Annual Tonnage: 5000.0	Issue Date: 4/12/1999 Expiry Date: - Effective Date: 10/29/2004 Status: Transferred Modified: - Site Name: M & N Containers Ltd Cancelled Date: - Correspondence Address: Avenue Works, Unit 2a, Trafford Park Road, Manchester, M17 1HU
42H	594.0	SE	379444,396905	Site Address: Avenue Works, Unit 2a, Trafford Park Road, Manchester, M17 1HU Type: Material recycling treatment facilities Size: ← 25000 tonnes Regis Licence Number: MND001 Operator: V Hughs M & S J Barrett Surrendered Date: - Waste Management licence No: 53460 Annual Tonnage: 417.0	Issue Date: 12/04/1999 Expiry Date: - Effective Date: - Status: Issued Modified: - Site Name: M & N Disposal Services Cancelled Date: - Correspondence Address: Avenue Works, Unit 2a, Trafford Park Road, Manchester, M17 1HU
Not shown	657.0	SW	378400,396600	Site Address: Monde Trading Estate, 1, Westinghouse Road, Trafford Park, Manchester, M17 1QR Type: Household, Commercial and Industrial transfer stations Size: ← 25000 tonnes Regis Licence Number: BRO011 Operator: Brocklehurst Darren Surrendered Date: - Waste Management licence No: 50367 Annual Tonnage: 0.0	Issue Date: 06/05/2005 Expiry Date: - Effective Date: - Status: Issued Modified: - Site Name: Brocklehurst Skip Hire Cancelled Date: - Correspondence Address: 35, Brook Avenue, Timperley, Altrincham, Cheshire, WA15 6SJ
Not shown	657.0	SW	378400,396600	Site Address: Monde Trading Estate, 1, Westinghouse Road, Trafford Park, Manchester, M17 1QR Type: Household, Commercial and Industrial transfer stations Size: →= 25000 tonnes ← 75000 tonnes Regis Licence Number: BRO011 Operator: Brocklehurst Darren Surrendered Date: - Waste Management licence No: 50367 Annual Tonnage: 74999.0	Issue Date: 5/6/2005 Expiry Date: - Effective Date: - Status: Issued Modified: - Site Name: Brocklehurst Skip Hire Cancelled Date: - Correspondence Address: 35, Brook Avenue, Timperley, Altrincham, Cheshire, WA15 6SJ
45I	667.0	W	377900,397100	Site Address: Former Adtranz Site, Ashburton Road West, Trafford Park, Manchester, M17 1SL Type: Mobile plant Size: ← 25000 tonnes Regis Licence Number: LAN003 Operator: Land Clean Ltd Surrendered Date: - Waste Management licence No: 50178 Annual Tonnage: 0.0	Issue Date: 17/04/2000 Expiry Date: - Effective Date: - Status: Issued Modified: - Site Name: Land Clean Ltd Cancelled Date: - Correspondence Address: Ffowlers' Bucke, The Street, South Harting, Petersfield, Hampshire, GU31 5QB
46I	667.0	W	377900,397100	Site Address: Former Adtranz Site, Longbridge Road, Off Ashburton Road West, Trafford Park, Manchester, M17 1SL Type: Mobile plant Size: ← 25000 tonnes Regis Licence Number: CAB001 Operator: C A Blackwell (contracts) Ltd Surrendered Date: - Waste Management licence No: 50179 Annual Tonnage: 0.0	Issue Date: 08/09/2000 Expiry Date: - Effective Date: - Status: Issued Modified: - Site Name: C A Blackwell Ltd Cancelled Date: - Correspondence Address: Coggeshall Road, Earls Colne, Essex, CO6 2JX
47I	667.0	W	377900,397100	Site Address: Former Adtranz Site, Ashburton Road West, Trafford Park, Manchester, M17 1SL Type: Mobile plant Size: Unknown Regis Licence Number: LAN003 Operator: Land Clean Ltd Surrendered Date: - Waste Management licence No: 50178 Annual Tonnage: 0.0	Issue Date: 17/04/2000 Expiry Date: - Effective Date: - Status: Issued Modified: - Site Name: Land Clean Ltd Cancelled Date: - Correspondence Address: Ffowlers' Bucke, The Street, South Harting, Petersfield, Hampshire, GU31 5QB

48J	717.0	SE	379549,396840	Site Address: Units 1 & 2 Discovery Works, Third Avenue, Trafford Park, Manchester, M17 1BW Type: Material recycling treatment facilities Size: ← 25000 tonnes Regis Licence Number: CDL001 Operator: Chemical Drums Ltd Surrendered Date: - Waste Management licence No: 53512 Annual Tonnage: 14800.0	Issue Date: 06/02/1998 Expiry Date: - Effective Date: - Status: Issued Modified: - Site Name: Chemical Drums Ltd Cancelled Date: - Correspondence Address: Units 1 & 2 Discovery Works, Third Avenue, Trafford Park, Manchester, M17 1BW
49J	717.0	SE	379549,396840	Site Address: Units 1 Discovery Works, Third Avenue, Trafford Park, Manchester, M17 1BW Type: Material recycling treatment facilities Size: ← 25000 tonnes Regis Licence Number: CDL002 Operator: Chemical Drums (Packaging) Ltd Surrendered Date: - Waste Management licence No: 53512 Annual Tonnage: 14800.0	Issue Date: 2/6/1998 Expiry Date: - Effective Date: 3/25/2005 Status: Transferred Modified: - Site Name: Chemical Drums (Packaging) Ltd Cancelled Date: - Correspondence Address: Unit 1 Discovery Works, Third Avenue, Trafford Park, Manchester, M17 1BW
Not shown	746.0	S	378776,396418	Site Address: Unit N9 Central Park Estate, Westinghouse Road, Trafford Park, Manchester, M17 1PG Type: Special waste transfer stations Size: ← 25000 tonnes Regis Licence Number: RPL002 Operator: Refrigerant Products Ltd Surrendered Date: 4/22/2005 Waste Management licence No: 53758 Annual Tonnage: 5000.0	Issue Date: 12/30/1993 Expiry Date: - Effective Date: - Status: Surrendered Modified: - Site Name: Refrigerant Products Ltd Trafford Park Transfer Station Cancelled Date: - Correspondence Address: Unit N9 Central Park Estate, Westinghouse Road, Trafford Park, Manchester, M17 1PG
Not shown	759.0	SW	378251,396580	Site Address: Unit 7, Westinghouse Road, Monde Trading Estate, Trafford Park, Manchester, M17 1LP Type: Household, Commercial and Industrial transfer stations Size: →= 25000 tonnes ← 75000 tonnes Regis Licence Number: HAL008 Operator: Halligan Thomas Patrick Surrendered Date: - Waste Management licence No: 50324 Annual Tonnage: 74999.0	Issue Date: 22/02/2005 Expiry Date: - Effective Date: - Status: Issued Modified: - Site Name: T P Halligan Transfer Station Cancelled Date: - Correspondence Address: Unit 7, Westinghouse Road, Monde Trading Estate, Trafford Park, Manchester, M17 1LP
Not shown	759.0	SW	378251,396580	Site Address: Unit 7, Westinghouse Road, Monde Trading Estate, Trafford Park, Manchester, M17 1LP Type: Household, Commercial and Industrial transfer stations Size: →= 25000 tonnes ← 75000 tonnes Regis Licence Number: HAL008 Operator: Halligan Thomas Patrick Surrendered Date: - Waste Management licence No: 50324 Annual Tonnage: 74999.0	Issue Date: 2/22/2005 Expiry Date: - Effective Date: - Status: Issued Modified: - Site Name: T P Halligan Transfer Station Cancelled Date: - Correspondence Address: Unit 7, Westinghouse Road, Monde Trading Estate, Trafford Park, Manchester, M17 1LP
Not shown	861.0	NW	377800,397800	Site Address: 1130, Nash Road, Trafford Park, Manchester, M17 1SX Type: Material recycling treatment facilities Size: →= 25000 tonnes ← 75000 tonnes Regis Licence Number: BLA002 Operator: Blagden Packaging N V Surrendered Date: 1/11/2005 Waste Management licence No: 53574 Annual Tonnage: 33250.0	Issue Date: 12/10/1996 Expiry Date: - Effective Date: 1/24/2001 Status: Surrendered Modified: 3/31/2003 Site Name: Blagden Packaging N V Cancelled Date: - Correspondence Address: Pickersdane Cottage, Brook, Ashford, Kent, TN25 5PL
Not shown	895.0	NE	379411,398110	Site Address: James Corbett Road, Salford, Manchester, M5 2DE Type: Biological treatment facilities Size: →= 75000 tonnes Regis Licence Number: NWW007 Operator: United Utilities Water Plc Surrendered Date: - Waste Management licence No: 53497 Annual Tonnage: 30417.0	Issue Date: 23/06/1998 Expiry Date: - Effective Date: - Status: Issued Modified: - Site Name: Salford Wastewater Treatment Works Cancelled Date: - Correspondence Address: Wastewater Services, Lingley Green Avenue, Great Sankey, Warrington, Cheshire, WA5 3LP

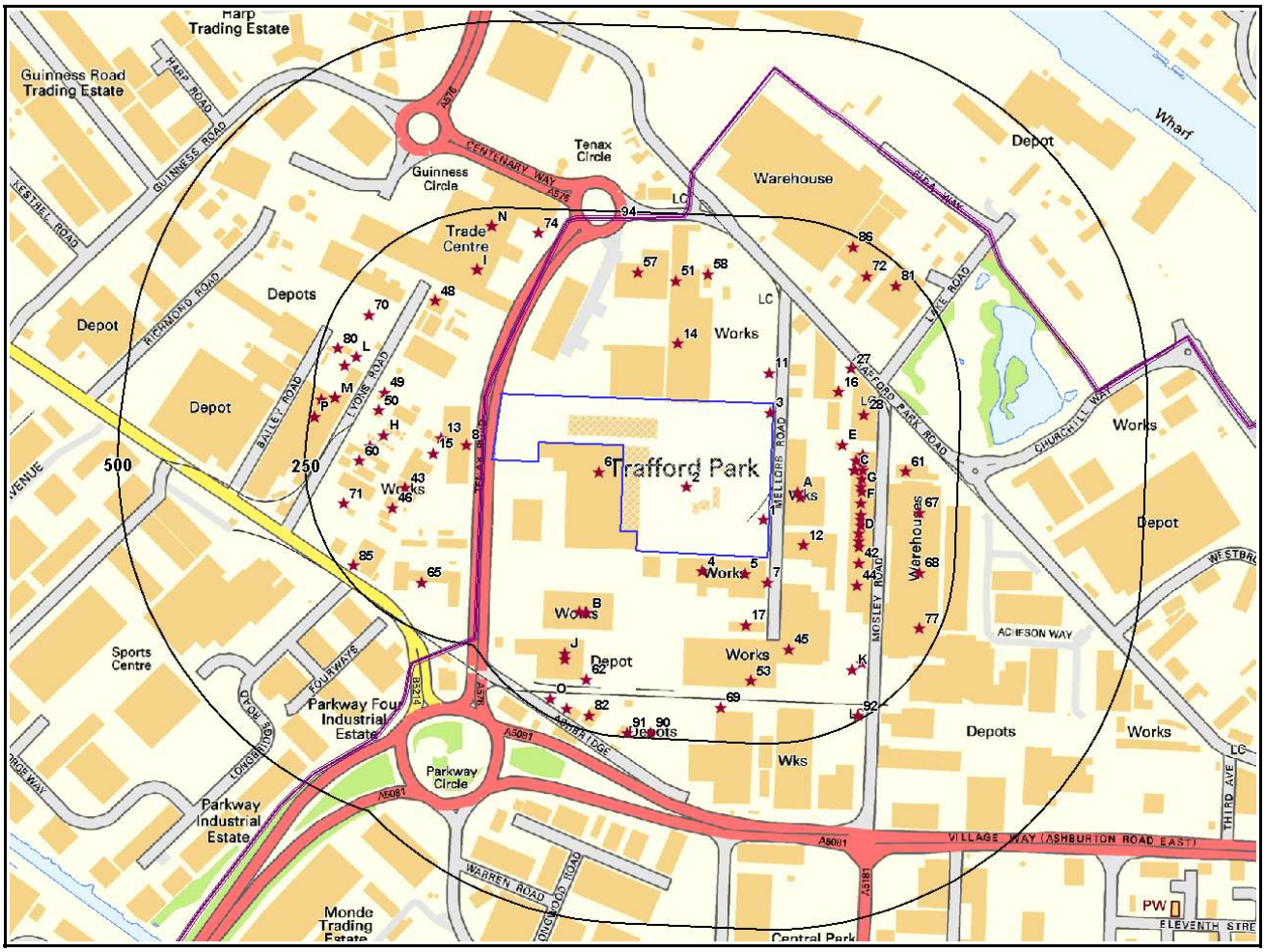
Not shown	895.0	NE	379411,398110	Site Address: James Corbett Road, Salford, Manchester, M5 2DX Type: Biological treatment facilities Size: ← 25000 tonnes Regis Licence Number: NWW007 Operator: United Utilities Water Plc Surrendered Date: - Waste Management licence No: 53497 Annual Tonnage: 75000.0	Issue Date: 6/23/1998 Expiry Date: - Effective Date: - Status: Modified Modified: 2/8/2006 Site Name: Salford Wastewater Treatment Works Cancelled Date: - Correspondence Address: Waste Controller, Dawson House, Great Sankey, Warrington, Cheshire, WA5 3LW
Not shown	964.0	NW	377733,397888	Site Address: Nash Road, Trafford Park, Manchester, M17 1SX Type: Physico-chemical treatment facilities Size: ← 25000 tonnes Regis Licence Number: CIW006 Operator: Collier Industrial Waste Limited Surrendered Date: - Waste Management licence No: 50496 Annual Tonnage: 0.0	Issue Date: 10/6/2006 Expiry Date: - Effective Date: - Status: IPPC Modified: - Site Name: Collier Trafford Park P P C Cancelled Date: - Correspondence Address: Moss Side Lane, Rixton, Warrington, Cheshire, WA3 6EL
Not shown	964.0	NW	377733,397888	Site Address: 9, Nash Road, Trafford Park, Manchester, M17 1SX Type: Physico-chemical treatment facilities Size: →= 75000 tonnes Regis Licence Number: SAR001 Operator: Progressive Waste Disposal Ltd Surrendered Date: - Waste Management licence No: 53522 Annual Tonnage: 2083.0	Issue Date: 2/1/1980 Expiry Date: - Effective Date: - Status: Issued Modified: - Site Name: Progressive Waste Disposal Ltd Cancelled Date: - Correspondence Address: 9, Nash Road, Trafford Park, Manchester, M17 1SX
Not shown	964.0	NW	377733,397888	Site Address: Nash Road, Trafford Park, Manchester, Gtr Manchester, M17 1SX Type: - Size: ← 25000 tonnes Regis Licence Number: CIW006 Operator: Collier Industrial Waste Limited Surrendered Date: - Waste Management licence No: 50496 Annual Tonnage: 0.0	Issue Date: 06/10/2006 Expiry Date: - Effective Date: - Status: Issued Modified: - Site Name: Collier Trafford Park P P C Cancelled Date: - Correspondence Address: Moss Side Lane, Rixton, Warrington, Cheshire, WA3 6EL
Not shown	1020.0	NE	379500,398200	Site Address: Salford Enterprise Centre, Guide Street, Salford, Lancashire, M50 1EW Type: Household, Commercial and Industrial transfer stations Size: ← 25000 tonnes Regis Licence Number: GPA001 Operator: Parish G Surrendered Date: - Waste Management licence No: 53884 Annual Tonnage: 24999.0	Issue Date: 9/27/1991 Expiry Date: - Effective Date: - Status: Issued Modified: - Site Name: G Parish Scrap Metal Dealer & Skip Waste Hire Cancelled Date: - Correspondence Address: Apartment 5, Cavendish Gardens, 26, Ellesmere Road, Eccles, Manchester, M30 9RT
Not shown	1022.0	S	378400,396200	Site Address: Former Azko Nobel Site, Barton Dock Road, Stretford, Manchester, M32 Type: Mobile plant Size: →= 75000 tonnes Regis Licence Number: KEL001 Operator: Keller Limited Surrendered Date: - Waste Management licence No: 48208 Annual Tonnage: 0.0	Issue Date: 27/10/2003 Expiry Date: - Effective Date: - Status: Issued Modified: - Site Name: Keller Ltd Mobile Plant Cancelled Date: - Correspondence Address: Oxford Road, Ryton On Dunsmore, Coventry, W Mids, CV8 3EG
Not shown	1022.0	S	378400,396200	Site Address: Former Azko Nobel Site, Barton Dock Road, Stretford, Manchester, M32 Type: Mobile plant Size: ← 25000 tonnes Regis Licence Number: KEL001 Operator: Keller Limited Surrendered Date: - Waste Management licence No: 48208 Annual Tonnage: 0.0	Issue Date: 27/10/2003 Expiry Date: - Effective Date: - Status: Issued Modified: - Site Name: Keller Ltd Mobile Plant Cancelled Date: - Correspondence Address: -
Not shown	1022.0	S	378400,396200	Site Address: Former Azko Nobel Site, Barton Dock Road, Stretford, Manchester, M32 Type: Mobile plant Size: →= 75000 tonnes Regis Licence Number: KEL001 Operator: Keller Limited Surrendered Date: - Waste Management licence No: 48208 Annual Tonnage: 0.0	Issue Date: 27/10/2003 Expiry Date: - Effective Date: - Status: Issued Modified: - Site Name: Keller Ltd Mobile Plant Cancelled Date: - Correspondence Address: Oxford Road, Ryton On Dunsmore, Coventry, W Mids, CV8 3EG

Not shown	1136.0	NW	377600,398000	Site Address: Irwell Park Wharf, Lankro Way, Eccles, Manchester, M30 0SA Type: Metal recycling sites (mixed MRSs) Size: →= 75000 tonnes Regis Licence Number: EUR003 Operator: European Metal Recycling Ltd Surrendered Date: - Waste Management licence No: 50335 Annual Tonnage: 74999.0	Issue Date: 26/10/2004 Expiry Date: - Effective Date: - Status: Issued Modified: - Site Name: European Metal Recycling Ltd Cancelled Date: - Correspondence Address: Sirius House, Delta Crescent, Westbrook, Warrington, Cheshire, WA5 7NS
Not shown	1136.0	NW	377600,398000	Site Address: Irwell Park Wharf, Lankro Way, Eccles, Manchester, M30 0SA Type: Metal recycling sites (mixed MRSs) Size: →= 75000 tonnes Regis Licence Number: EUR003 Operator: European Metal Recycling Ltd Surrendered Date: - Waste Management licence No: 50335 Annual Tonnage: 0.0	Issue Date: 10/26/2004 Expiry Date: - Effective Date: - Status: Modified Modified: 2/12/2007 Site Name: European Metal Recycling Ltd Cancelled Date: - Correspondence Address: Sirius House, Delta Crescent, Westbrook, Warrington, Cheshire, WA5 7NS
Not shown	1145.0	S	379310,396087	Site Address: Mercury House, 17, Commerce Way, Trafford Park, Manchester, M17 1HW Type: Household, Commercial and Industrial transfer stations Size: ← 25000 tonnes Regis Licence Number: MER018 Operator: Mercury Group Recycling Plc Surrendered Date: - Waste Management licence No: 50503 Annual Tonnage: 0.0	Issue Date: 11/6/2007 Expiry Date: - Effective Date: - Status: Issued Modified: - Site Name: Mercury Recycling Group Plc Cancelled Date: - Correspondence Address: Mercury House, 17, Commerce Way, Trafford Park, Manchester, M17 1HW
Not shown	1156.0	W	377446,397718	Site Address: 9, Nash Road, Ashburton, Trafford Park, Manchester, M17 1SX Type: Physico-chemical treatment facilities Size: ← 25000 tonnes Regis Licence Number: VTP001 Operator: Veolia E S Uk Ltd Surrendered Date: - Waste Management licence No: 50495 Annual Tonnage: 0.0	Issue Date: 23/08/2006 Expiry Date: - Effective Date: - Status: IPPC Modified: - Site Name: Veolia Trafford Park Cancelled Date: - Correspondence Address: 9, Nash Road, Ashburton, Trafford Park, Manchester, M17 1SX
Not shown	1156.0	W	377446,397718	Site Address: 9, Nash Road, Ashburton, Trafford Park, Manchester, M17 1SX Type: Physico-chemical treatment facilities Size: ← 25000 tonnes Regis Licence Number: VTP001 Operator: Veolia E S (U K) Ltd Surrendered Date: - Waste Management licence No: 50495 Annual Tonnage: 0.0	Issue Date: 8/23/2006 Expiry Date: - Effective Date: - Status: IPPC Modified: - Site Name: Veolia Trafford Park Cancelled Date: - Correspondence Address: 9, Nash Road, Ashburton, Trafford Park, Manchester, M17 1SX
Not shown	1156.0	W	377446,397718	Site Address: Nash Road, Trafford Park, Manchester, M17 1SX Type: Physico-chemical treatment facilities Size: →= 75000 tonnes Regis Licence Number: PJC001 Operator: Collier P J Surrendered Date: - Waste Management licence No: 53523 Annual Tonnage: 75000.0	Issue Date: 1/8/1985 Expiry Date: - Effective Date: - Status: Issued Modified: - Site Name: Tank Farm Chemical Treatment Facility Cancelled Date: - Correspondence Address: Nash Road, Trafford Park, Manchester, M17 1SX
Not shown	1156.0	W	377446,397718	Site Address: 9, Nash Road, Ashburton, Trafford Park, Manchester, M17 1SX Type: - Size: ← 25000 tonnes Regis Licence Number: VTP001 Operator: Veolia E S Onyx Ltd Surrendered Date: - Waste Management licence No: 50495 Annual Tonnage: 0.0	Issue Date: 23/08/2006 Expiry Date: - Effective Date: - Status: IPPC Modified: - Site Name: Veolia Trafford Park Cancelled Date: - Correspondence Address: 9, Nash Road, Ashburton, Trafford Park, Manchester, M17 1SX

Not shown	1156.0	W	377446,397718	Site Address: 9, Nash Road, Ashburton, Trafford Park, Manchester, M17 1SX Type: Physico-chemical treatment facilities Size: ← 25000 tonnes Regis Licence Number: VTP001 Operator: Veolia E S Onyx Ltd Surrendered Date: - Waste Management licence No: 50495 Annual Tonnage: 0.0	Issue Date: 23/08/2006 Expiry Date: - Effective Date: - Status: IPPC Modified: - Site Name: Veolia Trafford Park Cancelled Date: - Correspondence Address: 9, Nash Road, Ashburton, Trafford Park, Manchester, M17 1SX
Not shown	1285.0	W	377287,397607	Site Address: Thompson Road, Trafford Park, Manchester, M17 1SE Type: Household, Commercial and Industrial transfer stations Size: →= 25000 tonnes ← 75000 tonnes Regis Licence Number: GGS001 Operator: G Gervin & Sons Ltd Surrendered Date: - Waste Management licence No: 53581 Annual Tonnage: 6250.0	Issue Date: 10/30/1996 Expiry Date: - Effective Date: - Status: Issued Modified: - Site Name: G Gervin & Sons Ltd Cancelled Date: - Correspondence Address: 23, Richardson Road, Eccles, Manchester, M30 0WR
Not shown	1377.0	E	380253,396867	Site Address: Elevator Road, Trafford Park, Manchester, M17 1BR Type: Material recycling treatment facilities Size: ← 25000 tonnes Regis Licence Number: WIL208 Operator: Williams Pallet Services Ltd Surrendered Date: - Waste Management licence No: 50417 Annual Tonnage: 75000.0	Issue Date: 4/13/2006 Expiry Date: - Effective Date: - Status: Issued Modified: - Site Name: Williams Pallet Services Ltd Cancelled Date: - Correspondence Address: Williams Pallet Services Ltd, Higher Ardwick, Ardwick, Manchester, M12 6DB
Not shown	1472.0	SE	380264,396589	Site Address: 9 Bond Warehouse, Unit 1, Trafford Park Road, Trafford Park, Manchester, M17 1WR Type: Household, Commercial and Industrial transfer stations Size: →= 25000 tonnes ← 75000 tonnes Regis Licence Number: LA002 Operator: Lancashire Waste Services Ltd Surrendered Date: - Waste Management licence No: 53666 Annual Tonnage: 41200.0	Issue Date: 28/03/1995 Expiry Date: - Effective Date: 29/09/2001 Status: Modified Modified: 28/09/2001 Site Name: Trafford Park Road Transfer Station Cancelled Date: - Correspondence Address: Sita House, Grenfell Road, Maidenhead, Berkshire, SL6 1ES
Not shown	1472.0	SE	380264,396589	Site Address: 9 Bond Warehouse, Unit 1, Trafford Park Road, Trafford Park, Manchester, M17 1WR Type: Household, Commercial and Industrial transfer stations Size: →= 75000 tonnes Regis Licence Number: LA002 Operator: Lancashire Waste Services Ltd Surrendered Date: - Waste Management licence No: 53666 Annual Tonnage: 41200.0	Issue Date: 28/03/1995 Expiry Date: - Effective Date: 29/09/2001 Status: Modified Modified: 28/09/2001 Site Name: Trafford Park Road Transfer Station Cancelled Date: - Correspondence Address: John Inskip, Lancashire House, 24, Winckley Square, Preston, Lancashire, PR1 3JJ
Not shown	1472.0	SE	380264,396589	Site Address: 9 Bond Warehouse, Unit 1, Trafford Park Road, Trafford Park, Manchester, M17 1WR Type: Household, Commercial and Industrial transfer stations Size: →= 75000 tonnes Regis Licence Number: LA002 Operator: Lancashire Waste Services Ltd Surrendered Date: - Waste Management licence No: 53666 Annual Tonnage: 41200.0	Issue Date: 3/28/1995 Expiry Date: - Effective Date: 9/29/2001 Status: Modified Modified: 9/28/2001 Site Name: Trafford Park Road Transfer Station Cancelled Date: - Correspondence Address: Sita House, Grenfell Road, Maidenhead, Berkshire, SL6 1ES

3. Current Land Use Map

NW N NE



W E

SW S SE

Current Land Use Legend

Site Outline

250
500
Search Buffers (m)

Current Industrial Sites

Petrol & Fuel Sites

Underground High Pressure Oil & Fuel Pipelines

3. Current Land Uses

3.1 Current Industrial Data

Records of potentially contaminative industrial sites within 250m of the study site: 92

The following records are represented as points on the Current Land Uses map.

ID	Distance	Direction	Company	Address	Activity	Category
1	0.0	On Site	Collier & Henry Concrete Ltd	Unit 2, Mellors Road, Trafford Park, Manchester, M17 1PB	Concrete Products	Industrial Products
2	0.0	On Site	Scrap Yard	-	Scrap Metal Merchants	Recycling Services
3	0.0	On Site	Electricity Sub Station	-	Electrical Features	Infrastructure And Facilities
4	23.0	S	Works	-	Unspecified Works Or Factories	Industrial Features
5	23.0	S	Works	-	Unspecified Works Or Factories	Industrial Features
6	31.0	W	Alan Provisor Ltd	Unit 2/6 Trafford Distribution Centre, Tenax Road, Trafford Park, Manchester, M17 1JT	Ropes, Nets and Cordage	Industrial Products
7	34.0	S	Electricity Sub Station	-	Electrical Features	Infrastructure And Facilities
8	37.0	W	Works	-	Unspecified Works Or Factories	Industrial Features
9A	37.0	E	Works	-	Unspecified Works Or Factories	Industrial Features
10A	40.0	E	Bergen Transport Ltd	Mellors Road, Trafford Park, Manchester, M17 1PB	Distribution and Haulage	Transport, Storage And Delivery
11	41.0	N	Electricity Sub Station	-	Electrical Features	Infrastructure And Facilities
12	47.0	E	Warehouse	-	Container and Storage	Transport, Storage And Delivery
13	72.0	W	Tank	-	Tanks (Generic)	Industrial Features
14	76.0	N	Works	-	Unspecified Works Or Factories	Industrial Features
15	79.0	W	Tank	-	Tanks (Generic)	Industrial Features
16	88.0	E	Works	-	Unspecified Works Or Factories	Industrial Features
17	93.0	S	John Hogg	Mellors Road, Trafford Park, Manchester, M17 1PB	Colours, Chemicals and Water Softeners and Supplies	Industrial Products
18E	94.0	E	Tank	-	Tanks (Generic)	Industrial Features
19B	107.0	SW	Robert Horne	Huntsman House, Tenax Road, Trafford Park, Manchester, M17 1JT	Wood Products Including Charcoal, Paper, Card and Board	Industrial Products
20B	107.0	SW	Robert Horn Sign & Display	2, Tenax Road, Trafford Park, Manchester, M17 1JT	Rubber and Plastics	Industrial Products
21B	107.0	SW	Robert Horne Group	Huntsman House, Tenax Road, Trafford Park, Manchester, M17 1JT	Signs	Industrial Products
22B	107.0	SW	Marwood Group Ltd	10, Tenax Road, Trafford Park, Manchester, M17 1JT	Construction and Tool Hire	Hiring And Contract Services
23C	110.0	E	Sam Harrop Ltd	11 The Hives, Mosley Rd, Trafford Park, Manchester, M17 1HQ	Fish, Meat and Poultry Products	Foodstuffs
24C	111.0	E	Ryan Air Conditioning Spares	13 The Hives, Mosley Road, Trafford Park, Manchester, M17 1HQ	Cooling and Refrigeration	Industrial Products
25B	112.0	SW	Works	-	Unspecified Works Or Factories	Industrial Features
26C	113.0	E	Bostec Ltd	12 The Hives, Mosley Road, Trafford Park, Manchester, M17 1HQ	Rubber and Plastics	Industrial Products
27	114.0	NE	Electricity Sub Station	-	Electrical Features	Infrastructure And Facilities
28	120.0	E	Invincible Works	-	Unspecified Works Or Factories	Industrial Features

29D	121.0	E	Warehouse	-	Container and Storage	Transport, Storage And Delivery
30D	121.0	E	Warehouse	-	Container and Storage	Transport, Storage And Delivery
31F	121.0	E	Warehouse	-	Container and Storage	Transport, Storage And Delivery
32G	121.0	E	Warehouse	-	Container and Storage	Transport, Storage And Delivery
33D	121.0	E	Warehouse	-	Container and Storage	Transport, Storage And Delivery
34E	122.0	E	Warehouse	-	Container and Storage	Transport, Storage And Delivery
35F	122.0	E	Warehouse	-	Container and Storage	Transport, Storage And Delivery
36G	122.0	E	Works	-	Unspecified Works Or Factories	Industrial Features
37D	122.0	E	Works	-	Unspecified Works Or Factories	Industrial Features
38C	122.0	E	Works	-	Unspecified Works Or Factories	Industrial Features
39D	122.0	E	Works	-	Unspecified Works Or Factories	Industrial Features
40C	122.0	E	Works	-	Unspecified Works Or Factories	Industrial Features
41F	122.0	E	Warehouse	-	Container and Storage	Transport, Storage And Delivery
42	123.0	E	T D G UK Ltd	Depot 1, Mosley Road, Trafford Park, Manchester, Lancashire, M17 1NB	Distribution and Haulage	Transport, Storage And Delivery
43	123.0	W	Works	-	Unspecified Works Or Factories	Industrial Features
44	125.0	E	Warehouse	-	Container and Storage	Transport, Storage And Delivery
45	127.0	S	Works	-	Unspecified Works Or Factories	Industrial Features
46	148.0	SW	Tanks	-	Tanks (Generic)	Industrial Features
47H	148.0	W	Tanks	-	Tanks (Generic)	Industrial Features
48	153.0	NW	Works	-	Unspecified Works Or Factories	Industrial Features
49	156.0	W	Tanks	-	Tanks (Generic)	Industrial Features
50	159.0	W	Tanks	-	Tanks (Generic)	Industrial Features
51	160.0	N	Works	-	Unspecified Works Or Factories	Industrial Features
52H	164.0	W	Tanks	-	Tanks (Generic)	Industrial Features
53	167.0	S	Works	-	Unspecified Works Or Factories	Industrial Features
54J	167.0	SW	Depot	-	Container and Storage	Transport, Storage And Delivery
55I	170.0	N	Beamech Group Ltd	Unit 5 Orion Trading Estate, Tenax Road, Trafford Park, Manchester, M17 1JT	Industrial Engineers	Engineering Services
56I	170.0	N	Beamech Group Ltd	Unit 5 Orion Trading Estate, Tenax Road, Trafford Park, Manchester, M17 1JT	Unspecified Manufacturing	Industrial Products
57	170.0	N	Arco	Tenax Circle, Trafford Park, Manchester, M17 1EZ	Workwear	Industrial Products
58	171.0	N	Wincanton Logistics	Ocean Estates, Trafford Park Road, Trafford Park, Manchester, M17 1AT	Distribution and Haulage	Transport, Storage And Delivery
59J	174.0	SW	E O C (UK) Ltd	Tenax Road, Trafford Park, Manchester, M17 1JT	Colours, Chemicals and Water Softeners and Supplies	Industrial Products
60	178.0	W	Tanks	-	Tanks (Generic)	Industrial Features

61	180.0	E	Warehouse	-	Container and Storage	Transport, Storage And Delivery
62	185.0	S	Depot	-	Container and Storage	Transport, Storage And Delivery
63K	189.0	SE	Tank	-	Tanks (Generic)	Industrial Features
64K	190.0	SE	Electricity Sub Station	-	Electrical Features	Infrastructure And Facilities
65	190.0	SW	Electricity Sub Station	-	Electrical Features	Infrastructure And Facilities
66L	200.0	W	Depot	-	Container and Storage	Transport, Storage And Delivery
67	201.0	E	Warehouse	-	Container and Storage	Transport, Storage And Delivery
68	203.0	E	Warehouse	-	Container and Storage	Transport, Storage And Delivery
69	205.0	S	Tank	-	Tanks (Generic)	Industrial Features
70	205.0	NW	Depot	-	Container and Storage	Transport, Storage And Delivery
71	207.0	W	Tanks	-	Tanks (Generic)	Industrial Features
72	212.0	NE	M A N E R F Manchester	Trafford Park Road, Trafford Park, Manchester, M17 1NJ	New Vehicles	Motoring
73L	212.0	W	Tanks	-	Tanks (Generic)	Industrial Features
74	218.0	N	Electricity Sub Station	-	Electrical Features	Infrastructure And Facilities
75M	220.0	W	Ehs International Ltd	E H S House, Lyons Road, Trafford Park, Manchester, M17 1RN	Cooling and Refrigeration	Industrial Products
76M	220.0	W	Servistec Ltd	Bailey Road, Trafford Park, Manchester, M17 1SA	Cooling and Refrigeration	Industrial Products
77	224.0	SE	Warehouse	-	Container and Storage	Transport, Storage And Delivery
78N	226.0	N	D Walton	Unit 4 Orion Trading Estate, Tenax Road, Trafford Park, Manchester, M17 1JT	Vehicle Repair and Servicing	Repair And Servicing
79N	226.0	N	Walkden Warehousing Ltd	Unit 3 Orion Trading Estate, Tenax Road, Trafford Park, Manchester, M17 1JT	Container and Storage	Transport, Storage And Delivery
80	226.0	W	Tanks	-	Tanks (Generic)	Industrial Features
81	227.0	NE	Warehouse	-	Container and Storage	Transport, Storage And Delivery
82	229.0	S	Depot	-	Container and Storage	Transport, Storage And Delivery
83O	229.0	SW	Electricity Sub Station	-	Electrical Features	Infrastructure And Facilities
84O	232.0	SW	Depot	-	Container and Storage	Transport, Storage And Delivery
85	234.0	SW	Tank	-	Tanks (Generic)	Industrial Features
86	235.0	NE	Warehouse	-	Container and Storage	Transport, Storage And Delivery
87M	238.0	W	Warehouse	-	Container and Storage	Transport, Storage And Delivery
88P	243.0	W	Torkington Engineering Ltd	Bailey Road, Trafford Park, Manchester, M17 1SA	Industrial Engineers	Engineering Services
89P	243.0	W	Rowham Steel Products Ltd	Lyons Road, Trafford Park, Manchester, M17 1RN	Metals Manufacturers, Fabricators and Stockholders	Industrial Products
90	243.0	S	Depot	-	Container and Storage	Transport, Storage And Delivery
91	244.0	S	Depot	-	Container and Storage	Transport, Storage And Delivery

92	245.0	SE	Electricity Sub Station	-	Electrical Features	Infrastructure And Facilities

3.2 Petrol and Fuel Sites

Records of petrol or fuel sites within 500m of the study site: **0**

Database searched and no data found.

3.3 Underground High Pressure Oil and Gas Pipelines

Records of high pressure underground pipelines within 500m of the study site: **2**

The following Underground High Pressure Oil and Gas pipeline records provided by Linewatch are represented as linear features on the Current Land Use map:

ID	Distance	Direction	Address	Operator	Telephone
93	9.0	W	Including CP Cables	3m Pipelines Easement	n/a
94	12.0	W	Fishergerman Chartered Surveyors, Pipelines Office, New Road, Hardley, Hythe, Southampton, Hampshire, SO45 3NW	Mainline pipelines	023 8088 3150

4. Geology

4.1 Artificial Ground and Made Ground

Database searched and no data found.

The database has been searched on site, including a 50m buffer.

4.2 Superficial Ground and Drift Geology

The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
GFSDD-SAGR	GLACIOFLUVIAL SHEET DEPOSITS, DEVENSIAN	SAND AND GRAVEL
PEAT-PEAT	PEAT	PEAT

(Derived from the BGS 1:50,000 Digital Geological Map of Great Britain)

4.3 Bedrock and Solid Geology

The database has been searched on site, including a 50m buffer.

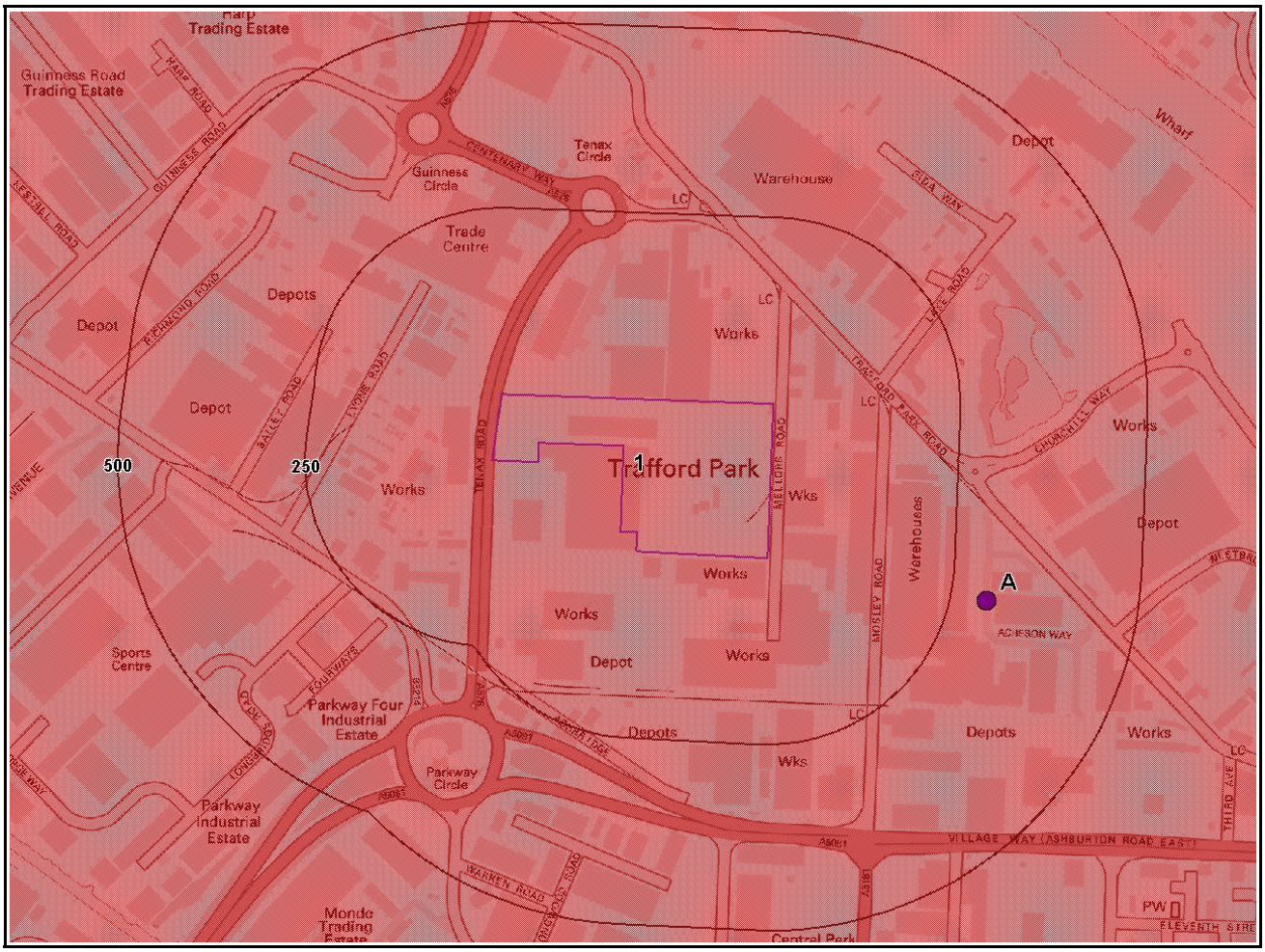
LEX Code	Description	Rock Type
SSG-SDST	SHERWOOD SANDSTONE GROUP	SANDSTONE
SSG-SDST	SHERWOOD SANDSTONE GROUP	SANDSTONE

(Derived from the BGS 1:50,000 Digital Geological Map of Great Britain)

For more detailed geological and ground stability data please refer to the "GroundSure GeoInsight". Available from our website.

5. Hydrogeology and Hydrology - Aquifer and Abstraction Licence Map

NW N NE



◄W E►

SW S SE

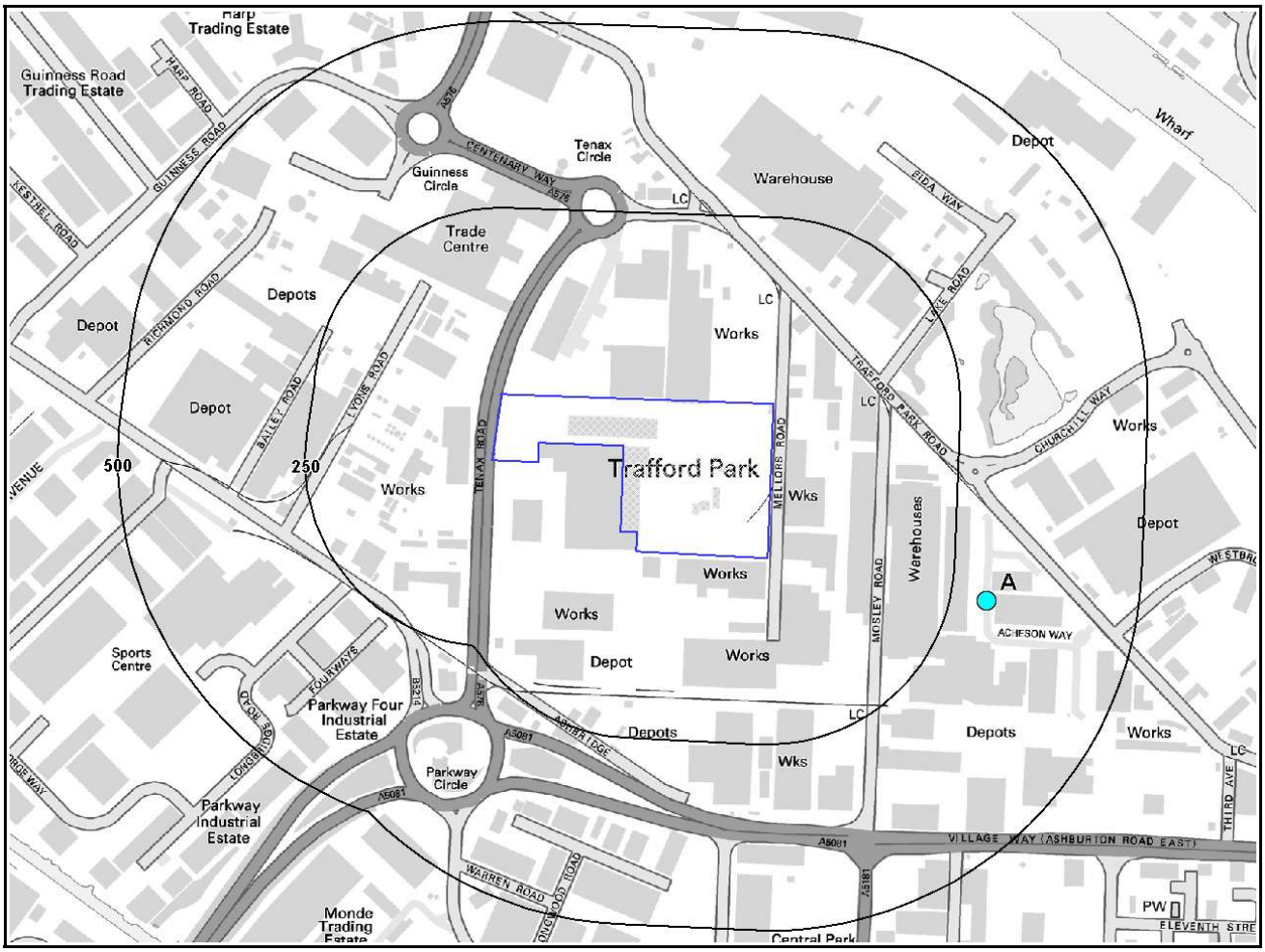
Hydrogeology and Hydrology Legend

Enabled by Ordnance Survey

- Site Outline
- Search Buffers (m): 250, 500
- Minor Aquifer - Low Leaching Potential
- Minor Aquifer - Intermediate Leaching Potential
- Minor Aquifer - High Leaching Potential
- Major Aquifer - Low Leaching Potential
- Major Aquifer - Intermediate Leaching Potential
- Major Aquifer - High Leaching Potential
- Main River
- Groundwater Abstraction Licence
- Surface Water Abstraction Licence

5b. Hydrogeology and Hydrology - SPZ and Potable Water Abstraction Map

NW N NE



◄W E►

SW S SE

Hydrogeology and Hydrology Legend

Enabled by Ordnance Survey

Site Outline

250
500
Search Buffers (m)

Source Protection Zone 1 - Inner Catchment

Source Protection Zone 2 - Outer Catchment

Source Protection Zone 3 - Total Catchment

Source Protection Zone 4 - Zone of Special Interest

Potable Water Abstraction Licence

5. Hydrogeology and Hydrology

5.1 Groundwater Vulnerability and Soil Classification

Records of aquifer and soil classification within 200m of the study site: **Yes**

The following groundwater information is represented as polygons on the Aquifer and Abstraction Licence Map:

ID	Distance	Direction	Classification
1	0.0	On Site	Major Aquifer/High Leaching Potential

5.2 Groundwater Abstraction Licences

Are there any Groundwater Abstraction Licences within 1000m of the study site? **Yes**

The following Abstraction Licences records are represented as points, lines and regions on the Aquifer and Abstraction Licence Map:

ID	Distance	Direction	NGR	Details	
2A	299.0	E	379200,397100	Licence No: 2569007065 Details: "Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services" Direct Source: Ground Water - North West Region Point: "borehole At Premises, Trafford Park, Manchester" Data Type: Point	Original Application No: Original Start Date: 31/1/1967 Expiry Date: - Issue No: 100 Version Start Date: 27/10/1993 Version End Date: -
3A	299.0	E	379200,397100	Licence No: 2569007065 Details: Effluent/Slurry Dilution Direct Source: Ground Water - North West Region Point: "borehole At Premises, Trafford Park, Manchester" Data Type: Point	Original Application No: Original Start Date: 31/1/1967 Expiry Date: - Issue No: 100 Version Start Date: 27/10/1993 Version End Date: -
4A	299.0	E	379200,397100	Licence No: 2569007065 Details: Non-Evaporative Cooling Direct Source: Ground Water - North West Region Point: "borehole At Premises, Trafford Park, Manchester" Data Type: Point	Original Application No: Original Start Date: 31/1/1967 Expiry Date: - Issue No: 100 Version Start Date: 27/10/1993 Version End Date: -
5A	299.0	E	379200,397100	Licence No: 2569007065 Details: Process water Direct Source: Ground Water - North West Region Point: "borehole At Premises, Trafford Park, Manchester" Data Type: Point	Original Application No: Original Start Date: 31/1/1967 Expiry Date: - Issue No: 100 Version Start Date: 27/10/1993 Version End Date: -
6A	299.0	E	379200,397100	Licence No: 2569007065 Details: Non-Evaporative Cooling Direct Source: Ground Water - North West Region Point: Borehole At Premises, Trafford Park, Manchester Data Type: Point	Original Application No: Original Start Date: 31/1/1967 Expiry Date: - Issue No: 100 Version Start Date: 27/10/1993 Version End Date: -
7A	299.0	E	379200,397100	Licence No: 2569007065 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: Ground Water - North West Region Point: Borehole At Premises, Trafford Park, Manchester Data Type: Point	Original Application No: Original Start Date: 31/1/1967 Expiry Date: - Issue No: 100 Version Start Date: 27/10/1993 Version End Date: -

8A	299.0	E	379200,397100	Licence No: 2569007065 Details: Effluent/Slurry Dilution Direct Source: Ground Water - North West Region Point: Borehole At Premises, Trafford Park, Manchester Data Type: Point	Original Application No: Original Start Date: 31/1/1967 Expiry Date: - Issue No: 100 Version Start Date: 27/10/1993 Version End Date: -
9A	299.0	E	379200,397100	Licence No: 2569007065 Details: Process Water Direct Source: Ground Water - North West Region Point: Borehole At Premises, Trafford Park, Manchester Data Type: Point	Original Application No: Original Start Date: 31/1/1967 Expiry Date: - Issue No: 100 Version Start Date: 27/10/1993 Version End Date: -
Not shown	717.0	N	378470,398090	Licence No: 2569007049 Details: Non-Evaporative Cooling Direct Source: Ground Water - North West Region Point: Borehole At Trafford Park Data Type: Point	Original Application No: Original Start Date: 8/2/1966 Expiry Date: - Issue No: 101 Version Start Date: 13/8/2007 Version End Date: -
Not shown	717.0	N	378470,398090	Licence No: 2569007049 Details: Evaporative Cooling Direct Source: Ground Water - North West Region Point: Borehole At Trafford Park Data Type: Point	Original Application No: Original Start Date: 8/2/1966 Expiry Date: - Issue No: 101 Version Start Date: 13/8/2007 Version End Date: -
Not shown	723.0	N	378600,398100	Licence No: 2569007012 Details: General Cooling (Existing Licences Only) (Low Loss) Direct Source: Ground Water - North West Region Point: "borehole At Premises, Trafford Park" Data Type: Point	Original Application No: Original Start Date: 8/2/1966 Expiry Date: - Issue No: 100 Version Start Date: 19/3/1990 Version End Date: -
Not shown	723.0	N	378600,398100	Licence No: 2569007012 Details: General Cooling (Existing Licences Only) (Low Loss) Direct Source: Ground Water - North West Region Point: Borehole At Premises, Trafford Park Data Type: Point	Original Application No: Original Start Date: 8/2/1966 Expiry Date: - Issue No: 102 Version Start Date: 3/7/2008 Version End Date: -
Not shown	809.0	N	378280,398140	Licence No: 2569007049 Details: Non-Evaporative Cooling Direct Source: Ground Water - North West Region Point: Borehole At Trafford Park Data Type: Point	Original Application No: Original Start Date: 8/2/1966 Expiry Date: - Issue No: 101 Version Start Date: 13/8/2007 Version End Date: -
Not shown	809.0	N	378280,398140	Licence No: 2569007049 Details: Evaporative Cooling Direct Source: Ground Water - North West Region Point: Borehole At Trafford Park Data Type: Point	Original Application No: Original Start Date: 8/2/1966 Expiry Date: - Issue No: 101 Version Start Date: 13/8/2007 Version End Date: -
Not shown	844.0	W	377700,397200	Licence No: 2569007071 Details: Non-Evaporative Cooling Direct Source: Ground Water - North West Region Point: "borehole At Trafford Park, Manchester" Data Type: Point	Original Application No: Original Start Date: 18/9/1980 Expiry Date: - Issue No: 101 Version Start Date: 1/7/1999 Version End Date: -
Not shown	844.0	W	377700,397200	Licence No: 2569007071 Details: Process water Direct Source: Ground Water - North West Region Point: "borehole At Trafford Park, Manchester" Data Type: Point	Original Application No: Original Start Date: 18/9/1980 Expiry Date: - Issue No: 101 Version Start Date: 1/7/1999 Version End Date: -
Not shown	844.0	W	377700,397200	Licence No: 2569007071 Details: Non-Evaporative Cooling Direct Source: Ground Water - North West Region Point: Borehole At Trafford Park, Manchester Data Type: Point	Original Application No: Original Start Date: 18/9/1980 Expiry Date: - Issue No: 101 Version Start Date: 1/7/1999 Version End Date: -
Not shown	844.0	W	377700,397200	Licence No: 2569007071 Details: Process water Direct Source: Ground Water - North West Region Point: Borehole At Trafford Park, Manchester Data Type: Point	Original Application No: Original Start Date: 18/9/1980 Expiry Date: - Issue No: 101 Version Start Date: 1/7/1999 Version End Date: -

Not shown	844.0	W	377700,397200	Licence No: 2569007071 Details: Process Water Direct Source: Ground Water - North West Region Point: Borehole At Trafford Park Manchester Data Type: Point	Original Application No: Original Start Date: 18/9/1980 Expiry Date: - Issue No: 101 Version Start Date: 1/7/1999 Version End Date: -
Not shown	844.0	W	377700,397200	Licence No: 2569007071 Details: Non-Evaporative Cooling Direct Source: Ground Water - North West Region Point: Borehole At Trafford Park Manchester Data Type: Point	Original Application No: Original Start Date: 18/9/1980 Expiry Date: - Issue No: 101 Version Start Date: 1/7/1999 Version End Date: -
Not shown	967.0	S	378700,396200	Licence No: 2569007019 Details: General Cooling (Existing Licences Only) (High Loss) Direct Source: Ground Water - North West Region Point: Boreholes (2) At Trafford Park, Manchester. Data Type: Point	Original Application No: Original Start Date: 8/2/1966 Expiry Date: - Issue No: 102 Version Start Date: 10/7/2000 Version End Date: -
Not shown	967.0	S	378700,396200	Licence No: 2569007019 Details: General Cooling (Existing Licences Only) (Low Loss) Direct Source: Ground Water - North West Region Point: Boreholes (2) At Trafford Park, Manchester. Data Type: Point	Original Application No: Original Start Date: 8/2/1966 Expiry Date: - Issue No: 102 Version Start Date: 10/7/2000 Version End Date: -

5.3 Surface Water Abstraction Licences

Are there any Surface Water Abstraction Licences within 1000m of the study site? **Yes**

The following Surface Water Abstraction Licences records are represented as points, lines and regions on the Aquifer and Abstraction Licence Map:

ID	Distance	Direction	NGR	Details	
Not shown	812.0	E	379720,397470	Licence No: 2569007084 Details: Hydraulic Testing Direct Source: "surface, Non-tidal - North West Region" Point: "manchester Ship Canal At Mode Wheel Locks, Trafford Park" Data Type: Point	Application No: Original Start Date: - Expiry Date: - Issue No: 1 Version Start Date: 15/2/2000 Version End Date: -
Not shown	812.0	E	379720,397470	Licence No: 2569007084 Details: Hydraulic Testing Direct Source: Surface, Non-tidal - North West Region Point: Manchester Ship Canal At Mode Wheel Locks, Trafford Park Data Type: Point	Application No: Original Start Date: 15/2/2000 Expiry Date: - Issue No: 1 Version Start Date: 15/2/2000 Version End Date: -

5.4 Potable Water Abstraction Licences

Are there any Potable Water Abstraction Licences within 2000m of the study site? **Yes**

The following Potable Water Abstraction Licences records are represented as points, lines and regions on the SPZ and Potable Water Abstraction Map:

ID	Distance	Direction	NGR	Details	
1A	299.0	E	379200,397100	Licence No: 2569007065 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: Ground Water - North West Region Point: Borehole At Premises, Trafford Park, Manchester Data Type: Point	Original Application No: Original Start Date: 31/1/1967 Expiry Date: - Issue No: 100 Version Start Date: Version End Date: -

2A	299.0	E	379200,397100	Licence No: 2569007065 Details: "Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services" Direct Source: Ground Water - North West Region Point: "borehole At Premises, Trafford Park, Manchester" Data Type: Point	Original Application No: Original Start Date: 31/1/1967 Expiry Date: - Issue No: 100 Version Start Date: Version End Date: -
Not shown	1129.0	NW	377900,398300	Licence No: 2569007055 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: Ground Water - North West Region Point: B/hole At Premises, Bentcliffe Works, Salters Lane, Eccles Data Type: Point	Original Application No: Original Start Date: 17/2/1966 Expiry Date: - Issue No: 101 Version Start Date: Version End Date: -
Not shown	1129.0	NW	377900,398300	Licence No: 2569007055 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: Ground Water - North West Region Point: Borhole At Premises Bentcliffe Works Salters Lane Eccles Data Type: Point	Original Application No: Original Start Date: 17/2/1966 Expiry Date: - Issue No: 101 Version Start Date: Version End Date: -
Not shown	1129.0	NW	377900,398300	Licence No: 2569007055 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: Ground Water - North West Region Point: Borhole At Premises Bentcliffe Works Salters Lane Eccles Data Type: Point	Original Application No: Original Start Date: 17/2/1966 Expiry Date: - Issue No: 101 Version Start Date: Version End Date: -
Not shown	1129.0	NW	377900,398300	Licence No: 2569007055 Details: "Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services" Direct Source: Ground Water - North West Region Point: "b/hole At Premises, Bentcliffe Works, Salters Lane, Eccles" Data Type: Point	Original Application No: Original Start Date: 17/2/1966 Expiry Date: - Issue No: 101 Version Start Date: Version End Date: -

5.5 Source Protection Zones

Are there any Source Protection Zones within 500m of the study site? **No**

Database searched and no data found.

5.6 River Quality

Is there any Environment Agency information on river quality within 500m of the study site? **No**

Database searched and no data found.

5.7 Main Rivers

Are there any Main Rivers within 500m of the study site? **No**

Database searched and no data found.

5.8 Surface Water Features

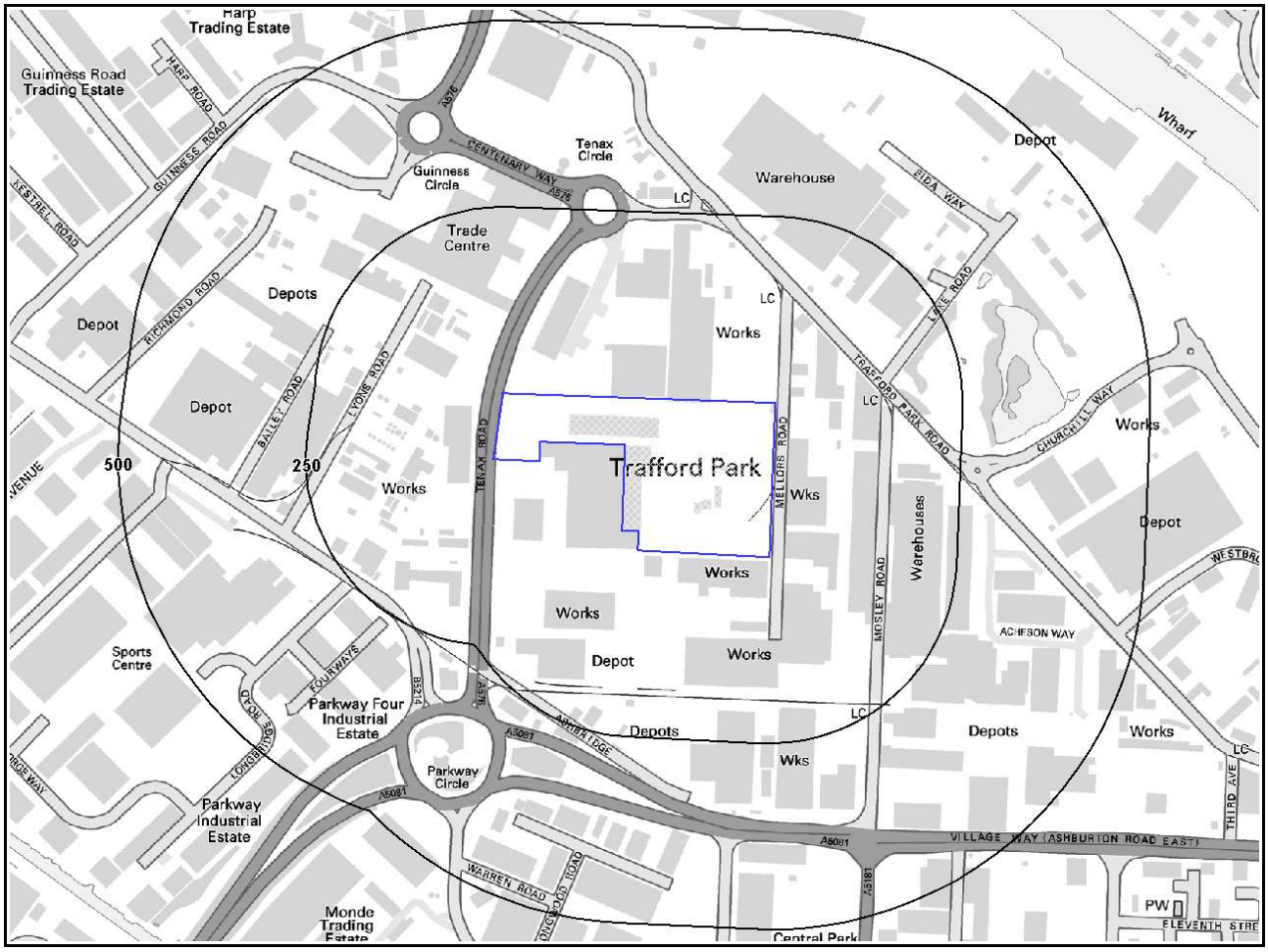
Are there any surface water features within 250m of the study site? **Yes**

The following surface water records are not represented on mapping:

Distance to Surface Water (m)	on-site	0-50	51-250
Surface water features within 250m of the study site	No	No	Yes

6. Surface Water Flood Map

NW ▲ N NE



◄W E►

SW ▼ S SE

Surface Water Flood Legend

Site Outline

250
500
Search Buffers (m)

Zone 2 Floodplain

Zone 3 Floodplain

Flood Storage Area

Area Benefiting from Flood Defences

Flood Defences

6. Flooding

6.1 Zone 2 Flooding

Zone 2 floodplain estimates the annual probability of flooding as one in one thousand (0.1%) or greater from rivers and the sea but less than 1% from rivers or 0.5% from the sea. Alternatively, where information is available they may show the highest known flood level.

Is the site within 250m of an Environment Agency indicative Zone 2 floodplain? **No**

Guidance: More detailed information may be available from the Environment Agency through their floodline (0845 988 1188) or by ordering an Environment Agency Flood Report from the local Environment Agency Office.

Database searched and no data found.

6.2 Zone 3 Flooding

Zone 3 estimates the annual probability of flooding as one in one hundred (1%) or greater from rivers and a one in two hundred (0.5%) or greater from the sea. Alternatively, where information is available they may show the highest known flood level.

Is the site within 250m of an Environment Agency indicative Zone 3 floodplain? **No**

Guidance: More detailed information may be available from the Environment Agency through their floodline (0845 988 1188) or by ordering an Environment Agency Flood Report from the local Environment Agency Office.

Database searched and no data found.

6.3 Flood Defences

Are there any Flood Defences within 250m of the study site ? **No**

6.4 Areas benefiting from Flood Defences

Are there any areas benefiting from Flood Defences within 250m of the study site? **No**

Guidance: More detailed information may be available from the Environment Agency through their floodline (0845 988 1188) or by ordering an Environment Agency Flood Report from the local Environment Agency Office.

6.5 Areas used for Flood Storage

Are there any areas used for Flood Storage within 250m of the study site? **No**

Guidance: More detailed information may be available from the Environment Agency through their floodline (0845 988 1188) or by ordering an Environment Agency Flood Report from the local Environment Agency Office.

6.6 Groundwater Flooding Susceptibility Areas

Are there any British Geological Survey groundwater flooding susceptibility flood areas within 50m of the boundary of the study site? **Yes**

What is the highest susceptibility to groundwater flooding in the search area based on the underlying geological conditions? **Moderately High**

Guidance: Where moderately high groundwater flooding susceptibility is indicated, this means that given the geological conditions in the area groundwater flooding hazard should be considered in all land-use planning decisions. It is recommended that other relevant information e.g. records of previous incidence of groundwater flooding, rainfall, property type, and land drainage information be investigated in order to establish relative, but not absolute, risk of groundwater flooding.

6.7 Groundwater Flooding Confidence Areas

What is the British Geological Survey confidence rating in this result?	Moderate

Notes:

Groundwater flooding is defined as the emergence of groundwater at the ground surface or the rising of groundwater into man-made ground under conditions where the normal range of groundwater levels is exceeded.

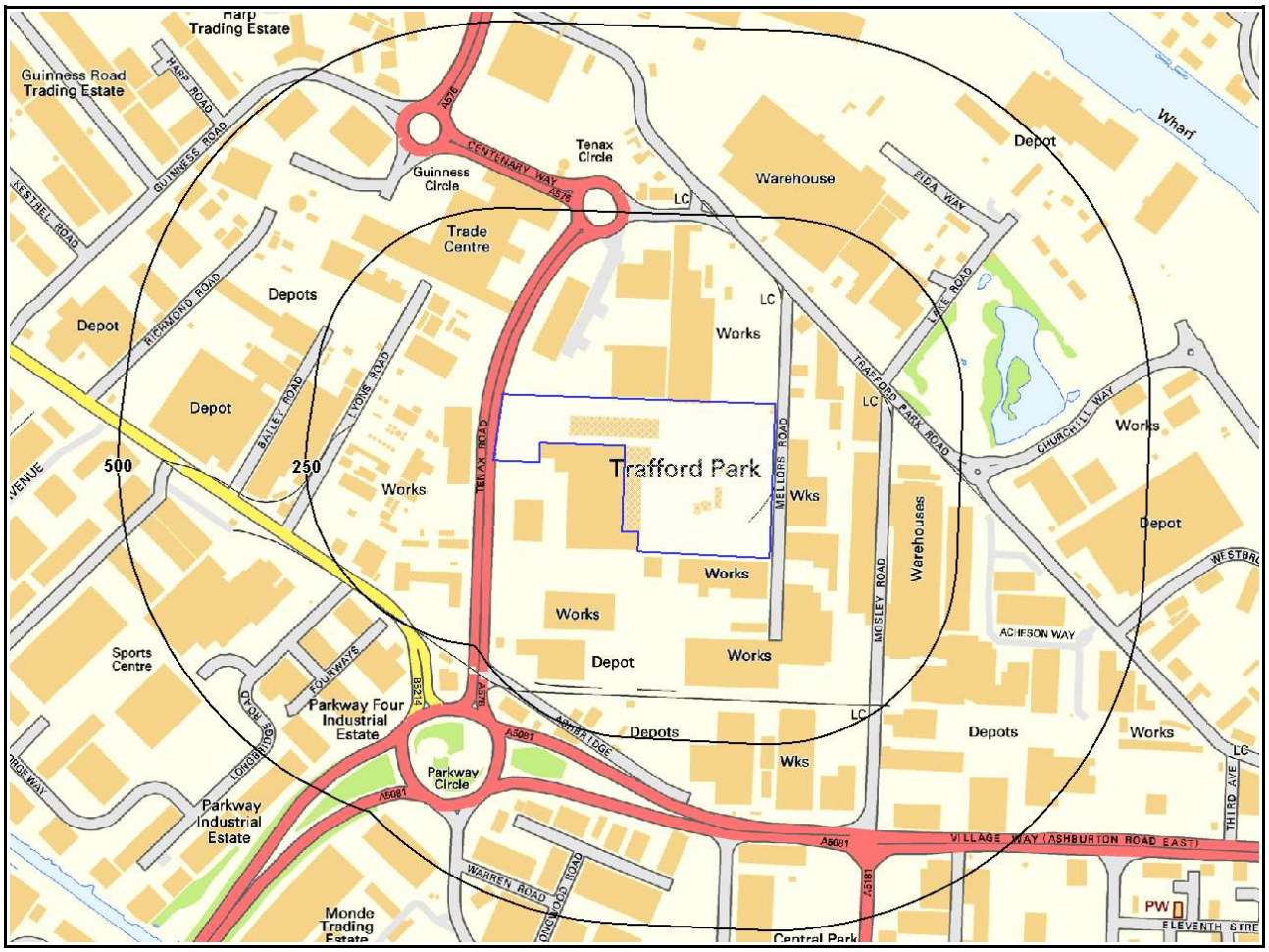
The confidence rating is on a fivefold scale - Low, Moderately Low, Moderate, Moderately High and High. This provides a relative indication of the BGS confidence in the accuracy of the susceptibility result for groundwater flooding. This is based on the amount and precision of the information used in the assessment. In areas with a relatively lower level of confidence the susceptibility result should be treated with more caution. In other areas with higher levels of confidence the susceptibility result can be used with more confidence.

7.Designated Environmentally Sensitive Sites Map

NW ▲ N NE

◄W E►

SW ▼ S SE



Designated Environmentally Sensitive Sites Legend

Enabled by Ordnance Survey

- Site Outline
- Search Buffers (m) — 250 / 500
- SAC
- SSSI
- NNR
- World Heritage Sites
- SPA
- Ramsar
- LNR
- Environmentally Sensitive Areas
- Areas of Outstanding Natural Beauty
- Nitrate Sensitive Areas
- National Parks

7.Designated Environmentally Sensitive Sites

Presence of Designated Environmentally Sensitive Sites within 500m of the study site? **No**

Records of Sites of Special Scientific Interest (SSSI) within 500m of the study site: **0**

Database searched and no data found.

Records of National Nature Reserves (NNR) within 500m of the study site: **0**

Database searched and no data found.

Records of Special Areas of Conservation (SAC) within 500m of the study site: **0**

Database searched and no data found.

Records of Special Protection Areas (SPA) within 500m of the study site: **0**

Database searched and no data found.

Records of Ramsar sites within 500m of the study site: **0**

Database searched and no data found.

Records of Local Nature Reserves (LNR) within 500m of the study site: **0**

Database searched and no data found.

Records of World Heritage Sites within 500m of the study site: **0**

Database searched and no data found.

Records of Environmentally Sensitive Areas within 500m of the study site: **0**

Database searched and no data found.

Records of Areas of Outstanding Natural Beauty (AONB) within 500m of the study site: **0**

Database searched and no data found.

Records of National Parks (NP) within 500m of the study site: **0**

Database searched and no data found.

Records of Nitrate Sensitive Areas within 500m of the study site: **0**

Database searched and no data found.

Records of Nitrate Vulnerable Zones within 500m of the study site: **0**

Database searched and no data found.

8. Natural Hazards Findings

8.1 Detailed BGS GeoSure Data

BGS GeoSure Data has been searched to 50m. The data is included in tabular format. If you require further information, please obtain a GroundSure GeoInsight. Available from our website. The following information has been found:

8.1.1 Shrink Swell

What is the maximum Shrink-Swell* hazard rating identified on the study site? **Negligible**

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Ground conditions predominantly non-plastic. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely likely due to potential problems with shrink-swell clays.

8.1.2 Landslides

What is the maximum Landslide* hazard rating identified on the study site? **Very Low**

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.

8.1.3 Soluble Rocks

What is the maximum Soluble Rocks* hazard rating identified on the study site? **Null - Negligible**

Database searched and no data found.

8.1.4 Compressible Ground

What is the maximum Compressible Ground* hazard rating identified on the study site? **High**

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Very significant potential for compressibility problems. Avoid large differential loadings of ground. Do not drain or de-water ground near the property without technical advice. For new build – consider possibility of compressible ground in ground investigation, construction and building design. Consider effects of groundwater changes. Construction may not be possible at economic cost. For existing property – probable increase in insurance risk from compressibility especially if water conditions or loading of the ground change significantly.

8.1.5 Collapsible Rocks

What is the maximum Collapsible Rocks* hazard rating identified on the study site? **Null - Negligible**

Database searched and no data found.

8.1.6 Running Sand

What is the maximum Running Sand* hazard rating identified on the study site? **Very Low**

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Very low potential for running sand problems if water table rises or if sandy strata are exposed to water. No special actions required, to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.

* This indicates an automatically generated 50m buffer and site.

9.Mining

9.1 Coal Mining

Are there any coal mining areas within 75m of the study site? **Yes**

The following coal mining information provided by the Coal Authority is not represented on Mapping:

Distance	Direction	Details
0.0	On Site	The study site is located within the specified search distance of an identified mining area. Further details concerning this can be obtained from the Coal Authority Helpline on 0845 762 6848.

9.2 Shallow Mining

What is the hazard of subsidence relating to shallow mining on-site (including a 150m buffer) ? **Negligible**

Guidance: Where negligible potential is indicated, this means that the rocks underlying the area are not likely to have been mined at shallow depth.

9.3 Brine Affected Areas

Are there any brine affected areas within 75m of the study site? **No**

Database searched and no data found.

10.Contacts

CENTREMAPS
Telephone: 01886 832972
groundsure@centremaps.co.uk
CENTREMAPS, Brockamin House, Leigh, Worcester, London, WR6 5JU

Directors: M C Walker, MInst C.E.S., C M Walker,
S J Hawkins BSc (Hons), S E Stewart BSc (Hons)
Registered No. 1890261 Registered in England and Wales
Registered Company: Laser Surveys Limited
Brockamin House, Leigh, Worcester, WR6 5JU.

British Geological Survey (England & Wales)
Kingsley Dunham Centre
Keyworth, Nottingham NG12 5GG
Tel: 0115 936 3143. Fax: 0115 936 3276. Email: enquiries@bgs.ac.uk
Web: www.bgs.ac.uk
BGS Geological Hazards Reports and general geological enquiries

Environment Agency
National Customer Contact Centre
PO Box 544
Rotherham
S60 1BY
Tel: 08708 506 506
Web: www.environment-agency.gov.uk
Email: enquiries@environment-agency.gov.uk

Health Protection Agency
Chilton, Didcot, Oxon, OX11 0RQ
Tel: 01235 822622 www.hpa.org.uk/radiation
Radon measures and general radon information and guidance

The Coal Authority
200 Lichfield Lane, Mansfield, Notts NG18 4RG
Tel: 0845 762 6848. DX 716176 Mansfield 5
www.coal-authority.co.uk
Coal mining reports and related enquiries

Ordnance Survey
Romsey Road
Southampton SO16 4GU
Tel: 08456 050505

Local Authority
Authority: Trafford Metropolitan Borough
Phone: 0161 912 2000
Web: www.trafford.gov.uk
Address: Trafford Town Hall, Talbot Road, Stretford, Manchester, M32 0YT

Get Mapping PLC
Virginia Villas, High Street, Hartley Witney, Hampshire RG27 8NW
Tel: 01252 845444

Acknowledgements
This product includes map data licensed from Landmark Information Group Limited®.

Standard Terms and Conditions

1 Definitions

In these conditions unless the context otherwise requires:
"Beneficiary" means the Client or the customer of the Client for whom the Client has procured the Services.
"Commission" means an order for Consultancy Services submitted by a Client.
"Consultancy Services" mean consultancy services provided by GroundSure including, without limitation, carrying out interpretation of third party and in-house environmental data, provision of environmental consultancy advice, undertaking environmental audits and assessments, Site investigation, Site monitoring and related items.
"Content" means any data, database or other information contained in a Report or Mapping which is provided to GroundSure by a Data Provider.
"Contract" means the contract between GroundSure and the Client for the performance of the Services which arises upon GroundSure's acceptance of an Order or Commission and which shall incorporate these conditions, the relevant GroundSure User Guide, proposal by GroundSure and the content of any subsequent report, and any agreed amendments in accordance with condition 11 .
"Client" means the party that submits an Order or Commission.
"Data Provider" means any third party providing Content to GroundSure.
"Data Report" means reports comprising factual data with no professional interpretation in respect of the level of likely risk and/or liability available from GroundSure.
"GroundSure" means GroundSure Limited, a company registered in England and Wales under number 03421028 and whose registered office is at Greater London House, Hampstead Road, London NW1 7EJ.
"Home Information Pack" means a combination of reports required when selling a residential property.
"Intellectual Property" means any patent, copyright, design rights, service marks, moral rights, data protection rights, know-how, trade mark or any other intellectual property rights.
"Mapping" an historical map or a combination of historical maps of various ages, time periods and scales available from GroundSure.
"Order" means an order form submitted by the Client requiring Services from GroundSure in respect of a specified Site.
"Order Website" means online platform via which Orders may be placed.
"Report" means a Risk Screening Report or Data Report for commercial or residential property available from GroundSure relating to the Site prepared in accordance with the specifications set out in the relevant User Guide.
"Risk Screening Report" means one of GroundSure's risk screening reports such as GroundSure Homebuyers, GroundSure Home Environmental GroundSure SiteGuard, GroundSure Screening, GroundSure Review, GroundSure Developer Review, or any other risk screening report available from GroundSure.
"Services" means the provision of any Report, Mapping or Consultancy Services which GroundSure has agreed to carry out for the Client/Beneficiary on these terms and conditions in respect of the Site.
"Site" means the landsite in respect of which GroundSure provides the Services.
"User Guide" means the relevant current version of the user guide, available upon request from GroundSure.

2 Scope of Services

2.1 GroundSure agrees to carry out the Services in accordance with the Contract and to the extent set out therein.
2.2 GroundSure shall exercise all the reasonable skill, care and diligence to be expected of experienced environmental consultants in the performance of the Services.
2.3 The Client acknowledges that it has not relied on any statement or representation made by or on behalf of GroundSure which is not set out and expressly agreed in the Contract.
2.4 Terms and conditions appearing on a Client's order form, printed stationery or other communication, including invoices, to GroundSure, its employees, servants, agents or other representatives or any terms implied by custom, practice or course of dealing shall be of no effect and these terms and conditions shall prevail over all others.
2.5 In the event that a Client/Beneficiary opts to take out insurance in conjunction with or as a result of the Services, such insurance shall be subject solely to the terms of any policy issued to it in that respect and GroundSure will have no liability therefore.
2.6 GroundSure's quotations/proposals are valid for a period of 30 days only. GroundSure reserves the right to withdraw any quotation at any time before GroundSure accepts an Order or Commission. GroundSure's acceptance of an Order or Commission shall be effective only where such acceptance is in writing and signed by GroundSure's authorised representative or where accepted via GroundSure's Order Website.

3 The Client's obligations

3.1 The Client shall be solely responsible for ensuring that the Report/Mapping ordered is appropriate and suitable for the Beneficiary's needs.
3.2 The Client shall (or shall procure that the Beneficiary shall) supply to GroundSure as soon as practicable and without charge all information necessary and accurate relevant data including any specific and/or unusual environmental information relating to the Site known to the Client/Beneficiary which may pertain to the Services and shall give such assistance as GroundSure shall reasonably require in the performance of the Services (including, without limitation, access to a Site, facilities and equipment as agreed in the Contract).
3.3 Where Client/Beneficiary approval or decision is required, such approval or decision shall be given or procured in reasonable time as not to delay or disrupt the performance of any other part of the Services.
3.4 The Client shall not and shall not knowingly permit the Beneficiary to, save as expressly permitted by these terms and conditions, re-sell, alter, add to, amend or use out of context the content of any Report, Mapping or, in respect of any Services, information given by GroundSure. For the avoidance of doubt, the Client and Beneficiary may make the Report, Mapping or GroundSure's findings available to a third party, but such third party cannot rely on the same unless expressly permitted under condition 4.
3.5 The Client is responsible for maintaining the confidentiality of its user name and password if using GroundSure's internet ordering service and accepts responsibility for all activity that occurs under such account and password.

4 Reliance

4.1 Upon full payment of all relevant fees and subject to the provisions of these terms and conditions, the Client and Beneficiary are granted an irrevocable royalty-free licence to use the information contained in the Report, Mapping or in a report prepared by GroundSure in respect of or arising out of the Consultancy Services. The Services may only be used for the benefit of the Client and those persons listed in conditions 4.2 and 4.3.
4.2 In relation to Data Reports, Mapping and Risk Screening Reports, the Client shall be entitled to make Reports available to (i) the Beneficiary, (ii) the Beneficiary's professional advisers, (iii) any person providing funding to the Beneficiary in relation to the Site (whether directly or as part of a lending syndicate), (iv) the first purchaser or first tenant of the Site (v) the professional advisers and lenders of the first purchaser or tenant of the Site. For the avoidance of doubt, such persons shall include any entity necessary under the Housing Act 2004 (as amended). Accordingly GroundSure shall have the same duties and obligations to those persons in respect of the Services as it has to the Client and those persons shall have the benefit of any of the Client's rights under the Contract as if those persons were parties to the Contract. For the avoidance of doubt, the limitations of GroundSure's liability as set out in condition 7 shall apply.
4.3 In relation to Consultancy Services, reliance shall be limited to the Client, Beneficiary and named parties on the Report.
4.4 Save as set out in conditions 4.2 and 4.3 and unless otherwise agreed in writing with GroundSure, any other party considering the information supplied by GroundSure as part of the Services, including (but not limited to) insurance underwriters, does so at their own risk and GroundSure has no legal obligations to such party unless otherwise agreed in writing.
4.5 The Client shall not and shall not knowingly permit any person (including the Beneficiary) who is provided with a copy of any Report shall not except as permitted herein or by separate agreement with GroundSure: (a) remove, suppress or modify any trade mark, copyright or other proprietary marking from the Report or Mapping; (b) create any product which is derived directly or indirectly from the data contained in the Report or Mapping; (c) combine the Report or Mapping with, or incorporate the Report or Mapping into any other information data or service; or (d) re-format or otherwise change (whether by modification, addition or enhancement) data or images contained in the Report or Mapping.
4.6 Notwithstanding condition 4.5, if the Client acts in a professional capacity, it may make reasonable use of a Report and/or findings made as a result of Consultancy Services to advise Beneficiaries. However, GroundSure shall have no liability in respect of any opinion or report given to such Beneficiaries by the Client or a third party.

5 Fees and Disbursements

5.1 GroundSure shall charge the Client fees at the rate and frequency specified in the Contract together, in the case of Consultancy Services, with all proper disbursements incurred by GroundSure in performing the Services. For the avoidance of doubt, the fees payable for the Services are as set out in GroundSure's written proposal, Order Website or Order acknowledgement form. The Client shall in addition pay all value added tax or other tax payable on such fees and disbursements in relation to the provision of the Services.
5.2 Unless GroundSure requires prepayment, the Client shall promptly pay all fees disbursements and other monies due to GroundSure in full without deduction, counterclaim or set off together with such value added tax or other tax as may be required within 30 days from the date of GroundSure's invoice or such other period as may be agreed in writing between GroundSure and the Client ("Payment Date"). GroundSure reserves the right to charge interest which shall accrue on a daily basis from 30 days after the date of Payment Date until the date of payment (whether before or after judgement) at the rate of five per cent per annum above the Bank of England base rate from time to time.
5.3 In the event that the Client disputes the amount payable in respect of GroundSure's invoice it shall notify GroundSure no later than 28 days after the date thereof that it is in dispute. In default of such notification the Client shall be deemed to have agreed the amount thereof. As soon as reasonably practicable following receipt of a notification in respect of any disputed invoice, a member of the management team at GroundSure shall contact the Client and the parties shall use all reasonable endeavours to resolve the dispute.

6 Intellectual Property

6.1 Subject to the provisions of condition 4.1, the Client and the Beneficiary hereby acknowledge that all Intellectual Property in the Services are and shall remain owned by either GroundSure or the Data Providers and nothing in these terms purports to transfer or assign any rights to the Client or the Beneficiary in respect of the Intellectual Property.
6.2 The Client shall acknowledge the ownership of the Content where such Content is incorporated or used in the Client's own documents, reports, systems or services whether or not these are supplied to a third party.
6.3 Data Providers may enforce any breach of condition 6.1 against the Client or Beneficiary.

7. Liability

7.1 Nothing in these terms and conditions shall limit GroundSure's liability for causing death or personal injury through negligence or wilful default.
7.2 Save as otherwise set out in these conditions, any information provided by one party ("Disclosing party") to the other party ("Receiving Party") shall be treated as confidential except so far as authorised by the Disclosing Party to provide such information in whole or in part to a third party.
7.3 Nothing in these conditions shall affect the statutory rights of a consumer under the applicable consumer protection legislation from time to time.
7.4 In relation to Data Reports, Mapping and Risk Screening Reports, GroundSure's liability under the Contract shall cease upon the expiry of six years from the date when the Beneficiary became aware that it may have a claim against GroundSure in respect of the Services provided always that there shall be no liability at the expiration of twelve years from the completion of the Contract. For the avoidance of doubt, any claims in respect of which proceedings are notified to GroundSure in writing prior to the expiry of the time periods referred to in this clause shall survive the expiry of those time periods provided any such claim is actually commenced within six months of notification.
7.5 In relation to Consultancy Services GroundSure's liability under the Contract shall cease upon the expiry of six years from the date the Services were completed.
7.6 GroundSure shall not be liable to the Client or any person to whom the Client provides a copy of a Data Report, Mapping or Risk Screening Report in any circumstances whatsoever unless arising out of a breach on its part of the obligations set out in the Contract.
7.7 GroundSure shall not be liable if the Data Reports, Mapping or Risk Screening Report are used otherwise than as provided or referred to in these conditions and the relevant User Guide.
7.8 Subject to the provisions of condition 7.3, GroundSure makes no representation, warranties, express or implied, as to the accuracy, reliability, completeness, validity or fitness for purpose of any Content and shall not be liable for any omission, error or inaccuracy in relation thereto unless GroundSure should reasonably have been alerted to any omission, error or inaccuracy in the Content.
7.9 Subject to the provisions of clause 7.1 notwithstanding anything to the contrary contained elsewhere in the Contract, and irrespective of whether multiple parties make use of the same Services, the total liability of GroundSure under or in connection with the Contract, whether in contract in tort for breach of statutory duty or otherwise shall not exceed £5 million per claim or series of connected claims.
7.10 Whilst GroundSure will use all reasonable endeavours to maintain operability of its internet ordering service it will not be liable for any loss or damages caused by a delay or loss of use of such service. The Client shall use GroundSure's internet ordering service at its own risk. GroundSure shall not be responsible for any damage to a Client or permitted assignee's computer, software, modem, telephone or other property resulting from the use of GroundSure's internet ordering service.
7.11 The Client accepts, and shall use all reasonable endeavours to procure that anyone who is provided with a copy of the Report accepts, that it has no claim or recourse to any Data Provider or to GroundSure in respect of the acts or omissions of such Data Providers including Content supplied by them save for where a Risk Screening Report comprises part of a Home Information Pack:

(i) the Data Providers set out in the relevant User Guide shall be responsible for the quality and accuracy of the data supplied by them; and
(ii) where GroundSure makes an assessment of a Site to determine if it is likely to fall within Part II(A) of the Environmental Protection Act 1990, GroundSure shall be responsible for the interpretation of any Content provided by a Data Provider subject to the limitations set out in these terms and conditions.

7.12 GroundSure shall provide the Services using reasonable skill and care, however, GroundSure shall not be liable for any inaccurate statement or risk rating in a Report which resulted from a reasonable interpretation of the Content.
7.13 Subject to the provisions of clause 7.1, GroundSure shall not be liable for any losses (whether direct or indirect) and including (but not limited to) loss of profit caused by the suspension or reduction of activity on a Site, business interruption, all third party off-Site claims or any loss in value of a Site, loss of goodwill, loss of business opportunity or other similar losses alleged to be sustained by the Client, the Beneficiary or any third party.
7.14 GroundSure undertakes for the duration of the liability periods referred to in conditions 7.4 and 7.5 to maintain professional indemnity insurance in respect of its liabilities in respect of the Contract for £5 million in the aggregate which amount shall first include the whole of any sum payable for death or personal injury provided such insurance is readily available at commercially viable rates or for a lesser amount to be agreed with the Client should the cost of such insurance become commercially unviable. GroundSure shall produce evidence of such insurance if requested by the Client. A greater level of cover may be available upon request and agreement with the Client.

8 GroundSure right to suspend or terminate

8.1 In the event that GroundSure reasonably believes that the Client or Beneficiary as applicable has not provided the information or assistance required to enable the proper performance of the Services, GroundSure shall be entitled on fourteen days written notice to suspend all further performance of the Services until such time as any such deficiency has been made good.
8.2 GroundSure may additionally terminate the Contract immediately on written notice in the event that:

(i)the Client shall fail to pay any sum due to GroundSure within 28 days of the due date for payment; or
(ii)the Client (being an individual) has a bankruptcy order made against him or (being a company) shall enter into liquidation whether compulsory or voluntary or have an Administration Order made against it or if a Receiver shall be appointed over the whole or any part of its property assets or undertaking or if the Client is struck off the Register of Companies or dissolved; or
(iii)the Client being a company is unable to pay its debts within the meaning of Section 123 of the Insolvency Act 1986 or being an individual appears unable to pay his debts within the meaning of Section 268 of the Insolvency Act 1986 or if the Client shall enter into a composition or arrangement with the Client's creditors or shall suffer distress or execution to be levied on his goods; or
(iv) the Client breaches any material term of the Contract (including, but not limited to, the obligations in condition 4) incapable of remedy or if remediable, is not remedied within 14 days of notice of the breach.

9. Client's Right to Terminate and Suspend

9.1 Subject to condition 10.2, the Client may at any time after commencement of the Services by notice in writing to GroundSure require GroundSure to terminate or suspend immediately performance of all or any of the Services.
9.2 The Client waives all and any right of cancellation it may have under the Consumer Protection (Distance Selling) Regulations 2000 (as amended) in respect of the Order of a Report/Mapping. This does not affect the Beneficiary's statutory rights.

10 Consequences of Withdrawal, Termination or Suspension

10.1 Upon termination or any suspension of the Services, GroundSure shall take steps to bring to an end the Services in an orderly manner, vacate any Site with all reasonable speed and shall deliver to the Client/Beneficiary any property of the Client/ Beneficiary in GroundSure's possession or control.
10.2 In the event of termination/suspension of the Contract under conditions 8 or 9, the Client shall pay to GroundSure all and any fees payable in respect of the performance of the Services up to the date of termination/suspension. In respect of any Consultancy Services provided, the Client shall also pay GroundSure any additional costs incurred in relation to the termination/suspension of the Contract.

11 General

11.1 The mapping contained in the Services is protected by Crown copyright and must not be used for any purpose outside the context of the Services or as specifically provided in these terms.
11.2 GroundSure reserves the right to amend these terms and conditions. No variation to these terms shall be valid unless signed by an authorised representative of GroundSure.
11.3 No failure on the part of GroundSure to exercise and no delay in exercising, any right, power or provision under these terms and conditions shall operate as a waiver thereof.
11.4 Save as expressly provided in conditions 4.2, 4.3, 6.3 and 11.5, no person other than the persons set out therein shall have any right under the Contract (Rights of Third Parties) Act 1999 to enforce any terms of the Contract.
11.5 The Secretary of State for Communities and Local Government acting through Ordnance Survey, may enforce breach of conditions 6.1 or 11.1 of these terms and conditions against the Client in accordance with the provisions of the Contracts (Rights of Third Parties) Act 1999.
11.6 GroundSure shall not be liable to the Client if the provision of the Services is delayed or prevented by one or more of the following circumstances:

(i)the Client or Beneficiary's failure to provide facilities, access or information;
(ii)fire, storm, flood, tempest or epidemic;
(iii)Acts of God or the public enemy;
(iv)riot, civil commotion or war;
(v)strikes, labour disputes or industrial action;
(vi)acts or regulations of any governmental or other agency;
(vii)suspension or delay of services at public registries by Data Providers; or
(viii)changes in law.

11.7 Any notice provided shall be in writing and shall be deemed to be properly given if delivered by hand or sent by first class post, facsimile or by email to the address, facsimile number or email address of the relevant party as may have been notified by each party to the other for such purpose or in the absence of such notification the last known address.
11.8 Such notice shall be deemed to have been received on the day of delivery if delivered by hand, facsimile or email and on the second working day after the day of posting if sent by first class post.
11.9 The Contract constitutes the entire contract between the parties and shall supersede all previous arrangements between the parties.
11.10 Each of the provisions of the Contract is severable and distinct from the others and if one or more provisions is or should become invalid, illegal or unenforceable, the validity and enforceability of the remaining provisions shall not in any way be tainted or impaired.
11.11 These terms and conditions shall be governed by and construed in accordance with English law and any proceedings arising out of or connected with these terms and conditions shall be subject to the exclusive jurisdiction of the English courts.
11.12 If the Client or Beneficiary has a complaint about the Services, notice should be given in writing to the Compliance Officer at GroundSure who will respond in a timely manner.

centremapslive.com
the mapping portal from Laser Surveys

GroundSure

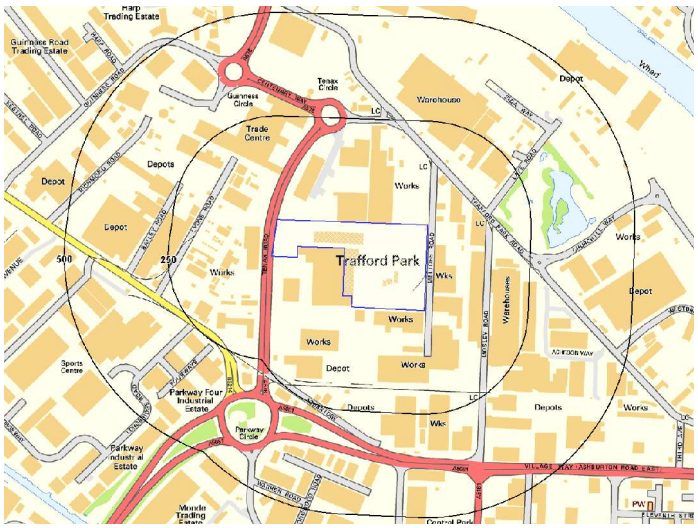
GroundSure GeoInsight

Address: S. Norton & Co Ltd, Tenax Road, Trafford Park, M17 1JT

Date: May 14, 2009

Report Reference: CMAPS-CM-29165-4165-140509GEO

Your Reference: 4165



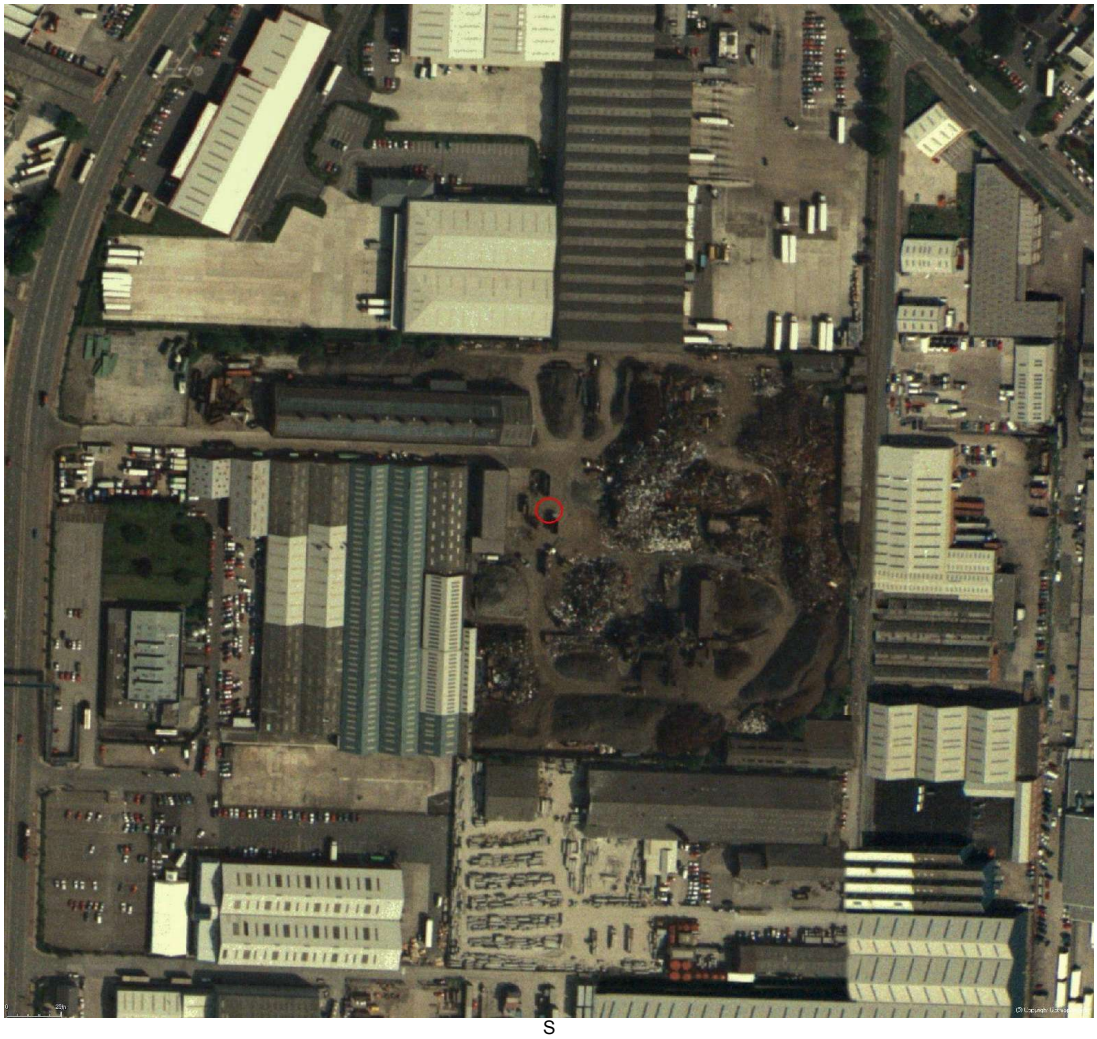
Brought to you by CENTREMAPS

If you would like any further assistance regarding this report then please contact
CENTREMAPS on (T) 01886 832972, (F) 01883 833485, email: groundsure@centremaps.co.uk

Aerial Photograph of Study Site

NW ▲ N NE

◄W



E►

SW S ▼ SE

Site Name: S. Norton & Co Ltd, Tenax Road, Trafford Park, M17 1JT
Grid Reference: 378727,397268

Overview of Findings

The GroundSure GeoInsight provides high quality geo-environmental information that allows geo-environmental professionals and their clients to make informed decisions and be forewarned of potential ground instability problems that may affect the ground investigation, foundation design and possibly remediation options that could lead to possible additional costs.

The report is based on the BGS 1:50,000 Digital Geological Map of Great Britain, BGS Geosure data; BRITPITS database; Shallow Mining data and Borehole Records, Coal Authority data including brine extraction areas, PBA non-coal mining and natural cavities database and GroundSure's unique database including historical surface ground and underground workings.

For further details on each dataset, please refer to each individual section in the report as listed. Where the database has been searched a numerical result will be recorded. Where the database has not been searched '-' will be recorded.

Report Section	Number of records found within (X) m of the study site boundary
1. Geology	Description
1.1 Artificial Ground,	
1.1.1 Is there any Artificial Ground /Made Ground present beneath the study site? *	No
1.1.2 Are there any records relating to permeability of artificial ground within the study site* boundary?	No
1.2 Superficial Geology & Landslips	
1.2.1 Is there any Superficial Ground /Drift Geology present beneath the study site? *	Yes
1.2.2 Are there any records relating to permeability of superficial geology within the study site* boundary?	Yes
1.2.3 Are there any records of landslip within 500m of the study site boundary?	No
1.2.4 Are there any records relating to permeability of landslips within the study site* boundary?	No
1.3 Bedrock, Solid Geology & Faults	
1.3.1 For records of Bedrock and Solid Geology beneath the study site* see the detailed findings section.	
1.3.2 Are there any records relating to permeability of bedrock within the study site* boundary?	Yes
1.3.3 Are there any records of faults within 500m of the study site boundary?	No
1.3.4 Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?	The property is not in a radon Affected Area, as less than 1% of properties are above the Action Level
1.3.5 Is the property in an area where Radon Protection Measures are required for new properties or extensions to existing ones as described in publication BR211 by the Building Resea rch Establishment?	No radon protective measures are necessary

*** This includes an automatically generated 50m buffer zone around the site**

Source:Scale 1:50,000 BGS Sheet No:085

2. Ground Workings	on-site	0-50	51-250	251-500	501-1000
2.1 Historical Surface Ground Working Features from Small Scale Mapping	0	1	13	-	-
2.2 Historical Underground Workings Features from Small Scale Mapping	0	0	0	0	0
2.3 Current Ground Workings	0	0	0	0	0

3. Mining, Extraction & Natural Cavities	on-site	0-50	51-250	251-500	501-1000
3.1 Historical Mining	0	0	0	0	0
3.2 Coal Mining	1	0	0	0	0
3.3 Shallow Mining*	1	-	-	-	-
3.4 Non – Coal Mining Cavities	0	0	0	0	0
3.5 Natural Cavities	0	0	0	0	0
3.6 Brine Extraction	0	0	0	0	0
3.7 Gypsum Extraction	0	0	0	0	0
3.8 Tin Mining	0	0	0	0	0
3.9 Clay Mining	0	0	0	0	0

*This includes an automatically generated 150m buffer zone around the site

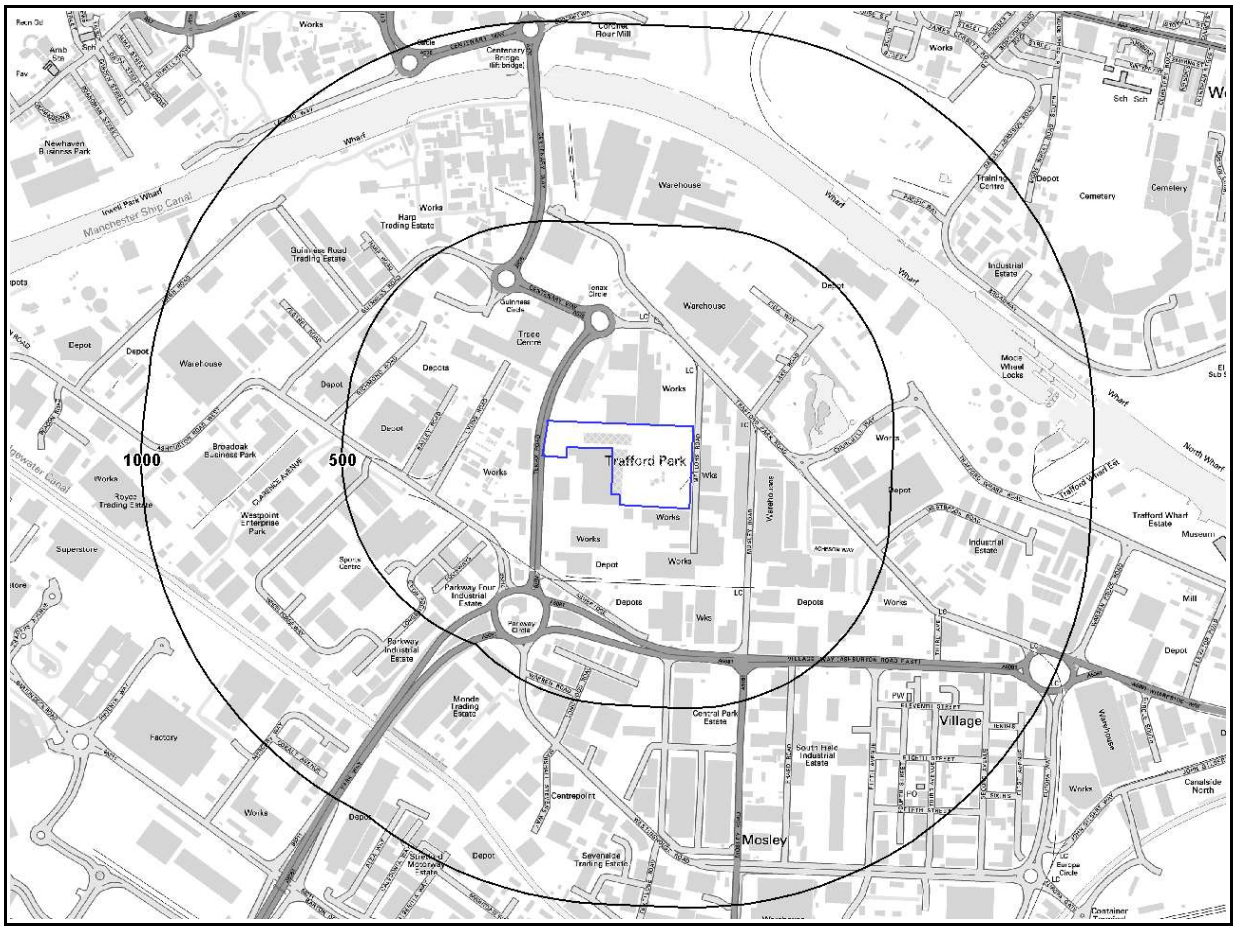
4. Natural Ground Subsidence	on-site*	0-50	51-250	251-500	501-1000
4.1 Shrink-Swell Clay	Negligible	-	-	-	-
4.2 Landslides	Very Low	-	-	-	-
4.3 Ground Dissolution of Soluble Rocks	Negligible	-	-	-	-
4.4 Compressible Deposits	High	-	-	-	-
4.5 Collapsible Deposits	Negligible	-	-	-	-
4.6 Running Sand	Very Low	-	-	-	-

* This includes an automatically generated 50m buffer zone around the site

5. Borehole Records	on-site	0-50	51-250	251-500	501-1000
5.1 BGS Recorded Boreholes	1	8	45	-	-

1.1 Artificial Ground Map

NW ▲ N NE



◄W E►

SW ▼ S SE

Artificial Ground Legend

Site Outline

500
1000
Search Buffers (m)

Made Ground (undivided)

Worked Ground (undivided)

Infilled Ground

Disturbed Ground (undivided)

Landscaped Ground (undivided)

Reclaimed Ground

Geological information represented on the mapping is derived from the BGS Digital Geological map of Great Britain at 1:50,000 scale.

1.1 Artificial Ground

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No:085

1.1.1 Artificial/Made Ground

Are there any records of Artificial/Made Ground within 500m of the study site boundary: **No**

Database searched and no data found.

1.1.2 Permeability of Artificial Ground

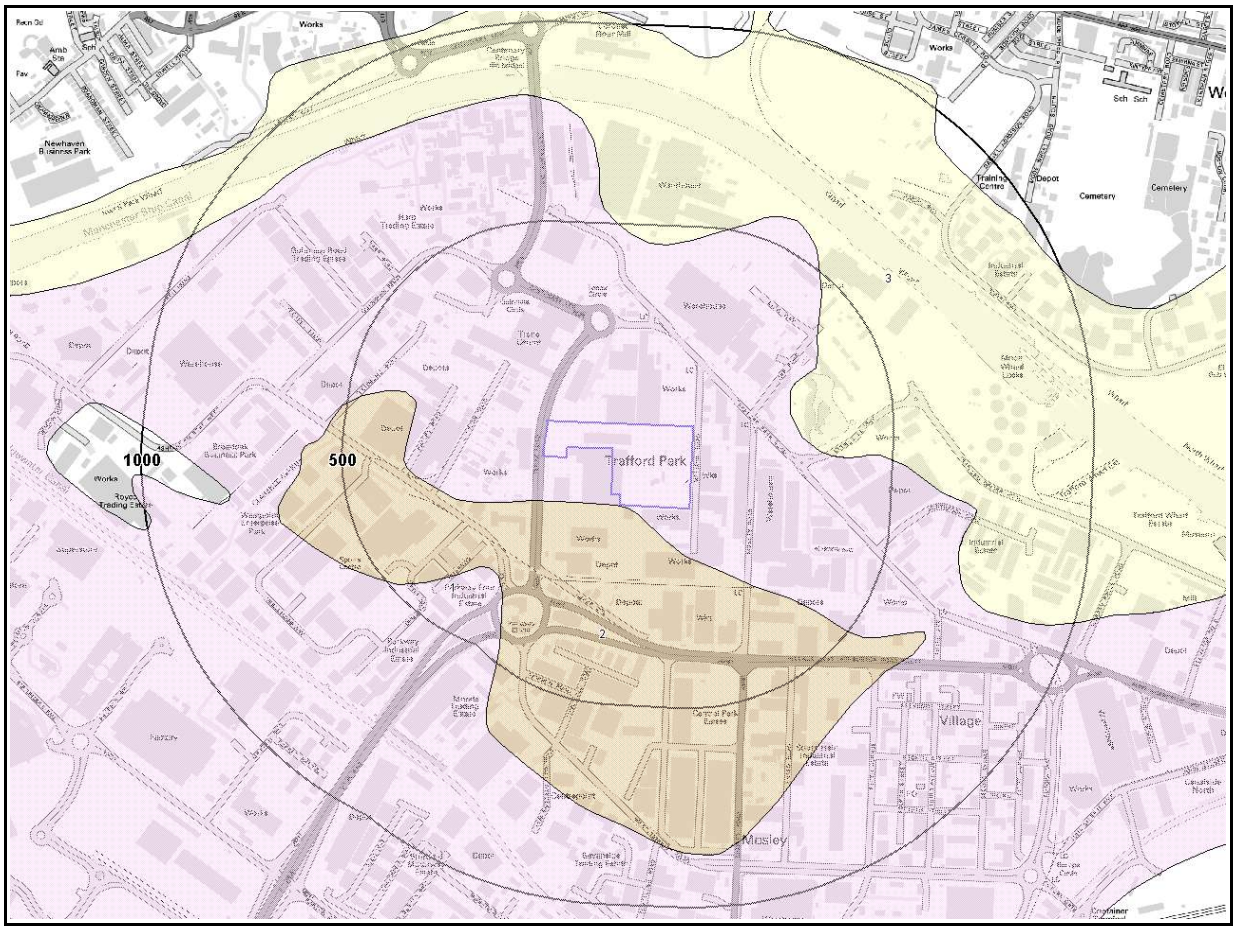
Are there any records relating to permeability of artificial ground within the study site* boundary: **No**

Database searched and no data found.

* This includes an automatically generated 50m buffer zone around the site.

1.2 Superficial Deposits and Landslips Map

NW ▲ N NE



◄W E►

SW ▼ S SE

Superficial and Landslips Legend

Site Outline

500
1000
Search Buffers (m)

Geological information represented on the mapping is derived from the BGS Digital Geological map of Great Britain at 1:50,000 scale.

1.2 Superficial Deposits and Landslips

1.2.1 Superficial Deposits/Drift Geology

Are there any records of Superficial Deposits/Drift Geology within 500m of the study site boundary: Yes

ID	Distance (m)	Direction	Lex Code	Description	Rock Description
1	0.0	On Site	GFSDD-SAGR	GLACIOFLUVIAL SHEET DEPOSITS, DEVENSIAN	SAND AND GRAVEL
2	2.0	S	PEAT-PEAT	PEAT	PEAT
3	245.0	E	ALV-CSSG	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL

1.2.2 Permeability of Superficial Ground

Are there any records relating to permeability of superficial ground within the study site* boundary: Yes

Distance (m)	Direction	Flow type	Maximum Permeability	Minimum Permeability
0.0	On Site	Intergranular	Very High	High
2.0	S	Mixed	Low	Very Low

1.2.3 Landslip

Database searched and no data found.

Are there any records of Landslip within 500m of the study site boundary? No

The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of Great Britain at 1:50,000 scale.
This Geology shows the main components as discreet layers, these are: Artificial / Made Ground, Superficial / Drift Geology and Landslips. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

1.2.4 Landslip Permeability

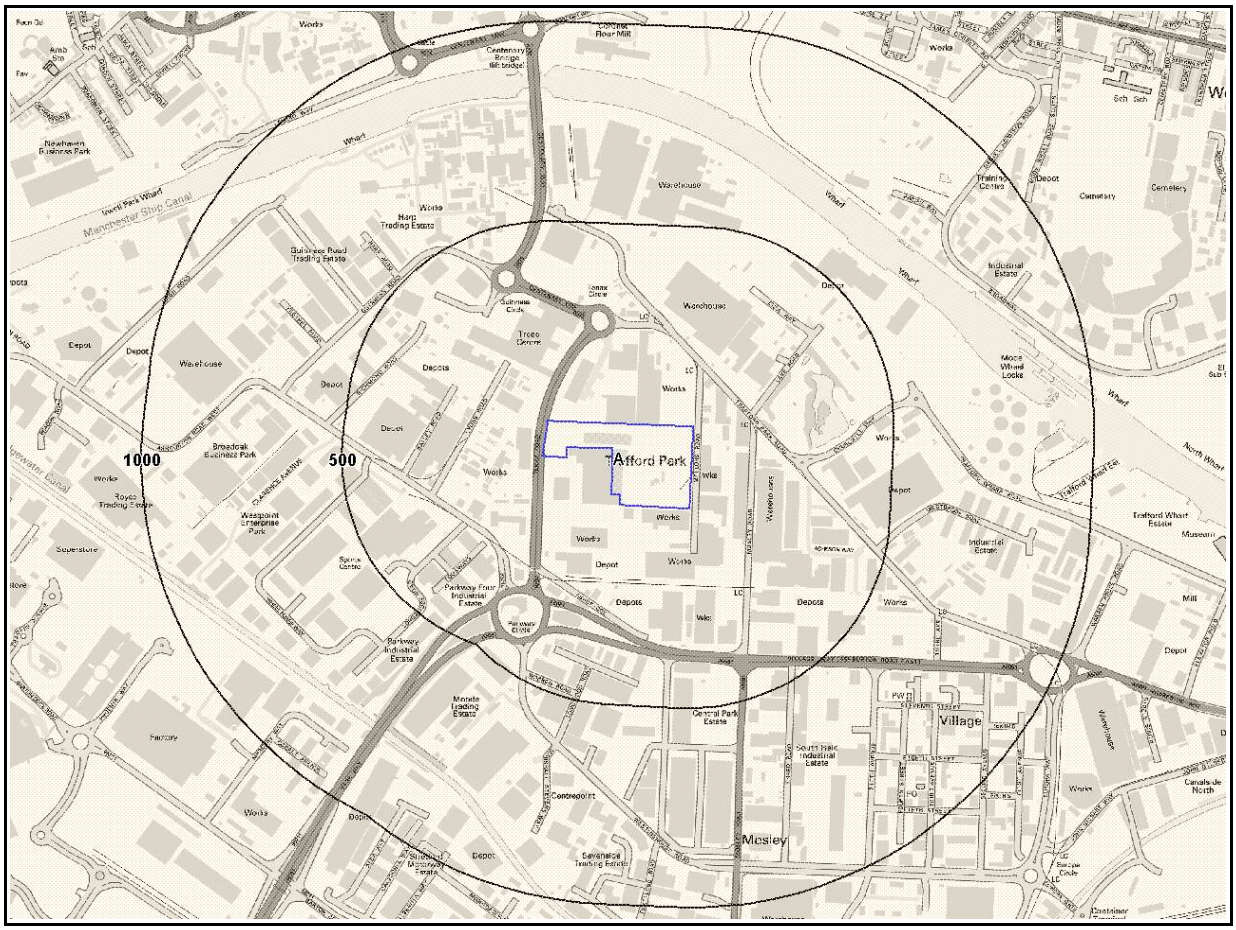
Are there any records relating to permeability of landslips within the study site* boundary: No

Database searched and no data found.

* This includes an automatically generated 50m buffer zone around the site.

1.3 Bedrock and Faults Map

NW ▲ N NE



◄W E►

SW ▼ S SE

Bedrock & Faults Deposits Legend

Site Outline

500
1000
Search Buffers (m)

Geological information represented on the mapping is derived from the BGS Digital Geological map of Great Britain at 1:50,000 scale.

1.3 Bedrock, Solid Geology & Faults

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No:085

1.3.1 Bedrock/Solid Geology

Records of Bedrock/Solid Geology within 500m of the study site boundary:

ID	Distance (m)	Direction	LEX Code	Rock Description	Rock Age
1A	0.0	On Site	SSG-SDST	Sherwood Sandstone Group - Sandstone	Ladinian / Late Permian
2A	0.0	On Site	SSG-SDST	Sherwood Sandstone Group - Sandstone	Ladinian / Late Permian

1.3.2 Permeability of Bedrock Ground

Are there any records relating to permeability of bedrock ground within the study site* boundary: **Yes**

Distance (m)	Direction	Flow type	Maximum Permeability	Minimum Permeability
0.0	On Site	Mixed	High	High

1.3.3 Faults

Database searched and no data found.

Are there any records of Faults within 500m of the study site boundary? **No**

The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of Great Britain at 1:50,000 scale.

This Geology shows the main components as discreet layers, these are: Bedrock/ Solid Geology and linear features such as Faults. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

1.3.4 Radon Affected Areas

Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?

The property is not in a radon Affected Area, as less than 1% of properties are above the Action Level

1.3.5 Radon Protection

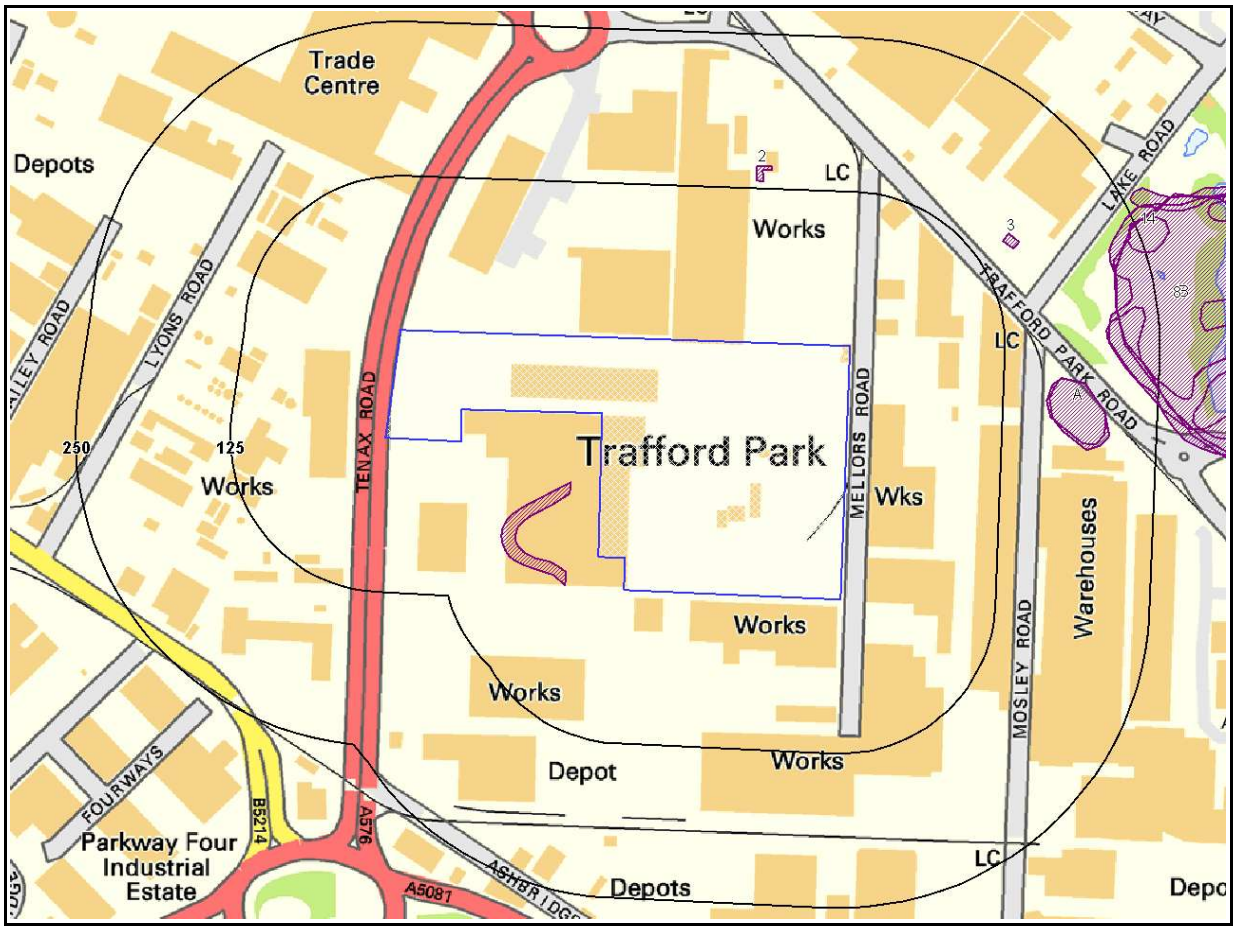
Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment?

No radon protective measures are necessary

* This includes an automatically generated 50m buffer zone around the site.

2. Ground Workings Map

NW N NE



W E

SW S SE

Ground Workings Legend

Site Outline

125
250
Search Buffers (m)

Historic Surface Ground Workings

Historic Underground Workings

Current Ground Workings

2. Ground Workings

2.1 Historical Surface Ground Working Features derived from the Historical Mapping

This dataset is based on GroundSure's unique Historical Land Use Database derived from 1:10,560 and 1:10,000 scale historical mapping.

Are there any Historical Surface Ground Working Features within 250m of the study site boundary? **Yes**

The following Historical Surface Ground Working Features are provided by GroundSure:

ID	Distance (m)	Direction	NGR	Use	Date
1	23.0	W	378639,397213	Refuse Heap	1956
2	131.0	N	378842,397504	Sewage Tanks	1927
3	150.0	NE	379045,397450	Sewage Tank	1927
4A	160.0	E	379097,397312	Pond	1905
5A	163.0	E	379100,397309	Pond	1894
6A	163.0	E	379100,397309	Pond	1894
7	207.0	E	379140,397385	Refuse Heap	1956
8	209.0	E	379190,397393	Refuse Heap	1977
9B	217.0	E	379231,397379	Lake	1938
10B	217.0	E	379231,397379	Fish Pond	1905
11B	217.0	E	379231,397379	Water Body	1927
12B	217.0	E	379230,397374	Fish Pond	1894
13B	217.0	E	379230,397374	Fish Pond	1894
14	240.0	E	379156,397455	Refuse Heap	1956

2.2 Historical Underground Workings Features derived from the Historical Mapping

This data is derived from the GroundSure unique Historical Land Use Database. It contains data derived from 1:10,000 and 1:10,560 historical Ordnance Survey Mapping and includes some natural topographical features (Shake Holes for example) as well as manmade features that may have implications for ground stability. Underground and mining features have been identified from surface features such as shafts. The distance that these extend underground is not shown.

Are there any Historical Underground Working Features within 1000m of the study site boundary? **No**

Database searched and no data found.

2.3 Current Ground Workings

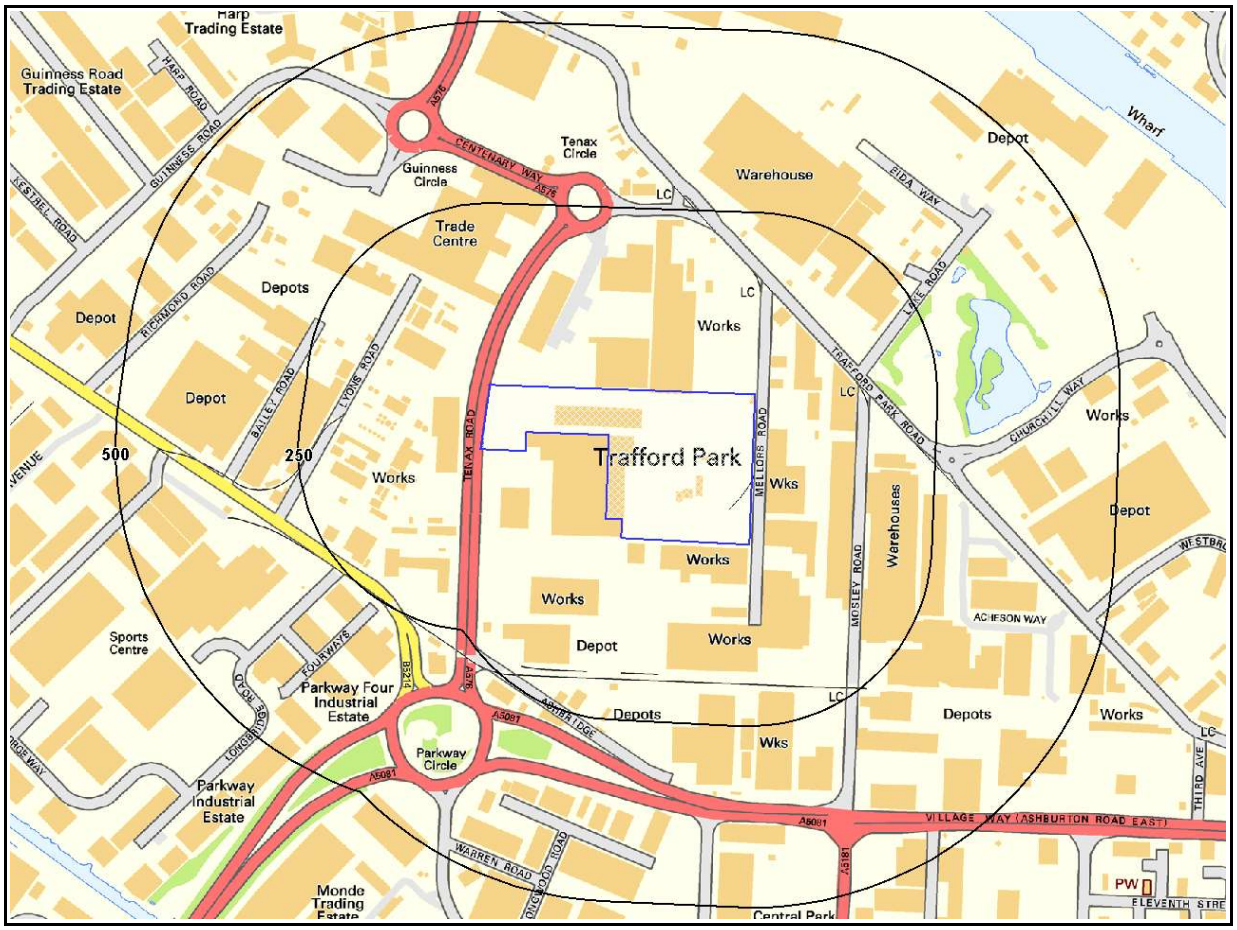
This dataset is derived from the BGS BRITPITS database covering active; inactive mines; quarries; oil wells; gas wells and mineral wharves; and rail deposits throughout the British Isles.

Are there any BGS Current Ground Workings within 1000m of the study site boundary? **No**

Database searched and no data found.

3. Mining, Extraction & Natural Cavities Map

NW ▲ N NE



◄W E►

SW ▼ S SE

Mining, Extraction & Natural Cavities Legend

Site Outline

250
500
Search Buffers (m)

Historical Mining

Non-Coal Mining Cavities

Natural Cavities

3. Mining, Extraction & Natural Cavities

3.1 Historical Mining

This dataset is derived from GroundSure unique Historical Land-use Database that are indicative of mining or extraction activities.

Are there any Historical Mining areas within 1000m of the study site boundary? **No**

Database searched and no data found.

3.2 Coal Mining

This dataset provides information as to whether the study site lies within a known coal mining affected area as defined by the coal authority.

Are there any Coal Mining areas within 1000m of the study site boundary? **Yes**

The following Coal Mining information provided by the Coal Authority is not represented on Mapping:

Distance (m)	Direction	Details
0.0	On Site	The study site is located within the specified search distance of an identified mining area. Further details concerning this can be obtained from the Coal Authority Helpline on 0845 762 6848.

3.3 Shallow Mining

This dataset refers to the (largely very old) extraction of mineral deposits by means of near surface underground workings.

What is the maximum hazard rating of subsidence relating to shallow mining within the study site* boundary? **Negligible**

*This includes an automatically generated 150m buffer zone around the study site boundary

The following Shallow Mining information provided by the British Geological Survey is not represented on Mapping:

Distance (m)	Direction	Hazard Rating	Details
0.0	On Site	Negligible	Where negligible potential is indicated, this means that the rocks underlying the area are not likely to have been mined at shallow depth. However, you should still find out whether or not a Coal Authority mining search is required in the area, for example, to check for deeper mining.

3.4 Non – Coal Mining Cavities

This dataset provides information from the Peter Brett Associates (PBA) mining cavities database (compiled for the national study entitled "Review of mining instability in Great Britain, 1990" PBA has also continued adding to this database) on mineral extraction by mining.

Are there any Non-Coal Mining cavities within 1000m of the study site boundary? **No**

Database searched and no data found.

3.5 Natural Cavities

This dataset provides information based on Peter Brett Associates natural cavities database.

Are there any Natural Cavities within 1000m of the study site boundary? **No**

Database searched and no data found.

3.6 Brine Extraction

This dataset provides information from the Brine compensation board which has been discontinued and is now covered by the Coal Authority.

Are there any Brine Extraction areas within 1000m of the study site boundary? **No**

Database searched and no data found.

3.7 Gypsum Extraction

This dataset provides information on Gypsum extraction from British Gypsum records.

Are there any Gypsum Extraction areas within 1000m of the study site boundary? **No**

Database searched and no data found.

3.8 Tin Mining

This dataset provides information on tin mining areas and is derived from tin mining records.

Are there any Tin Mining areas within 1000m of the study site boundary? **No**

Database searched and no data found.

3.9 Clay Mining

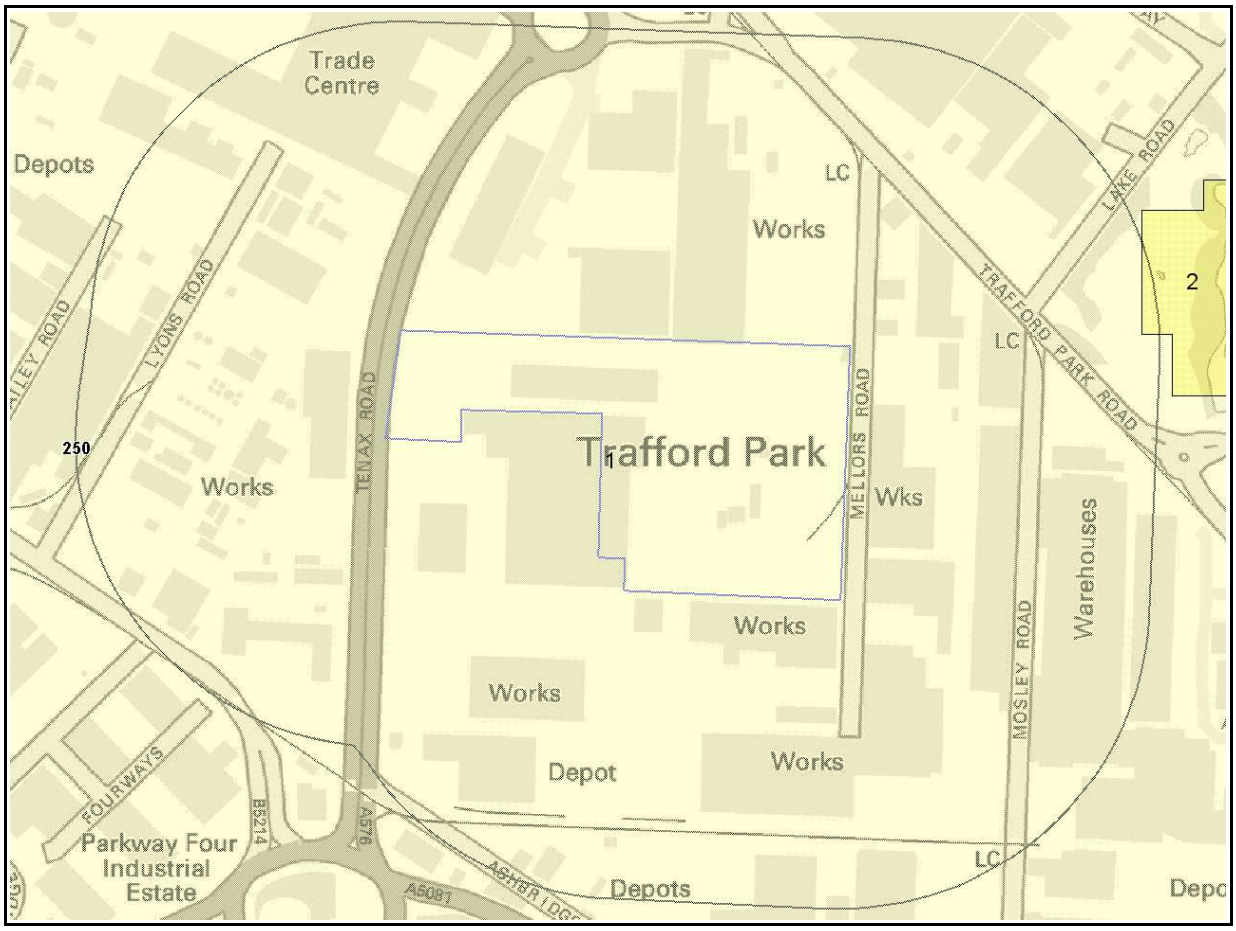
This dataset provides information on Kalin and Ball Clay mining from relevant mining records.

Are there any Clay Mining areas within 1000m of the study site boundary? **No**

Database searched and no data found.

4. Natural Ground Subsidence
4.1 Shrink-Swell Clay Map

NW N NE



◄W E►

SW S SE

Shrink-Swell Clay Legend

Site Outline

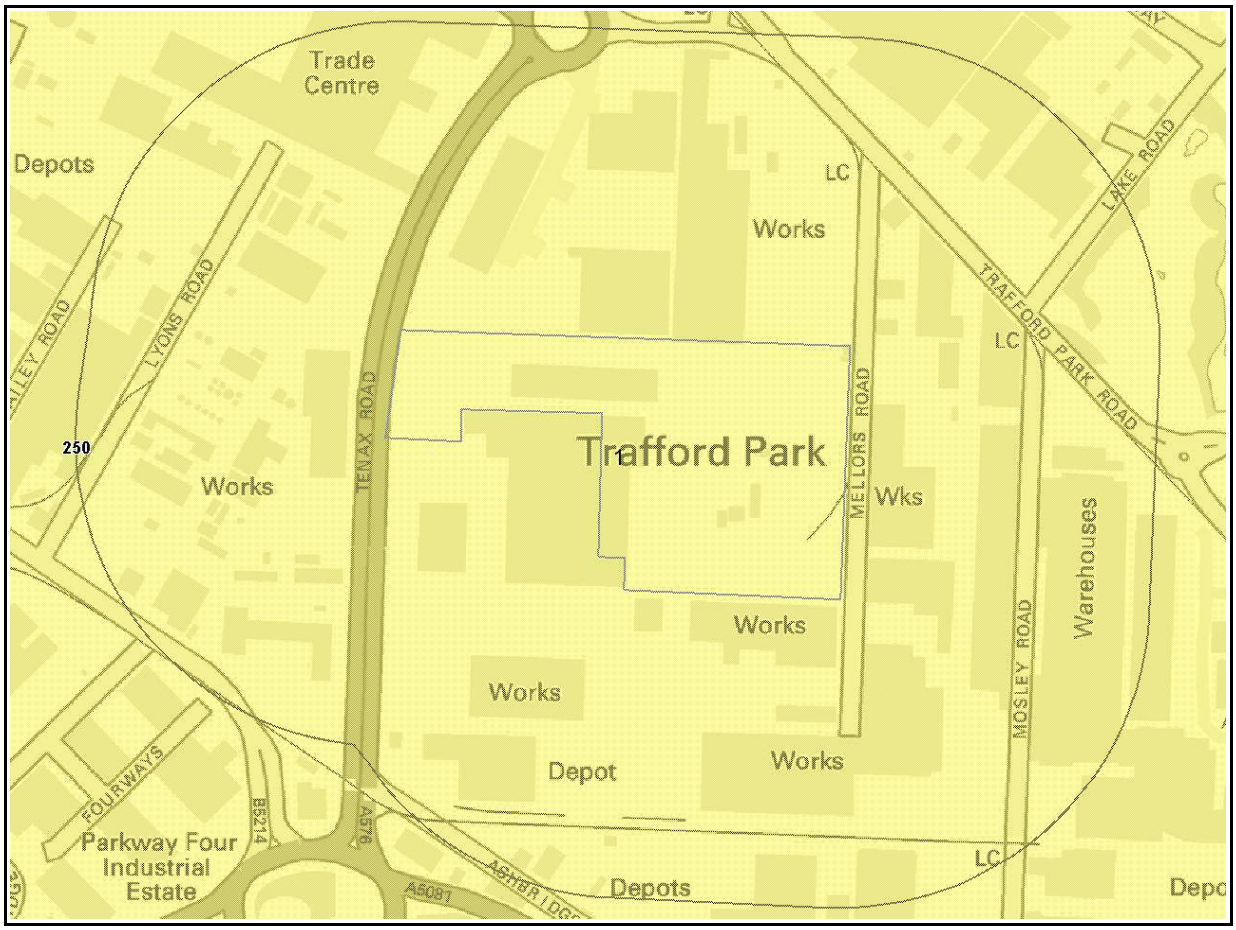
125
250
Search Buffers (m)

No Data / Null
Negligible
Very Low

Low
Moderate
High

4.2 Landslides Map

NW ▲ N NE



◄W E►

SW ▼ S SE

Landslides Legend

Site Outline

125
250
Search Buffers (m)

No Data / Null

Negligible

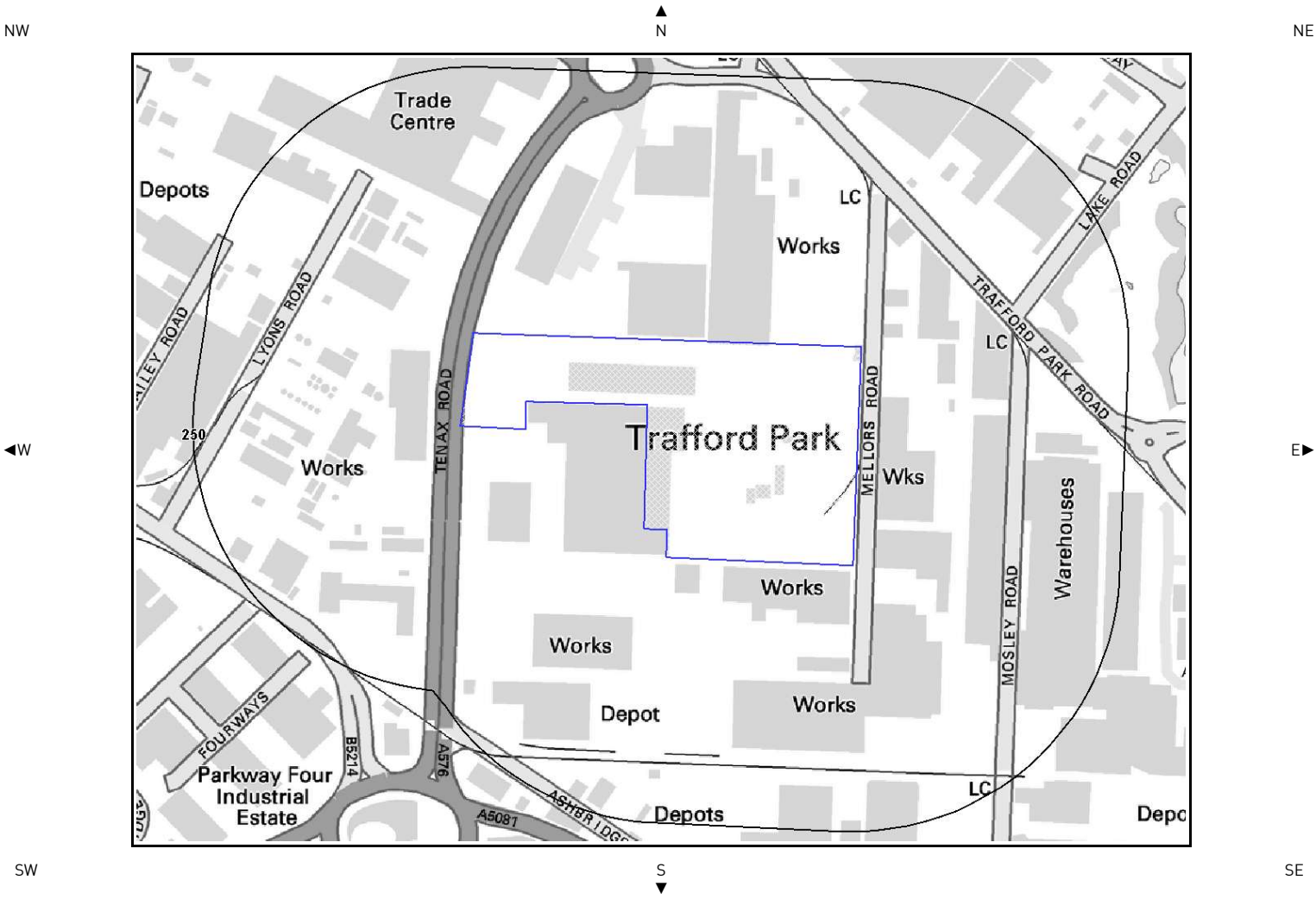
Very Low

Low

Moderate

High

4.3 Ground Dissolution Soluble Rocks Map



Ground Dissolution Soluble Rocks Legend

Site Outline

125
250
Search Buffers (m)

No Data / Null

Negligible

Very Low

Low

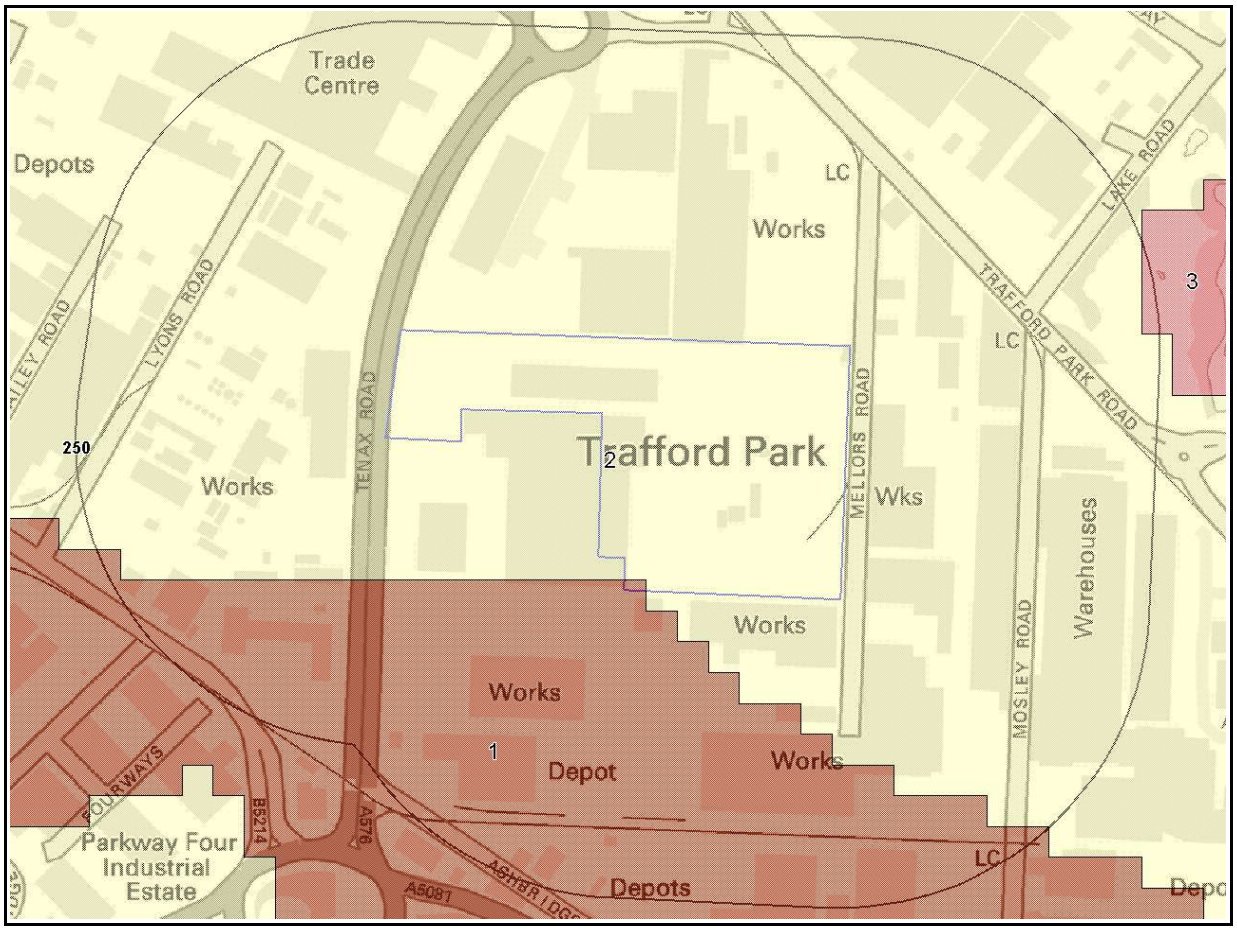
Moderate

High

4.4 Compressible Deposits Map

NW ▲ N NE

◄W



E►

SW ▼ S SE

Compressible Deposits Legend

Site Outline

125
250
Search Buffers (m)

No Data / Null

Negligible

Very Low

Low

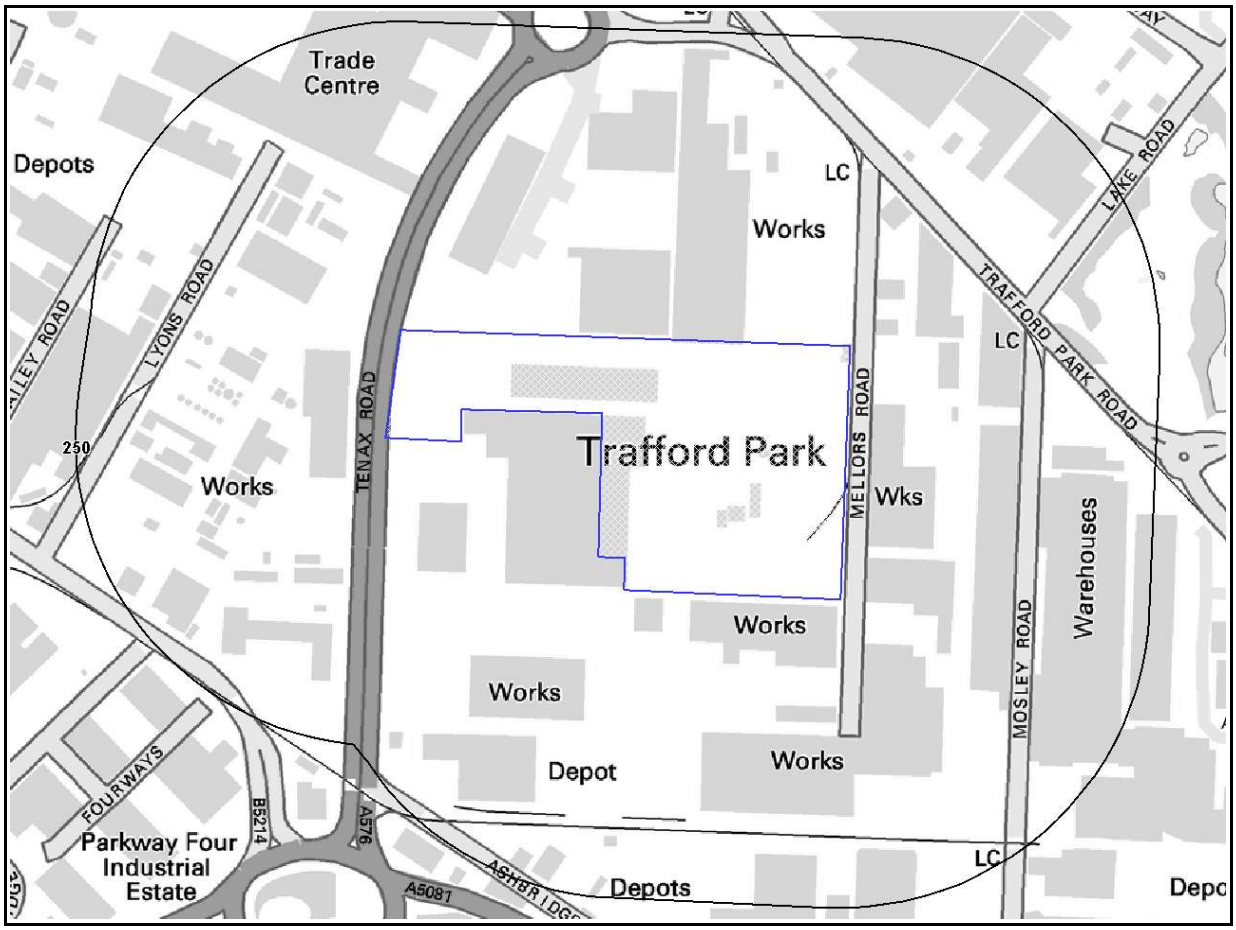
Moderate

High

4.5 Collapsible Deposits Map

NW ▲ N NE

◄W E►



SW ▼ S SE

Collapsible Deposits Legend

Site Outline

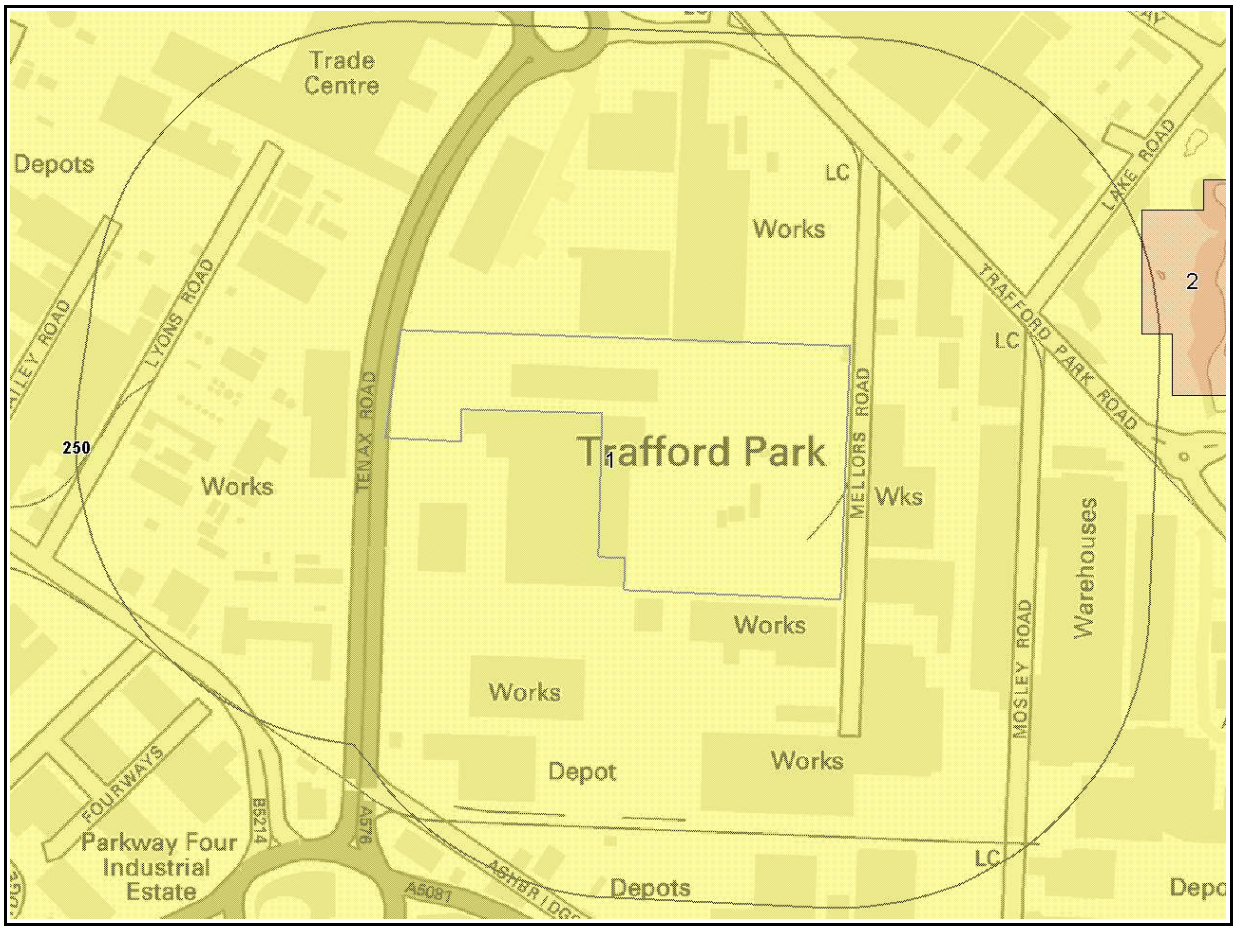
No Data / Null

125
250
Search Buffers (m)

Significant

4.6 Running Sand Map

NW N NE



W E

SW S SE

Running Sand Legend

Site Outline

125
250
Search Buffers (m)

No Data / Null

Negligible

Very Low

Low

Moderate

High

4. Natural Ground Subsidence

The National Ground Subsidence rating is obtained through the 6 natural ground stability hazard datasets, which are supplied by the British Geological Survey (BGS)
The following GeoSure data represented on the mapping is derived from the BGS Digital Geological map of Great Britain at 1:50,000 scale.

What is the maximum hazard rating of natural subsidence within the study site* boundary? **High**

*This includes an automatically generated 50m buffer zone around the study site boundary.

4.1 Shrink – Swell Clays

The following Shrink Swell information provided by the British Geological Survey:

ID	Distance (m)*	Direction	Hazard Rating	Details
1	0.0	On Site	Negligible	Ground conditions predominantly non-plastic. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely likely due to potential problems with shrink-swell clays.

4.2 Landslides

The following Landslides information provided by the British Geological Survey:

ID	Distance (m)*	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.

4.3 Ground Dissolution of Soluble Rocks

The following Soluble Rocks information provided by the British Geological Survey:

Distance (m)*	Direction	Hazard Rating	Details
0	On site	Null-Negligible	Soluble rocks are present, but unlikely to cause problems except under exceptional conditions. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.

4.4 Compressible Deposits

The following Compressible Ground information provided by the British Geological Survey:

ID	Distance (m)*	Direction	Hazard Rating	Details
1	0.0	On Site	High	Very significant potential for compressibility problems. Avoid large differential loadings of ground. Do not drain or de-water ground near the property without technical advice. For new build – consider possibility of compressible ground in ground investigation, construction and building design. Consider effects of groundwater changes. Construction may not be possible at economic cost. For existing property – probable increase in insurance risk from compressibility especially if water conditions or loading of the ground change significantly.
2	0.0	On Site	Negligible	No indicators for compressible deposits identified. No special actions required to avoid problems due to compressible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible deposits.

4.5 Collapsible Deposits

The following Collapsible Rocks information is provided by the British Geological Survey:

Distance (m)*	Direction	Hazard Rating	Details
0	On site	Null-Negligible	No Indicators for collapsible deposits identified. No Special actions required to avoid problems due to collapsible deposit.

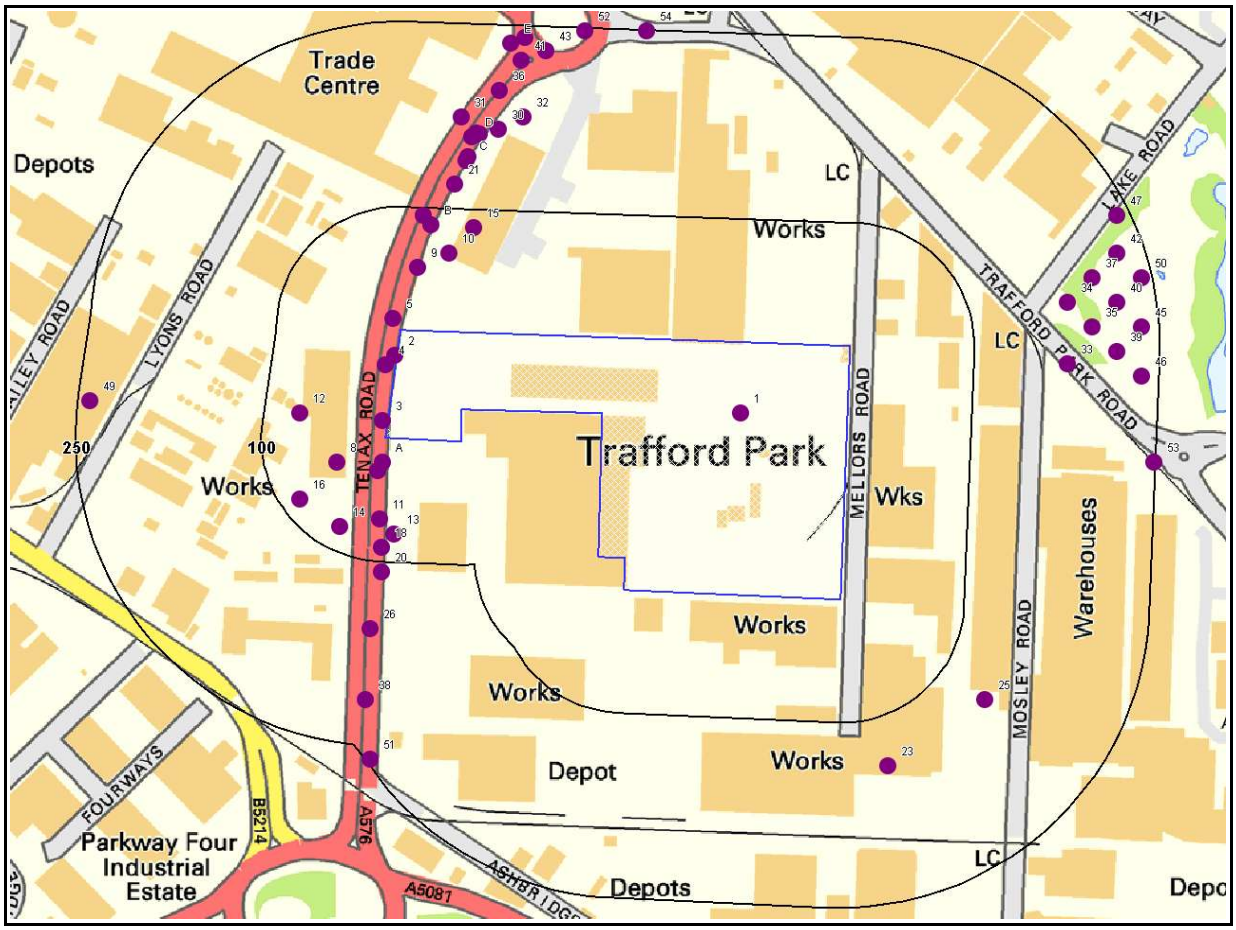
4.6 Running Sands

The following Running Sands information is provided by the British Geological Survey:

ID	Distance (m)*	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Very low potential for running sand problems if water table rises or if sandy strata are exposed to water. No special actions required, to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.

5. Borehole Records Map

NW ▲ N NE



◄W E►

SW ▼ S SE

Borehole Records Legend

Site Outline

Borehole Locations

125
250
Search Buffers (m)

5. Borehole Records

The systematic analysis of data extracted from the BGS Borehole Records database provides the following information.

Records of boreholes within 250m of the study site boundary: **54**

ID	Distance (m)	Direction	NGR	BGS Reference	Drilled Length (m)	Borehole Name
1	0.0	On Site	378826,0397310	SJ79NE50	160.02	LONDON ELECTRIC WIRE CO & SMITHS LTD
2	2.0	W	378547,0397357	SJ79NE565	3.0	M602 PARKWAY EXTENSION TP T46
3	4.0	W	378537,0397304	SJ79NE201	2.8	M602 PARK'Y EXT' TRAFF' TP 125
4	9.0	W	378539,0397349	SJ79NE200	2.7	M602 PARK'Y EXT' TRAFF' TP 124
5	11.0	NW	378545,0397387	SJ79NE199	2.4	M602 PARK'Y EXT' TRAFF' TP 123
6A	20.0	S	378537,0397270	SJ79NE202	3.2	M602 PARK'Y EXT' TRAFF' TP 126
7A	28.0	S	378533,0397263	SJ79NE566	3.0	M602 PARKWAY EXTENSION TP T47
8	44.0	SW	378500,0397270	SJ79NE661	12.45	NEW WAREHOUSE TENAX ROAD 41
9	50.0	N	378565,0397428	SJ79NE198	2.4	M602 PARK'Y EXT' TRAFF' TP 122
10	63.0	N	378590,0397440	SJ79NE1484	-1.0	TENAX ROAD TRAFFORD PARK 1
11	66.0	S	378534,0397224	SJ79NE203	2.8	M602 PARK'Y EXT' TRAFF' TP 127
12	71.0	W	378470,0397310	SJ79NE662	10.45	NEW WAREHOUSE TENAX ROAD 42
13	78.0	S	378546,0397212	SJ79NE538	10.0	M602 PARKWAY EXTENSION 53
14	81.0	SW	378502,0397218	SJ79NE537	10.0	M602 PARKWAY EXTENSION 52
15	84.0	N	378610,0397460	SJ79NE1485	-1.0	TENAX ROAD TRAFFORD PARK 2
16	85.0	SW	378470,0397240	SJ79NE660	10.58	NEW WAREHOUSE TENAX ROAD 40
17B	86.0	N	378576,0397463	SJ79NE197	2.8	M602 PARK'Y EXT' TRAFF' TP 121
18	89.0	S	378536,0397201	SJ79NE567	3.2	M602 PARKWAY EXTENSION TP T48
19B	93.0	N	378570,0397470	SJ79NE211	-1.0	TENAX RD SEWER UPGRADE 1
20	109.0	S	378536,0397181	SJ79NE204	1.9	M602 PARK'Y EXT' TRAFF' TP 128
21	119.0	N	378595,0397496	SJ79NE196	3.2	M602 PARK'Y EXT' TRAFF' TP 120
22C	139.0	N	378604,0397515	SJ79NE564	2.7	M602 PARKWAY EXTENSION TP T45
23	140.0	S	378945,0397024	SJ79NE49	98.75	SUPERHEATER CO LTD
24C	142.0	N	378606,0397518	SJ79NE206	3.0	M602 PARK'Y EXT' TRAFF' TP 144
25	142.0	SE	379023,0397077	SJ79NE48	60.96	BROTHERS CHEMICAL CO. MOSLEY ROAD
26	155.0	S	378527,0397135	SJ79NE568	2.6	M602 PARKWAY EXTENSION TP T49
27D	158.0	N	378609,0397534	SJ79NE195	2.3	M602 PARK'Y EXT' TRAFF' TP 119C
28D	160.0	N	378615,0397536	SJ79NE193	0.35	M602 PARK'Y EXT' TRAFF' TP 119A
29D	161.0	N	378613,0397537	SJ79NE194	0.35	M602 PARK'Y EXT' TRAFF' TP 119B
30	165.0	N	378630,0397540	SJ79NE1486	-1.0	TENAX ROAD TRAFFORD PARK 3
31	174.0	N	378600,0397550	SJ79NE212	-1.0	TENAX RD SEWER UPGRADE 2
32	175.0	N	378650,0397550	SJ79NE1487	-1.0	TENAX ROAD TRAFFORD PARK 4
33	175.0	E	379090,0397350	SJ79NE982	-1.0	TRAFFORD PARK VILLAGE SURFACE WATER DRAINAGE 5
34	178.0	E	379090,0397400	SJ79NE784	15.0	TRAFFORD PARK LAKE G2
35	196.0	E	379110,0397380	SJ79NE785	5.0	TRAFFORD PARK LAKE G3
36	197.0	N	378631,0397572	SJ79NE192	3.1	M602 PARK'Y EXT' TRAFF' TP 118
37	203.0	E	379110,0397420	SJ79NE778	5.0	TRAFFORD PARK LAKE F2
38	214.0	S	378523,0397077	SJ79NE536	9.9	M602 PARKWAY EXTENSION 50
39	215.0	E	379130,0397360	SJ79NE786	3.5	TRAFFORD PARK LAKE G4
40	218.0	E	379130,0397400	SJ79NE779	2.7	TRAFFORD PARK LAKE F3
41	221.0	N	378649,0397596	SJ79NE191	3.1	M602 PARK'Y EXT' TRAFF' TP 117
42	228.0	E	379130,0397440	SJ79NE774	5.0	TRAFFORD PARK LAKE E2
43	230.0	N	378669,0397604	SJ79NE205	2.9	M602 PARK'Y EXT' TRAFF' TP 141
44E	235.0	N	378640,0397610	SJ79NE213	-1.0	TENAX RD SEWER UPGRADE 3
45	235.0	E	379150,0397380	SJ79NE780	2.0	TRAFFORD PARK LAKE F4
46	236.0	E	379150,0397340	SJ79NE787	3.6	TRAFFORD PARK LAKE G5
47	239.0	NE	379130,0397470	SJ79NE770	5.0	TRAFFORD PARK LAKE D1
48E	240.0	N	378652,0397615	SJ79NE563	3.0	M602 PARKWAY EXTENSION TP T44
49	241.0	W	378300,0397320	SJ79NE1526	123.75	TURNER BROS ASHBURTON ROAD
50	241.0	E	379150,0397420	SJ79NE775	5.3	TRAFFORD PARK LAKE E3
51	247.0	SW	378527,0397029	SJ79NE569	3.0	M602 PARKWAY EXTENSION TP T51
52	247.0	N	378700,0397620	SJ79NE214	-1.0	TENAX RD SEWER UPGRADE 4
53	248.0	E	379160,0397270	SJ79NE983	-1.0	TRAFFORD PARK VILLAGE SURFACE WATER DRAINAGE 6
54	249.0	N	378750,0397620	SJ79NE215	-1.0	TENAX RD SEWER UPGRADE 5

Contacts

CENTREMAPS
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groundsure@centremaps.co.uk
CENTREMAPS, Brockamin House, Leigh, Worcester, London, WR6 5JU

Directors: M C Walker, MInst C.E.S., C M Walker, S J Hawkins BSc (Hons), S E Stewart BSc (Hons)
Registered No. 1890261 Registered in England and Wales
Registered Company: Laser Surveys Limited
Brockamin House, Leigh, Worcester, WR6 5JU.

British Geological Survey Enquiries
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Keyworth, Nottingham NG12 5GG
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Email: enquiries@bgs.ac.uk
Web: www.bgs.ac.uk
BGS Geological Hazards Reports and general geological enquiries

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Acknowledgements

Standard Terms and Conditions

1 Definitions

In these conditions unless the context otherwise requires:
"Beneficiary" means the Client or the customer of the Client for whom the Client has procured the Services.
"Commission" means an order for Consultancy Services submitted by a Client.
"Consultancy Services" mean consultancy services provided by GroundSure including, without limitation, carrying out interpretation of third party and in-house environmental data, provision of environmental consultancy advice, undertaking environmental audits and assessments, Site investigation, Site monitoring and related items.
"Content" means any data, database or other information contained in a Report or Mapping which is provided to GroundSure by a Data Provider.
"Contract" means the contract between GroundSure and the Client for the performance of the Services which arises upon GroundSure's acceptance of an Order or Commission and which shall incorporate these conditions, the relevant GroundSure User Guide, proposal by GroundSure and the content of any subsequent report, and any agreed amendments in accordance with condition 11 .
"Client" means the party that submits an Order or Commission.
"Data Provider" means any third party providing Content to GroundSure.
"Data Report" means reports comprising factual data with no professional interpretation in respect of the level of likely risk and/or liability available from GroundSure.
"GroundSure" means GroundSure Limited, a company registered in England and Wales under number 03421028 and whose registered office is at Greater London House, Hampstead Road, London NW1 7EJ.
"Home Information Pack" means a combination of reports required when selling a residential property.
"Intellectual Property" means any patent, copyright, design rights, service marks, moral rights, data protection rights, know-how, trade mark or any other intellectual property rights.
"Mapping" an historical map or a combination of historical maps of various ages, time periods and scales available from GroundSure.
"Order" means an order form submitted by the Client requiring Services from GroundSure in respect of a specified Site.
"Order Website" means online platform via which Orders may be placed.
"Report" means a Risk Screening Report or Data Report for commercial or residential property available from GroundSure relating to the Site prepared in accordance with the specifications set out in the relevant User Guide.
"Risk Screening Report" means one of GroundSure's risk screening reports such as GroundSure Homebuyers, GroundSure Home Environmental GroundSure SiteGuard, GroundSure Screening, GroundSure Review, GroundSure Developer Review, or any other risk screening report available from GroundSure.
"Services" means the provision of any Report, Mapping or Consultancy Services which GroundSure has agreed to carry out for the Client/Beneficiary on these terms and conditions in respect of the Site.
"Site" means the landsite in respect of which GroundSure provides the Services.
"User Guide" means the relevant current version of the user guide, available upon request from GroundSure.

2 Scope of Services

2.1 GroundSure agrees to carry out the Services in accordance with the Contract and to the extent set out therein.
2.2 GroundSure shall exercise all the reasonable skill, care and diligence to be expected of experienced environmental consultants in the performance of the Services.
2.3 The Client acknowledges that it has not relied on any statement or representation made by or on behalf of GroundSure which is not set out and expressly agreed in the Contract.
2.4 Terms and conditions appearing on a Client's order form, printed stationery or other communication, including invoices, to GroundSure, its employees, servants, agents or other representatives or any terms implied by custom, practice or course of dealing shall be of no effect and these terms and conditions shall prevail over all others.
2.5 In the event that a Client/Beneficiary opts to take out insurance in conjunction with or as a result of the Services, such insurance shall be subject solely to the terms of any policy issued to it in that respect and GroundSure will have no liability therefore.
2.6 GroundSure's quotations/proposals are valid for a period of 30 days only. GroundSure reserves the right to withdraw any quotation at any time before GroundSure accepts an Order or Commission. GroundSure's acceptance of an Order or Commission shall be effective only where such acceptance is in writing and signed by GroundSure's authorised representative or where accepted via GroundSure's Order Website.

3 The Client's obligations

3.1 The Client shall be solely responsible for ensuring that the Report/Mapping ordered is appropriate and suitable for the Beneficiary's needs.
3.2 The Client shall (or shall procure that the Beneficiary shall) supply to GroundSure as soon as practicable and without charge all information necessary and accurate relevant data including any specific and/or unusual environmental information relating to the Site known to the Client/Beneficiary which may pertain to the Services and shall give such assistance as GroundSure shall reasonably require in the performance of the Services (including, without limitation, access to a Site, facilities and equipment as agreed in the Contract).
3.3 Where Client/Beneficiary approval or decision is required, such approval or decision shall be given or procured in reasonable time as not to delay or disrupt the performance of any other part of the Services.
3.4 The Client shall not and shall not knowingly permit the Beneficiary to, save as expressly permitted by these terms and conditions, re-sell, alter, add to, amend or use out of context the content of any Report, Mapping or, in respect of any Services, information given by GroundSure. For the avoidance of doubt, the Client and Beneficiary may make the Report, Mapping or GroundSure's findings available to a third party, but such third party cannot rely on the same unless expressly permitted under condition 4.
3.5 The Client is responsible for maintaining the confidentiality of its user name and password if using GroundSure's internet ordering service and accepts responsibility for all activity that occurs under such account and password.

4 Reliance

4.1 Upon full payment of all relevant fees and subject to the provisions of these terms and conditions, the Client and Beneficiary are granted an irrevocable royalty-free licence to use the information contained in the Report, Mapping or in a report prepared by GroundSure in respect of or arising out of the Consultancy Services. The Services may only be used for the benefit of the Client and those persons listed in conditions 4.2 and 4.3.
4.2 In relation to Data Reports, Mapping and Risk Screening Reports, the Client shall be entitled to make Reports available to (i) the Beneficiary, (ii) the Beneficiary's professional advisers, (iii) any person providing funding to the Beneficiary in relation to the Site (whether directly or as part of a lending syndicate), (iv) the first purchaser or first tenant of the Site (v) the professional advisers and lenders of the first purchaser or tenant of the Site. For the avoidance of doubt, such persons shall include any entity necessary under the Housing Act 2004 (as amended). Accordingly GroundSure shall have the same duties and obligations to those persons in respect of the Services as it has to the Client and those persons shall have the benefit of any of the Client's rights under the Contract as if those persons were parties to the Contract. For the avoidance of doubt, the limitations of GroundSure's liability as set out in condition 7 shall apply.
4.3 In relation to Consultancy Services, reliance shall be limited to the Client, Beneficiary and named parties on the Report.
4.4 Save as set out in conditions 4.2 and 4.3 and unless otherwise agreed in writing with GroundSure, any other party considering the information supplied by GroundSure as part of the Services, including (but not limited to) insurance underwriters, does so at their own risk and GroundSure has no legal obligations to such party unless otherwise agreed in writing.
4.5 The Client shall not and shall not knowingly permit any person (including the Beneficiary) who is provided with a copy of any Report shall not except as permitted herein or by separate agreement with GroundSure: (a) remove, suppress or modify any trade mark, copyright or other proprietary marking from the Report or Mapping; (b) create any product which is derived directly or indirectly from the data contained in the Report or Mapping; (c) combine the Report or Mapping with, or incorporate the Report or Mapping into any other information data or service; or (d) re-format or otherwise change (whether by modification, addition or enhancement) data or images contained in the Report or Mapping.
4.6 Notwithstanding condition 4.5, if the Client acts in a professional capacity, it may make reasonable use of a Report and/or findings made as a result of Consultancy Services to advise Beneficiaries. However, GroundSure shall have no liability in respect of any opinion or report given to such Beneficiaries by the Client or a third party.

5 Fees and Disbursements

5.1 GroundSure shall charge the Client fees at the rate and frequency specified in the Contract together, in the case of Consultancy Services, with all proper disbursements incurred by GroundSure in performing the Services. For the avoidance of doubt, the fees payable for the Services are as set out in GroundSure's written proposal, Order Website or Order acknowledgement form. The Client shall in addition pay all value added tax or other tax payable on such fees and disbursements in relation to the provision of the Services.
5.2 Unless GroundSure requires prepayment, the Client shall promptly pay all fees disbursements and other monies due to GroundSure in full without deduction, counterclaim or set off together with such value added tax or other tax as may be required within 30 days from the date of GroundSure's invoice or such other period as may be agreed in writing between GroundSure and the Client ("Payment Date"). GroundSure reserves the right to charge interest which shall accrue on a daily basis from 30 days after the date of Payment Date until the date of payment (whether before or after judgement) at the rate of five per cent per annum above the Bank of England base rate from time to time.
5.3 In the event that the Client disputes the amount payable in respect of GroundSure's invoice it shall notify GroundSure no later than 28 days after the date thereof that it is in dispute. In default of such notification the Client shall be deemed to have agreed the amount thereof. As soon as reasonably practicable following receipt of a notification in respect of any disputed invoice, a member of the management team at GroundSure shall contact the Client and the parties shall use all reasonable endeavours to resolve the dispute.

6 Intellectual Property

6.1 Subject to the provisions of condition 4.1, the Client and the Beneficiary hereby acknowledge that all Intellectual Property in the Services are and shall remain owned by either GroundSure or the Data Providers and nothing in these terms purports to transfer or assign any rights to the Client or the Beneficiary in respect of the Intellectual Property.
6.2 The Client shall acknowledge the ownership of the Content where such Content is incorporated or used in the Client's own documents, reports, systems or services whether or not these are supplied to a third party.
6.3 Data Providers may enforce any breach of condition 6.1 against the Client or Beneficiary.

7. Liability

7.1 Nothing in these terms and conditions shall limit GroundSure's liability for causing death or personal injury through negligence or wilful default.
7.2 Save as otherwise set out in these conditions, any information provided by one party ("Disclosing party") to the other party ("Receiving Party") shall be treated as confidential except so far as authorised by the Disclosing Party to provide such information in whole or in part to a third party.
7.3 Nothing in these conditions shall affect the statutory rights of a consumer under the applicable consumer protection legislation from time to time.
7.4 In relation to Data Reports, Mapping and Risk Screening Reports, GroundSure's liability under the Contract shall cease upon the expiry of six years from the date when the Beneficiary became aware that it may have a claim against GroundSure in respect of the Services provided always that there shall be no liability at the expiration of twelve years from the completion of the Contract. For the avoidance of doubt, any claims in respect of which proceedings are notified to GroundSure in writing prior to the expiry of the time periods referred to in this clause shall survive the expiry of those time periods provided any such claim is actually commenced within six months of notification.
7.5 In relation to Consultancy Services GroundSure's liability under the Contract shall cease upon the expiry of six years from the date the Services were completed.
7.6 GroundSure shall not be liable to the Client or any person to whom the Client provides a copy of a Data Report, Mapping or Risk Screening Report in any circumstances whatsoever unless arising out of a breach on its part of the obligations set out in the Contract.
7.7 GroundSure shall not be liable if the Data Reports, Mapping or Risk Screening Report are used otherwise than as provided or referred to in these conditions and the relevant User Guide.
7.8 Subject to the provisions of condition 7.3, GroundSure makes no representation, warranties, express or implied, as to the accuracy, reliability, completeness, validity or fitness for purpose of any Content and shall not be liable for any omission, error or inaccuracy in relation thereto unless GroundSure should reasonably have been alerted to any omission, error or inaccuracy in the Content.
7.9 Subject to the provisions of clause 7.1 notwithstanding anything to the contrary contained elsewhere in the Contract, and irrespective of whether multiple parties make use of the same Services, the total liability of GroundSure under or in connection with the Contract, whether in contract in tort for breach of statutory duty or otherwise shall not exceed £5 million per claim or series of connected claims.
7.10 Whilst GroundSure will use all reasonable endeavours to maintain operability of its internet ordering service it will not be liable for any loss or damages caused by a delay or loss of use of such service. The Client shall use GroundSure's internet ordering service at its own risk. GroundSure shall not be responsible for any damage to a Client or permitted assignee's computer, software, modem, telephone or other property resulting from the use of GroundSure's internet ordering service.
7.11 The Client accepts, and shall use all reasonable endeavours to procure that anyone who is provided with a copy of the Report accepts, that it has no claim or recourse to any Data Provider or to GroundSure in respect of the acts or omissions of such Data Providers including Content supplied by them save for where a Risk Screening Report comprises part of a Home Information Pack:

(i) the Data Providers set out in the relevant User Guide shall be responsible for the quality and accuracy of the data supplied by them; and
(ii) where GroundSure makes an assessment of a Site to determine if it is likely to fall within Part II(A) of the Environmental Protection Act 1990, GroundSure shall be responsible for the interpretation of any Content provided by a Data Provider subject to the limitations set out in these terms and conditions.

7.12 GroundSure shall provide the Services using reasonable skill and care, however, GroundSure shall not be liable for any inaccurate statement or risk rating in a Report which resulted from a reasonable interpretation of the Content.
7.13 Subject to the provisions of clause 7.1, GroundSure shall not be liable for any losses (whether direct or indirect) and including (but not limited to) loss of profit caused by the suspension or reduction of activity on a Site, business interruption, all third party off-Site claims or any loss in value of a Site, loss of goodwill, loss of business opportunity or other similar losses alleged to be sustained by the Client, the Beneficiary or any third party.
7.14 GroundSure undertakes for the duration of the liability periods referred to in conditions 7.4 and 7.5 to maintain professional indemnity insurance in respect of its liabilities in respect of the Contract for £5 million in the aggregate which amount shall first include the whole of any sum payable for death or personal injury provided such insurance is readily available at commercially viable rates or for a lesser amount to be agreed with the Client should the cost of such insurance become commercially unviable. GroundSure shall produce evidence of such insurance if requested by the Client. A greater level of cover may be available upon request and agreement with the Client.

8 GroundSure right to suspend or terminate

8.1 In the event that GroundSure reasonably believes that the Client or Beneficiary as applicable has not provided the information or assistance required to enable the proper performance of the Services, GroundSure shall be entitled on fourteen days written notice to suspend all further performance of the Services until such time as any such deficiency has been made good.
8.2 GroundSure may additionally terminate the Contract immediately on written notice in the event that:

(i)the Client shall fail to pay any sum due to GroundSure within 28 days of the due date for payment; or
(ii)the Client (being an individual) has a bankruptcy order made against him or (being a company) shall enter into liquidation whether compulsory or voluntary or have an Administration Order made against it or if a Receiver shall be appointed over the whole or any part of its property assets or undertaking or if the Client is struck off the Register of Companies or dissolved; or
(iii)the Client being a company is unable to pay its debts within the meaning of Section 123 of the Insolvency Act 1986 or being an individual appears unable to pay his debts within the meaning of Section 268 of the Insolvency Act 1986 or if the Client shall enter into a composition or arrangement with the Client's creditors or shall suffer distress or execution to be levied on his goods; or
(iv) the Client breaches any material term of the Contract (including, but not limited to, the obligations in condition 4) incapable of remedy or if remediable, is not remedied within 14 days of notice of the breach.

9. Client's Right to Terminate and Suspend

9.1 Subject to condition 10.2, the Client may at any time after commencement of the Services by notice in writing to GroundSure require GroundSure to terminate or suspend immediately performance of all or any of the Services.
9.2 The Client waives all and any right of cancellation it may have under the Consumer Protection (Distance Selling) Regulations 2000 (as amended) in respect of the Order of a Report/Mapping. This does not affect the Beneficiary's statutory rights.

10 Consequences of Withdrawal, Termination or Suspension

10.1 Upon termination or any suspension of the Services, GroundSure shall take steps to bring to an end the Services in an orderly manner, vacate any Site with all reasonable speed and shall deliver to the Client/Beneficiary any property of the Client/ Beneficiary in GroundSure's possession or control.
10.2 In the event of termination/suspension of the Contract under conditions 8 or 9, the Client shall pay to GroundSure all and any fees payable in respect of the performance of the Services up to the date of termination/suspension. In respect of any Consultancy Services provided, the Client shall also pay GroundSure any additional costs incurred in relation to the termination/suspension of the Contract.

11 General

11.1 The mapping contained in the Services is protected by Crown copyright and must not be used for any purpose outside the context of the Services or as specifically provided in these terms.
11.2 GroundSure reserves the right to amend these terms and conditions. No variation to these terms shall be valid unless signed by an authorised representative of GroundSure.
11.3 No failure on the part of GroundSure to exercise and no delay in exercising, any right, power or provision under these terms and conditions shall operate as a waiver thereof.
11.4 Save as expressly provided in conditions 4.2, 4.3, 6.3 and 11.5, no person other than the persons set out therein shall have any right under the Contract (Rights of Third Parties) Act 1999 to enforce any terms of the Contract.
11.5 The Secretary of State for Communities and Local Government acting through Ordnance Survey, may enforce breach of conditions 6.1 or 11.1 of these terms and conditions against the Client in accordance with the provisions of the Contracts (Rights of Third Parties) Act 1999.
11.6 GroundSure shall not be liable to the Client if the provision of the Services is delayed or prevented by one or more of the following circumstances:

(i)the Client or Beneficiary's failure to provide facilities, access or information;
(ii)fire, storm, flood, tempest or epidemic;
(iii)Acts of God or the public enemy;
(iv)riot, civil commotion or war;
(v)strikes, labour disputes or industrial action;
(vi)acts or regulations of any governmental or other agency;
(vii)suspension or delay of services at public registries by Data Providers; or
(viii)changes in law.

11.7 Any notice provided shall be in writing and shall be deemed to be properly given if delivered by hand or sent by first class post, facsimile or by email to the address, facsimile number or email address of the relevant party as may have been notified by each party to the other for such purpose or in the absence of such notification the last known address.
11.8 Such notice shall be deemed to have been received on the day of delivery if delivered by hand, facsimile or email and on the second working day after the day of posting if sent by first class post.
11.9 The Contract constitutes the entire contract between the parties and shall supersede all previous arrangements between the parties.
11.10 Each of the provisions of the Contract is severable and distinct from the others and if one or more provisions is or should become invalid, illegal or unenforceable, the validity and enforceability of the remaining provisions shall not in any way be tainted or impaired.
11.11 These terms and conditions shall be governed by and construed in accordance with English law and any proceedings arising out of or connected with these terms and conditions shall be subject to the exclusive jurisdiction of the English courts.
11.12 If the Client or Beneficiary has a complaint about the Services, notice should be given in writing to the Compliance Officer at GroundSure who will respond in a timely manner.

APPENDIX F

THE COAL AUTHORITY REPORT

Issued by:
The Coal Authority, Mining Reports Office, 200 Lichfield Lane, Berry Hill, Mansfield, Nottinghamshire NG18 4RG
ON-Line Service: www.groundstability.com - Phone: 0845 762 6848 - DX 716176 MANSFIELD 5

PAUL MCFADDEN,
CCGEOTECHNICAL,
ESSEX HOUSE,
BRIDLE ROAD,
BOOTLE,
LIVERPOOL,
MERSEYSIDE,
L30 4UE

Person dealing with this matter:	**Richard Booth**
Our reference:	**00026736-09**
Your reference:	09/5512 PO331
Electronic Ref:	EME_00011867000001_005
RRUID:	005.00011867000001
Date of your enquiry:	**17 June 2009**
Date we received your enquiry:	**17 June 2009**
Date of issue:	**22 June 2009**

This report is for the property described in the address below and the attached plan.

Coal and Brine Report

S.Norton & Co Ltd, Tenax Road, Trafford Park, Greater Manchester

This report is based on and limited to the records held by, the Coal Authority, and the Cheshire Brine Subsidence Compensation Board's records, at the time we answer the search.

Coal mining	Yes
Brine Compensation District	No

Information from the Coal Authority

Underground Coal Mining

Past

According to the records in our possession, the property is not within the zone of likely physical influence on the surface from past underground workings.

Present

The property is not in the likely zone of influence of any present underground coal workings.

Future

The property is not in an area for which the Coal Authority is determining whether to grant a licence to remove coal using underground methods.

The property is not in an area for which a licence has been granted to remove coal using underground methods.

The property is not in an area that is likely to be affected at the surface from any planned future workings.

However reserves of coal exist in the local area which could be worked at some time in the future.

No notice of the risk of the land being affected by subsidence has been given under section 46 of the Coal Mining Subsidence Act 1991.

Mine entries

There are no known coal mine entries within, or within 20 metres of, the boundary of the property.

Coal-mining geology

At the surface, there are no known faults or other lines of weakness due to coal mining that have made the property unstable.

Opencast Coal Mining

Past

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

Present

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

Future

The property is not within 800 metres of the boundary of an opencast site for which the Coal Authority is determining whether to grant a licence to remove coal by opencast methods.

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

Coal-mining subsidence

The Coal Authority has not received a damage notice or claim for the property since 1 January 1984. There is no current Stop Notice delaying the start of remedial works or repairs to the property.

The Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.

Mine gas

There is no record of a mine gas emission requiring action by the Coal Authority within the boundary of the property.

Hazards related to coal mining

The property has not been subject to remedial works, by or on behalf of the Authority, under its Emergency Surface Hazard Call Out procedures.

Withdrawal of Support

The property is not in an area for which a notice of entitlement to withdraw support has been published.

The property is not in an area for which a notice has been given under section 41 of the Coal Industry Act 1994, revoking the entitlement to withdraw support.

Working Facilities Orders

The property is not in an area for which an Order has been made under the provisions of the Mines (Working Facilities and Support) Acts 1923 and 1966 or any statutory modification or amendment thereof.

Payments to Owners of Former Copyhold Land

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

Information from the Cheshire Brine Subsidence Compensation Board

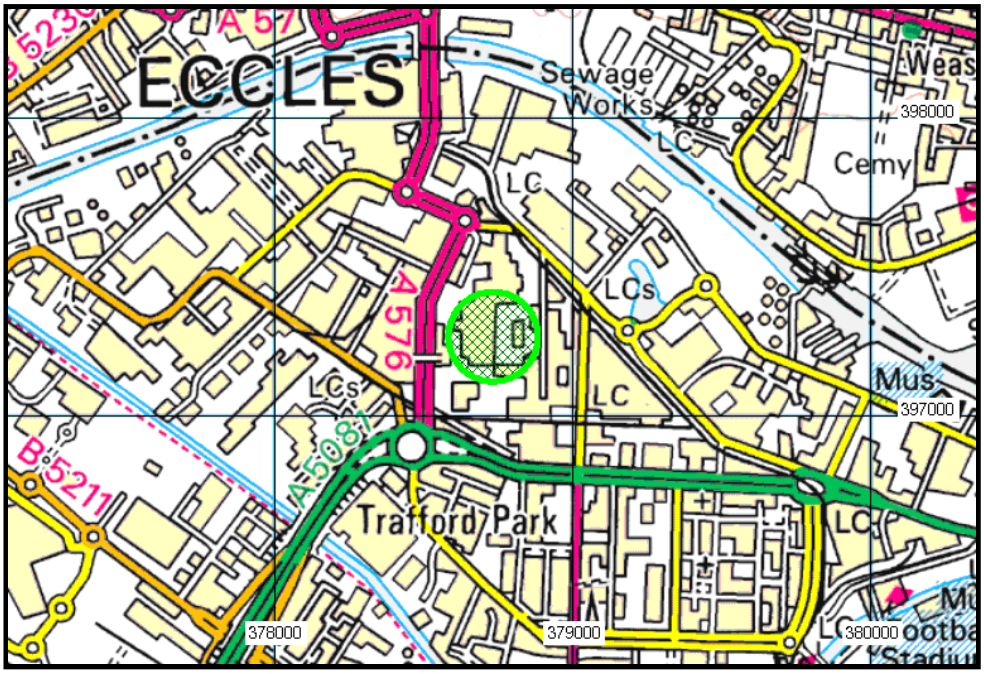
The property lies outside the Cheshire Brine Compensation District.

Additional remarks

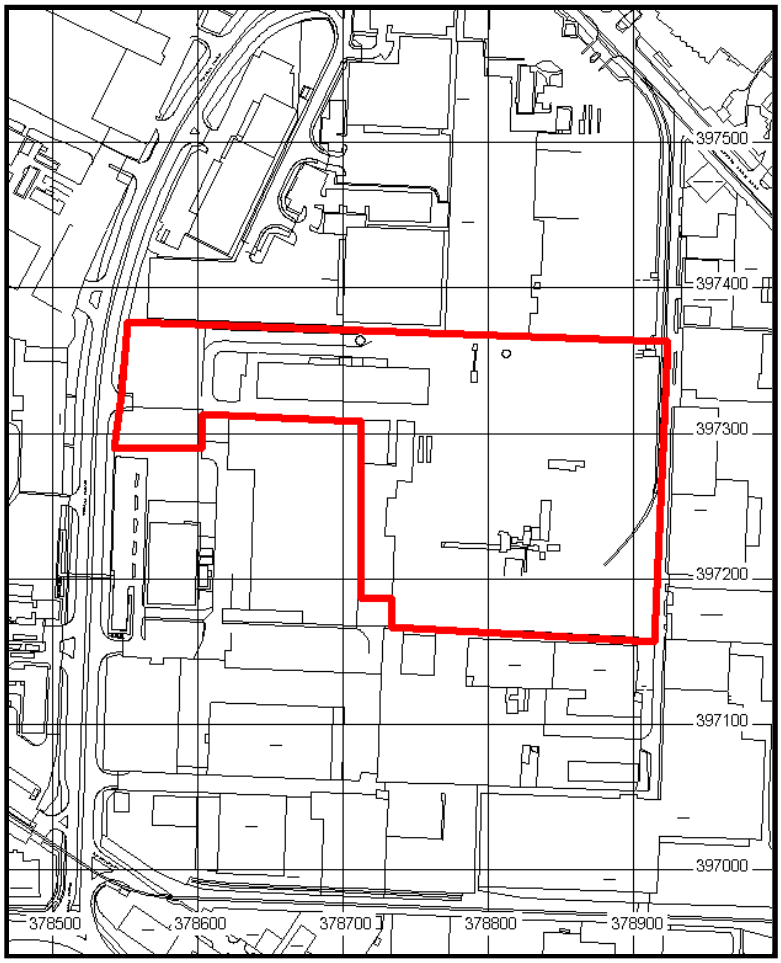
This report is prepared in accordance with the Law Society's Guidance Notes 2006, the User Guide 2006 and the Coal Authority and Cheshire Brine Board's Terms and Conditions 2006. The report is compliant with Home Information Pack requirements.

Location map

Approximate
position
of property



Enquiry boundary



Key

Approximate position of enquiry boundary shown

Mapping sourced from Ordnance Survey®

APPENDIX G

SAMPLING AND ASSESSMENT METHODOLOGIES

CC Geotechnical

SAMPLING, SAMPLE TRANSPORTATION, AND FIELD MONITORING PROTOCOLS

Soil / water / gas sampling and monitoring methodologies employed by ***CC GEOTECHNICAL LTD*** are presented hereunder.

SAMPLING OF SOIL FOR CONTAMINATION ASSESSMENTS

Soil samples are recovered in contamination site investigations by one or both of two sampling methodologies - dynamic sampling boreholes or trial pits.

Sampling equipment (steel casing tubes, spatulas etc) is cleaned using deionised water between sample positions to avoid cross contamination. Gloves are changed on completion of each sampling location)

Dynamic Sampling Boreholes

In this method of investigation samples are recovered in relatively undisturbed 1m long plastic tubes. Each tube is uniquely labelled with the Project Name / Project No / Borehole No / Depth increment / Date Sampled. The tubes are sealed by air tight caps fitted at each end, and are temporarily stored out of sunlight, awaiting transportation to the laboratory, where they are immediately split, scanned by PID, logged and subsampled.

Trial Pits

Samples are taken from the bucket of an excavator and placed in airtight containers. Each container is uniquely labelled with the Project No / Trial Pit No / Depth increment/ Date Sampled. The samples are then immediately placed in a cool box chilled by ice packs, and the boxes are sealed for transportation to the laboratory.

SAMPLING CONTAINERS

Subsamples from dynamic sampling boreholes or samples from trial pits comprise of a 1kg plastic tub and a 500g amber glass jar. Whilst in the laboratory awaiting courier collection, samples are stored in a refrigerator at $4^{O}C$, when they are replaced in a cool box with ice packs.

CHAIN OF CUSTODY RECORDS

A Chain of Custody Record (CoC) is sent with the batch of samples. A copy of the CoC is also emailed to the laboratory prior to sample delivery. ***A copy of the CoC is included in the analyses certificates.***

HEADSPACE ANALYSES

Duplicate subsamples of ALL samples selected for laboratory analysis, are taken for headspace analyses, using a Photo Ionisation Detector (PID). In the test method, an amber glass jar is half filled with soil, and the lid is sealed with aluminium foil secured by an elastic band. The jar and contents are agitated for 30 seconds and left for a minimum of 30 minutes out of direct sunlight for the headspace to achieve equilibrium. The PID then pierces the seal and the maximum reading is recorded.

The prevailing weather conditions, and ambient temperature are also recorded.

The PID headspace results are recorded on the exploratory borehole or trial pit logs.

Laboratory VOC analyses will be obtained where the PID headspace data indicate a potential presence of volatiles.

SAMPLING OF WATER IN STANDPIPES

Water is sampled from standpipes installed during borehole drilling. On completion of the construction of the standpipe, the installation is developed by removing up to 4 x the internal volume of the installation. The volume of water removed is recorded. The standpipe is then left for a week for hydraulic equilibrium to be restored.

Prior to sampling the standpipe, the depth to the water table, and the depth to the base of the standpipe are monitored using an electronic dipmeter. In circumstances where free phase product is suspected to be present, then an 'Interface Meter' is used to determine the free phase film thickness.

A minimum of 3 x the standpipe volume is then removed. The pH of the water is then monitored and the sample is taken when the change in pH between any two consecutive standpipe extracts is less than 10%. The volume of water removed is recorded.

A sample comprises of a minimum of 3 litres. Two litres are taken in amber glass bottles, and one litre in a plastic bottle.

To avoid cross-contamination one bailer is used per position.

The samples are uniquely labelled with Project Name / Project No / Borehole No / Depth / Date Sampled. They are placed in a cool box chilled by ice packs, and the containers are sealed for transportation to the laboratory.

Once the samples are received in the ***CC GEOTECHNICAL LTD*** laboratory, the samples are stored in a refrigerator and returned to the cool boxes once collected.

Water taken from the installations are taken back to the ***CC GEOTECHNICAL LTD*** laboratory and disposed.

Other data recorded in the sampling comprises:

- Volume of water removed during development of well
- Volume of water removed during purging of the well
- Results of on-site pH analyses
- Sample appearance – colour, suspended solids

MONITORING OF GAS

Prior to embarking on a gas-monitoring round, all equipment is checked for functionality and the calibration status is confirmed.

At the commencement of the monitoring round, the prevailing weather conditions, air temperature, barometric pressure and direction of movement of barometric pressure are recorded.

The flow meter is first attached to the standpipe valve, and the flow rate is measured (peak and steady flow) for 1 minute. The results are recorded in $l.hr^{-1}$.The flow meter tube is protected from the effects of wind by aligning the exhaust downwind.

Following measurement of borehole flow rate, the installation is left for a minimum of 10 minutes for the headspace to restore equilibrium.

Once the gas in the installation has regained equilibrium, the gas analyser is connected and monitoring commences. The peak and steady state readings for CH_4, CO_2, CO, H_2S and CO are recorded. The steady state is monitored for a minimum of one minute, and possibly up to a maximum of 10 minutes where fluctuations continue.

When the monitoring is complete, the depth to the water table, and the depth to the base of the well are monitored using an electronic dipmeter. In circumstances where free phase product is suspected to be present, then an 'Interface Meter' is used to determine the free phase film thickness.

CURRENT CONTAMINATED LAND LEGISLATION / GUIDANCE & ENVIRONMENTAL RISK ASSESSMENT METHODLOGY

LEGISLATION OVERVIEW

This report includes hazard identification and risk assessment in line with the risk-based methods referred to in relevant UK legislation and guidance. Government environmental policy is based upon a "suitable for use approach". When considering the current use of land, Part IIA of the Environment Protection Act 1990 (EPA 1990) provides the regulatory regime, which was introduced by Section 57 of the Environment Act 1995, which came into force in England on 1 April 2000. The main objective of introducing the Part IIA regime is to provide an improved system for the identification and remediation of land where contamination is causing unacceptable risks to human health or the wider environment given the current use and circumstances of the land.

Part IIA provides a statutory definition of contaminated land under Section 78A(2) as:

"any land which appears to the Local Authority in whose area it is situated to be in such a condition, by reason of substances in, on, or under the land, that:

(a) Significant harm is being caused or there is a significant possibility of such harm being caused;
or
(b) Pollution of controlled waters is being, or is likely to be, caused."

Part IIA provides a statutory definition of the pollution of controlled waters under Section 78A(9) as:

*"the entry into controlled waters of **any** poisonous, noxious or polluting matter or **any** solid waste matter"*.

In order to assist in establishing if there is a "significant possibility of significant harm" there must be a "significant pollutant linkage" for potential harm to exist. That means there must be a source(s) of contamination, sensitive receptors present and a connection or pathway between the two. This combination of source-pathway-receptor is termed a "pollutant linkage or SPR linkage."

Part IIA of The Environmental Protection Act 1990 is supported by a substantial quantity of guidance and other Regulations, especially DEFRA Circular 01/2006 Contaminated Land (this replaces DETR Circular 02/2000). Part IIA defines the duties of Local Authorities in dealing with it. With the exception of situations of very high pollution risk, Part IIA places contaminated land responsibility on thee planning and redevelopment process. In situations where there is very high pollution risk direct action from the Local Authority is usually necessary. Planning Policy Statement 23 (PPS23) provides guidance on the planning process and requires that sites which have been developed shall not be capable of being determined "contaminated land" under Part IIA.

The criteria for assessing levels of pollutants and hence determining whether a site represents a hazard are based on a range of techniques, models and guidance. Within this context it is relevant to note that Government objectives are:

(a) to identify and remove unacceptable risks to human health and the environment;
(b) to seek to bring damaged land back into beneficial use;
(c) to seek to ensure that the cost burdens faced by individuals, companies and society as a whole are proportionate, manageable and economically sustainable.

These three objectives underlie the "suitable for use" approach to remediation of contaminated land. The "suitable for use" approach focuses on the risks caused by land contamination. The approach recognises that the risks presented by any given level of contamination will vary greatly according to the use of the land and a wide range of other factors, such as the underlying geology of the site. Risks therefore should be assessed on a site-by-site basis.

The "suitable for use" approach then consists of three elements:

(a) ensuring that land is suitable for its current use - in other words, identifying any land where contamination is causing unacceptable risks to human health and the environment, assessed on the basis of the current use and circumstances of the land, and returning such land to a condition where such risks no longer arise; the contaminated land regime provides the regulatory mechanisms to achieve this;

(b) ensuring that land is made suitable for any new use, as planning permission is given for that new use - in other words, assessing the potential risks from contamination, on the basis of the proposed future use and circumstances, before official permission is given for the development and, where necessary to avoid unacceptable risks to human health and the environment, remediating the land before the new use commences; this is the role of the town and country planning and building control regimes; and

(c) limiting requirements for remediation to the work necessary to prevent unacceptable risks to human health or the environment in relation to the current use or future use of the land for which planning permission is being sought - in other words, recognising that the risks from contaminated land can be satisfactory assessed only in the context of specific uses of the land (whether current or proposed), and that any attempt to guess what might be needed at some time in the future for other uses is likely to result either in premature work (thereby running the risk of distorting social, economic and environmental priorities) or in unnecessary work (thereby wasting resources).

The mere presence of pollutants does not therefore necessarily warrant action, and consideration must be given to the scale of risk involved for the current and proposed end use of the site.

RISK ASSESSMENT METHODOLOGY

Current practice recommends that the determination of potential liabilities that could arise from land contamination be carried out using the process of risk assessment, whereby "risk" is defined as:

"(a) The probability, or frequency, or occurrence of a defined hazard; and
(b) The magnitude (including the seriousness) of the consequences."

The UK's approach to the assessment of environmental risk is set out in by the Department of the Environment (2000) publication "A Guide to Risk Assessment and Risk Management for Environmental Protection." This established an iterative, systematic staged process which comprises:

(a) Hazard identification
(b) Hazard assessment
(c) Risk estimation
(d) Risk evaluation
(e) Risk Assessment

At each stage during the investigation process the above steps are repeated as more detailed information becomes available for the site.

CLR11- 'Model Procedures for the Management of Land Contamination', a document published by the Department for Environment, Food and Rural Affairs (DEFRA) and the Environment Agency (EA) outlines a tiered approach to the assessment of risks posed by contaminated land, as summarised hereunder:

Tier 1: Preliminary Risk Assessment

A Preliminary Risk Assessment is usually undertaken as part of a desk study, outlines potential risks posed by potential contamination to all receptors by defining plausible "pollution linkages" and developing a preliminary conceptual model (PCM). The purpose of this model is to define all possible complete pollution linkages, where the requisite source – pathway – target elements are present, and these elements being defined as:

- a contaminant (source) is a hazardous substance or agent, present at levels that have the potential to cause harm or damage a receptor
- a pathway is the means by or through which a contaminant comes into contact with, or otherwise affects, the receptor
- a receptor (target) is an entity (human being, aquatic environment, flora and fauna etc) that is vulnerable to the adverse effects of the contaminant

This relationship is termed a "pollution linkage". It should be recognised that for a health or environmental risk to exist, all three elements of the relationship or linkage must be present, i.e.

- if there is no contaminant, or contaminant present at levels below those considered to be harmful or damaging to a receptor, then there can be no adverse effect on a receptor
- if there is no receptor present that can be adversely affected by a contaminant, no harm or damage can arise
- even where both a contaminant and a receptor are present, no harm or damage will occur if there is no pathway by or through which a linkage between the two can be established

The absence of one or more of each component (source, pathway, receptor) would prevent a pollutant linkage being established and there would be no significant environmental risk.

The PCM is subject to continual refinement as additional data becomes available. As part of a Phase I Investigation (Desk Study and site walk over) a PCM is formed. Based on the PCM, potential pollutant linkages can be assessed. If the PCM and hazard assessment indicate that a pollution linkage is not of significance then no further assessment or action is required due to this linkage. For each significant and possible linkage a risk assessment is carried out. The linkages which potentially pose significant risks may require a variety of responses ranging from immediate remedial action or risk management or, more commonly, further investigation and risk assessment. This next stage is usually termed a Phase II Main Site Investigation and should provide additional data to allow refinement of the PCM and assess the level of risk from each pollutant linkage. Risk assessment will usually include Tier 2 Generic Quantitative Risk Assessment and / or, if necessary, a Tier 3 Detailed Quantitative Risk Assessment.

Tier 2: Generic Quantitative Risk Assessment (GQRA)

GQRA requires an intrusive investigation in order to characterise the site assisting in the re-assessment of the source-pathway receptor linkage. The conceptual model should be refined accordingly.

Upon completion of an intrusive investigation a it must be decided whether Generic Assessment Criteria (GAC) are suitable for assessing the risk posed by potential contaminantion at the site. If GAC are deemed unacceptable for risk assessment purposes or cannot be developed a Tier 3 Detailed Quantitative Risk Assessment (DQRA) is required.

If GQRA reveals that unnacceptable risks are not present then no further action is required. If GQRA identifies a possibility of risk, a decision must be made whether further work is required or necessary for the purposes of risk assessment. If further risk assessment is is deemed not suitable not required an Options Appraisal should be undertaken. If further risk assessment is required, the scope nature of further risk assessment must be decided – it is possible that a Tier 3 DQRA will be undertaken in this scenario.

Tier 3: Detailed Quantitative Risk Assessment (DQRA)
DQRA is used when pollutant linkages require further assessment. DQRA is often undertaken for pollutant linkages where GAC are unavailable or inappropriate for or more conservative than the actual circumstances of the site. Site specific data is used to create Site Specific Assessment Criteria (SSAC) and enable a more accurate assessment of the risks. Further investigation may or may not be required to formulate SSAC depending on the site specific conditions and information alrerady obtained.

If DQRA reveals that unnacceptable risks are not present then no further action is required. If DQRA identifies a possibility of risk, a decision must be made whether further work is required or necessary for the purposes of risk assessment. If further risk assessment is is deemed not suitable not required an Options Appraisal should be undertaken. If further risk assessment is required, the scope and nature of further risk assessment must be decided at this point.

NOTE: A Tier 1 Preliminary Risk Assessment is undertaken as part of a Desk Study Report and a Preliminary Conceptual Model is devloped for all pollutant linkages. However, the methodologies for assessing the risks to human health, risks to controlled waters and risk posed by ground gas using quantative techniques vary considerably, therefore GQRA and DQRA for human health, controlled waters and ground gas must be undertaken seperately. The risk assessment methodologies where quantative assessment is used for risks to human health, risks to controlled waters and risks posed by ground gas, if relevant, are described hereunder.

BACKGROUND INFROMATION, CURRENT GUIDANCE AND RISK ASSESSMENT METHODOLOGY FOR RISKS POSED TO HUMAN HEALTH

Background
In March 2002, the Department for Environment, Food and Rural Affairs (DEFRA) and the EA published the Contaminated Land Exposure Assessment (CLEA) Model and a series of related reports. These were designed to provide a scientifically based framework for the assessment of chronic risks to human health from contaminated land. These reports (CLR7-10) together with associated "SGV" documents have since been withdrawn (August 2008) and the following documents have been published as revised guidance to the CLEA assessment:

- Environment Agency : 2008: Updated Technical Background to the CLEA model Science Report SC050021/SR3
- Environment Agency : 2008: Human Health Toxicological Assessment of Contaminants in Soil SC050021/SR2

Additional guidance on statistical assessment replacing CLR 7 is provided in:

- CL:AIRE :2008 Guidance on Comparing Data With a Critical Concentration

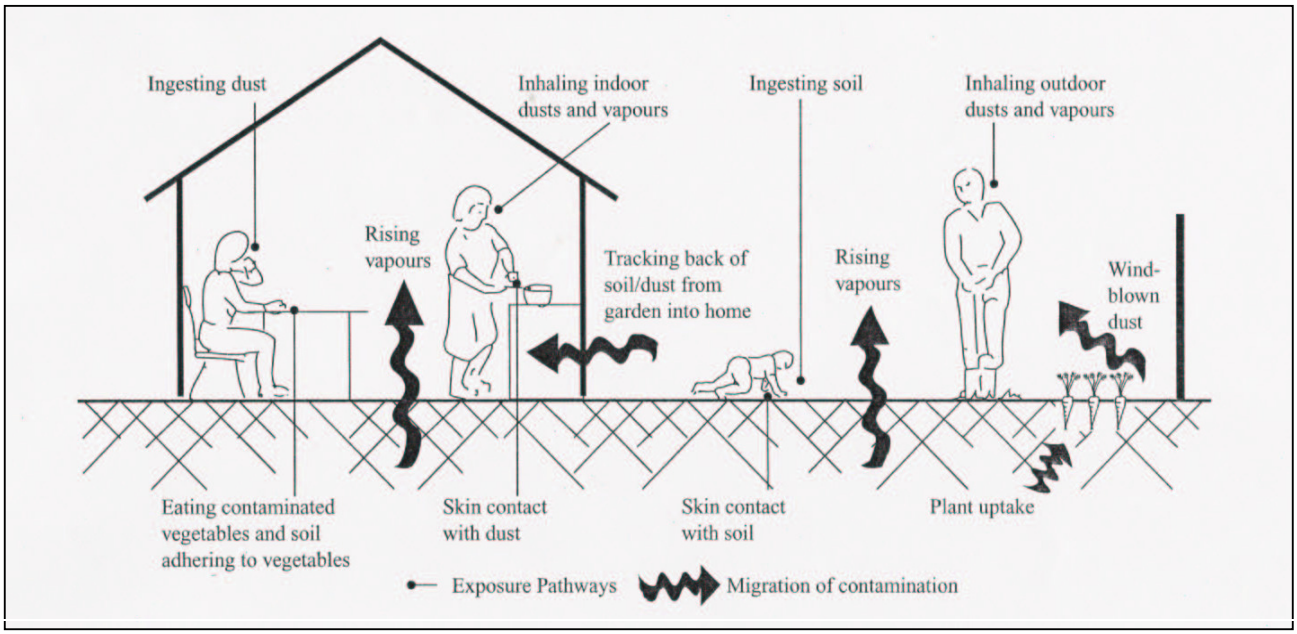
Other guidance/software used in spatial / statistical assessment is provided in:

- USEPA 2006: Data Quality Assessment: Statistical Methods for Practitioners
- Spatial Analysis and Decision Assistance (SADA) – The University of Tennessee

A different approach to the statistical appraisal of data is required depending on whether the assessment of risk is to assess whether land is Contaminated Land in accordance with regulations, or whether the assessment is to determine whether the site is suitable for new development in according with Planning guidance. This is discussed further in CL:AIRE :2008 "Guidance on Comparing Data With a Critical Concentration".

A program for the derivation of GAC`s based on the above guidance is provided by the Environment Agency and is entitled "CLEA Software Version 1.04".

The CLEA model has been developed to calculate an estimated tolerable daily soil intake (TDSI) for site users given a set 'default' exposure pathways. Ten human exposure pathways are covered in the CLEA model as presented below:



Ingestion
- ingestion of outdoor soil
- ingestion of indoor dust
- ingestion of home grown produce
- ingestion of soil attached to home grown produce

Dermal Contact
- dermal contact with outdoor soil
- dermal contact with indoor dust

Inhalation
- inhalation of outdoor dust
- inhalation of indoor dust
- inhalation of outdoor soil vapour
- inhalation of indoor soil vapour

It should be noted that there are other potential exposure pathways on some sites not included in the CLEA model e.g. certain organic compounds can pass through plastic water pipes into drinking water supply.

Where contaminated water is present at a depth less than 2.00mbgl and there is a potential risk of inhalation of vapours (only when volatile compounds are present) the risk from inhalation of vapours from soil water will be assessed using a UK compliant version of BP Risc v4.02.

The presence and/or significance of each of the above exposure pathways are dependent on the type of land use being considered and the nature of the contaminant under scrutiny. Accordingly, the CLEA model considers for principle 'default' land use types and makes a series of 'default' assumptions with regard to human exposure frequency, duration and critical human target groups for each land use considered:

- residential
- allotments
- commercial / industrial land use

The above land use categories defined in the CLEA are detailed below:

Residential: This generic scenario assumes a typical residential property consisting of a two-storey house built on a ground-bearing slab with a private garden consisting of lawn, flowerbeds, and a small fruit and vegetable patch. The occupants are assumed to be parents with young children, who make regular use of the garden area.

Allotments: This generic scenario assumes a plot of open space (about 250 m2), commonly made available by the local authority to tenants to grow fruit and vegetables for their own consumption. There are usually several plots to a site and the overall site area may cover more than a hectare. The tenants are assumed to be parents or grandparents and that young children make occasional accompanied visits to the plot.

Commercial/Industrial: There are many different kinds of workplace and work-related activities. This generic scenario assumes a typical commercial or light industrial property consisting of a threestorey building at which employees spend most time indoors and are involved in officebased or relatively light physical work.

Human Health Risk Assessment Methodolgy
Assessment of risk for the protection of human health is undertaken using the methodology as outlined previously, and summarised hereunder:

- Tier 1 Preliminary Risk Assessmnent
- Tier 2 Generic Quantitative Risk Assessment
- Tier 3 Detailed Quantitative Risk Assessment

The Tier 1 Preliminary Risk Assessment is undertaken as part of the desk study report and includes the development of a Preliminary Conceptuel Model. Tier 2 and Tier 3 Quantitative Risk Assessments are undertaken in order to develop and refine the Preliminary Conceptual Model aiding a more detailed assessment of the risk posed by contaminants revelaed by site investigation and soil / soil water chemical analyses.

The methods used by ***CC GEOTECHNICAL LTD*** to derive assessment criteria, to statistically analyse chemical data and to compare chemical data to the derived assessment criteria are discussed herunder.

Derivation of Generic Assessment Criteria (GAC) and Site Specific Assessment Criteria (SSAC)
GAC`s are derived on the basis of the proposed land use and the associated applicable exposure pathways. It should be noted that there are difficulties in establishing soil concentrations of contaminants beyond which risks from exposure to these contaminants would be 'unacceptable' and the GAC value does not necessarily equate to the level for "significant possibility of significant harm" as defined in Part IIA of The Environmental Protection Act (1990) to determine whether land is "contaminated." This ultimately requires detailed 'toxicological' information of the health effects of individual contaminants and also a scientific judgement on what constitutes an 'unacceptable' risk. The primary purpose of the CLEA derived GAC's are as 'minimal risk thresholds' for the assessment of human health risks in relation to land use.

Minimal risk thresholds calculated using generic input parameters for each of the above land uses are termed Generic Assessment Criteria (GAC) and are used for Generic Quanatative Risk Assessment (GQRA). However, further assessment may

be required taking into consideration site specific factors such as the way the land is used, the soil type, the building characteristics and the exact nature of the receptor, to determine whether there is a significant possibility of risk to human health to site users. Such an assessment is known as a Detailed Quantitative Risk Assessment (DQRA) and the resultant threshold concentrations are known as Site Specific Assessment Criteria (SSAC). Such assessments should be conducted with the agreement of the local authority (or the Environment Agency) since it is the authority that determines whether land is Contaminated Land or whether Planning Permission for a new development may be granted.

For the purposes of this report, assessment criteria have been derived in accordance with current guidance based on the conceptual model for the proposed land use using the CLEA v1.04 software. These criteria are not intended to indicate whether the site may be contaminated land nor do they replace any published soil guideline values. However, the values are intended to provide guidance for the local authority on whether the site may be considered uncontaminated. If, based on the site's proposed future use, the site would be considered by the local authority to be uncontaminated and therefore, on the basis of soil concentrations, fit for purpose, then no further risk assessment based on soil concentrations and the risk to human health would be necessary. However, should these criteria be exceeded or the conceptual site model vary from the model used in the risk assessment to derive these values then the risk assessment should be updated accordingly.

For contamiants routinely analysed where inhalation is a significant pathway (naphthalene, phenanthrene, Aromatic EC5-EC7, Aromatic EC7-EC8, Aromatic EC8-EC10, Aromatci EC10-EC12, Aromatic EC12-EC16, Aliphatic EC5-EC6, Aliphatic EC8_EC10, Aliphatic EC10-EC12, Aliphatic EC12-EC16), plots of the GAC as a function of Soil Organic Matter (SOM) are used to determine if they pose a potential risk to human health, which are presented hereunder. Where there is an exceedance further assessment may be undertaken.

Statistical Assessment of Soil Contamination Data & Comparison of Contamination Data to Threshold Values
In any site investigation only a small fraction of the soil on the site is analysed. Therefore the mean derived from the contamination data for a contaminant may not be the same as the true mean for the contaminant distribution on the site. To improve the reliability of any assessment a statistical analyses is undertaken in line with the CL:AIRE document "Guidance on Comparing Soil Contamination Data with a Critical Concentration".

Statistical assessment of soil data is undertaken using programs based on the guidance in the CL:AIRE document or the USEPA software ProUCL v4.0.

Where the number of results in a dataset is less than four, a statistical assessment is not undertaken, and the assessment is performed by comparison of the maximum value(s) with a Health Criteria Value (HCV), such as Generic Assessement Criteria value(s).

For the Planning situation, the regulator needs to check whether the concentration of contaminants is low compared to the HCV. This decision is based on whether there is at least a 95% confidence level that the true mean of the dataset is lower than the HCV.

For the Part IIA scenario the regulator needs to determine whether the concentration of contaminants is greater than the HCV. This decision is based on whether there is at least a 95% confidence level that the true mean of the dataset is higher than the HCV. However, the regulator may proceed with determination if there is just a 51% probability, "on the balance of probabilities".

The Outlier Test used in the statistical assessment may not be able identify separate populations if numerous populations are present. Inorder to ensure that this is not the case a spatial assessment of the data will be undertaken using SADA.

If the screening levels are exceeded then more sophisticated quantitative risk assessment or remedial action may be undertaken. The benefits of undertaking a quantitative risk assessment must be weighed against the likelihood that it will bring about cost savings in the proposed remediation.

BACKGROUND INFORMATION, CURRENT GUIDANCE AND RISK ASSESSMENT METHODOLOGY FOR RISKS POSED TO CONTROLLED WATER

Definition of Controlled Waters
The term 'controlled waters' is defined in Section 104 of the Water Resources Act 1991 as:

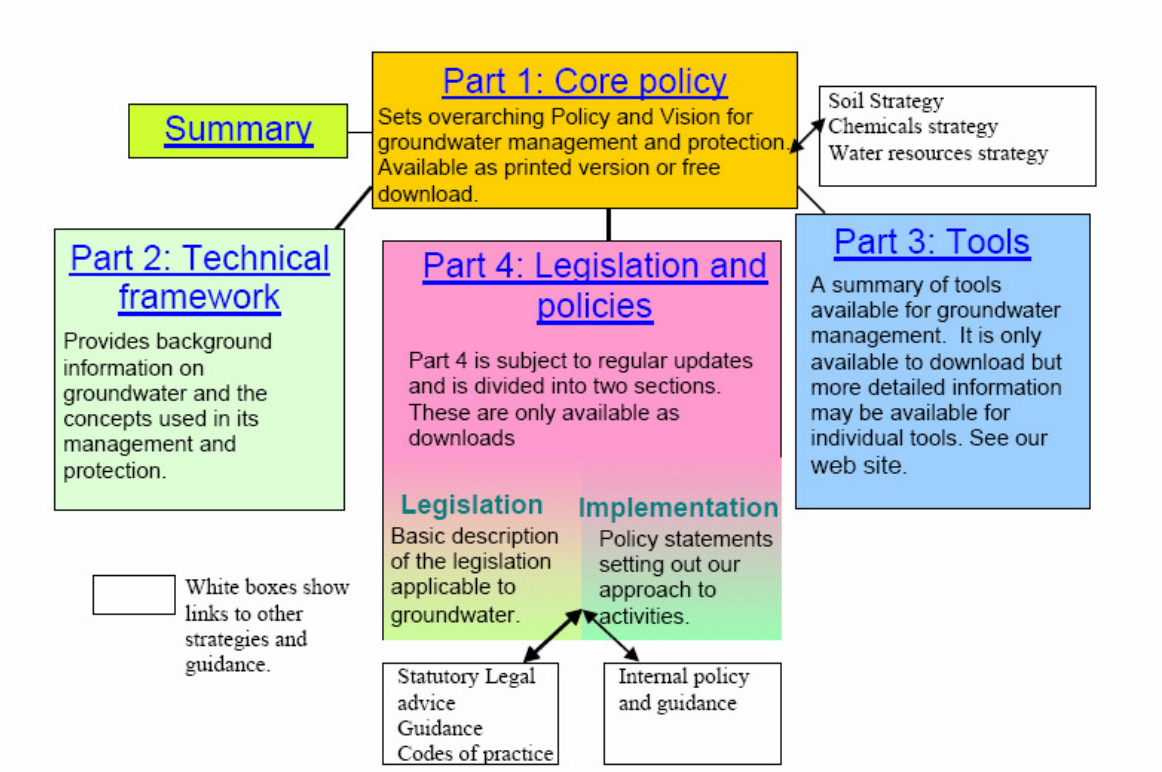
"Territorial Waters…which extend seawards for three miles…, coastal waters…, inland freshwaters, waters in any relevant lake or pond or of so much of any relevant river or watercourse as is above the freshwater limit, and ground waters, that is to say, any waters contained in underground strata."

Note that the definition of groundwater under the Water Resources Act 1991 includes all water within underground strata (including soil / pore water in the unsaturated zone). The definition of groundwater under the Groundwater Directive however is limited to water in the saturated zone. For the purposes of Part IIA of the Environmental Protection Act 1990, the Environment Agency recommends that the groundwater within the saturated zone only is considered as the receptor (rather than soil / pore water).

Environment Agency Guidance
Legislation and guidance surrounding the protection of controlled waters in the UK is abundant and can be complex. The Environment Agency's overall position on groundwater is *"To protect and manage groundwater resources for present and future generation in ways that are appropriate for the risks that we identify"* (Groundwater Protection : Policy and Practice GP3, 2006). In brief, the core objectives of the existing legislation serve to enforce this position.

In 1992, the National Rivers Authority published their Policy and Practice for the Protection of Groundwater (PPPG), this document was influential as it provided a focus for key developments such as Source Protection Zones (SPZs) and Groundwater Vulnerability Maps. The Policy was then revised in 1998, since which there have been substantial changes in legislation, driven by Europe. Key European Directives relating to groundwater include the Groundwater Directive (80/68/EEC) and the Water Framework Directive (2000/60/EC). Aspects of these directives are controlled by primary UK legislation such as the Water Resources Act 1991. Further to legislative changes, gaps identified in the 1998 PPPG required addressing. These changes are reflected in the forthcoming Environment Agency Policy document entitled *Groundwater Protection : Policy and Practice (GP3)*, a draft version of which was available for public consultation (Parts 1 to 3) ending July 2006 with Part 4 issued in March 2008. Part 4 includes a section on key groundwater legislation and the Environment Agency's interpretation of it.

The following gives a breakdown of the structure of the document (taken from the Environment Agency GP3 draft consultation document, 2006)



Controlled Water Risk Assessment Methodology
The risk posed to controlled water is assessed by ***CC GEOTECHNICAL*** in accordance with current guidance as outlined hereunder.

In order for a developer of a potentially contaminated site to fulfil their obligations under the legislation, a site assessment would be required to be undertaken in order to identify any potential risks to controlled waters and to derive suitable clean-up criteria if necessary to ensure the protection of controlled waters. The general approach for Groundwater Protection is detailed further in Part 3 of GP3.

When assessing groundwater impact the Environment Agency advocate the application of their framework methodology "Remedial Targets Methodology – Hydrogeological Risk Assessment for Land Contamination" Environment Agency (2006). The methodology has four levels of assessment as described below:

- **Level 1** considers whether contaminant concentrations in "pore water" in contaminated soil are sufficient to impact on the receptor, ignoring dilution, dispersion and attenuation along the pathway. The "pore water" concentration is determined from:

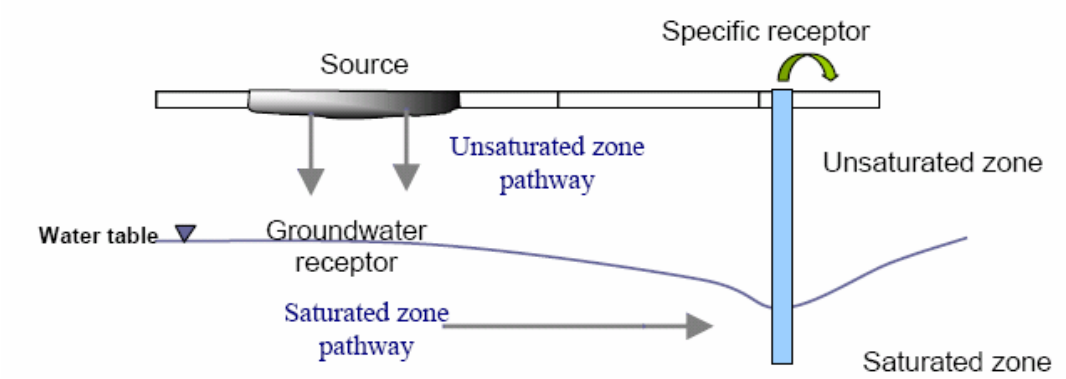
  i) measured "pore water" concentrations or perched water quality
  ii) soil leaching tests
  iii) theoretical calculations based on soil/water partitioning equations

- **Level 2** considers dilution by the receiving groundwater or surface water body and whether this is sufficient to reduce contaminant concentrations to acceptable levels. The remedial target is defined as the target concentration multiplied by a dilution factor (DF).
- **Levels 3 and 4** consider whether natural attenuation (including dispersion, retardation and degradation) of the contaminant as it moves through the unsaturated and saturated zones to the receptor are sufficient to reduce contaminant concentrations to acceptable levels. The remedial target is defined as target concentration multiplied by a dilution factor (DF) and attenuation factor (AF). In **Level 3** simple analytical models are used to calculate the significance

of attenuation. The Environment Agency has released a "Remedial targets worksheet v3.1" to carry out basic calculations using a conservative approach up to **Level 3** using basic principles assuming a simple migration of contaminants from the source zone into the aquifer receptor. **Level 4** assessment uses more sophisticated numerical models, and allows for the introduction of additional geological horizons and is used mainly to determine whether soil contaminants will reach their target within a specified timeframe. Use of such software should only be used once agreement has been obtained from the Environment Agency.

Three main stages apply to any risk assessment of controlled waters, these are:

1. **Risk Screening (Tier 1 Preliminary Risk Assessment):** The understanding of the Conceptual Site Model (CSM) is the key to assessing any site. Using a robust CSM, potential pathways or receptors may be screened out from any further assessment at an early stage. For example if the pathway through the unsaturated zone is blocked by the presence of a significant thickness of low permeability clay. A greater understanding of the CSM is achieved with each tier of risk assessment. An example of a basic CSM is given below (taken from the Environment Agency GP3 draft consultation document, 2006):



2. **Generic Hydrogeological Risk Assessment (EA Remedial Targets Methodology Level 1):** When undertaking the Generic Hydrogeological Risk Assessment (EA Remedial Targets Methodology Tier 1), comparison of chemical analytical results is made with screening criteria. Published values of screening criteria with which chemical test results can be compared are published in the following guidance:

   - Water Supply (Water Quality) Regulations 2000
   - The Private Water Supplies Regulations 1991
   - Environmental Quality Standards for surface waters based on The EC Dangerous Substnaces Directive (76/464/EEC and Daughter Directives)
   - The Surface Waters(Abstraction for Drinking Water Classification) Reguslations 1996
   - World Health Organisation Drinking Water Standards 2004

   Should the Level 1 assessment indicate threshold levels to be exceeded, then there are three alternative ways in which to proceed:

   - To devise suitable remedial solutions
   - To carry out more investigation, sampling and analysis
   - To conduct a site specific Detailed Quantitative Risk Assessment (DQRA) to determine determine if the materials are suitable for thair proposed use, or devise site specific clean-up level

3. **Detailed Quantitative Risk Assessment (EA Remedial Targets Methodology Levels 2 to 4):** The decision to carry out a DQRA will be dependant on the extent and implications of the initial qualitative and generic assessment. The scope of any such assessment will be accurately defined by the outcomes of the previous levels of assessment. The conceptual model will be sufficiently refined by this stage that only certain contaminants of concern, certain pathways and certain receptors will require further assessment, the remainder having been screened out.

   Additional site specific data is normally required for this stage of assessment, as explained above, more processes that are capable of affecting contaminant concentrations are considered (such as dilution and attenuation).

   Remediation criteria, if derived, will therefore be specific to each site and will be based on a detailed assessment of the potential impact at the identified receptor or *compliance point*. A greater level of confidence can be placed on the predicted impact on the compliance point following a DQRA.

BACKGROUND INFORMATION, CURRENT GUIDANCE AND RISK ASSESSMENT METHODOLOGY FOR RISKS POSED BY GROUND GAS

Background

Origin of Ground and Landfill Gases

When carrying out a ground gas risk assessment, the origin or source of the gases is important as potential risks will vary depending on the source. This Appendix relates to the risk of the two main ground gases of concern; methane and carbon dioxide, and does not apply to other ground gases (e.g. radon or vapours from hydrocarbon spills). Methane and carbon dioxide are major constituents of landfill gas but can also occur from a variety of anthropogenic and natural sources, as summarised in Table 5 below:

Gas	Source	Comments
Landfill Gas	Anaerobic decomposition of degradable waste within landfill sites. Typically 60% methane and 40% carbon dioxide during methanogenic phase.	Composition varies over time, particularly in early stages. Contains a range of minor constituents (particularly carbon monoxide and hydrogen sulphide).
Landfill Associated Gases	- Anaerobic degradation of leachate external to the site; - Degassing of dissolved gases in groundwater; - Evolution of gases following interaction between leachate and groundwater	Can result in secondary (external) production of methane or carbon dioxide.
Made Ground	Anaerobic degradation of organic components	Very variable depending on source
Sewer Gas, Cess Pits	Anaerobic degradation of organic components of sewage producing methane and carbon dioxide.	Often characterised by hydrogen sulphide odour.
Mains Gas	Leakage from underground pipework or storage tanks. Mainly methane but often contains higher alkanes.	An odouriser is added to permit detection of leaks. Typically 90% CH_4, but 1 to 27% C_2-C_4 alkanes, May also contain other trace gases e.g. CO, helium and CO_2 (from degradation of CH_4 in the ground).
Other Anthropogenic Sources	- Degradation of leaked or spilled hydrocarbons or other industrial chemicals; - Anaerobic degradation of organic contaminants in groundwaters (e.g. silage liquor); - Reactions between monitoring well construction components and environment; - Burial grounds/cemeteries.	Hydrocarbon spillages often have an 'oily' odour. Fuel spillages common – Petrol or Diesel and can contain a wide range of VOC's. Can degrade to produce methane / carbon dioxide.
Alluvium / Marsh / Peat Gas	Anaerobic microbial degradation of organic material (usually waterlogged vegetation / peat). Often associated with the presence of alluvial deposits or dredgings.	
Geogenic Gas	Natural seepages of carbon dioxide and hydrocarbon gases derived from geologic sources such as coal seams and deep oil / gas source formations. Can be present in solution in groundwaters.	Methane most common but can contain carbon dioxide and higher alkanes.
Mine Gases	Various types. Most common is "fire damp" with high methane, produced by the desorption of gas trapped in coal. "Black damp" (Stythe gas) with high carbon dioxide and denser than air. "White damp" is high in carbon monoxide.	Methane most common. Can contain higher alkanes, carbon dioxide and carbon monoxide. Often low in oxygen.
Natural Shallow Ground Gas	Various types - high carbon dioxide formed by subsurface aerobic activity leading to depleted oxygen and elevated carbon dioxide; - chemical degradation of rocks (e.g. carbonates) producing carbon dioxide; - carbon dioxide production in root zone of soils by plants.	Gases can be emitted from ground under falling barometric pressure conditions.

Table 5. Potential Sources of Ground Gases

This Appendix does not provide guidance for the assessment of risk when other gases are present due to 'Other Sources' from the above table (particularly organic compounds such as BTEX and VOC's or for the risk from radon or hydrogen sulphide).

To determine the origin of the gas a range of factors must be considered together, including;

1. Proximity of likely sources
2. Ground conditions (geology, hydrogeology, anthropogenic pathways etc)
3. Properties of gases present including:
   - Chemical composition
   - Physical properties
   - Ratios of components e.g. methane : carbon dioxide
4. Timeframe of activities such as infilling periods, capping works, installation of gas control systems etc

Identification of the originating source may be problematic given that there may be more than one source present and trace gas analysis may be required. Identification of the sources of the gases encountered during monitoring is usually carried out through a process of eliminating the most unlikely potential sources (given the site setting) and selecting those which are most likely.

Hazards Associated with Presence of Methane

Methane gas is combustible and potentially explosive. When the concentration of methane in air is between the limits of 5.0%v/v and 15.0%v/v an explosive mixture is formed. The Lower Explosive Limit (LEL) of methane is 5.0%v/v, which is equivalent to 100% LEL. The 15.0%v/v limit is known as the Upper Explosive Limit (UEL), but concentrations above this level cannot be assumed to represent safe concentrations. Further, the LEL and UEL will vary (up and down) depending upon the proportion of other gases (including oxygen). However, the fact that methane is a colourless, odourless gas means that there

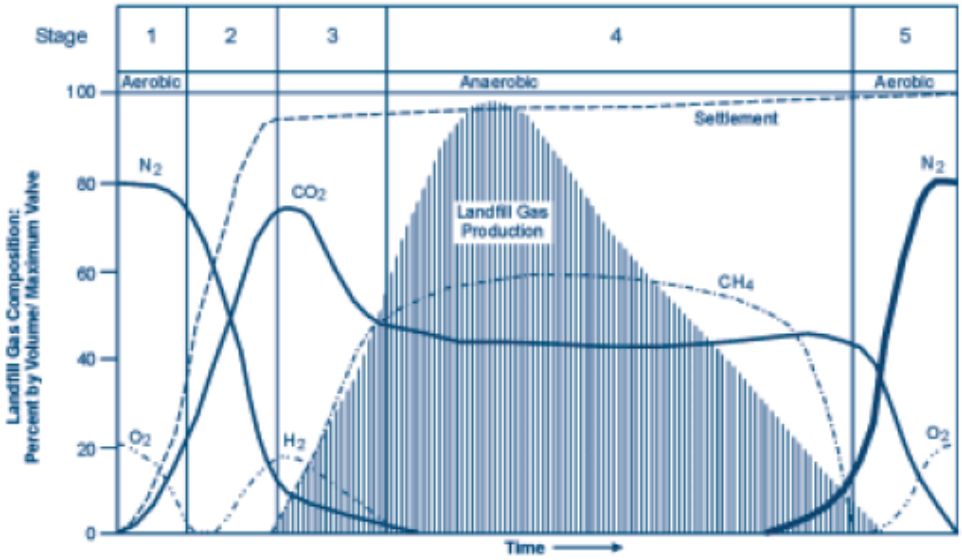
is no simple indicator of the presence of the gas until such a time as explosive limits are reached and an incident occurs. Methane is lighter than air and has a low toxicity. However, at high concentrations it can result in asphyxiation due to oxygen displacement.

Hazards Associated with Presence of Carbon Dioxide

Carbon dioxide is a colourless, odourless gas, which, although non-flammable, is both toxic and an asphyxiant. As carbon dioxide is denser than air, it will collect in low points and depressions. The UK Health & Safety Executive (HSE) has published information relating to concentrations of carbon dioxide that humans may be exposed to, which uses concentrations contained in the Control of Substances Hazardous to Health Regulations 2002 (as amended). These are the Long Term Occupational Exposure Limit (LTOEL, 8 hour period) and the Short Term Occupational Exposure Limit (STOEL, 15 minute period), which are 0.5% and 1.5% carbon dioxide, respectively.

Parameters Influencing the Rate of Ground Gas Production

The figure below is taken from EA guidance document LFTGN 03 illustrates typical ground gas generation curves from biodegradable materials:



The production of methane and carbon dioxide at a landfill site may be expected to be considerable and ongoing. Concentrations of methane will eventually decrease, followed by concentrations of carbon dioxide, but the duration and rate of gas production can vary markedly between sites. Five distinct phases of gas production occur during the process which are, in order of event as marked above, as follows:

1. An aerobic phase involving oxygen depletion and temperature increase through aerobic respiration;
2. The establishment of anaerobic conditions and the evolution of carbon dioxide and hydrogen through acidogenic activity;
3. Commencement of methanogenic activity; the establishment of populations of methanogenic bacteria;
4. A phase of stable methanogenic activity, which may go on for many tens of years;
5. A phase of decreasing methanogenic activity, representing depletion of the organic material and a return to aerobic conditions.

The time scale for the return to the normal ground gas concentrations will be highly variable, depending upon the types and quantities of materials present. In addition, the optimum parameters influencing the rate of decomposition and ground gas production within the ground at a site are as follows:

- High water content with adequate rainfall and water infiltration to provide moisture content between approximately 20 to 26%;
- Conditions that either are or are very close to anaerobic;
- High proportion of biodegradable materials;
- A pH between 6.5 and 8.5, ideally verging slightly on the acidic between pH 6 to 7;
- Temperature between 25°C and 55°C;
- The ratio of the biochemical and chemical oxygen demands (BOD:COD);
- High permeability;
- Small particle size, as finer subsurface materials possess a greater surface area to provide a growing 'face' for the micro-organisms but high fines levels reduces permeability and reduces decomposition rate.

For this reason, it is vital that sources of methane and carbon dioxide are identified prior to the commencement of any work on a construction site, and that the ground gas regime is characterised at the worst temporal conditions a site may experience. From this, a risk assessment is carried out to identify the risk at the site from ground gases so that suitable protection measures can be designed and incorporated into a development to prevent a dangerous build-up of gas occurring.

Factors Influencing the Migration and Behaviour of Ground Gases
There are many factors that influence the migration of ground gases which can effect the risk from a gassing source:

- driving force – pressure differential along a pathway, diffusion and dissolved in solution;
- meteorological conditions – short term and seasonal conditions including atmospheric pressure changes (e.g. rapidly falling pressure causes gas to expand increasing emission rates), rainfall, frozen ground and thawing, temperature;
- geological and groundwater conditions – these can have the over riding influence on the direction/pathways and quantity of migrating gas;
- anthropogenic influences – man-made pathways include mine shafts, service runs/drains, foundation piles, underground voids/pits/basements, foundation/building design/construction

Current Guidance
Previous versions of Building Regulations Approved Document C provided statutory guidance stating that consideration should be given to appropriate action and / or specific solutions in situations where methane concentration exceeded 1%v/v or carbon dioxide concentrations exceeded 5%v/v. The latest Building Regulations Approved Document C (DoE 2004) no longer endorses this approach and recommends the use of a risk based approach to interpreting a gas monitoring survey. This is in line with current EA guidance for landfill gas (LFTGN 03, 2004) which recommends the use of a structured risk based approach similar to that outlined in CLR 11. On this basis, recent guidance has been produced in 2006 and 2007 with the aim of providing up to date advice in relation to residential and commercial development. The guidance does not address issues associated with gas derived from landfills, for this refer to *"Guidance on the Management of Landfill Gas"* (Environment Agency 2004) for an overview.

Recent guidance relevant to gas assessments for residential and commercial development includes;

- **Wilson *et al.* (CIRIA C665, December 2007) *"Assessing Risks Posed by Hazardous Ground Gases for Buildings."***
  This document provides up to date advice on all aspects of ground gas risk assessment such as investigation, monitoring programmes, data collection and interpretation. The guidance presents separate methodologies for the characterisation of:
  - All development types except low rise housing with gardens (Situation A)
  - Low rise housing with gardens (Situation B)

- **Boyle and Witherington (NHBC / RSK Group, Report 10627-R01(04) January 2007) *"Guidance on the Evaluation of Development Proposals on Sites where Methane and Carbon Dioxide are Present."***
  This document presents the "Traffic Lights System" detailed below and is relevant only for low rise properties (e.g. bungalows and town houses) that have a ventilated sub-floor void (i.e. Situation B as described in CIRIA C665).

- **British Standard (BS 8485, December 2007) *"Code of Practice for the Characterization and Remediation from Ground Gas in Affected Developments"***
  This document provides an overview of gas characterisation and assessment. The Standard is intended to be used by designers of gas protection measures and regulators involved in the assessment of design solutions.

Further guidance, **Wilson and Card (CIEH) *"Ground Gas Handbook for Designers and Regulators"*** providing practical guidance on ground gas assesments and the design and evaluation of protection measures, is expected to be published in March 2009.

Each of these documents continues to highlight the importance of, and give further guidance towards, carrying out a tiered risk-based decision-making process in accord with government policy on dealing with contamination from historic or natural sources and highlight the importance of the Conceptual Model in site characterisation.

Ground Gas Risk Assessment Methodology
Assessment of risk posed by ground gas is undertaken using the methodology as outlined previously, and summarised hereunder:

- Tier 1 Preliminary Risk Assessmnent
- Tier 2 Generic Quantitative Risk Assessment
- Tier 3 Detailed Quantitative Risk Assessment

The methodology used in each of the above assessments with concern to ground gas is discussed hereunder.

Tier 1 Preliminary Risk Assessment
All potential sources of methane and carbon dioxide are identified in the Preliminary Conceptual Model and the generation potential determined. The background information discussed earlier is referred to in order to determine the potential for a source to generate ground gas.

CIRIA C665 provides idealised monitoring frequency / period dependant upon generation potential of gas source and sensitivity of the proposed land use as below:

Idealised Frequency and Period of Monitoring (after Table 5.5a and 5.5b, CIRIA C665)

		Generation Potential of Source				
		Very Low	**Low**	**Moderate**	**High**	**Very High**
Sensitivity of Development	**Low** (Commercial)	4/1	6/2	6/3	12/6	12/12
	Moderate (Flats)	6/2	6/3	9/6	12/12	24/24
	High (Residential with Gardens)	6/3	9/6	12/6	24/12	24/24

Notes
1. First number is the number of readings and the second is the minimum period in months (e.g. 6/2 – six sets of readings over two months).
2. At least two sets of readings must be at low (preferably under 1,000 mb) and falling pressure.

The monitoring programme is decided using the above table prior to the intrusive site investigation. However, if the intrusive investigation reveals that a the potential source is better or worse than anticipated the monitoring programme should be modified accordingly. For example, if the made ground contains no evidence of organic material and comprises entirely granular brick fill, the potential for that made ground to generate ground gas is reduced considerably.

Tier 2 Generic Quantitative Risk Assessment
Generic Quantitiative Risk Assessment is undertaken upon completion of the required gas monitoring period.

All three current guidance documents propose that both ground gas concentrations and flow rates are used to calculate the limiting gas well gas volume flow rates for methane and carbon dioxide, based on the ground gas conditions monitored for during the worse-case temporal conditions. This limiting gas well volume flow rate is termed the Gas Screening Value (GSV, note that this was termed borehole gas volume flow), and is calculated as follows:

$$\textbf{GSV}\ (\text{l/hr}) = \frac{[\text{gas well gas concentration (\%v/v)}] \times [\text{gas well flow rate (l/hr)}]}{100}$$

GSV's are compared to typical max concentrations and limiting gas screening values derived for either Situation A - All development except low rise housing with gardens, or Situation B low rise housing with gardens (NHBC Traffic Light System). Table 8.5 from CIRIA C665 is used for comparison of gas screening values for "Situation A Developments" and is presented hereunder:

Characteristic Situation (CIRIA R149)	Comparable Partners in Technology gas Regime (see Box 8.2)	Risk Classification	Gas Screening Value (CH_4 or CO_2) (l/hr)[1]	Additional Factors	Typical Source of Generation
1	A	Very low risk	<0.07	Typically methane ≤ 1% and/or carbon dioxide ≤ 5%. Otherwise consider increase to Situation 2	Natural soils with low organic content "Typical" made ground
2	B	Low risk	<0.7	Borehole air flow rate not to exceed 70l/hr. Otherwise consider increase to characteristic Situation 3	Natural soil, high peat/organic content. "Typical" made ground
3	C	Moderate risk	<3.5		Old landfill, inert waste, mineworking flooded
4	D	Moderate to high risk	<15	Quantitative risk assessment required to evaluate scope of protective measures.	Mineworking susceptible to flooding, completed landfill (WMP 26B criteria)
5	E	High risk	<70		Mineworking unflooded inactive with shallow workings near surface
6	F	Very high risk	>70		Recent landfill site

Table 8.5 from CIRIA C665 Modified Wilson and Card Classification

Table 8.7 is used for comparison of gas screening values for "Situation B Developments" and is presented herunder:

Traffic Light	Methane[1]		Carbon Dioxide[2]	
	Typical max concentration[3] (% by volume)	Gas screening value[2,4] (litres/hour)	Typical max concentration[3] (% by volume)	Gas screening value[2,4] (litres/hour)
Green	1	0.13	5	0.78
Amber 1	5	0.63	10	1.60
Amber 2	20	1.60	30	3.10
Red				

Notes:
1. The worst-case ground gas regime identified on the site, either methane or carbon dioxide, at the worst-case temporal conditions that the site may be expected to encounter will be the decoder as to what Traffic Light is allocated;
2. Borehole Gas Volume Flow Rate, in litres per hour as defined in Wilson and Card (1999), is the borehole flow rate multiplied by the concentration in the air stream of the particular gas being considered;
3. The Typical Maximum Concentration can be exceeded in certain circumstances should the Conceptual Site Model indicate it is safe to do so;
4. The Gas Screening Value thresholds should not generally be exceeded without the completion of a detailed ground gas risk assessment taking into account site-specific conditions.

Table 8.7 from CIRIA C665 - NHBC Traffic light system for 150 mm void

Dependant on the outcome of the assessment of risk posed by ground gas it is determined whether gas protection measures are required for the proposed development, and or whether a detailed quantitative risk assessment is required for the site.

Selection & Design of Protective Measures
Table 8.6 and Box 8.4 of CIRIA C665 contain information on the detailed design of protection measures and were initially intended for the purposes of determining then level of protection measures a development requires. These tables and related text include some useful information on the design of gas protection measures, however BS84845:2007, which supersedes the guidance included within CIRIA C665, is used for selection of gas protection measures.

BS8485: 2007 uses a scoring system dependant on the Characteristic Situation / NHBC Traffic Light and proposed end use of the site. The scoring system is summarised in BS8485:2007 Table 2 as presented hereunder:

Characteristic gas situation, CS	NHBC traffic light	Required gas protection			
		Non-managed property e.g. private housing	Public building (a)	Commercial buildings	Industrial buildings (b)
1	*Green*	0	0	0	0
2	*Amber 1*	3	3	2	1 (c)
3	*Amber 2*	4	3	2	2
4	*Red*	6 (d)	5(d)	4	3
5			6(e)	5	4
6				7	6

NOTE *Traffic light indications are taken from NHBC Report no.:10627-RO1 (04) and are mainly applicable to low-rise residential housing[1]. These are for comparative purposes but the boundaries between the traffic light indications and CS values do not coincide.*

a) Public buildings include, for example, managed apartments, schools and hospitals.
b) Industrial buildings are generally open and well ventilated. However, areas such as office pods might require a separate assessment and may be classified as commercial buildings and require a different scope of gas protection to the main building.
c) Maximum methane concentration 20% otherwise consider and increase to CS3.
d) Residential building on higher traffic light/CS sites is not recommended unless the type of construction or site circumstances allow additional levels of protection to be incorporated, e.g. high-performance ventilation or pathway intervention measures, and an associated sustainable system of management of maintenance of the gas control system, e.g. in institutional and/or fully serviced contractual situations.
e) Consideration of issues such as ease of evacuation and how false alarms will be handled are needed when completing the design specification of any gas protection scheme

[1] The NHBC guidance and CIRIA C665 guidance refers to low rise housing (which is up to three storeys without lifts) that is constructed with a 150mm ventilated sub-floor void.

BS8485:2007 Table 2 Required gas protection by characteristic gas situation and type of building

Once a score is assigned, a combination of protection systems / elements is chosen from BS8485:2007 Table 3 shown below:

PROTECTION ELEMENT/SYSTEM		SCORE	COMMENTS
a) Venting/dilution (See Annex A BS8485)			
Passive sub floor ventilation (venting layer can be a clear void or formed using gravel, geocomposites, polystyrene void formers, etc.)[A]	Very good performance	2.5	*Ventilation performance in accordance with Annex A (BS8485)*
	Good performance	1	*If passive ventilation is poor this is generally unacceptable and some form of active system will be required.*
Subfloor ventilation with active abstraction/pressurization (venting layer can be a clear void or formed using gravel, geocomposites, polystyrene void formers, etc.)[A]		2.5	*There have to be robust management systems in place to ensure the continued maintenance of any ventilation system. Active ventilation can always be designed to meet good performance.*
Ventilated car park (basement or undercroft)		4	*Mechanically assisted systems come in two forms: extraction and positive pressurization.*
b) Barriers			
Floor slabs			
Block and beam floor slab		0	*It is good practice to install ventilation in all foundation systems to effect pressure relief as a minimum. Breaches in floor slabs such as joints have to be effectively sealed against gas ingress in order to maintain these performances.*
Reinforced concrete ground bearing slab		0.5	
Reinforced concrete ground bearing foundation raft with limited service penetrations that are cast into slab		1.5	
Reinforced concrete cast in situ suspended floor slab with minimal service penetrations and water bars around all slab penetrations and at joints		1.5	
Fully tanked basement		2	
c) Membranes			
Taped and sealed membrane to reasonable levels of workmanship/in line with current good practice with validation [B,C]		0.5	*The performance of membranes is heavily dependent on the quality of design of the installation, resistance to damage after installation, and the integrity of joints.*
Proprietary gas resistant membrane to reasonable levels of workmanship /in line with good practice under independent inspection (CQA)[B,C]		1	
Proprietary gas resistant membrane installed to reasonable levels of workmanship/in line with current good practice under CQA with integrity testing and independent validation		2	
d) Monitoring and detection (not applicable to non-managed property, or in isolation)			
Intermittent monitoring using hand held equipment		0.5	*Where fitted, permanent monitoring systems ought to be installed in the underfloor venting/dilution system in the first instance but can also be provided within the occupied space as a fail safe.*
Permanent monitoring and alarm system [A]	Installed in the underfloor venting/dilution system	2	
	Installed in the building	1	
e) Pathway Intervention			
Pathway intervention		-	*This can consist of site protection measures for off-site or on-site sources (see Annex A, BS8485)*
NOTE In practice the choice of materials might well rely on factors such as construction method and the risk of damage after installation. It is important to ensure that the chosen combination gives an appropriate level of protection			
A) It is possible to test ventilation systems by installing monitoring probes for post installation validation.			
B) If a 1 200g DPM material is to function as a gas barrier it should be installed according to BRE 212 /BRE 414 being taped and sealed to all penetrations			
C) Polymeric Materials> 1200 g (proportional to thickness) but their physical properties mean that they are more robust and resistant to damage.			

BS8485:2007 Table 3 Solution Scores

Where the gas situation is 4 or more (and for NHBC Red situations) the site requires a comprehensive risk assessment to confirm the scope of protection measures. These are higher risk sites and reliance on Table 2 and 3 alone is not sufficient.

For a site which is impacted by migratory gases from an off site source, the development may be protected by imposing pathway intervention methods, which if successfully validated, could also remove the need for further analysis. It is essential that the gas regime in these circumstances has been fully characterised and that the only source impacting the site is located off site and that the pathway is clearly defined and its interception equally proven before construction commences. Pathway intervention methods may include vertical membrane installations, venting trenches, rows of stone columns, activated trenches and various proprietary systems. These systems are particularly relevant to domestic housing where there is limited scope for foundation type solutions.

CURRENT GUIDANCE ON REMEDIATION

When risk assessment of the site has been completed and it indicates that remedial works are required, the main guidance in managing this process is set out in the DEFRA/EA publication CLR11 (2004) "Model Procedures for the Management of Land Contamination." The stages of managing remediation are as follows:

(a) Options Appraisal and develop Remediation Strategy;
(b) Develop Implementation Plan and Verification Plan;
(c) Remediation, Verification and Monitoring.

The Remediation Strategy sets out the remediation targets, identifies technically feasible remedial solutions and presents an evaluation of the options so that these can be assessed enabling that the most suitable solution is adopted. An outline of the proposed remedial method should be presented. Agreement should be sought of the appropriate statutory bodies for the Remediation Strategy before proceeding to the next stage.

The Implementation Plan is a detailed method statement setting out how the remediation is to be carried out including stating how the site will be managed, welfare procedures, health and safety considerations together with practical measures such as details of temporary works, programme of works, waste management licences and regulatory consents required. Agreement should again be sought of the appropriate statutory bodies for this Plan.

The Verification Plan sets out the requirements for gathering data to demonstrate that the remediation has met the required remediation objectives and criteria. The Verification Plan presents the requirements for a wide range of issues including the level of supervision, sampling and testing regimes for treated materials, waste and imported materials, required monitoring works during and post remediation, how compliance with all licenses and consents will be checked etc. Agreement should again be sought of the appropriate statutory bodies for the Verification Plan. On completion of the remediation a Verification Report should be produced to provide a complete record of all remediation activities on site and the data collected as required in the Verification Plan. The Verification Report should demonstrate that the remediation has met the remedial targets to show that the site is suitable for the proposed use.

WASTE LEGISLATION OVERVIEW & METHODOLOGY FOR THE ASSESSMENT OF SOIL FOR OFF SITE DISPOSAL AT A LANDFILL SITE

LEGISLATION OVERVIEW

The majority of development projects will produce excess soils and made ground which if not re-usable, are required to be disposed of at suitably licensed landfill sites. The regulations and guidance associated with disposal of waste at landfill sites (published by the Environment Agency) is complex and lengthy. The following documents should be referred to when assessing soil for off site disposal:

- Guidance for Waste destined for disposal in landfills: Interpretation of the Waste Acceptance Requirements of the Landfill (England and Wales) Regulations 2002 (as amended) (EA, 2004)
- Guidance on Sampling and Testing of Wastes to Meet Landfill Waste Acceptance Procedures (EA, April 2005)
- Guidance on Waste Destined for Disposal in Landfill (EA, 2006)
- Treatment of Non-hazardous wastes for landfill (EA, 2007)
- HWR08 v3.1: How to find out if Waste Oils and Wastes that Contain Oil are Hazardous (EA, 2007)
- WM2-Hazardous Waste: Interpretation of the Definition and Classification of Hazardous Wastes Version 2.2 (EA, 2008)
- Site Waste Management Plan (SWMP) Regulations (EA, 2008)

In accordance with the Landfill Directive 199/31/EC amended on 30th October 2007, all waste materials produced at construction sites have to be pre-treated prior to disposal. Waste can be pre-treated by waste minimisation, recovery / re-use and separation of materials into different waste categories. Mixing of different waste types shall be avoided. Intentional mixing of inert materials with hazardous waste to 'dilute' contamination and lower it's classification is illegal.

Furthermore in April 2008, SWMP Regulations 2008 came into force requiring that all construction projects costing over £300k have a Site Waste Management Plan (SWMP). The purpose of the plan is to ensure that:

- Building materials are managed efficiently
- Waste is disposed of legally
- Material recycling, reuse and recovery is maximised.

Pre-construction, the responsibility of producing a SWMP may lie with the Client, however at construction stage, the contractor must appoint a person with overall responsibility for production and implementation of the SWMP.

In preparing the SWMP, it may be assumed on the basis of soil contamination data obtained, that all site soils have the potential for reuse on site. It is important of course, to further assess the specific engineering properties of soils and/or site generated fill (crushed pavements / crushed brick etc), where they are proposed for use in structural applications such as road capping or engineered fill, since they may not be suitable for such applications. Such assessments can only realistically be carried out on bulk stockpiles of materials.

The methodology employed by ***CC GEOTECHNICAL LIMITED*** for the classification of soil for off site disposal adopts the principles set out the above guidance and is discussed hereunder.

METHODOLOGY FOR THE ASSESSMENT OF WASTE DISPOSAL

The desk study element of this report will give an indication as to whether site soils are likely to be impacted by contamination. The intrusive investigation will allow chemical analyses of soils for the purposes of assessing contamination levels in the soil for the purposes of waste classification.

Current waste regulations introduced classification system for waste materials which defines the following three categories of waste:

- Inert
- Non-hazardous
- Hazardous

The process of determining the category of waste soil is a three stage process as follows:

1. Classification of Waste by Definition

Some materials are classified as Inert Waste without any requirement for laboratory chemical analyses, for example concrete or glass. For the purposes of off site waste disposal the majority of soils will require laboratory chemical testing to confirm whether or not they contain dangerous substances. Where it is suspected that soils contain potentially contaminative chemicals, chemical analyses are required to enable Stage 2 Waste Characterisation as discussed below.

Waste materials are categorised with six figure numeric codes in the European Waste Catalogue. Wastes derived from construction and demolition including excavated soil from contaminated sites are summarised in the table hereunder.

Waste Code	What is it?	Likely Waste Category		
		Inert Waste	Non-Hazardous	Hazardous Waste
17 01 01 Concrete	Concrete, possibly with reinforcement (from Construction & Demolition)	✓		
17 01 02 Bricks		✓		
17 01 06* Mixtures of concrete, bricks, tiles & ceramics containing dangerous substances	These are not normally considered hazardous but if they are contaminated (e.g. by asbestos) then could be hazardous – see comment above			✓
17 01 07 Mixtures of concrete, bricks, tiles & ceramics other than those in 17 01 06	This is mixed inerts c.f. 17 09 04	✓		
17 05 03* soils and stones containing dangerous substances				✓
17 05 04 soils and stones other than those mentioned in 17 05 03	Soil and stones only (excluding top soil, peat, soil and stones from contaminated sites)	✓		
17 06 05* Construction materials containing asbestos	e.g. corrugated asbestos sheeting			✓
17 08 02 Gypsum-based construction materials other than those mentioned in 17 08 01	Plaster & plasterboard (although specific disposal requirements are required for high sulphate waste – see EA guidance 'Understanding the Landfill Directive' version 1.0 March 2008.		✓	
17 09 01* Construction & demolition wastes containing mercury				✓
17 09 02* Construction & demolition wastes containing PCBs	Waste with more than 50 mg/kg of PCB's are hazardous			✓
17 09 03* Other mixed construction & demolition wastes containing dangerous substances	Broad range of potentially (see notes below – if asterisk the waste is hazardous) hazardous wastes			✓
17 09 04 Mixed construction & demolition wastes other than those mentioned in 17 09 01, 17 09 02 & 17 09 03	Mixed inerts with soil, tarmac, cables, vegetation, plaster, etc. (this waste can only be considered inert if it passes the waste acceptance criteria identified in the regulations).	✓	✓	

Note: all wastes with an asterisk code are hazardous regardless of whether they are mirror or absolute entries in the EWC list. The decision with regard to composition must come before applying the code for mirror entries.

2. Waste Characterisation

Waste characterisation is the process that determines whether waste is "Hazardous" or "Non-hazardous". Excavated soil is characterised based on the contaminants present, their hazardous properties and appropriate thresholds using a complicated protocol outlined in "Technical Guidance WM2 Hazardous Waste – Interpretation of the Definition and Classification of Hazardous Waste" v2.2 by the Environment Agency (2008).

"Technical Guidance WM2 Hazardous Waste – Interpretation of the Definition and Classification of Hazardous Waste" v2.2 by the Environment Agency (2008) provides information on how to assess waste soils and how to derive the thresholds of different contaminants using their hazardous properties. The hazardous properties are defined as: explosive, oxidising, highly flammable/flammable, irritant, harmful, toxic, carcinogenic, corrosive, infectious, toxic for reproduction, mutagenic and ecotoxic. Two other scenarios are also classed as hazards: substance that can release toxic gases in contact with water, acid or air and substances which after disposal can yield another substance that possesses any of the aforementioned hazardous properties. In some cases, hazardous properties are sub-divided, for example there are three categories of carcinogenic substances. Should a waste contain a contaminants with one or more of the listed hazardous properties at a concentration equal to or above the threshold value for the particular property, then waste is characterised as "Hazardous".

The Approved Supply List (ASL), which is published as part of the Chemical (Hazard Information and Packaging for Supply) Regulations, provide the source for the hazardous properties of a wide range of the contaminants that may be present in site soils.

Site soils at any brownfield site will potentially contain contaminants that will cause waste soils to be characterised as "Hazardous". The contaminants that are likely cause waste soils to be "Hazardous" are can be divided into four groups as follows:

- Metals – for example at former metal processing sites / mining sites
- Hydrocarbons – generally Polycyclic Aromatic Hydrocarbons (PAH's) and Total Petroleum Hydrocarbons (TPH), Petrol Range Organics (PRO) and Diesel Range Organics (DRO)
- Asbestos
- Anions – for example sulphate in plaster board

For metals the Approved Supply List (ASL) only details hazardous properties for metallic compounds rather than hazard properties of individual metals. Therefore the measured concentrations of metal contaminants must be converted before assessing the results against the compound most likely to be present on site. For example, if high lead and sulphate concentrations are measured in site soils, it is likely that lead is present as lead sulphate. The most likely compounds could be determined by reviewing desk study data / site history. However, ***CC GEOTECHNICAL LIMITED*** adopts a more conservative approach, and uses the worst case scenario that the most hazardous compound for the purposes of assessment. The compounds and thresholds used are shown in the table at the end of this appendix.

Where assessment characterises waste as "Non-hazardous" further analysis is required to determine whether waste soil will classify as "Inert".

Where assessment characterises waste as "Hazardous" further analysis is required as detailed hereunder.

3. Assessment against Waste Acceptance Criteria

Waste can be disposed of at three different categories of landfill: **Inert**, **Non-hazardous** and **Hazardous**. The type of landfill at which waste can be disposed at is dependant the level of contamination present in site soils. At this point is usually necessary to undertake further testing to allow comparison against Waste Acceptance Criteria.

If waste was characterised as "Non-hazardous" in the previous stage soil results should be compared against inert Waste Acceptance Criteria (WAC). If levels of contamination fall below inert WAC limit values the soils can be disposed of at an inert landfill site. If values are above inert WAC the waste classifies as "Non-hazardous" by default.

If waste was characterised as "Hazardous" in the previous stage soil results should be compared against Hazardous Waste Acceptance Criteria (WAC). If any of the results exceed their limit value, it is recommended that waste is pre-treated prior to disposal at a landfill licensed to take hazardous waste.
NOTE: The characterisation or classification of soil as waste does not equate to the site specific risk assessment to human health or controlled waters. For example, if site soils classify as "Hazardous" for the purposes of waste disposal, it does not mean that the material is not "suitable for use" on site for the proposed end use of the site.

DERIVATION OF THRESHOLD LEVELS FOR TIER 2 WASTE CHARACTERISATION

Determinand	Potentially worst compound	Risk Phrases	Hazard Phrases	Threshold (%)	Threshold (mg/kg)	Minimum Threshold (mg/kg)
Arsenic	Arsenic Oxide	Carc Cat 1: R45	H7	0.1	824	484
		R23/R25	H6 (H5)	3	24719	
		R50,53	H14	25	205996	
	Arsenic Pentoxide	Carc Cat 1: R45	H7	0.1	484	
		R23/R25	H6 (H5)	3	14506	
		R50-53	H14	25	120884	
Cadmium	Cadmium Chloride	Carc Cat2: R45	H7	0.1	760	539
		Muta Cat 2: R46	H11	0.1	760	
		Repr Cat 2: R60,61	H10	0.5	3801	
		T+:R26	H6 (H5)	0.1	760	
		T:R25, 48/23/25	H6 (H5)	3	22807	
		N:R50,53	H14	25	190058	
	Cadmium Oxide	Carc Cat 2:R49	H7	0.1	875	
		T: R48/23/25	H6 (H5)	3	26262	
		Xn: R22	H5	25	218850	
	Cadmium Sulphate	Carc Cat 2:R49	H7	0.1	539	
		T: R48/23/25	H6 (H5)	3	16181	
		Xn:R22	H5	25	134843	
		N:R50,53	H14	25	134843	
	Cadmium Hydroxide	N: R50-53	H14	0.25	2172	
		R20/21/22	H5	25	217159	
Chromium	Chromium Trioxide	Carc Cat 1: R49	H7	0.1	1520	1520
		R48/23/25	H6 (H5)	3	45602	
		R22	H5	1	15201	
		R50/53	H14	25	380013	
Lead	Lead Sulphate	R61	H10	0.5	3334	1667
		R63	N/A	5	33344	
		R20/22	H5	25	166722	
		R50-53	H14	0.25	1667	
Mercury	Inorganic Mercury	T:R23	H6 (H5)	3	30000	1000
		T+:R26/27/28	H6 (H5)	0.1	1000	
		N: R50,53	H14	25	250000	
Nickel	Nickel Carbonate	Carc Cat3: R40	H7	1	1556	1556
		R22	H5	25	38888	
		R50-53	H14	25	38888	
Copper	Copper Chloride	R22	H5	25	36348	25304
	Copper Oxide	R22	H5	25	100808	
	Copper Sulphate	R22	H5	25	25304	
Selenium	Selenium	T: R23/25	H6 (H5)	3	30000	30000
		R53	H14	25	250000	
Water Soluble Boron	Boron Tribromide	T+: R26/28	H6 (H5)	0.1	43	43
		C: R34	H8(H4)	5	2158	
	Boron Trichloride	T+: R26/28	H6 (H5)	0.1	92	
		C: R34	H8(H4)	5	4608	
Naphthalene		Cart Cat2:R45	H7	0.1	1000	1000
Acenaphthylene		Cart Cat2:R45	H7	0.1	1000	1000
Acenaphthene		Cart Cat2:R45	H7	0.1	1000	1000
Fluorene		Cart Cat2:R45	H7	0.1	1000	1000
Phenanthrene		Cart Cat2:R45	H7	0.1	1000	1000
Anthracene		Cart Cat2:R45	H7	0.1	1000	1000
Fluoranthene		Cart Cat2:R45	H7	0.1	1000	1000
Pyrene		Cart Cat2:R45	H7	0.1	1000	1000
Benz(a)anthracene		Cart Cat2:R45	H7	0.1	1000	1000
Chrysene		Cart Cat2:R45	H7	0.1	1000	1000
Benzo(b)fluoranthene		Cart Cat2:R45	H7	0.1	1000	1000
Benzo(k)fluoranthene		Cart Cat2:R45	H7	0.1	1000	1000
Benzo(a)pyrene		Cart Cat2:R45	H7	0.1	1000	1000
Indeno(123-cd)pyrene		Cart Cat2:R45	H7	0.1	1000	1000
Dibenz(ah)anthracene		Cart Cat2:R45	H7	0.1	1000	1000
Benzo(ghi)perylene		Cart Cat2:R45	H7	0.1	1000	1000
Aromatic EC5-EC7		Cart Cat2:R45	H7	0.1	1000	1000
Aromatic EC7-EC8		Cart Cat2:R45	H7	0.1	1000	1000
Aromatic EC8-EC10		Cart Cat2:R45	H7	0.1	1000	1000
Aromatic EC10-EC12		Cart Cat2:R45	H7	0.1	1000	1000
Aromatic EC12-EC16		Cart Cat2:R45	H7	0.1	1000	1000
Aromatic EC16-EC21		Cart Cat2:R45	H7	0.1	1000	1000
Aromatic EC21-EC35		Cart Cat2:R46	H8	1.1	1000	1000
Aliphatic EC5-EC6		Cart Cat2:R45	H7	0.1	1000	1000
Aliphatic EC6-EC8		Cart Cat2:R45	H7	0.1	1000	1000
Aliphatic EC8-EC10		Cart Cat2:R45	H7	0.1	1000	1000
Aliphatic EC10-EC12		Cart Cat2:R45	H7	0.1	1000	1000
Aliphatic EC12-EC16		Cart Cat2:R45	H7	0.1	1000	1000
Aliphatic EC16-EC35		Cart Cat2:R45	H7	0.1	1000	1000
TPH (C6 - C40)		Cart Cat2:R45	H7	0.1	1000	1000
PRO (C6-C10)		Cart Cat2:R45	H7	0.1	1000	1000
DRO (C10-C35)		Cart Cat2:R45	H7	0.1	1000	1000
PRO's (Sum of C5-C10)		Cart Cat2:R45	H7	0.1	1000	1000
DRO's (Sum of C10-C25)		Cart Cat3:R40	H6	1	10000	10000
Others (C25-C40)		Cart Cat2:R45	H7	0.1	1000	1000

APPENDIX H

CABLE PERCUSSION BOREHOLE LOGS

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BOREHOLE LOG

HOLE NO. BH1
Sheet 1 of 2

CLIENT	SITE
AXION/S.NORTON	S.NORTON, TENAX ROAD, TRAFFORD PARK

DATE OF FIELDWORK	SCALE	LEVEL/POSITION	OPERATOR	LOGGED BY	JOB NO.
12/05/09-13/05/09	1:50	SEE LOCATION PLAN	LW	PMC	09/5512

SAMPLE RECORD DEPTH	TYPE	SPT N (Cu·kN/m^2)	Standp/ Piezo	DESCRIPTION OF STRATUM (thickness)	DEPTH	REDUCED LEVEL	LEGEND
0.30	SD			MADE GROUND comprising of broken brick and angular gravel in a dark brown silty sand matrix (0.50)			
0.30	PID	0.0PPM					
0.50	SD				0.50		
0.50	PID	0.0PPM		Loose MADE GROUND comprising of a gravel of coal ash in a black silty sand matrix (1.00)			
0.70	SD						
0.70	PID	0.0PPM					
1.20 - 1.65	SPT	9			1.50		
1.65	BULK			Loose brown fine and medium silty gravelly SAND (2.70)			
2.00 - 2.45	SPT	6					
2.50	BULK						
3.00 - 3.45	SPT	8					
3.50	BULK						
4.00 - 4.45	SPT	9					
4.50	BULK			Firm tending to stiff brown silty sandy gravelly CLAY (5.90)	4.20		
5.00 - 5.45	SPT	12					
6.00	BULK						
6.50 - 6.95	U100	(60*)					
7.50	BULK						
8.00 - 8.45	U100	(115)					
9.00	BULK						
9.50 - 9.65	SPT	17					

GROUNDWATER AND CASING INFORMATION

DEPTH STRUCK	DEPTH CASED	ELAPSED TIME	WATER LEVEL	DEPTH SEALED	REMARKS ON GROUNDWATER AND CASING
2.70	2.70				SEEPAGE
	7.50		DRY		BH DRY AT E.O.S. 12/05/09
	7.50		DRY		BH DRY AT S.O.S. 13/05/09
10.10	10.10	20MINS	9.80		SLIGHT SEEPAGE

BORING METHOD AND REMARKS

DANDO 150
HAND DUG SERVICE PIT TO 1.2MBGL
* DENOTES RESULT OBTAINED VIA LABORATORY HAND SHEAR VANE METHOD

All dimensions are in metres unless otherwise stated

CC Geotechnical
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BOREHOLE LOG

HOLE NO. BH1
Sheet 2 of 2

CLIENT	SITE
AXION/S.NORTON	S.NORTON, TENAX ROAD, TRAFFORD PARK

DATE OF FIELDWORK	SCALE	LEVEL/POSITION	OPERATOR	LOGGED BY	JOB NO.
12/05/09-13/05/09	1:50	SEE LOCATION PLAN	LW	PMC	09/5512

SAMPLE RECORD DEPTH	TYPE	SPT N (Cu-kN/m^2)	Standp/ Piezo	DESCRIPTION OF STRATUM (thickness)	DEPTH	REDUCED LEVEL	LEGEND
				CONTINUED BORING IN SAME STRATUM	10.10		4 ▽
				Stiff brown silty sandy gravelly CLAY with frequent sand lenses			
10.50	BULK						
11.00-11.45	SPT	22					
				BOREHOLE TERMINATED	12.00		

GROUNDWATER AND CASING INFORMATION

DEPTH STRUCK	DEPTH CASED	ELAPSED TIME	WATER LEVEL	DEPTH SEALED	REMARKS ON GROUNDWATER AND CASING
2.70	2.70				SEEPAGE
	7.50		DRY		BH DRY AT E.O.S. 12/05/09
	7.50		DRY		BH DRY AT S.O.S. 13/05/09
10.10	10.10	20MINS	9.80		SLIGHT SEEPAGE

BORING METHOD AND REMARKS

DANDO 150
HAND DUG SERVICE PIT TO 1.2MBGL
* DENOTES RESULT OBTAINED VIA LABORATORY HAND SHEAR VANE METHOD

All dimensions are in metres unless otherwise stated

CC Geotechnical	Tel: 0151-523-0202 Fax: 0151-523-0252	BOREHOLE LOG	HOLE NO. BH2 Sheet 1 of 2

CLIENT	SITE
AXION/S.NORTON	S.NORTON, TENAX ROAD, TRAFFORD PARK

DATE OF FIELDWORK	SCALE	LEVEL/POSITION	OPERATOR	LOGGED BY	JOB NO.
13/05/09-15/05/09	1:50	SEE LOCATION PLAN	LW	PMC	09/5512

SAMPLE RECORD DEPTH	TYPE	SPT N (Cu-kN/m^2)	Standp/ Piezo	DESCRIPTION OF STRATUM (thickness)	DEPTH	REDUCED LEVEL	LEGEND
0.20	SD			MADE GROUND comprising of angular gravel and fine to coarse sand (SUBBASE) (0.30)			
0.20	PID	0.0PPM			0.30		
0.40	SD			Loose (drillers description) MADE GROUND comprising of a gravel of coal ash in a black silty sand matrix (0.70)			
0.40	PID	0.0PPM					
0.50	BULK						
0.70	SD						
0.70	PID	0.0PPM			1.00		
1.20 - 1.65	SPT	5		Loose brown fine and medium silty gravelly SAND (1.00)			
1.50	BULK						
2.00 - 2.45	SPT	9			2.00		
2.50	BULK			Loose becoming medium dense brown fine to coarse very gravelly SAND (2.20)			
3.00 - 3.45	SPT	13					
3.50	BULK						
4.00 - 4.45	SPT	14					
4.50	BULK				4.20		
5.20 - 5.65	U100	(41)		Firm tending to stiff brown silty sandy gravelly CLAY (6.10)			
6.00	BULK						
6.50 - 6.95	SPT	14					
7.50	BULK						
8.00 - 8.45	U100	(98)					
9.00	BULK						
9.50 - 9.95	SPT	16					

GROUNDWATER AND CASING INFORMATION

DEPTH STRUCK	DEPTH CASED	ELAPSED TIME	WATER LEVEL	DEPTH SEALED	REMARKS ON GROUNDWATER AND CASING
2.60	2.60				SEEPAGE
	5.00		DRY		BH DRY AT E.O.S. 13/05/09
	5.00		DRY		BH DRY AT S.O.S. 15/05/09
10.50	10.50				SLIGHT SEEPAGE

BORING METHOD AND REMARKS

DANDO 150
POSITION ENABLED BY REMOVAL OF APPROX 200MM THICK CONCRETE SLAB
HAND DUG SERVICE PIT TO 1.2MBGL

All dimensions are in metres unless otherwise stated

CC Geotechnical	Tel: 0151-523-0202 Fax: 0151-523-0252	BOREHOLE LOG	HOLE NO. BH2 Sheet 2 of 2

CLIENT	SITE
AXION/S.NORTON	S.NORTON, TENAX ROAD, TRAFFORD PARK

DATE OF FIELDWORK	SCALE	LEVEL/POSITION	OPERATOR	LOGGED BY	JOB NO.
13/05/09-15/05/09	1:50	SEE LOCATION PLAN	LW	PMC	09/5512

SAMPLE RECORD DEPTH	SAMPLE RECORD TYPE	SPT N (Cu-kN/m^2)	Standp/ Piezo	DESCRIPTION OF STRATUM (thickness)	DEPTH	REDUCED LEVEL	LEGEND
				CONTINUED BORING IN SAME STRATUM			
10.50	BULK			Stiff brown silty sandy gravelly CLAY with frequent sand lenses	10.30		
11.00-11.45	SPT	17					
				BOREHOLE TERMINATED	12.00		

GROUNDWATER AND CASING INFORMATION

DEPTH STRUCK	DEPTH CASED	ELAPSED TIME	WATER LEVEL	DEPTH SEALED	REMARKS ON GROUNDWATER AND CASING
2.60	2.60				SEEPAGE
	5.00		DRY		BH DRY AT E.O.S. 13/05/09
	5.00		DRY		BH DRY AT S.O.S. 15/05/09
10.50	10.50				SLIGHT SEEPAGE

BORING METHOD AND REMARKS

DANDO 150
POSITION ENABLED BY REMOVAL OF APPROX 200MM THICK CONCRETE SLAB
HAND DUG SERVICE PIT TO 1.2MBGL

All dimensions are in metres unless otherwise stated

CC Geotechnical	Tel: 0151-523-0202 Fax: 0151-523-0252	BOREHOLE LOG	HOLE NO. BH3 Sheet 1 of 2

CLIENT	SITE
AXION/S.NORTON	S.NORTON, TENAX ROAD, TRAFFORD PARK

DATE OF FIELDWORK	SCALE	LEVEL/POSITION	OPERATOR	LOGGED BY	JOB NO.
18/05/09-19/05/09	1:50	SEE LOCATION PLAN	LW	PMC	09/5512

SAMPLE RECORD DEPTH	TYPE	SPT N (Cu-kN/m^2)	Standp/ Piezo	DESCRIPTION OF STRATUM (thickness)	DEPTH	REDUCED LEVEL	LEGEND
				CONCRETE SLAB (0.25)	0.25		
0.30	SD			Medium dense MADE GROUND comprising of broken brick and gravels of coal ash in a brown sand matrix with boulders of broken concrete (1.35)			
0.30	PID	0.0PPM					
0.50	BULK						
0.60	SD						
0.60	PID	0.0PPM					
0.90	SD						
0.90	PID	0.0PPM					
1.20 - 1.65	SPT	23					
1.60	BULK				1.60		
2.00 - 2.45	SPT	13		Medium dense brown fine to coarse silty gravelly SAND becoming increasingly gravelly with depth (2.60)			
2.50	BULK						
3.00 - 3.45	SPT	16					
3.50	BULK						
4.00 - 4.45	SPT	14					
4.20				Firm tending to stiff brown silty sandy gravelly CLAY (5.80)			
4.50	BULK						
5.00 - 5.45	U100	(42)					
6.00	BULK						
6.50 - 6.95	SPT	14					
7.50	BULK						
8.00 - 8.45	U100	(139)					
9.00	BULK						
9.50 - 9.95	SPT	18					
					10.00		

GROUNDWATER AND CASING INFORMATION

DEPTH STRUCK	DEPTH CASED	ELAPSED TIME	WATER LEVEL	DEPTH SEALED	REMARKS ON GROUNDWATER AND CASING
2.50	2.50				SEEPAGE
	10.00		DRY		BH DRY AT E.O.S. 18/05/09
	10.00		DRY		BH DRY AT S.O.S. 19/05/09

BORING METHOD AND REMARKS

DANDO 150
HAND DUG SERVICE PIT TO 1.2MBGL
*DENOTES RESULT OBTAINED VIA THE LABORATORY
HAND SHEAR VANE METHOD

All dimensions are in metres unless otherwise stated

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BOREHOLE LOG

HOLE NO. BH3
Sheet 2 of 2

CLIENT	SITE
AXION/S.NORTON	S.NORTON, TENAX ROAD, TRAFFORD PARK

DATE OF FIELDWORK	SCALE	LEVEL/POSITION	OPERATOR	LOGGED BY	JOB NO.
18/05/09-19/05/09	1:50	SEE LOCATION PLAN	LW	PMC	09/5512

SAMPLE RECORD DEPTH	TYPE	SPT N (Cu-kN/m^2)	Standp/ Piezo	DESCRIPTION OF STRATUM (thickness)	DEPTH	REDUCED LEVEL	LEGEND
10.50	BULK			Stiff (drillers description) silty sandy gravelly CLAY with frequent sand lenses			
11.00-11.45	U100	(120)					
				BOREHOLE TERMINATED	12.00		

GROUNDWATER AND CASING INFORMATION

DEPTH STRUCK	DEPTH CASED	ELAPSED TIME	WATER LEVEL	DEPTH SEALED	REMARKS ON GROUNDWATER AND CASING
2.50	2.50				SEEPAGE
	10.00		DRY		BH DRY AT E.O.S. 18/05/09
	10.00		DRY		BH DRY AT S.O.S. 19/05/09

BORING METHOD AND REMARKS

DANDO 150
HAND DUG SERVICE PIT TO 1.2MBGL
*DENOTES RESULT OBTAINED VIA THE LABORATORY
HAND SHEAR VANE METHOD

All dimensions are in metres unless otherwise stated

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BOREHOLE LOG

HOLE NO. BH4
Sheet 1 of 2

CLIENT	SITE
AXION/S.NORTON	S.NORTON, TENAX ROAD, TRAFFORD PARK

DATE OF FIELDWORK	SCALE	LEVEL/POSITION	OPERATOR	LOGGED BY	JOB NO.
19/05/09-20/05/09	1:50	SEE LOCATION PLAN	LW	PMC	09/5512

SAMPLE RECORD DEPTH	TYPE	SPT N (Cu-kN/m^2)	Standp/ Piezo	DESCRIPTION OF STRATUM (thickness)	DEPTH	REDUCED LEVEL	LEGEND
				BITUMEN MACADAM (0.15)			
0.25	SD				0.15		
0.25	PID	0.0PPM		Loose (drillers description) MADE GROUND comprising of broken and fragmented brick with gravel of coal ash within a brown/black silty clayey sand matrix (1.15)			
0.50	SD						
0.50	PID	0.0PPM					
0.50	BULK						
0.75	SD						
0.75	PID	0.0PPM					
1.20 - 1.65	SPT	9			1.30		
				Medium dense brown fine and medium silty gravelly SAND (1.90)			
1.65	BULK						
2.00 - 2.45	SPT	14					
3.50	BULK			Medium dense brown fine to coarse very gravelly SAND (1.10)	3.20		
4.00 - 4.45	SPT	15					
4.50	BULK			Firm becoming firm to stiff brown silty sandy gravelly CLAY (6.20)	4.30		
5.00 - 5.45	SPT	12					
6.00	BULK						
6.50 - 6.95	U100	(69)					
7.50	BULK						
8.00 - 8.45	SPT	16					
9.00	BULK						
9.50 - 9.95	U100	(63)					

GROUNDWATER AND CASING INFORMATION

DEPTH STRUCK	DEPTH CASED	ELAPSED TIME	WATER LEVEL	DEPTH SEALED	REMARKS ON GROUNDWATER AND CASING
2.70	2.70				SEEPAGE
	10.00		DRY		BH DRY AT E.O.S. 19/05/09
	10.00		DRY		BH DRY AT S.O.S. 20/05/09

BORING METHOD AND REMARKS

DANDO 150
HAND DUG SERVICE PIT TO 1.2MBGL

All dimensions are in metres unless otherwise stated

CC Geotechnical	Tel: 0151-523-0202 Fax: 0151-523-0252	BOREHOLE LOG	HOLE NO. BH4 Sheet 2 of 2

CLIENT	SITE
AXION/S.NORTON	S.NORTON, TENAX ROAD, TRAFFORD PARK

DATE OF FIELDWORK	SCALE	LEVEL/POSITION	OPERATOR	LOGGED BY	JOB NO.
19/05/09-20/05/09	1:50	SEE LOCATION PLAN	LW	PMC	09/5512

SAMPLE RECORD DEPTH	TYPE	SPT N (Cu-kN/m^2)	Standp/ Piezo	DESCRIPTION OF STRATUM (thickness)	DEPTH	REDUCED LEVEL	LEGEND
				CONTINUED BORING IN SAME STRATUM			
10.50	BULK			Stiff brown silty sandy gravelly CLAY with frequent sand lenses	10.50		
11.00-11.45	SPT	18					
				BOREHOLE TERMINATED	12.00		

GROUNDWATER AND CASING INFORMATION

DEPTH STRUCK	DEPTH CASED	ELAPSED TIME	WATER LEVEL	DEPTH SEALED	REMARKS ON GROUNDWATER AND CASING
2.70	2.70				SEEPAGE
	10.00		DRY		BH DRY AT E.O.S. 19/05/09
	10.00		DRY		BH DRY AT S.O.S. 20/05/09

BORING METHOD AND REMARKS

DANDO 150

HAND DUG SERVICE PIT TO 1.2MBGL

All dimensions are in metres unless otherwise stated

APPENDIX I

GAS AND GROUNDWATER MONITORING DATA AND INSTRUMENT CALIBRATION CERTIFICATES

MONITORING RESULTS

Job Number:	09/5512		Site Name:	S.NORTON & CO LTD, TENAX ROAD

BH	VISIT NUMBER	1	2	3	4	5		
	DATE	27/05/09	02/06/09	12/06/09	19/06/09	03/07/09		
	ATMOSPHERIC PRESSURE (mB) / TREND	1016 / FALLING	1027 / RISING	1016 / FALLING	1017 / RISING	1006 / FALLING		
	AIR TEMPERATURE (^{O}C)	10	21	9	11	20		
	CLOUD COVER	OVERCAST	CLEAR	CLEAR	OVERCAST	OVERCAST		
	WIND	LIGHT	LIGHT	LIGHT	MODERATE	MODERATE		
	PRECIPITATION	MODERATE	DRY	DRY	DRY	WET		
	STATE OF GROUND	WET	DRY	DRY	DRY	WET		
BH1	CH_4 (%)	NIL	NIL	NIL	NIL	NIL		
	CO_2 (%)	4.8	4.6	4.5	4.1	4.7		
	O_2 (%)	12.2	13.1	15.8	16.1	15.1		
	H_2S (p.p.m.)	NIL	NIL	NIL	NIL	NIL		
	CO (p.p.m.)	NIL	NIL	NIL	NIL	NIL		
	PID READING (ppm)	0.0	0.0	0.0	0.0	0.0		
	FLOW (l/hr)	<0.1	<0.1	<0.1	<0.1	<0.1		
	STANDING WATER LEVEL (m)	2.68	2.63	2.66	2.67	2.74		
BH2	CH_4 (%)	NIL	NIL	NIL	NIL	NIL		
	CO_2 (%)	NIL	NIL	0.7	0.6	0.7		
	O_2 (%)	20.8	20.9	19.9	19.8	19.0		
	H_2S (p.p.m.)	NIL	NIL	NIL	NIL	NIL		
	CO (p.p.m.)	NIL	NIL	NIL	NIL	NIL		
	PID READING (ppm)	0.0	0.0	0.0	0.0	0.0		
	FLOW (l/hr)	<0.1	<0.1	<0.1	<0.1	<0.1		
	STANDING WATER LEVEL (m)	2.64	2.61	2.61	2.60	2.64		
BH3	CH_4 (%)	NIL	NIL	NIL	NIL	NIL		
	CO_2 (%)	NIL	NIL	NIL	NIL	NIL		
	O_2 (%)	21.0	21.1	20.6	20.5	20.4		
	H_2S (p.p.m.)	NIL	NIL	NIL	NIL	NIL		
	CO (p.p.m.)	NIL	NIL	NIL	NIL	NIL		
	PID READING (ppm)	0.0	0.0	0.0	0.0	0.0		
	FLOW (l/hr)	<0.1	<0.1	<0.1	<0.1	<0.1		
	STANDING WATER LEVEL (m)	2.44	2.42	2.42	2.40	2.44		
BH4	CH_4 (%)	NIL	NIL	NIL	NIL	NIL		
	CO_2 (%)	0.4	0.3	0.4	0.4	0.5		
	O_2 (%)	20.1	20.2	19.8	19.7	19.2		
	H_2S (p.p.m.)	NIL	NIL	NIL	NIL	NIL		
	CO (p.p.m.)	NIL	NIL	NIL	NIL	NIL		
	PID READING (ppm)	0.0	0.0	0.0	0.0	0.0		
	FLOW (l/hr)	<0.1	<0.1	<0.1	<0.1	<0.1		
	STANDING WATER LEVEL (m)	2.52	2.51	2.52	2.53	2.59		

INSTRUMENTS USED: GA2000 AND FLOW POD / MINIRAE 2000

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CERTIFICATE OF CALIBRATION

Certificate number: GA08842_1/3830
Date of check: 01 June 2009
Product: GA2000
Serial number: GA08842

Calibration checked at: 22.1°C to 32.1°C

Primary Gas Channels

Methane (CH4)		Carbon Dioxide (CO2)	
Certified Gas (%)	**Reading (%)**	**Certified Gas (%)**	**Reading (%)**
49.97	48.6	50.03	49.9
15.12	15.0	15.44	15.1
5.00	4.9	4.94	4.7

Oxygen (O2)	
Certified Gas (%)	**Reading (%)**
20.95	21.1

Additional Gas Cells		
Gas	Certified Gas (ppm)	**Reading (ppm)**
H2S	52.1	52.6
CO	506.0	508.2

Barometer	
Certified (mb)	**Reading (mb)**
1017	1018

Approved by: D. HEMINGS **(Name)**

(Signature)

All gases are traceable to certified National Standards

As the Manufacturer, we recommend that this unit be Serviced in accordance with the date specified by the analyser. This is to be done ONLY by a Geotechnical Instruments (UK) Ltd approved Service Facility.

Registered in England and Wales: 1898734
Geotechnical Instruments (UK) Ltd
Sovereign House, Queensway, Leamington Spa, Warwickshire, CV31 3JR, England.
Tel: +44 (0)1926 338111 Fax: +44 (0)1926 338110 www.geotech.co.uk

020248/14

Geotech

A subsidiary of LANDTEC

FLOW POD CALIBRATION CERTIFICATE

Certificate number: **00853090521**
Date of Calibration: **21/05/2009**
Product: **GA5.3 - Flow Pod for Gas Analyser**
Serial number: **853**

Flow range (units)	Flow reference ID no	Ambient temperature (°c)
0-12l/hr	345	22.7

Actual Flow		Displayed Flow Reading		Permissible error
0.0	l/hr	00.0	l/hr	± 0.3
3.0	l/hr	03.0	l/hr	± 0.3
6.0	l/hr	06.0	l/hr	± 0.3
9.0	l/hr	08.9	l/hr	± 0.3
12.0	l/hr	11.8	l/hr	± 0.3

EEPROM Information

Byte address	00	01	02	03	04	05	06	07	08	09	10	11
Byte data	071	009	180	010	072	005	180	010	072	005	009	009

Calibrated by: **M. Moloney** (Name)

M. Moloney (Signature)

All equipment used to obtain these results are traceable to international standards.

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Geotechnical Instruments (UK) Ltd
Sovereign House, Queensway, Leamington Spa, Warwickshire, CV31 3JR, England.
Tel: +44 (0)1926 338111 Fax: +44 (0)1926 338110 www.geotech.co.uk

shawcity LIMITED

CERTIFICATE OF CALIBRATION
MiniRAE 2000

CALIBRATION CERTIFICATE NO: **35414**

ISSUED BY:	SHAWCITY LIMITED
DATE:	21.04.09
APPROVED SIGNATORY:	
NAME:	Peter Gunter
CUSTOMER:	CC Geotechnical
INSTRUMENT:	MiniRAE 2000
SERIAL NUMBER:	110-009958
CALIBRATION METHOD:	CM03
AMBIENT CONDITIONS:	20°C ± 2°C and 50% (± 20%) RH

Prior to calibration the instrument was allowed to stabilise in the laboratory for at least 30 minutes.
The instrument was calibrated by exposing the sensor to known values of gas concentrations.
All gases were sampled through the complete probe and in line filter, where applicable.
The reference value is that generated by the certified source and the indicated value is that measured by the instrument.

CALIBRATION RESULTS

GAS	LOT No	REF. VALUE	INDICATED VALUE
Isobutylene	592696	100 ppm	100 ppm

COMMENTS:
The reported uncertainty is based on a standard uncertainty multiplied by a coverage factor of k=2.
This provides a level of confidence of uncertainty of approximately 95%.
The uncertainty of measurement is ±2 ppm.
The results indicate that the instrument conforms to the applicable parts of the published specification.

Tel: 01367 241675
www.shawcity.co.uk
13 Pioneer Road, FARINGDON, Oxon., SN7 7BU
Fax: 01367 242491
service@shawcity.co.uk

CD24a

APPENDIX J

SOIL ENGINEERING DATA

T5

SUMMARY OF SOIL CLASSIFICATION TESTS

In accordance with BS1377:Part 2:1990 & B.R.E. IP 4/93 (soil suction values)

BH / TP / WS Number	Type	Depth From (m)	Depth To (m)	Moisture Content (%)	Bulk Density (Mg/m^3)	Dry Density (Mg/m^3)	Shear Strength (kN/m^2)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425micron (%)	Soil Classification	Description / Remarks Samples described in accordance with BS 5930:1999 Clause 6
BH1	BD	2.50	2.50	26	-	-	-	-	-	-	-	-	Brown silty slightly gravelly SAND. (see PSD result sheet)
BH1	BD	4.50	4.50	18	-	-	-	29	13	16	87	CL	Brown silty slightly sandy slightly gravelly CLAY
BH1	U100	6.50	6.95	15	-	-	60*	-	-	-	-	-	Firm brown silty slightly sandy slightly gravelly CLAY with occasional coal gravels
BH1	U100	8.00	8.45	15	2.20	1.91	115	-	-	-	-	-	Stiff brown silty slightly sandy slightly gravelly CLAY with occasional coal gravel. (see triaxial result sheet)
BH2	BD	1.50	1.50	26	-	-	-	-	-	-	-	-	Brown silty slightly gravelly SAND. (see PSD result sheet)
BH2	BD	3.50	3.50	20	-	-	-	-	-	-	-	-	Brown silty gravelly SAND. (see PSD result sheet)
BH2	BD	4.50	4.50	22	-	-	-	34	13	21	90	CL	Brown silty slightly sandy slightly gravelly CLAY
BH2	U100	5.20	5.65	16	2.28	1.97	41	-	-	-	-	-	Firm brown silty slightly sandy slightly gravelly CLAY. (see triaxial result sheet)
BH2	U100	8.00	8.45	15	2.22	1.93	98	-	-	-	-	-	Stiff brown silty slightly sandy slightly gravelly CLAY. (see triaxi result sheet)
BH3	BD	3.50	3.50	17	-	-	-	-	-	-	-	-	Brown very gravelly silty SAND. (see PSD result sheet)
BH3	BD	4.50	4.50	21	-	-	-	35	14	21	90	CL / CI	Brown silty slightly sandy slightly gravelly CLAY
BH3	U100	5.00	5.45	15	2.26	1.96	42	-	-	-	-	-	Firm brown silty slightly sandy slightly gravelly CLAY. (see triaxial result sheet)
BH3	U100	8.00	8.45	18	2.21	1.87	139	-	-	-	-	-	Stiff brown silty slightly sandy slightly gravelly CLAY. (see triaxi result sheet)
BH3	U100	11.00	11.45	14	-	-	120*	-	-	-	-	-	Stiff brown silty slightly sandy slightly gravelly CLAY
BH4	BD	1.65	1.65	26	-	-	-	-	-	-	-	-	Brown very silty gravelly SAND. (see PSD result sheet)

SITE: TENAX ROAD, S. NORTON (09/5512)

CLIENT: AXION

DATE: Jun-09

SHEET: 1 of 2

CC Geotechnical

Telephone: (0151) 523 0202

Key:- BD = Bulk Disturbed; SD = Small Disturbed; U100 = Undisturbed 100mm

CL = Low Plasticity; CI = Intermediate; CH = High; CV = Very high; CE = Extremely high; NP = Non-plastic

(* Denotes Hand Shear Vane test result)

T5

SUMMARY OF SOIL CLASSIFICATION TESTS

In accordance with BS1377:Part 2:1990 & B.R.E. IP 4/93 (soil suction values)

BH / TP / WS Number	Type	Depth From (m)	Depth To (m)	Moisture Content (%)	Bulk Density (Mg/m³)	Dry Density (Mg/m³)	Shear Strength (kN/m²)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425micron (%)	Soil Classification	Description / Remarks Samples described in accordance with BS 5930:1999 Clause 6
BH4	BD	3.50	3.50	9.7	-	-	-	-	-	-	-	-	Brown very sandy slightly silty GRAVEL. (see PSD result sheet)
BH4	BD	4.50	4.50	28	-	-	-	50	19	31	99	CI / CH	Brown silty slightly sandy slightly gravelly CLAY
BH4	U100	6.50	6.95	15	2.30	2.00	69	-	-	-	-	-	Firm brown silty slightly sandy slightly gravelly CLAY. (see triaxial result sheet)
BH4	U100	9.50	9.95	14	2.22	1.95	63	-	-	-	-	-	Firm brown silty slightly sandy slightly gravelly CLAY. (see triaxial result sheet)

SITE: TENAX ROAD, S. NORTON (09/5512)

CLIENT: AXION

DATE: Jun-09

SHEET: 2 of 2

CC Geotechnical

Telephone: (0151) 523 0202

Key:- BD = Bulk Disturbed; SD = Small Disturbed; U100 = Undisturbed 100mm

CL = Low Plasticity; CI = Intermediate; CH = High; CV = Very high; CE = Extremely high; NP = Non-plastic

(* Denotes Hand Shear Vane test result)

CC Geotechnical
Tel: 0151-523-0202
Fax: 0151-523-0252

DETERMINATION OF UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

HOLE NO. BH1

CLIENT AXION

SITE TENAX ROAD, S. NORTON

SAMPLE DEPTH 8.00 - 8.45

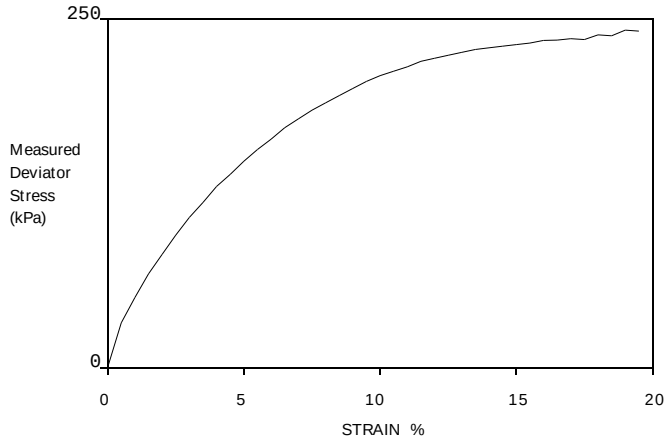
SAMPLE REF 10

JOB NO. 09/5512

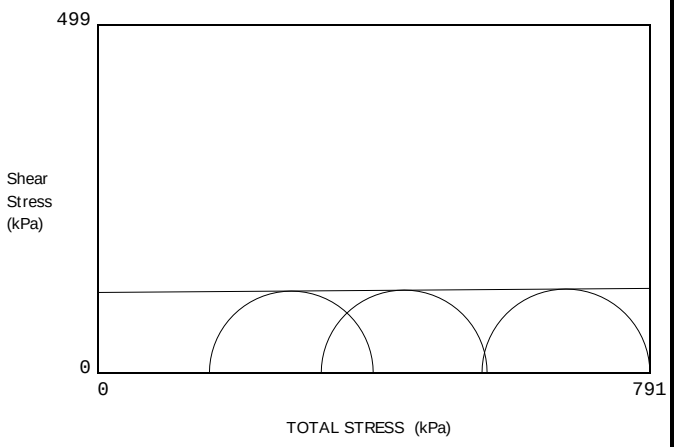
Initial Specimen	Height mm	Diameter mm	Weight g	Moisture Content %	Wet Density Mg/m^3	Dry Density Mg/m^3
Depth of Top of Specimen (m)						
8.00	200.0	102.0	3603	15	2.20	1.91

TEST INFORMATION — Rate of Strain 2.0 % per Min — Rubber Membrane Thickness 0.5 mm

STRESS/STRAIN CURVE



MOHRS CIRCLE ANALYSIS



Specimen at Failure	Measured Cell Pressure σ_3 (kPa)	Strain at Failure (%)	Stress Correction (kPa)		Corrected Max. Deviator Stress $\sigma_1 - \sigma_3$ (kPa)	Shear Stress Cu $\frac{1}{2}(\sigma_1 - \sigma_3)_f$ (kPa)	Mohrs Circle Analysis	
			Membrane Thickness	Piston Friction			Cu (kPa)	$\varnothing$ °
	160	17.0	1.6	/	234	117	115.25	0.42
	320	18.0	1.7	/	237	119		
	550	19.0	1.8	/	240	120		

METHOD OF PREPARATION : BS 1377:Part 1:1990

METHOD OF TEST : BS 1377:Part 7:1990:9 Multi-stage loading

SAMPLE DESCRIPTION

Stiff brown silty slightly sandy slightly gravelly CLAY with occasional fine gravels of coal

REMARKS

CC Geotechnical
Tel: 0151-523-0202
Fax: 0151-523-0252

DETERMINATION OF UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

HOLE NO. BH2

CLIENT AXION

SITE TENAX ROAD, S. NORTON

SAMPLE DEPTH 8.00 - 8.45

SAMPLE REF 12

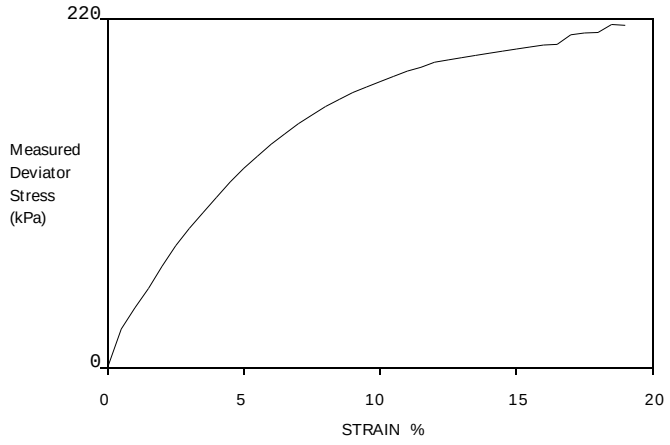
JOB NO. 09/5512

Initial Specimen	Height mm	Diameter mm	Weight g	Moisture Content %	Wet Density Mg/m^3	Dry Density Mg/m^3
Depth of Top of Specimen (m) 8.00	200.0	102.0	3620	15	2.22	1.93

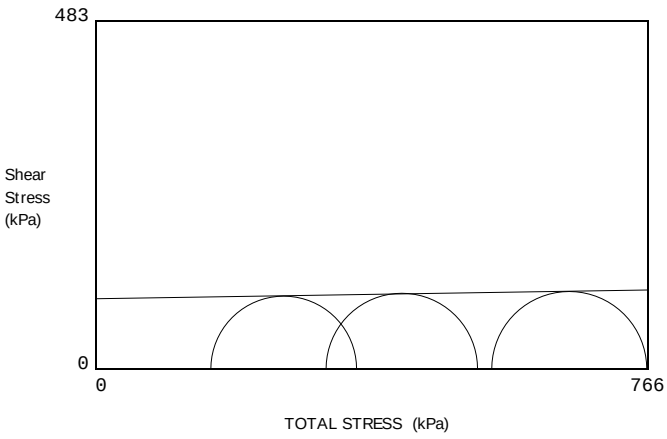
TEST INFORMATION Rate of Strain 2.0 % per Min

Rubber Membrane Thickness 0.5 mm

STRESS/STRAIN CURVE



MOHRS CIRCLE ANALYSIS



Specimen at Failure	Measured Cell Pressure σ_3 (kPa)	Strain at Failure (%)	Stress Correction (kPa)		Corrected Max. Deviator Stress $\sigma_1 - \sigma_3$ (kPa)	Shear Stress Cu $\frac{1}{2}(\sigma_1 - \sigma_3)_f$ (kPa)	Mohrs Circle Analysis	
			Membrane Thickness	Piston Friction			Cu (kPa)	$\varnothing$ °
	160	16.5	1.6	/	202	101	97.57	0.91
	320	18.0	1.7	/	210	105		
	550	18.5	1.8	/	215	108		

METHOD OF PREPARATION : BS 1377:Part 1:1990

METHOD OF TEST : BS 1377:Part 7:1990:9 Multi-stage loading

SAMPLE DESCRIPTION

Stiff brown silty slightly sandy slightly gravelly CLAY

REMARKS

CC Geotechnical
Tel: 0151-523-0202
Fax: 0151-523-0252

DETERMINATION OF UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

HOLE NO. BH2

CLIENT AXION

SITE TENAX ROAD, S. NORTON

SAMPLE DEPTH 5.20 - 5.65

SAMPLE REF 9

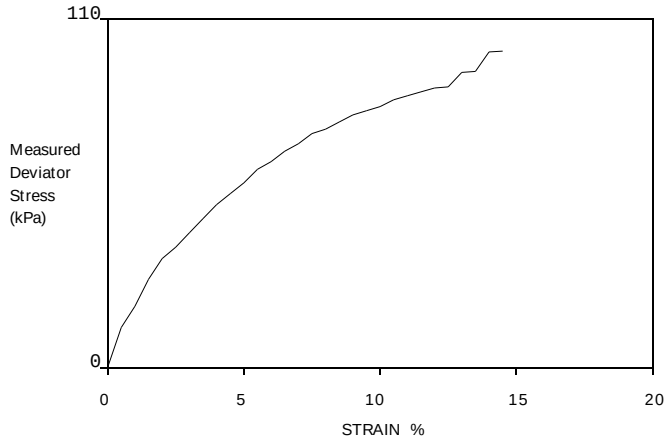
JOB NO. 09/5512

Initial Specimen	Height mm	Diameter mm	Weight g	Moisture Content %	Wet Density Mg/m^3	Dry Density Mg/m^3
Depth of Top of Specimen (m)						
5.20	195.0	102.0	3640	16	2.28	1.97

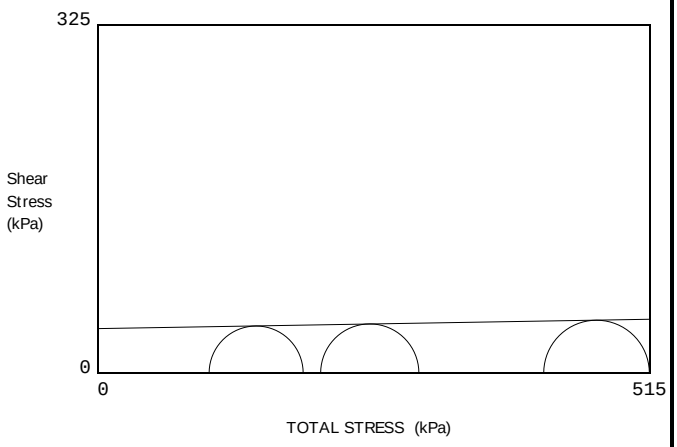
TEST INFORMATION Rate of Strain 2.0 % per Min

Rubber Membrane Thickness 0.5 mm

STRESS/STRAIN CURVE



MOHRS CIRCLE ANALYSIS



Specimen at Failure	Measured Cell Pressure σ_3 (kPa)	Strain at Failure (%)	Stress Correction (kPa)		Corrected Max. Deviator Stress $\sigma_1 - \sigma_3$ (kPa)	Shear Stress Cu $\frac{1}{2}(\sigma_1 - \sigma_3)_f$ (kPa)	Mohrs Circle Analysis	
			Membrane Thickness	Piston Friction			Cu (kPa)	$\varnothing$ °
	104	12.5	1.3	/	88	44	41.41	0.97
	208	13.5	1.4	/	92	46		
	416	14.5	1.5	/	99	49		

METHOD OF PREPARATION : BS 1377:Part 1:1990

METHOD OF TEST : BS 1377:Part 7:1990:9 Multi-stage loading

SAMPLE DESCRIPTION

Firm brown silty slightly sandy slightly gravelly CLAY

REMARKS

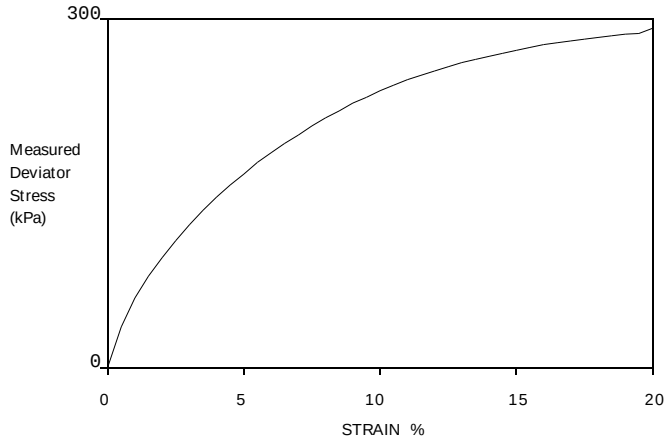
CC Geotechnical	Tel: 0151-523-0202 Fax: 0151-523-0252	**DETERMINATION OF UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION**	HOLE NO. BH3

CLIENT	AXION	SITE	TENAX ROAD, S. NORTON	
SAMPLE DEPTH 8.00 - 8.45		SAMPLE REF 12		JOB NO. 09/5512

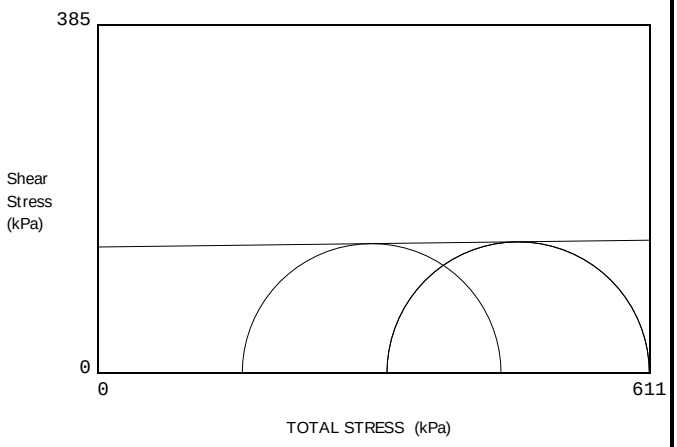
Initial Specimen Depth of Top of Specimen (m)	Height mm	Diameter mm	Weight g	Moisture Content %	Wet Density Mg/m^3	Dry Density Mg/m^3
8.00	193.0	102.0	3490	18	2.21	1.87

TEST INFORMATION	Rate of Strain	2.0	% per Min	Rubber Membrane Thickness	0.5	mm

STRESS/STRAIN CURVE



MOHRS CIRCLE ANALYSIS



Specimen at Failure	Measured Cell Pressure σ_3 (kPa)	Strain at Failure (%)	Stress Correction (kPa)		Corrected Max. Deviator Stress $\sigma_1 - \sigma_3$ (kPa)	Shear Stress Cu $\frac{1}{2}(\sigma_1 - \sigma_3)_f$ (kPa)	Mohrs Circle Analysis	
			Membrane Thickness	Piston Friction			Cu (kPa)	$\varnothing$ °
	160	19.5	1.9	/	286	143		
	320	20.0	1.9	/	290	145	139.34	0.71

METHOD OF PREPARATION : BS 1377:Part 1:1990

METHOD OF TEST : BS 1377:Part 7:1990:9 Multi-stage loading

SAMPLE DESCRIPTION

Stiff brown silty slightly sandy slightly gravelly CLAY

REMARKS

CC Geotechnical
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DETERMINATION OF UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

HOLE NO. BH3

CLIENT AXION

SITE TENAX ROAD, S. NORTON

SAMPLE DEPTH 5.00 - 5.45

SAMPLE REF 9

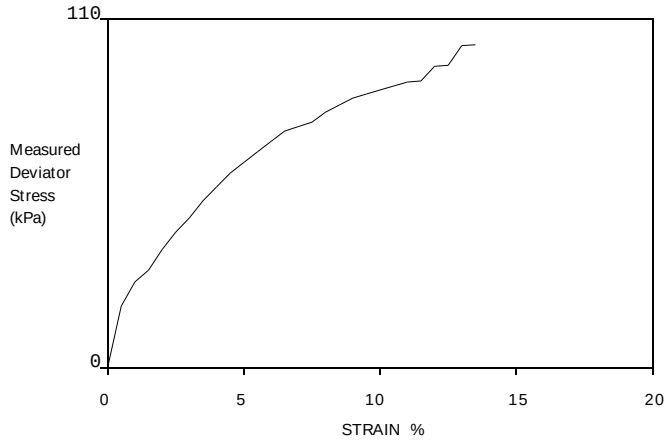
JOB NO. 09/5512

Initial Specimen	Height mm	Diameter mm	Weight g	Moisture Content %	Wet Density Mg/m^3	Dry Density Mg/m^3
Depth of Top of Specimen (m)						
5.00	200.0	102.0	3690	15	2.26	1.96

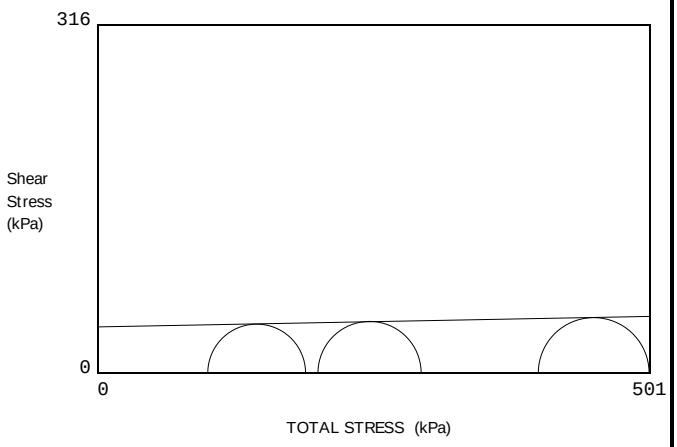
TEST INFORMATION Rate of Strain 2.0 % per Min

Rubber Membrane Thickness 0.5 mm

STRESS/STRAIN CURVE



MOHRS CIRCLE ANALYSIS



Specimen at Failure	Measured Cell Pressure σ_3 (kPa)	Strain at Failure (%)	Stress Correction (kPa)		Corrected Max. Deviator Stress $\sigma_1 - \sigma_3$ (kPa)	Shear Stress Cu $\frac{1}{2}(\sigma_1 - \sigma_3)_f$ (kPa)	Mohrs Circle Analysis	
			Membrane Thickness	Piston Friction			Cu (kPa)	$\varnothing$ °
	100	11.5	1.2	/	89	44	41.86	1.09
	200	12.5	1.3	/	94	47		
	400	13.5	1.4	/	101	50		

METHOD OF PREPARATION : BS 1377:Part 1:1990

METHOD OF TEST : BS 1377:Part 7:1990:9 Multi-stage loading

SAMPLE DESCRIPTION

Firm brown silty slightly sandy slightly gravelly CLAY

REMARKS

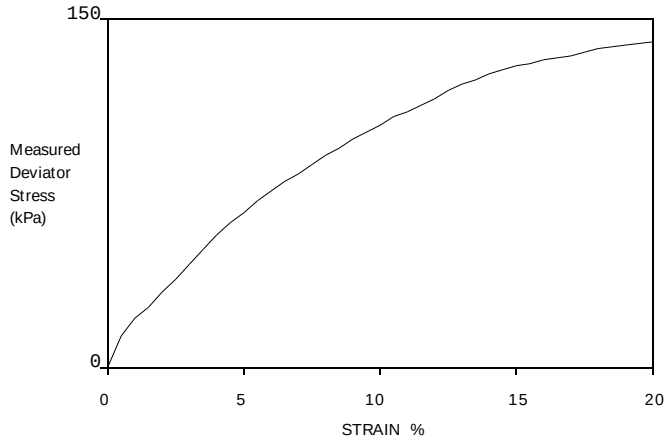
CC Geotechnical	Tel: 0151-523-0202 Fax: 0151-523-0252	**DETERMINATION OF UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION**	HOLE NO. BH4

CLIENT	AXION	SITE	TENAX ROAD, S. NORTON	
SAMPLE DEPTH 6.50 - 6.95		SAMPLE REF 10		JOB NO. 09/5512

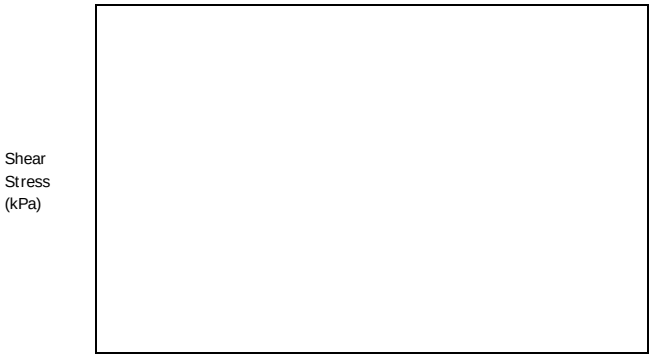
Initial Specimen Depth of Top of Specimen (m)	Height mm	Diameter mm	Weight g	Moisture Content %	Wet Density Mg/m^3	Dry Density Mg/m^3
6.50	199.0	102.0	3732	15	2.30	2.00

TEST INFORMATION	Rate of Strain	2.0	% per Min	Rubber Membrane Thickness	0.5	mm

STRESS/STRAIN CURVE



MOHRS CIRCLE ANALYSIS



Specimen at Failure	Measured Cell Pressure σ_3 (kPa)	Strain at Failure (%)	Stress Correction (kPa)		Corrected Max. Deviator Stress $\sigma_1 - \sigma_3$ (kPa)	Shear Stress Cu $\frac{1}{2}(\sigma_1 - \sigma_3)_f$ (kPa)	Mohrs Circle Analysis	
			Membrane Thickness	Piston Friction			Cu (kPa)	$\varnothing$ ^{o}
	130	20.0	1.9	/	138	69		

METHOD OF PREPARATION : BS 1377:Part 1:1990

METHOD OF TEST : BS 1377:Part 7:1990:8 Definitive Method

SAMPLE DESCRIPTION	REMARKS
Firm brown silty slightly sandy slightly gravelly CLAY	

CC Geotechnical
Tel: 0151-523-0202
Fax: 0151-523-0252

DETERMINATION OF UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

HOLE NO. BH4

CLIENT AXION

SITE TENAX ROAD, S. NORTON

SAMPLE DEPTH 9.50 - 9.95

SAMPLE REF 13

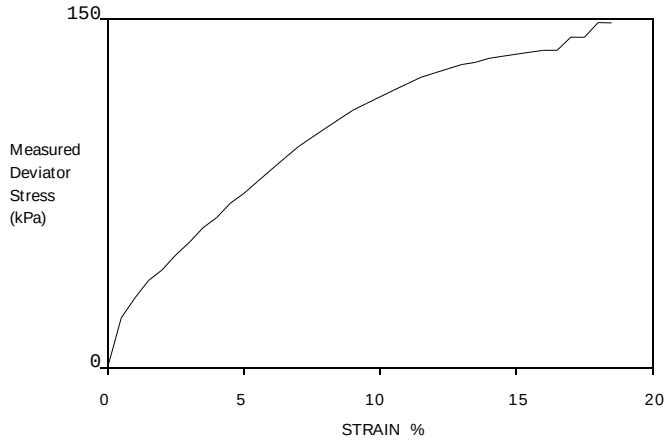
JOB NO. 09/5512

Initial Specimen	Height mm	Diameter mm	Weight g	Moisture Content %	Wet Density Mg/m^3	Dry Density Mg/m^3
Depth of Top of Specimen (m)						
9.50	201.0	102.0	3651	14	2.22	1.95

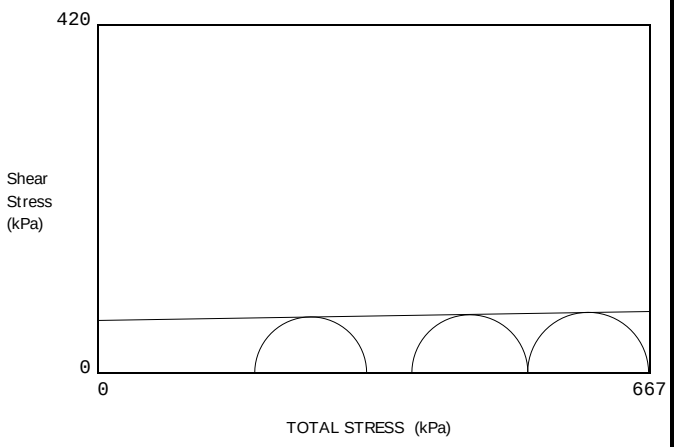
TEST INFORMATION Rate of Strain 2.0 % per Min

Rubber Membrane Thickness 0.5 mm

STRESS/STRAIN CURVE



MOHRS CIRCLE ANALYSIS



Specimen at Failure	Measured Cell Pressure σ_3 (kPa)	Strain at Failure (%)	Stress Correction (kPa)		Corrected Max. Deviator Stress $\sigma_1 - \sigma_3$ (kPa)	Shear Stress Cu $\frac{1}{2}(\sigma_1 - \sigma_3)_f$ (kPa)	Mohrs Circle Analysis	
			Membrane Thickness	Piston Friction			Cu (kPa)	$\varnothing$ °
	190	16.5	1.6	/	135	68	63.35	0.92
	380	17.0	1.6	/	140	70		
	520	18.0	1.7	/	146	73		

METHOD OF PREPARATION : BS 1377:Part 1:1990

METHOD OF TEST : BS 1377:Part 7:1990:9 Multi-stage loading

SAMPLE DESCRIPTION

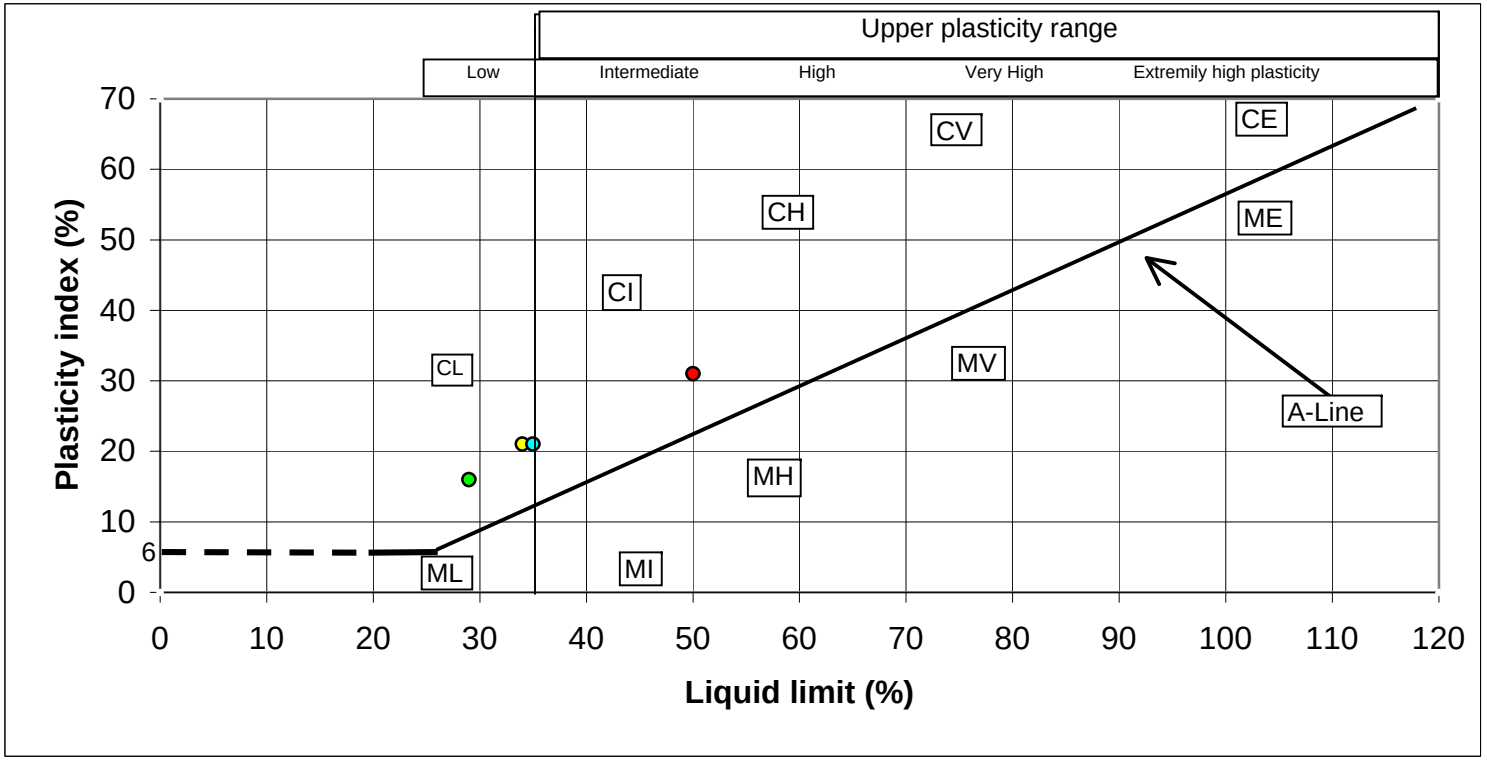
Firm brown silty slightly sandy slightly gravelly CLAY

REMARKS

CC Geotechnical

ATTERBERG TEST RESULT SHEET
BS 1377:Part 2:1990

SILT (M-SOIL), M plots below A-Line , CLAY,C, plots above A-Line, M and C may be combined as FINE SOIL, F.

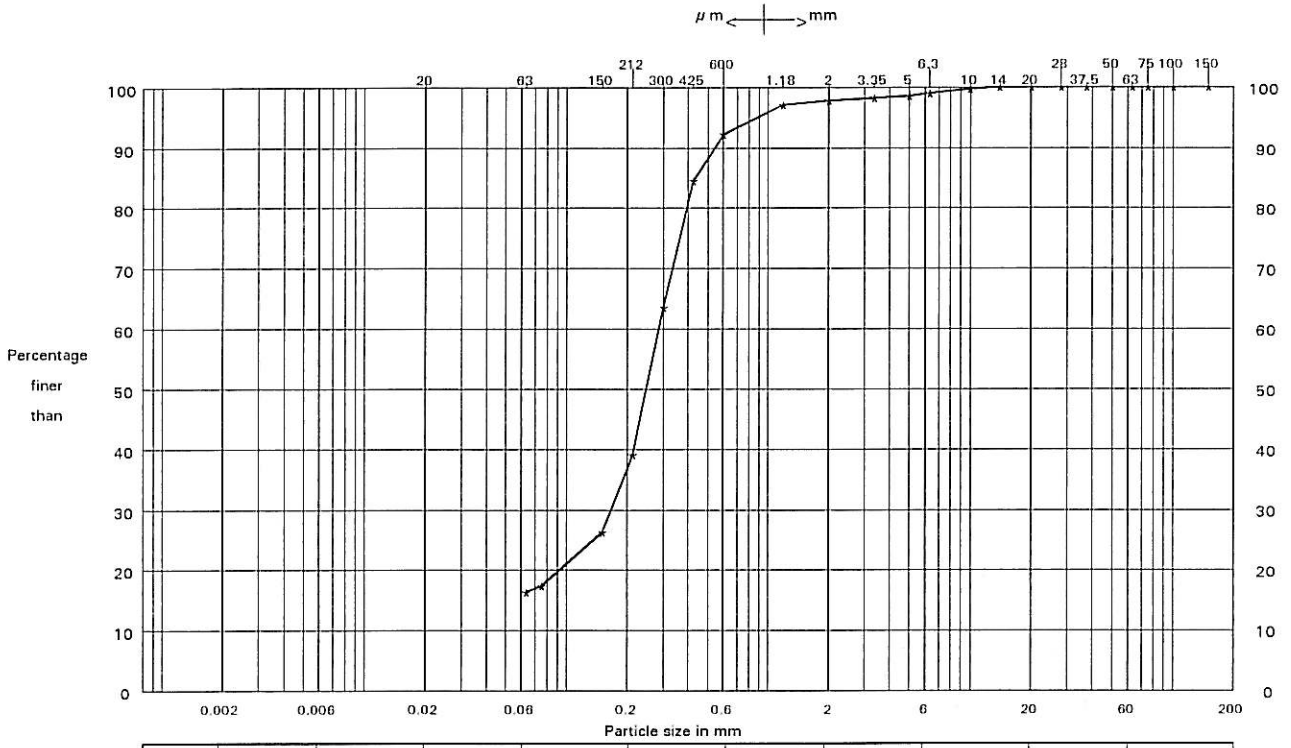


BH	Sample Depth	Liquid limit	Plasticity index
BH1	4.50	29.0	16.0
BH2	4.50	34.0	21.0
BH3	4.50	35.0	21.0
BH4	4.50	50.0	31.0

CLIENT: AXION	SITE: TENAX ROAD, S. NORTON (09/5512)

CC Geotechnical	Tel: 0151-523-0202 Fax: 0151-523-0252	DETERMINATION OF PARTICLE SIZE DISTRIBUTION	HOLE NO. BH1
CLIENT AXION		SITE TENAX ROAD, S. NORTON	
SAMPLE DEPTH 2.50 - 2.50		SAMPLE REF 5	JOB NO. 09/5512
METHOD OF PRETREATMENT		METHOD OF TEST Wet Sieve	

	Size (microns)							Size (mm)														
Sieve Size	63	75	150	212	300	425	600	1.18	2	3.35	5	6.3	10	14	20	28	37.5	50	63	75	100	150
% by Mass passing Sieve	16	17	26	39	63	84	92	97	98	98	98	99	100	100	100	100	100	100	100	100	100	100



	CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
		SILT			SAND			GRAVEL			
%	-	-			82			2			0

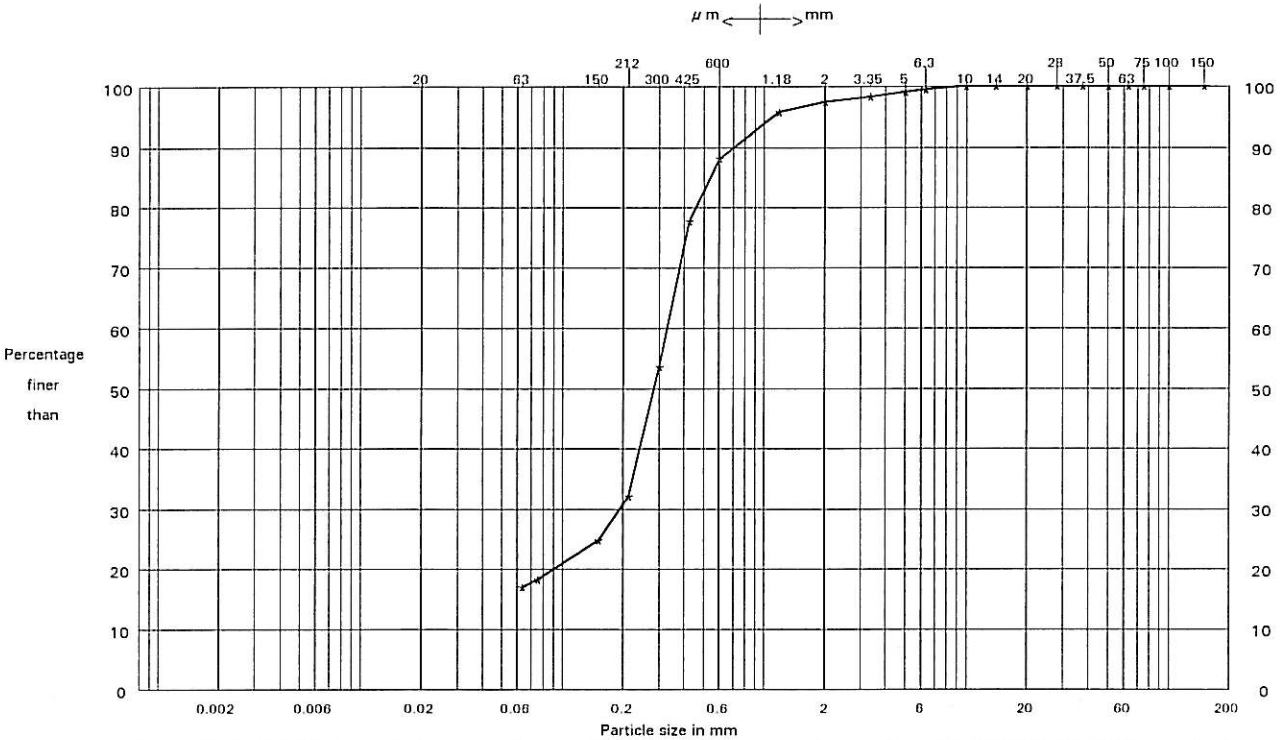
SAMPLE DESCRIPTION

Brown silty slightly gravelly SAND

REMARKS

CC Geotechnical	Tel: 0151-523-0202 Fax: 0151-523-0252	DETERMINATION OF PARTICLE SIZE DISTRIBUTION	HOLE NO. BH2
CLIENT AXION		SITE TENAX ROAD, S. NORTON	
SAMPLE DEPTH 1.50 - 1.50		SAMPLE REF 5	JOB NO. 09/5512
METHOD OF PRETREATMENT		METHOD OF TEST Wet Sieve	

	Size (microns)							Size (mm)														
Sieve Size	63	75	150	212	300	425	600	1.18	2	3.35	5	6.3	10	14	20	28	37.5	50	63	75	100	150
% by Mass passing Sieve	17	18	25	32	54	78	88	96	97	98	99	99	100	100	100	100	100	100	100	100	100	100

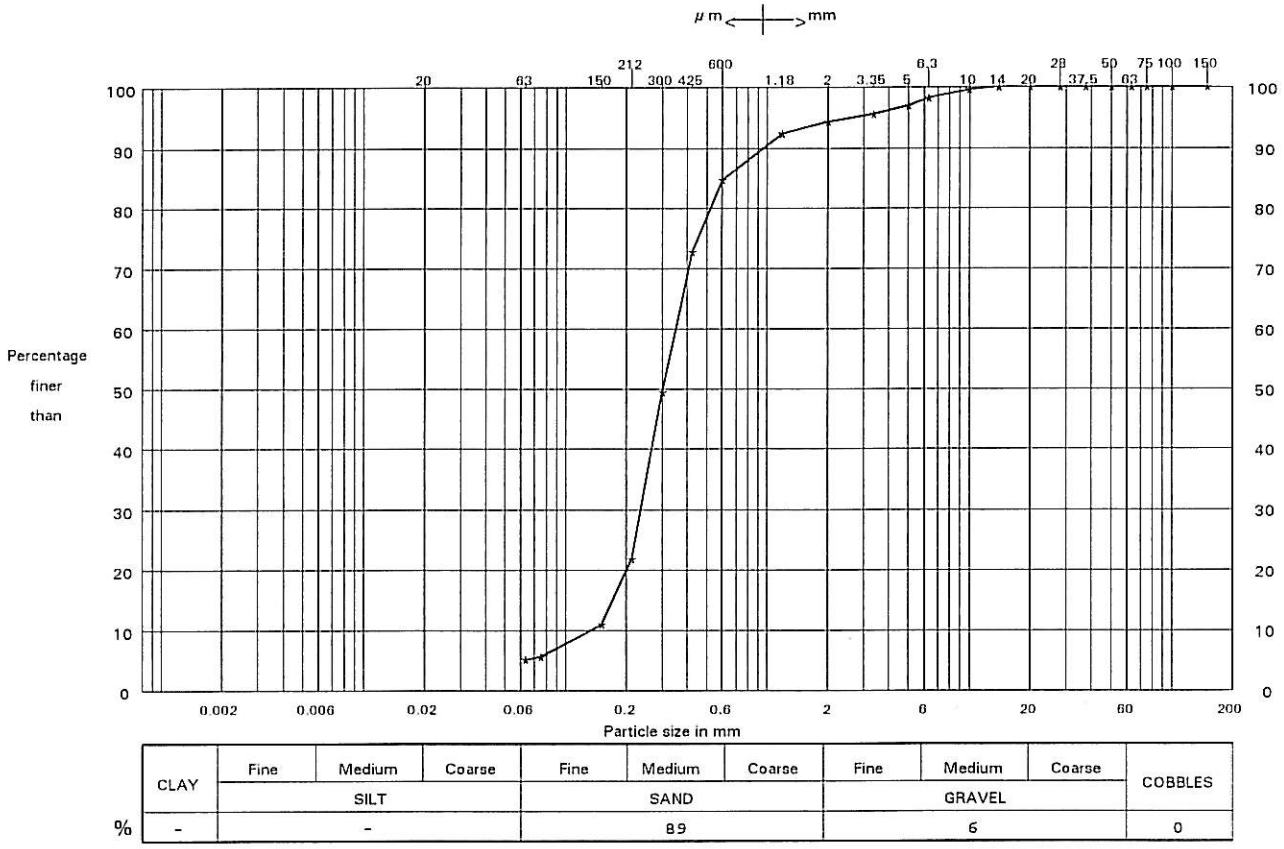


	CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
		SILT			SAND			GRAVEL			
%	-	-			80			3			0

SAMPLE DESCRIPTION	REMARKS
Brown silty slightly gravelly SAND	

CC Geotechnical	Tel: 0151-523-0202 Fax: 0151-523-0252	DETERMINATION OF PARTICLE SIZE DISTRIBUTION	HOLE NO. BH2
CLIENT AXION		SITE TENAX ROAD, S. NORTON	
SAMPLE DEPTH 3.50 - 3.50		SAMPLE REF 7	JOB NO. 09/5512
METHOD OF PRETREATMENT		METHOD OF TEST Wet Sieve	

	Size (microns)							Size (mm)													
Sieve Size	63	75	150	212	300	425	600	1.18	2	3.35	5	6.3	10	14	20	28	37.5	50	63	75	100	150
% by Mass passing Sieve	5	5	11	22	49	73	85	92	94	96	97	98	99	100	100	100	100	100	100	100	100	100

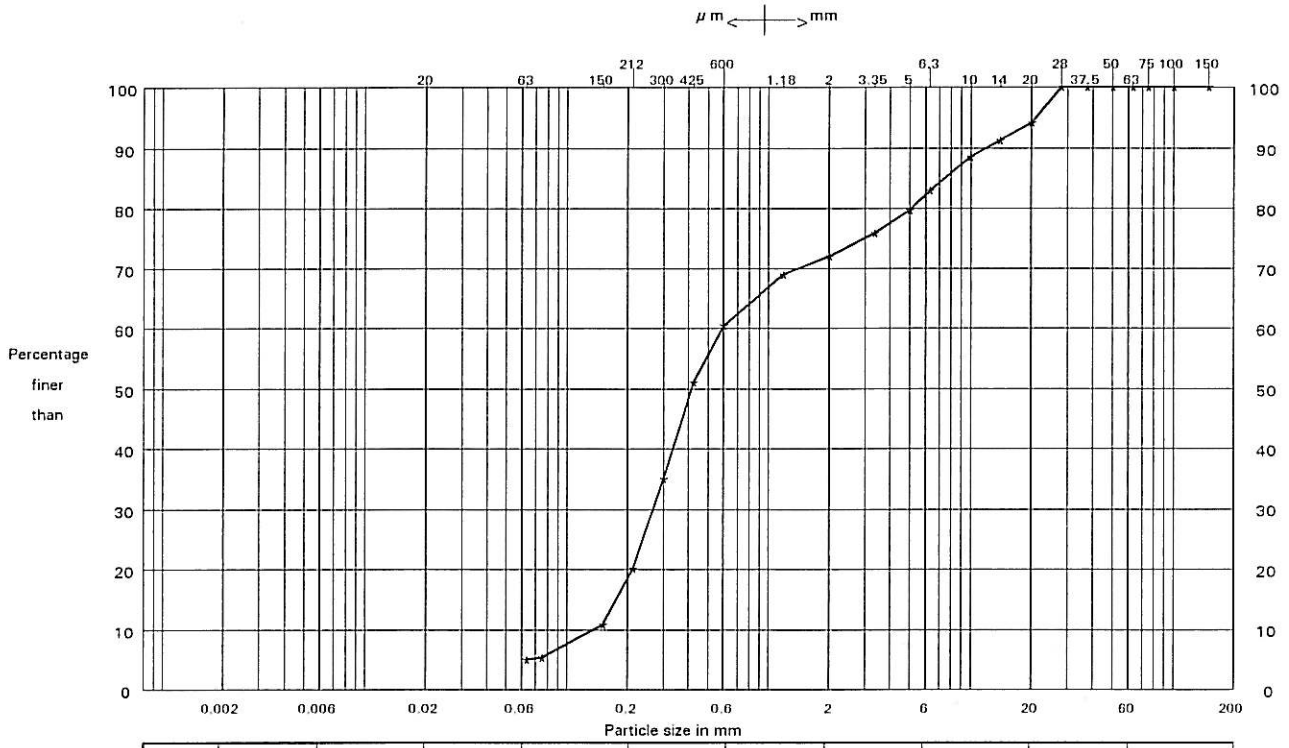


	CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
		SILT			SAND			GRAVEL			
%	-	-			89			6			0

SAMPLE DESCRIPTION	REMARKS
Brown silty gravelly SAND	

CC Geotechnical	Tel: 0151-523-0202 Fax: 0151-523-0252	DETERMINATION OF PARTICLE SIZE DISTRIBUTION	HOLE NO. BH3
CLIENT AXION		SITE TENAX ROAD, S. NORTON	
SAMPLE DEPTH 3.50 - 3.50		SAMPLE REF 7	JOB NO. 09/5512
METHOD OF PRETREATMENT		METHOD OF TEST Wet Sieve	

	Size (microns)							Size (mm)														
Sieve Size	63	75	150	212	300	425	600	1.18	2	3.35	5	6.3	10	14	20	28	37.5	50	63	75	100	150
% by Mass passing Sieve	5	5	11	20	35	51	60	69	72	76	80	83	88	91	94	100	100	100	100	100	100	100

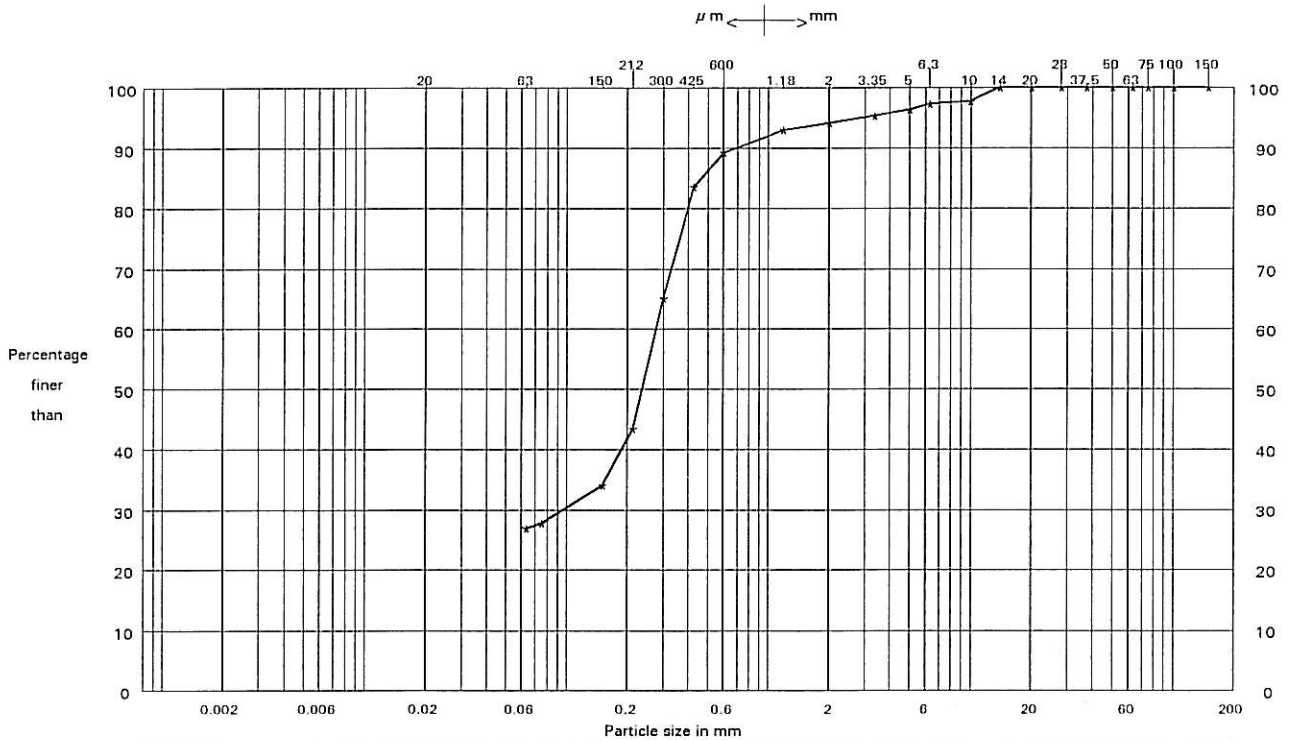


	CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
		SILT			SAND			GRAVEL			
%	-	-			67			28			0

SAMPLE DESCRIPTION	REMARKS
Brown very gravelly silty SAND	

CC Geotechnical	Tel: 0151-523-0202 Fax: 0151-523-0252	DETERMINATION OF PARTICLE SIZE DISTRIBUTION	HOLE NO. BH4
CLIENT AXION		SITE TENAX ROAD, S. NORTON	
SAMPLE DEPTH 1.65 - 1.65		SAMPLE REF 4	JOB NO. 09/5512
METHOD OF PRETREATMENT		METHOD OF TEST Wet Sieve	

	Size (microns)							Size (mm)														
Sieve Size	63	75	150	212	300	425	600	1.18	2	3.35	5	6.3	10	14	20	28	37.5	50	63	75	100	150
% by Mass passing Sieve	27	28	34	43	65	83	89	93	94	95	96	97	98	100	100	100	100	100	100	100	100	100



	CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
		SILT			SAND			GRAVEL			
%	-	-			67			6			0

SAMPLE DESCRIPTION	REMARKS
Brown very silty gravelly SAND	

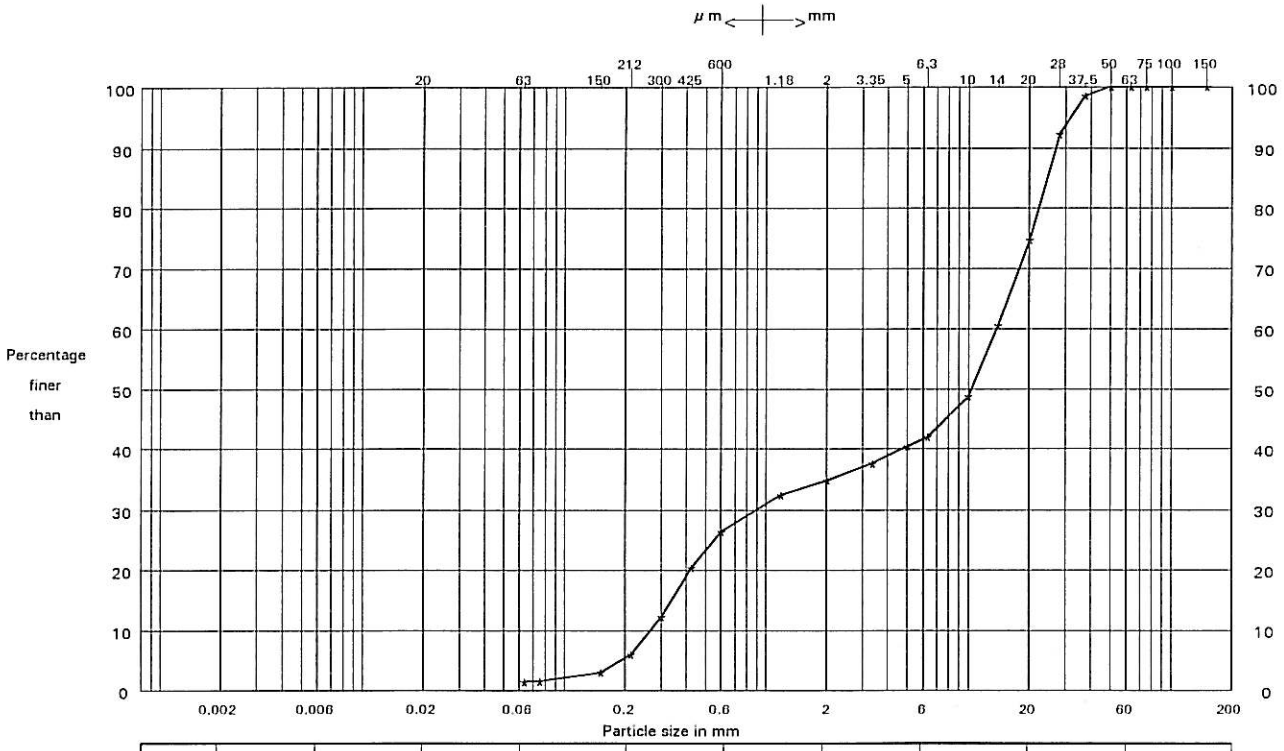
CC Geotechnical
Tel: 0151-523-0202
Fax: 0151-523-0252

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

HOLE NO. BH4

CLIENT: AXION	SITE: TENAX ROAD, S. NORTON
SAMPLE DEPTH: 3.50 - 3.50	SAMPLE REF: 6
JOB NO.: 09/5512	
METHOD OF PRETREATMENT:	METHOD OF TEST: Wet Sieve

	Size (microns)							Size (mm)														
Sieve Size	63	75	150	212	300	425	600	1.18	2	3.35	5	6.3	10	14	20	28	37.5	50	63	75	100	150
% by Mass passing Sieve	1	1	3	6	12	20	26	32	35	38	40	42	49	60	75	92	99	100	100	100	100	100



	CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
		SILT			SAND			GRAVEL			
%	-	-			34			65			0

SAMPLE DESCRIPTION

Brown very sandy slightly silty GRAVEL

REMARKS

APPENDIX K

SOIL AND WATER CHEMICAL DATA

The Harley Reed Building
Unit C, Drury Lane
Ponswood Industrial Estate
St Leonards on Sea
East Sussex
TN38 9BA
Telephone (01424) 718618
Facsimile (01424) 729911

2683 2683

THE ENVIRONMENTAL LABORATORY LTD

F.A.O. Paul McFadden
CC Geotechnical Limited
Essex House, Bridle Road
Bootle, Liverpool
Merseyside, L30 4UE

Reporting Date: 09/06/2009

ANALYTICAL REPORT No. AR21167

Samples Received By:-	Courier
Samples Received:-	21/05/09
Your Project No:	09/5512
Site Location:	Tenax Road
No Samples Received:-	6
Date of Sampling	12 - 27/05/09

Report Checked By:-

Steve Knight
Director

Authorised By:-

Cliff P.V. Knight BSc, EurChem, CChem FRSC
Managing Director

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

THE ENVIRONMENTAL LABORATORY LTD

The Harley Reed Building, Unit C, Drury Lane, Ponswood Industrial Estate, St Leonard's on Sea, East Sussex, TN38 9BA
Tel: 01424 718618 Fax: 01424 729911

UKAS TESTING 2683 mCERTS 2683

ANALYTICAL REPORT No. AR21167

Location: Tenax Road

Your Project No: 09/5512

Reporting Date: 09/06/09

F.A.O. Paul McFadden
CC Geotechnical Limited
Essex House, Bridle Road
Bootle, Liverpool
Merseyside, L30 4UE

Soils

Characteristic	Date Sampled	TP/BH	Depth (m)	Our ref	Arsenic**	Barium*	Beryllium*	Cadmium**	Chromium**	Lead**	Mercury**	Nickel**	Copper**	Zinc**	Selenium	Vanadium**	Water Soluble Boron
					(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Sandy silt loam	12/05/09	BH1	0.30	20745	11.5	3641	<1	4.8	17	88	<0.5	25	1548	118	<0.5	27	0.9
Sandy silt loam	13/05/09	BH2	0.40	21019	36.1	107	<1	1.5	32	224	<0.5	62	261	142	0.9	22	3.0
Sandy silt loam	18/05/09	BH3	0.60	21207	15.4	158	<1	0.7	143	994	1.0	21	43	230	0.5	94	0.9
Sandy Silt Loam	19/05/09	BH4	0.50	21277	14.1	553	<1	1.1	18	276	<0.5	22	548	222	1.0	28	2.2

All results expressed on dry weight basis
** - MCERTS accredited test
* = UKAS accredited test
MP

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Tel: 01424 718618 Fax: 01424 729911

UKAS TESTING 2683 mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME 2683

ANALYTICAL REPORT No. AR21167

Location: Tenax Road

Your Project No: 09/5512

Reporting Date: 09/06/09

F.A.O. Paul McFadden
CC Geotechnical Limited
Essex House, Bridle Road
Bootle, Liverpool
Merseyside, L30 4UE

Soils

Characteristic	Date Sampled	TP/BH	Depth (m)	Our ref	pH Value**	Total Sulphate	Water Soluble Sulphate**	Total Cyanide**	Free Cyanide	Complex Cyanide	Sulphide	Elemental Sulphur**	Water Soluble Nitrate	Soil Organic Matter*
					(Units)	(mg/kg)	(mg/l as SO4)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(%)
Sandy silt loam	12/05/09	BH1	0.30	20745	8.9	1596	119	<1	<1	<1	<2	<10	<5	0.4
Sandy silt loam	13/05/09	BH2	0.40	21019	6.0	3860	100	<1	<1	<1	<2	<10	8	3.4
Sandy silt loam	18/05/09	BH3	0.60	21207	9.8	6912	1525	<1	<1	<1	3.0	<10	34	0.5
Sandy Silt Loam	19/05/09	BH4	0.50	21277	6.8	1309	110	<1	<1	<1	31.3	83	9	2.3

All results expressed on dry weight basis
** - MCERTS accredited test
* = UKAS accredited test
MP

THE ENVIRONMENTAL LABORATORY LTD

The Harley Reed Building, Unit C, Drury Lane, Ponswood Industrial Estate, St Leonard's on Sea, East Sussex, TN38 9BA
Tel: 01424 718618 Fax: 01424 729911

UKAS TESTING 2683 mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME 2683

ELAB

ANALYTICAL REPORT No. AR21167

Location: Tenax Road

Your Project No: 09/5512

Reporting Date: 09/06/09

F.A.O. Paul McFadden
CC Geotechnical Limited
Essex House, Bridle Road
Bootle, Liverpool
Merseyside, L30 4UE

Soils

Characteristic	Date Sampled	TP/BH	Depth (m)	Our ref	Naphthalene** (mg/kg)	Acenaphthylene** (mg/kg)	Acenaphthene** (mg/kg)	Fluorene** (mg/kg)	Phenanthrene** (mg/kg)	Anthracene** (mg/kg)	Fluoranthene** (mg/kg)	Pyrene** (mg/kg)	Benz(a)anthracene** (mg/kg)	Chrysene** (mg/kg)	Benzo(b)fluoranthene** (mg/kg)	Benzo(k)fluoranthene** (mg/kg)	Benzo(a)pyrene** (mg/kg)	Indeno(123-cd)pyrene** (mg/kg)	Dibenz(ah)anthracene** (mg/kg)	Benzo(ghi)perylene** (mg/kg)	Total PAH** (mg/kg)
Sandy silt loam	12/05/09	BH1	0.30	20745	0.6	<0.1	1.0	0.7	6.9	1.7	6.2	4.3	2.6	3.1	2.0	1.9	1.8	1.2	0.3	1.3	35.5
Sandy silt loam	13/05/09	BH2	0.40	21019	0.3	0.2	0.3	<0.1	2.4	1.3	2.7	2.6	1.5	1.8	2.1	1.4	1.4	0.8	0.8	1.7	21.3
Sandy silt loam	18/05/09	BH3	0.60	21207	1.7	0.1	2.3	1.6	17.9	3.7	18.6	16.5	8.5	10.8	7.0	6.3	7.5	4.5	1.3	5.7	114.0
Sandy Silt Loam	19/05/09	BH4	0.50	21277	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	0.6	0.5	<0.1	<0.1	0.4	0.3	0.2	0.4	0.1	0.7	3.4

All results expressed on dry weight basis
** - MCERTS accredited test
MP

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Tel: 01424 718618 Fax: 01424 729911

ANALYTICAL REPORT No. AR21167

Location: Tenax Road

Your Project No: 09/5512

Reporting Date: 09/06/09

F.A.O. Paul McFadden
CC Geotechnical Limited
Essex House, Bridle Road
Bootle, Liverpool
Merseyside, L30 4UE

TPH CWG - Soil

					Aromatic							Aliphatic						
Characteristic	Date Sampled	TP/BH	Depth (m)	Our ref	>EC_5-EC_7 (mg/kg)	>EC_7-EC_8 (mg/kg)	>EC_8-EC_{10} (mg/kg)	>EC_{10}-EC_{12} (mg/kg)	>EC_{12}-EC_{16} (mg/kg)	>EC_{16}-EC_{21} (mg/kg)	>EC_{21}-EC_{35} (mg/kg)	>EC_5-EC_6 (mg/kg)	>EC_6-EC_8 (mg/kg)	>EC_8-EC_{10} (mg/kg)	>EC_{10}-EC_{12} (mg/kg)	>EC_{12}-EC_{16} (mg/kg)	>EC_{16}-EC_{35} (mg/kg)	TPH (C_6 - C_{40}) (mg/kg)
Sandy silt loam	12/05/09	BH1	0.30	20745	<0.01	<0.01	<0.1	<1	<1	<1	4	<0.01	<0.01	<0.1	<1	<1	9	13
Sandy silt loam	13/05/09	BH2	0.40	21019	<0.01	<0.01	0.1	<1	<1	<1	9	<0.01	<0.01	<0.1	<1	<1	12	21
Sandy silt loam	18/05/09	BH3	0.60	21207	<0.01	<0.01	<0.1	<1	<1	11	70	<0.01	<0.01	<0.1	<1	<1	179	260
Sandy Silt Loam	19/05/09	BH4	0.50	21277	<0.01	<0.01	<0.1	<1	<1	<1	9	<0.01	<0.01	<0.1	<1	<1	6	15

All results expressed on dry weight basis

MP

THE ENVIRONMENTAL LABORATORY LTD

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Tel: 01424 718618 Fax: 01424 729911

UKAS TESTING 2683

ANALYTICAL REPORT No. AR21167

Location: Tenax Road

F.A.O. Paul McFadden
CC Geotechnical Limited
Essex House, Bridle Road
Bootle, Liverpool
Merseyside, L30 4UE

Your Project No: 09/5512

Reporting Date: 09/06/09

Asbestos Identification

Sample ref:	**BH1**
Depth (m)	**0.30**
Our ref:	**20745**
#Description of Sample Matrix:	Sandy silt loam
Result	No asbestos identified

Sample ref:	**BH2**
Depth (m)	**0.40**
Our ref:	**21019**
#Description of Sample Matrix:	Sandy silt loam
Result	No asbestos identified

Sample ref:	**BH3**
Depth (m)	**0.60**
Our ref:	**21207**
#Description of Sample Matrix:	Sandy silt loam
Result	No asbestos identified

Sample ref:	**BH4**
Depth (m)	**0.50**
Our ref:	**21277**
#Description of Sample Matrix:	Sandy Silt Loam
Result	No asbestos identified

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

MP

THE ENVIRONMENTAL LABORATORY LTD

The Harley Reed Building, Unit C, Drury Lane, Ponswood Industrial Estate, St Leonard's on Sea, East Sussex, TN38 9BA
Tel: 01424 718618 Fax: 01424 729911

ANALYTICAL REPORT No. AR21167

Location: Tenax Road

2683 2683

F.A.O. Paul McFadden
CC Geotechnical Limited
Essex House, Bridle Road
Bootle, Liverpool
Merseyside, L30 4UE

Your Project No: 09/5512

Reporting Date: 09/06/09

VOC ANALYSIS

		Characteristic	Sandy Silt Loam
		Sampling Date	13/05/09
Soils		TP/BH	BH2
		Depth (m)	0.40
		Our ref	21019
	Benzene**	(µg/kg)	<10
	Toluene**	(µg/kg)	<10
	Ethyl Benzene**	(µg/kg)	<10
	mpXylene**	(µg/kg)	<10
	oXylene**	(µg/kg)	<10
	1, 2-Dichloroethene**	(µg/kg)	<10
	1, 1-Dichloroethane**	(µg/kg)	<10
	Chloroform**	(µg/kg)	<10
	Carbontetrachloride**	(µg/kg)	<10
	1, 1, 1-Trichloroethane**	(µg/kg)	<10
	Trichloroethylene**	(µg/kg)	<10
	Tetrachloroethylene**	(µg/kg)	<10
	1, 1, 1, 2-Tetrachloroethane**	(µg/kg)	<10
	1, 1, 2, 2-Tetrachloroethane**	(µg/kg)	<10
	Chlorobenzene**	(µg/kg)	<10
	Bromobenzene**	(µg/kg)	<10
	Bromodichloromethane**	(µg/kg)	<10
	Methylethylbenzene**	(µg/kg)	<10
	1, 1-Dichloro-1-propene**	(µg/kg)	<10
	1, 2-Dichloroethene	(µg/kg)	<10
	2, 2-Dichloropropane	(µg/kg)	<10
	Bromochloromethane	(µg/kg)	<10
	1, 2-Dichloroethane	(µg/kg)	<10
	Dibromomethane**	(µg/kg)	<10
	1, 2-Dichloropropane**	(µg/kg)	<10
	1, 3-Dichloro1propene**	(µg/kg)	<10
	1, 3-Dichloro1propene trans	(µg/kg)	<10
	1, 1, 2-Trichloroethane	(µg/kg)	<10
	Dibromochloromethane	(µg/kg)	<10
	1, 3-Dichloropropane	(µg/kg)	<10
	Dibromoethane**	(µg/kg)	<10
	Styrene	(µg/kg)	<10
	Propylbenzene	(µg/kg)	<10
	2-Chlorotoluene	(µg/kg)	<10
	1, 2, 4-Trimethylbenzene	(µg/kg)	<10
	4-Chlorotoluene	(µg/kg)	<10
	t-Butylbenzene	(µg/kg)	<10
	Trimethylbenzene	(µg/kg)	<10
	1-Methylpropylbenzene	(µg/kg)	<10
	o-Cymene	(µg/kg)	<10
	1, 4-Dichlorobenzene	(µg/kg)	<10
	Butylbenzene	(µg/kg)	<10
	1, 2-Dibromo-3-chloropropane	(µg/kg)	<10
	Hexachlorobutaciene	(µg/kg)	<10
	1, 2, 3-Trichlorobenzene	(µg/kg)	<10
	1, 2, 4-Trichlorobenzene	(µg/kg)	<10
	1, 3-Dichlorobenzene	(µg/kg)	<10
	1, 2-Dichlorobenzene	(µg/kg)	<10
	Bromoform	(µg/kg)	<10

** - MCERTS accredited test

MP

THE ENVIRONMENTAL LABORATORY LTD

The Harley Reed Building, Unit C, Drury Lane, Ponswood Industrial Estate, St Leonard's on Sea, East Sussex, TN38 9BA
Tel: 01424 718618 Fax: 01424 729911

ANALYTICAL REPORT No. AR21167

Location: Tenax Road

2683 2683

F.A.O. Paul McFadden
CC Geotechnical Limited
Essex House, Bridle Road
Bootle, Liverpool
Merseyside, L30 4UE

Your Project No: 09/5512

Reporting Date: 09/06/09

Soil

Characteristic		Sandy Silt Loam
Sampling Date		13/05/09
TP/BH		BH2
Depth (m)		0.40
Our ref		21019
PCB 28**	(µg/kg)	<10
PCB 52**	(µg/kg)	<10
PCB 101**	(µg/kg)	<10
PCB 118**	(µg/kg)	<10
PCB 138**	(µg/kg)	<10
PCB 153**	(µg/kg)	<10
PCB 180**	(µg/kg)	<10

** - MCERTS accredited test

MP

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Tel: 01424 718618 Fax: 01424 729911

ANALYTICAL REPORT No. AR21167

Location: Tenax Road

2683

Your Project No: 09/5512

Reporting Date: 09/06/09

F.A.O. Paul McFadden
CC Geotechnical Limited
Essex House, Bridle Road
Bootle, Liverpool
Merseyside, L30 4UE

Waters

Date Sampled	TP/BH	Depth (m)	Our ref	Total Hardness	Arsenic*	Cadmium*	Chromium*	Lead*	Nickel*	Copper*	Zinc*	Mercury*	Selenium*	Boron	Vanadium	Barium*
				(mg $CaCO_3$/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)
27/05/09	BH2	2.64	21941	473	<5	2	<5	<1	11	28	36	0.1	<5	1594	<5	194

* = UKAS accredited test

MP

THE ENVIRONMENTAL LABORATORY LTD

The Harley Reed Building, Unit C, Drury Lane, Ponswood Industrial Estate, St Leonard's on Sea, East Sussex, TN38 9BA
Tel: 01424 718618 Fax: 01424 729911

ANALYTICAL REPORT No. AR21167

Location: Tenax Road

Your Project No: 09/5512

Reporting Date: 09/06/09

2683

F.A.O. Paul McFadden
CC Geotechnical Limited
Essex House, Bridle Road
Bootle, Liverpool
Merseyside, L30 4UE

Waters

Date Sampled	TP/BH	Depth (m)	Our ref	pH Value*	Sulphate*	Total Cyanide*	Free Cyanide	Complex Cyanide	Elemental Sulphur	Total PAH (SUM DW4#)	TPH (C6-C40)*	Nitrate*
				(Units)	(mg/l)	(µg/l)	(µg/l)	(µg/l)	(mg/l)	(µg/l)	(µg/l)	(mg/l)
27/05/09	BH2	2.64	21941	7.0	335	<5	<5	<5	<0.1	<0.01	<10	<0.5

- Sum of benzo(b)flouranthene, benzo(k)flouranthene, benzo(ghi)perylene & indeno (1,2,3-cd) pyrene
* = UKAS accredited test

MP

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F.A.O. Paul McFadden
CC Geotechnical Limited
Essex House, Bridle Road
Bootle, Liverpool
Merseyside, L30 4UE

Waters

Date Sampled	TP/BH	Depth (m)	Our ref	Naphthalene (µg/l)	Acenaphthylene (µg/l)	Acenaphthene (µg/l)	Fluorene (µg/l)	Phenanthrene (µg/l)	Anthracene (µg/l)	Fluoranthene (µg/l)	Pyrene (µg/l)	Benz(a)anthracene (µg/l)	Chrysene (µg/l)	Benzo(b)fluoranthene (µg/l)	Benzo(k)fluoranthene (µg/l)	Benzo(a)pyrene (µg/l)	Indeno(123-cd)pyrene (µg/l)	Dibenz(ah)anthracene (µg/l)	Benzo(ghi)perylene (µg/l)	Total PAH (µg/l)
27/05/09	BH2	2.64	21941	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

MP

APPENDIX L

CLEA 1.04 WORKSHEETS

CLEA Software Version 1.04

Report generated	16-Jun-09
Report title	Tenax Road
Created by	Paul McFadden at CC GEOTECHNCIAL LTD

RESULTS

		Assessment Criterion (mg kg^{-1})			Ratio of ADE to HCV			Saturation Limit (mg kg^{-1})	50% rule?	
		oral	inhalation	combined	oral	inhalation	combined		Oral	Inhal
1	Aromatic EC5-EC7	4.25E+05	2.95E+04	2.76E+04	0.06	0.94	1.00	1.22E+03 (sol)	No	No
2	Aromatic EC7-EC8 (Toluene)	4.25E+05	6.85E+04	5.90E+04	0.14	0.86	1.00	8.69E+02 (vap)	No	No
3	Aromatic EC8-EC10	3.81E+04	1.90E+02	1.90E+02	0.00	1.00	1.00	5.80E+02 (vap)	Yes	Yes
4	Aromatic EC10-EC12	3.81E+04	1.01E+03	1.01E+03	0.01	0.99	1.00	3.02E+02 (vap)	Yes	Yes
5	Aromatic EC12-EC16	3.81E+04	5.27E+03	5.07E+03	0.07	0.93	1.00	1.37E+02 (vap)	Yes	Yes
6	Aromatic EC16-EC21	1.56E+04	NR	NR	1.00	NR	NR	4.87E+01 (vap)	Yes	No
7	Aromatic EC21-EC35	2.82E+04	NR	NR	1.00	NR	NR	4.38E+00 (vap)	Yes	No
8	Aromatic EC35-EC44	2.82E+04	NR	NR	1.00	NR	NR	4.38E+00 (vap)	Yes	No
9	Aliphatic EC5-EC6	4.77E+06	2.79E+02	2.79E+02	0.00	1.00	1.00	3.27E+02 (vap)	Yes	Yes
10	Aliphatic EC6-EC8	4.77E+06	5.64E+02	5.64E+02	0.00	1.00	1.00	1.45E+02 (vap)	Yes	Yes
11	Aliphatic EC8-EC10	9.53E+04	1.20E+02	1.20E+02	0.00	1.00	1.00	7.15E+01 (vap)	Yes	Yes
12	Aliphatic EC10-EC12	9.53E+04	6.00E+02	5.99E+02	0.00	1.00	1.00	5.02E+00 (sol)	Yes	Yes
13	Aliphatic EC12-EC16	9.53E+04	2.73E+03	2.71E+03	0.01	0.99	1.00	1.84E+01 (vap)	Yes	Yes
14	Aliphatic EC16-EC35	1.91E+06	NR	NR	1.00	NR	NR	8.57E+00 (vap)	Yes	No
15	Aliphatic EC35-EC44	1.91E+06	NR	NR	1.00	NR	NR	6.34E+00 (vap)	Yes	No
16	EC44-EC70	2.86E+04	NR	NR	1.00	NR	NR	4.82E+00 (sol)	Yes	No
17	Benzene	5.53E+02	2.96E+01	2.81E+01	0.05	0.95	1.00	1.22E+03 (sol)	No	No
18	Toluene	4.25E+05	6.85E+04	5.90E+04	0.14	0.86	1.00	8.69E+02 (vap)	No	No
19	Ethylbenzene	1.91E+05	1.84E+04	1.68E+04	0.09	0.91	1.00	5.18E+02 (vap)	No	No
20	Ortho-Xylene	3.43E+05	7.08E+03	6.94E+03	0.02	0.98	1.00	4.78E+02 (sol)	No	No

		Assessment Criterion (mg kg^{-1})			Ratio of ADE to HCV			Saturation Limit (mg kg^{-1})	50% rule?	
		oral	inhalation	combined	oral	inhalation	combined		Oral	Inhal
21	Meta-Xylene	3.43E+05	6.59E+03	6.46E+03	0.02	0.98	1.00	6.25E+02 (vap)	No	No
22	Para-Xylene	3.43E+05	6.34E+03	6.22E+03	0.02	0.98	1.00	5.76E+02 (sol)	No	No
23										
24										
25										
26										
27										
28										
29										
30										

		Soil Distribution				Media Concentrations													
		Sorbed	Dissolved	Vapour	Total	Soil	Soil gas	Indoor Dust	Outdoor dust at 0.8m	Outdoor dust at 1.6m	Indoor Vapour	Outdoor vapour at 0.8m	Outdoor vapour at 1.6m	Green vegetables	Root vegetables	Tuber vegetables	Herbaceous fruit	Shrub fruit	Tree fruit
		%	%	%	%	mg kg^{-1}	mg m^{-3}	mg kg^{-1}	mg m^{-3}	mg m^{-3}	mg m^{-3}	mg m^{-3}	mg m^{-3}	mg kg^{-1} FW	mg kg^{-1} FW	mg kg^{-1} FW	mg kg^{-1} FW	mg kg^{-1} FW	mg kg^{-1} FW
1	Aromatic EC5-EC7	57.3	39.9	2.8	100.0	2.76E+04	4.68E+06	1.38E+04	3.31E-04	1.88E-04	2.82E+01	2.02E+00	1.15E+00	NA	NA	NA	NA	NA	NA
2	Aromatic EC7-EC8 (Toluene)	80.2	18.5	1.3	100.0	5.90E+04	4.60E+06	2.95E+04	7.09E-04	4.02E-04	2.59E+01	2.77E+00	1.57E+00	NA	NA	NA	NA	NA	NA
3	Aromatic EC8-EC10	96.3	2.9	0.8	100.0	1.90E+02	9.57E+03	9.51E+01	2.29E-06	1.30E-06	6.17E-01	8.11E-03	4.60E-03	NA	NA	NA	NA	NA	NA
4	Aromatic EC10-EC12	98.0	1.8	0.2	100.0	1.01E+03	9.49E+03	5.04E+02	1.21E-05	6.86E-06	6.14E-01	1.86E-02	1.06E-02	NA	NA	NA	NA	NA	NA
5	Aromatic EC12-EC16	99.0	0.9	0.0	100.0	5.07E+03	9.16E+03	2.54E+03	6.10E-05	3.45E-05	5.94E-01	4.12E-02	2.33E-02	NA	NA	NA	NA	NA	NA
6	Aromatic EC16-EC21	99.7	0.3	0.0	100.0	1.56E+04	2.21E+03	7.82E+03	1.88E-04	1.07E-04	1.45E-01	3.60E-02	2.04E-02	NA	NA	NA	NA	NA	NA
7	Aromatic EC21-EC35	100.0	0.0	0.0	100.0	2.82E+04	2.59E+01	1.41E+04	3.39E-04	1.92E-04	2.16E-03	6.88E-03	3.90E-03	NA	NA	NA	NA	NA	NA
8	Aromatic EC35-EC44	100.0	0.0	0.0	100.0	2.82E+04	2.59E+01	1.41E+04	3.39E-04	1.92E-04	2.16E-03	6.88E-03	3.90E-03	NA	NA	NA	NA	NA	NA
9	Aliphatic EC5-EC6	44.6	2.6	52.8	100.0	2.79E+02	8.91E+05	1.40E+02	3.35E-06	1.90E-06	5.75E+01	9.48E-02	5.37E-02	NA	NA	NA	NA	NA	NA
10	Aliphatic EC6-EC8	73.0	0.9	26.1	100.0	5.64E+02	8.91E+05	2.82E+02	6.78E-06	3.84E-06	5.75E+01	1.35E-01	7.63E-02	NA	NA	NA	NA	NA	NA
11	Aliphatic EC8-EC10	93.1	0.1	6.7	100.0	1.20E+02	4.88E+04	6.00E+01	1.44E-06	8.17E-07	3.15E+00	1.45E-02	8.24E-03	NA	NA	NA	NA	NA	NA
12	Aliphatic EC10-EC12	98.6	0.0	1.3	100.0	5.99E+02	4.87E+04	3.00E+02	7.20E-06	4.08E-06	3.14E+00	3.25E-02	1.84E-02	NA	NA	NA	NA	NA	NA
13	Aliphatic EC12-EC16	99.7	0.0	0.3	100.0	2.71E+03	4.84E+04	1.36E+03	3.26E-05	1.85E-05	3.12E+00	6.88E-02	3.90E-02	NA	NA	NA	NA	NA	NA
14	Aliphatic EC16-EC35	100.0	0.0	0.0	100.0	1.91E+06	2.55E+06	9.53E+05	2.29E-02	1.30E-02	1.65E+02	1.33E+01	7.51E+00	NA	NA	NA	NA	NA	NA
15	Aliphatic EC35-EC44	100.0	0.0	0.0	100.0	1.91E+06	2.55E+06	9.53E+05	2.29E-02	1.30E-02	1.65E+02	1.33E+01	7.51E+00	NA	NA	NA	NA	NA	NA
16	EC44-EC70	100.0	0.0	0.0	100.0	2.86E+04	2.62E+01	1.43E+04	3.44E-04	1.95E-04	2.19E-03	6.96E-03	3.95E-03	NA	NA	NA	NA	NA	NA
17	Benzene	57.3	39.9	2.8	100.0	2.81E+01	4.77E+03	1.41E+01	3.38E-07	1.92E-07	2.88E-02	2.07E-03	1.17E-03	NA	NA	NA	NA	NA	NA
18	Toluene	80.2	18.5	1.3	100.0	5.90E+04	4.60E+06	2.95E+04	7.09E-04	4.02E-04	2.59E+01	2.77E+00	1.57E+00	NA	NA	NA	NA	NA	NA
19	Ethylbenzene	89.8	9.4	0.8	100.0	1.68E+04	8.08E+05	8.39E+03	2.02E-04	1.14E-04	4.30E+00	5.88E-01	3.33E-01	NA	NA	NA	NA	NA	NA
20	Ortho-Xylene	89.6	9.9	0.6	100.0	6.94E+03	2.31E+05	3.47E+03	8.34E-05	4.72E-05	1.23E+00	2.02E-01	1.14E-01	NA	NA	NA	NA	NA	NA

		Soil Distribution				Media Concentrations													
		Sorbed	Dissolved	Vapour	Total	Soil	Soil gas	Indoor Dust	Outdoor dust at 0.8m	Outdoor dust at 1.6m	Indoor Vapour	Outdoor vapour at 0.8m	Outdoor vapour at 1.6m	Green vegetables	Root vegetables	Tuber vegetables	Herbaceous fruit	Shrub fruit	Tree fruit
		%	%	%	%	mg kg^{-1}	mg m^{-3}	mg kg^{-1}	mg m^{-3}	mg m^{-3}	mg m^{-3}	mg m^{-3}	mg m^{-3}	mg kg^{-1} FW	mg kg^{-1} FW	mg kg^{-1} FW	mg kg^{-1} FW	mg kg^{-1} FW	mg kg^{-1} FW
21	Meta-Xylene	90.7	8.7	0.6	100.0	6.46E+03	2.31E+05	3.23E+03	7.77E-05	4.40E-05	1.23E+00	1.95E-01	1.11E-01	NA	NA	NA	NA	NA	NA
22	Para-Xylene	89.9	9.5	0.6	100.0	6.22E+03	2.31E+05	3.11E+03	7.48E-05	4.24E-05	1.23E+00	1.92E-01	1.09E-01	NA	NA	NA	NA	NA	NA
23																			
24																			
25																			
26																			
27																			
28																			
29																			
30																			

		Average Daily Exposure (mg kg^{-1} bw day^{-1})							Distribution by Pathway (%)							
		Direct soil ingestion	Consumption of homegrown produce and attached soil	Dermal contact with soil and dust	Inhalation of dust	Inhalation of vapour	Background (oral)	Background (inhalation)	Direct soil ingestion	Consumption of homegrown produce and attached soil	Dermal contact with soil and dust	Inhalation of dust	Inhalation of vapour (indoor)	Inhalation of vapour (outdoor)	Background (oral)	Background (inhalation)
1	Aromatic EC5-EC7	1.24E-02	0.00E+00	2.05E-03	7.93E-05	1.30E+00	1.43E-04	7.43E-03	0.94	0.00	0.15	0.01	98.08	0.25	0.01	0.56
2	Aromatic EC7-EC8 (Toluene)	2.66E-02	0.00E+00	4.39E-03	1.70E-04	1.20E+00	1.43E-04	7.43E-03	2.15	0.00	0.35	0.01	96.51	0.36	0.01	0.60
3	Aromatic EC8-EC10	8.56E-05	0.00E+00	1.41E-05	5.47E-07	2.85E-02	1.43E+94	1.43E+94	0.15	0.00	0.02	0.00	49.80	0.02	0.17	49.83
4	Aromatic EC10-EC12	4.54E-04	0.00E+00	7.49E-05	2.90E-06	2.83E-02	1.43E+94	1.43E+94	0.79	0.00	0.13	0.01	49.03	0.05	0.92	49.08
5	Aromatic EC12-EC16	2.28E-03	0.00E+00	3.77E-04	1.46E-05	2.74E-02	1.43E+94	1.43E+94	3.79	0.00	0.63	0.02	45.45	0.11	4.42	45.58
6	Aromatic EC16-EC21	7.04E-03	0.00E+00	1.16E-03	4.50E-05	6.75E-03	1.43E+94	0.00E+00	23.47	0.00	3.88	0.15	22.31	0.20	50.00	0.00
7	Aromatic EC21-EC35	1.27E-02	0.00E+00	2.10E-03	8.12E-05	1.11E-04	1.43E+94	0.00E+00	42.36	0.00	7.00	0.27	0.33	0.04	50.00	0.00
8	Aromatic EC35-EC44	1.27E-02	0.00E+00	2.10E-03	8.12E-05	1.11E-04	1.43E+94	0.00E+00	42.36	0.00	7.00	0.27	0.33	0.04	50.00	0.00
9	Aliphatic EC5-EC6	1.26E-04	0.00E+00	2.08E-05	8.03E-07	2.65E+00	1.43E+94	1.43E+94	0.00	0.00	0.00	0.00	49.99	0.00	0.00	50.00
10	Aliphatic EC6-EC8	2.54E-04	0.00E+00	4.19E-05	1.62E-06	2.65E+00	1.43E+94	1.43E+94	0.00	0.00	0.00	0.00	49.99	0.00	0.01	49.99
11	Aliphatic EC8-EC10	5.40E-05	0.00E+00	8.92E-06	3.45E-07	1.45E-01	1.43E+94	1.43E+94	0.02	0.00	0.00	0.00	49.97	0.01	0.02	49.98
12	Aliphatic EC10-EC12	2.70E-04	0.00E+00	4.45E-05	1.72E-06	1.45E-01	1.43E+94	1.43E+94	0.09	0.00	0.02	0.00	49.87	0.02	0.11	49.89
13	Aliphatic EC12-EC16	1.22E-03	0.00E+00	2.02E-04	7.80E-06	1.44E-01	1.43E+94	1.43E+94	0.42	0.00	0.07	0.00	49.47	0.04	0.49	49.51
14	Aliphatic EC16-EC35	8.58E-01	0.00E+00	1.42E-01	5.49E-03	7.61E+00	1.43E+94	0.00E+00	42.91	0.00	7.09	0.00	0.00	0.00	50.00	0.00
15	Aliphatic EC35-EC44	8.58E-01	0.00E+00	1.42E-01	5.49E-03	7.61E+00	1.43E+94	0.00E+00	42.91	0.00	7.09	0.00	0.00	0.00	50.00	0.00
16	EC44-EC70	1.29E-02	0.00E+00	2.13E-03	8.22E-05	1.12E-04	1.43E+94	0.00E+00	42.91	0.00	7.09	0.00	0.00	0.00	50.00	0.00
17	Benzene	1.27E-05	0.00E+00	2.09E-06	8.09E-08	1.33E-03	0.00E+00	0.00E+00	0.94	0.00	0.16	0.01	98.65	0.25	0.00	0.00
18	Toluene	2.66E-02	0.00E+00	4.39E-03	1.70E-04	1.20E+00	1.43E-04	7.43E-03	2.15	0.00	0.35	0.01	96.51	0.36	0.01	0.60
19	Ethylbenzene	7.55E-03	0.00E+00	1.25E-03	4.83E-05	1.99E-01	7.14E-05	1.86E-03	3.60	0.00	0.60	0.02	94.40	0.46	0.03	0.89
20	Ortho-Xylene	3.12E-03	0.00E+00	5.16E-04	2.00E-05	5.68E-02	1.57E-04	2.00E-03	4.99	0.00	0.82	0.03	90.19	0.52	0.25	3.19

		Average Daily Exposure (mg kg^{-1} bw day^{-1})							Distribution by Pathway (%)							
		Direct soil ingestion	Consumption of homegrown produce and attached soil	Dermal contact with soil and dust	Inhalation of dust	Inhalation of vapour	Background (oral)	Background (inhalation)	Direct soil ingestion	Consumption of homegrown produce	Dermal contact with soil and dust	Inhalation of dust	Inhalation of vapour (indoor)	Inhalation of vapour (outdoor)	Background (oral)	Background (inhalation)
21	Meta-Xylene	2.91E-03	0.00E+00	4.80E-04	1.86E-05	5.69E-02	1.57E-04	2.00E-03	4.66	0.00	0.77	0.03	90.58	0.51	0.25	3.20
22	Para-Xylene	2.80E-03	0.00E+00	4.63E-04	1.79E-05	5.69E-02	1.57E-04	2.00E-03	4.49	0.00	0.74	0.03	90.78	0.50	0.25	3.21
23																
24																
25																
26																
27																
28																
29																
30																

		Oral Health Criteria Value ($\mu g\ kg^{-1}\ BW\ day^{-1}$)		Inhalation Health Criteria Value ($\mu g\ kg^{-1}\ BW\ day^{-1}$)		Oral Mean Daily Intake ($\mu g\ day^{-1}$)	Inhalation Mean Daily Intake ($\mu g\ day^{-1}$)	Air-water partition coefficient (K_{aw}) ($cm^3\ cm^{-3}$)	Coefficient of Diffusion in Air ($m^2\ s^{-1}$)	Coefficient of Diffusion in Water ($m^2\ s^{-1}$)	log K_{oc} ($cm^3\ g^{-1}$)	log K_{ow} (dimensionless)	Dermal Absorption Fraction (dimensionless)	Soil-to-dust transport factor (g g^{-1} DW)	Sub-surface soil to indoor air correction factor (dimensionless)	Bioaccessible fraction in soil (unitless)	Bioaccessible fraction in airborne dust (unitless)
1	Aromatic EC5-EC7	TDI	223	TDI	1400	10	520	1.16E-01	8.77E-06	6.64E-10	1.83	2.13	0.1	0.5	10	1	1
2	Aromatic EC7-EC8 (Toluene)	TDI	223	TDI	1400	10	520	1.15E-01	7.78E-06	5.88E-10	2.31	2.73	0.1	0.5	10	1	1
3	Aromatic EC8-EC10	TDI	40	TDI	57	1E+99	1E+99	4.80E-01	1.00E-05	1.00E-09	3.2	3.7	0.1	0.5	1	1	1
4	Aromatic EC10-EC12	TDI	40	TDI	57	1E+99	1E+99	1.40E-01	1.00E-05	1.00E-09	3.4	3.9	0.1	0.5	1	1	1
5	Aromatic EC12-EC16	TDI	40	TDI	57	1E+99	1E+99	5.30E-02	1.00E-05	1.00E-09	3.7	4.3	0.1	0.5	1	1	1
6	Aromatic EC16-EC21	TDI	30	NR	0	1E+99	0	1.30E-02	1.00E-05	1.00E-09	4.2	4.9	0.1	0.5	1	1	1
7	Aromatic EC21-EC35	TDI	30	NR	0	1E+99	0	6.70E-04	1.00E-05	1.00E-09	5.1	6	0.1	0.5	1	1	1
8	Aromatic EC35-EC44	TDI	30	NR	0	1E+99	0	6.70E-04	1.00E-05	1.00E-09	5.1	6	0.1	0.5	1	1	1
9	Aliphatic EC5-EC6	TDI	5000	TDI	5300	1E+99	1E+99	3.30E+01	1.00E-05	1.00E-09	2.9	3.3	0.1	0.5	1	1	1
10	Aliphatic EC6-EC8	TDI	5000	TDI	5300	1E+99	1E+99	5.00E+01	1.00E-05	1.00E-09	3.6	4.1	0.1	0.5	1	1	1
11	Aliphatic EC8-EC10	TDI	100	TDI	290	1E+99	1E+99	8.00E+01	1.00E-05	1.00E-09	4.5	5.2	0.1	0.5	1	1	1
12	Aliphatic EC10-EC12	TDI	100	TDI	290	1E+99	1E+99	1.20E+02	1.00E-05	1.00E-09	5.4	6.3	0.1	0.5	1	1	1
13	Aliphatic EC12-EC16	TDI	100	TDI	290	1E+99	1E+99	5.20E+02	1.00E-05	1.00E-09	6.7	7.9	0.1	0.5	1	1	1
14	Aliphatic EC16-EC35	TDI	2000	NR	0	1E+99	0	4.90E+03	1.00E-05	1.00E-09	8.8	10.4	0.1	0.5	1	1	1
15	Aliphatic EC35-EC44	TDI	2000	NR	0	1E+99	0	4.90E+03	1.00E-05	1.00E-09	8.8	10.4	0.1	0.5	1	1	1
16	EC44-EC70	TDI	30	NR	0	1E+99	0	6.70E-04	1.00E-05	1.00E-09	5.1	6	0.1	0.5	1	1	1
17	Benzene	ID	0.29	ID	1.4	NR	NR	1.16E-01	8.77E-06	6.64E-10	1.83	2.13	0.1	0.5	10	1	1
18	Toluene	TDI	223	TDI	1400	10	520	1.15E-01	7.78E-06	5.88E-10	2.31	2.73	0.1	0.5	10	1	1
19	Ethylbenzene	TDI	100	TDI	220	5	130	1.39E-01	7.04E-06	5.31E-10	2.65	3.15	0.1	0.5	10	1	1
20	Ortho-Xylene	TDI	180	TDI	60	11	140	9.20E-02	7.01E-06	5.31E-10	2.63	3.12	0.1	0.5	10	1	1

		Oral Health Criteria Value ($\mu g\ kg^{-1}\ BW\ day^{-1}$)		Inhalation Health Criteria Value ($\mu g\ kg^{-1}\ BW\ day^{-1}$)		Oral Mean Daily Intake ($\mu g\ day^{-1}$)	Inhalation Mean Daily Intake ($\mu g\ day^{-1}$)	Air-water partition coefficient (K_{aw}) ($cm^3\ cm^{-3}$)	Coefficient of Diffusion in Air ($m^2\ s^{-1}$)	Coefficient of Diffusion in Water ($m^2\ s^{-1}$)	log K_{oc} ($cm^3\ g^{-1}$)	log K_{ow} (dimensionless)	Dermal Absorption Fraction (dimensionless)	Soil-to-dust transport factor ($g\ g^{-1}$ DW)	Sub-surface soil to indoor air correction factor (dimensionless)	Bioaccessible fraction in soil (unitless)	Bioaccessible fraction in airborne dust (unitless)
21	Meta-Xylene	TDI	180	TDI	60	11	140	1.12E-01	7.03E-06	5.31E-10	2.69	3.2	0.1	0.5	10	1	1
22	Para-Xylene	TDI	180	TDI	60	11	140	1.07E-01	7.04E-06	5.31E-10	2.65	3.15	0.1	0.5	10	1	1
23																	
24																	
25																	
26																	
27																	
28																	
29																	
30																	

		Soil-to-water partition coefficient ($cm^3\ g^{-1}$)	Vapour pressure (Pa)	Water solubility ($mg\ L^{-1}$)	Soil-to-plant concentration factor for green vegetables (mg g^{-1} plant DW or FW basis over mg g^{-1} DW soil)	Soil-to-plant concentration factor for root vegetables (mg g^{-1} plant DW or FW basis over mg g^{-1} DW soil)	Soil-to-plant concentration factor for tuber vegetables (mg g^{-1} plant DW or FW basis over mg g^{-1} DW soil)	Soil-to-plant concentration factor for herbaceous fruit (mg g^{-1} plant DW or FW basis over mg g^{-1} DW soil)	Soil-to-plant concentration factor for shrub fruit (mg g^{-1} plant DW or FW basis over mg g^{-1} DW soil)	Soil-to-plant concentration factor for tree fruit (mg g^{-1} plant DW or FW basis over mg g^{-1} DW soil)
1	Aromatic EC5-EC7	3.92E-01	6.24E+03	1.78E+03	model	model	model	model	model	model
2	Aromatic EC7-EC8 (Toluene)	1.18E+00	1.73E+03	5.90E+02	model	model	model	model	model	model
3	Aromatic EC8-EC10	9.19E+00	5.72E+02	6.50E+01	model	model	model	model	model	model
4	Aromatic EC10-EC12	1.46E+01	5.15E+01	2.50E+01	model	model	model	model	model	model
5	Aromatic EC12-EC16	2.91E+01	3.87E+00	5.80E+00	model	model	model	model	model	model
6	Aromatic EC16-EC21	9.19E+01	8.50E-02	6.50E-01	model	model	model	model	model	model
7	Aromatic EC21-EC35	7.30E+02	3.94E-05	6.60E-03	model	model	model	model	model	model
8	Aromatic EC35-EC44	7.30E+02	3.94E-05	6.60E-03	model	model	model	model	model	model
9	Aliphatic EC5-EC6	4.61E+00	3.03E+04	3.60E+01	model	model	model	model	model	model
10	Aliphatic EC6-EC8	2.31E+01	5.40E+03	5.40E+00	model	model	model	model	model	model
11	Aliphatic EC8-EC10	1.83E+02	5.26E+02	4.30E-01	model	model	model	model	model	model
12	Aliphatic EC10-EC12	1.46E+03	5.17E+01	3.40E-03	model	model	model	model	model	model
13	Aliphatic EC12-EC16	2.91E+04	3.87E+00	7.60E-04	model	model	model	model	model	model
14	Aliphatic EC16-EC35	3.66E+06	1.00E-01	2.50E-06	model	model	model	model	model	model
15	Aliphatic EC35-EC44	3.66E+06	7.40E-02	2.50E-06	model	model	model	model	model	model
16	EC44-EC70	7.30E+02	4.46E-05	6.60E-03	model	model	model	model	model	model
17	Benzene	3.92E-01	6.24E+03	1.78E+03	model	model	model	model	model	model
18	Toluene	1.18E+00	1.73E+03	5.90E+02	model	model	model	model	model	model
19	Ethylbenzene	2.59E+00	5.53E+02	1.80E+02	model	model	model	model	model	model
20	Ortho-Xylene	2.47E+00	3.86E+02	1.73E+02	model	model	model	model	model	model

		Soil-to-water partition coefficient ($cm^3\ g^{-1}$)	Vapour pressure (Pa)	Water solubility ($mg\ L^{-1}$)	Soil-to-plant concentration factor for green vegetables (mg g^{-1} plant DW or FW basis over mg g^{-1} DW soil)	Soil-to-plant concentration factor for root vegetables (mg g^{-1} plant DW or FW basis over mg g^{-1} DW soil)	Soil-to-plant concentration factor for tuber vegetables (mg g^{-1} plant DW or FW basis over mg g^{-1} DW soil)	Soil-to-plant concentration factor for herbaceous fruit (mg g^{-1} plant DW or FW basis over mg g^{-1} DW soil)	Soil-to-plant concentration factor for shrub fruit (mg g^{-1} plant DW or FW basis over mg g^{-1} DW soil)	Soil-to-plant concentration factor for tree fruit (mg g^{-1} plant DW or FW basis over mg g^{-1} DW soil)
21	Meta-Xylene	2.84E+00	4.95E+02	2.00E+02	model	model	model	model	model	model
22	Para-Xylene	2.59E+00	4.75E+02	2.00E+02	model	model	model	model	model	model
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CLEA Software Version 1.04

Report generated	16/06/2009
Report title	Tenax Road
Created by	Paul McFadden at CC GEOTECHNICAL LTD

BASIC SETTINGS

Land Use	Commercial						
Building	Office (pre 1970)						
Receptor	Female (com)	Start age class	17	End age class	17	Exposure Duration	49 years
Soil	Sandy loam						

Exposure Pathways

Direct soil and dust ingestion	✓	Dermal contact with indoor dust	✓	Inhalation of indoor dust	✓
Consumption of homegrown produce	✗	Dermal contact with soil	✓	Inhalation of soil dust	✓
Soil attached to homegrown produce	✗			Inhalation of indoor vapour	✓
				Inhalation of outdoor vapour	✓

Land Use Commercial

Age Class	Exposure Frequencies (days yr^{-1})						Occupation Periods (hr day^{-1})		Soil to skin adherence factors (mg cm^2)		Direct soil ingestion rate (g day^{-1})
	Direct soil ingestion	Consumption of homegrown produce	Dermal contact with indoor dust	Dermal contact with soil	Inhalation of dust and vapour, indoor	Inhalation of dust and vapour, outdoor	Indoors	Outdoors	Indoor	Outdoor	
1	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
2	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
3	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
4	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
5	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
6	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
7	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
8	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
9	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
10	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
11	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
12	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
13	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
14	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
15	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
16	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
17	230	0	230	170	230	170	8.3	0.7	0.14	0.14	0.05
18	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00

Receptor Female (com)

Age Class	Body weight (kg)	Body height (m)	Inhalation rate (m^3 day^{-1})	Max exposed skin factor: Indoor (m^2 m^{-2})	Max exposed skin factor: Outdoor (m^2 m^{-2})	Total skin area (m^2)	Consumption rates (g FW kg^{-1} BW day^{-1}): Green vegetables	Root vegetables	Tuber vegetables	Herbaceous fruit	Shrub fruit	Tree fruit
1	5.60	0.7	8.5	0.00	0.00	3.43E-01	7.12	10.69	16.03	1.83	2.23	3.82
2	9.80	0.8	13.3	0.00	0.00	4.84E-01	6.85	3.30	5.46	3.96	0.54	11.96
3	12.70	0.9	12.7	0.00	0.00	5.82E-01	6.85	3.30	5.46	3.96	0.54	11.96
4	15.10	0.9	12.2	0.00	0.00	6.36E-01	6.85	3.30	5.46	3.96	0.54	11.96
5	16.90	1.0	12.2	0.00	0.00	7.04E-01	3.74	1.77	3.38	1.85	0.16	4.26
6	19.70	1.1	12.2	0.00	0.00	7.94E-01	3.74	1.77	3.38	1.85	0.16	4.26
7	22.10	1.2	12.4	0.00	0.00	8.73E-01	3.74	1.77	3.38	1.85	0.16	4.26
8	25.30	1.2	12.4	0.00	0.00	9.36E-01	3.74	1.77	3.38	1.85	0.16	4.26
9	27.50	1.3	12.4	0.00	0.00	1.01E+00	3.74	1.77	3.38	1.85	0.16	4.26
10	31.40	1.3	12.4	0.00	0.00	1.08E+00	3.74	1.77	3.38	1.85	0.16	4.26
11	35.70	1.4	12.4	0.00	0.00	1.19E+00	3.74	1.77	3.38	1.85	0.16	4.26
12	41.30	1.4	13.4	0.00	0.00	1.29E+00	3.74	1.77	3.38	1.85	0.16	4.26
13	47.20	1.5	13.4	0.00	0.00	1.42E+00	3.74	1.77	3.38	1.85	0.16	4.26
14	51.20	1.6	13.4	0.00	0.00	1.52E+00	3.74	1.77	3.38	1.85	0.16	4.26
15	56.70	1.6	13.4	0.00	0.00	1.60E+00	3.74	1.77	3.38	1.85	0.16	4.26
16	59.00	1.6	13.4	0.00	0.00	1.63E+00	3.74	1.77	3.38	1.85	0.16	4.26
17	70.00	1.6	14.8	0.08	0.08	1.78E+00	2.94	1.40	1.79	1.61	0.22	2.97
18	70.90	1.6	12.0	0.00	0.00	1.80E+00	2.94	1.40	1.79	1.61	0.22	2.97

Building Office (pre 1970)

Building footprint (m^2)	4.24E+02
Living space air exchange rate (hr^{-1})	1.00E+00
Living space height (above ground, m)	9.60E+00
Living space height (below ground, m)	0.00E+00
Pressure difference (soil to enclosed space, Pa)	4.40E+00
Foundation thickness (m)	1.50E-01
Floor crack area (cm^2)	1.65E+03
Dust loading factor ($\mu g\ m^{-3}$)	1.00E+02

Soil Sandy loam

Porosity, Total ($cm^3\ cm^{-3}$)	5.30E-01
Porosity, Air-Filled ($cm^3\ cm^{-3}$)	2.00E-01
Porosity, Water-Filled ($cm^3\ cm^{-3}$)	3.30E-01
Residual soil water content ($cm^3\ cm^{-3}$)	1.20E-01
Saturated hydraulic conductivity ($cm\ s^{-1}$)	3.56E-03
van Genuchten shape parameter *m* (dimensionless)	3.20E-01
Bulk density ($g\ cm^{-3}$)	1.21E+00
Threshold value of wind speed at 10m ($m\ s^{-1}$)	7.20E+00
Empirical function (F_x) for dust model (dimensionless)	1.22E+00
Ambient soil temperature (K)	2.83E+02
Soil pH	7.00E+00
Soil Organic Matter content (%)	1.00E+00
Fraction of organic carbon ($g\ g^{-1}$)	5.80E-03
Effective total fluid saturation (unitless)	5.12E-01
Intrinsic soil permeability (cm^2)	4.75E-08
Relative soil air permeability (unitless)	6.42E-01
Effective air permeability (cm^2)	3.05E-08

Soil - Vapour Model

Depth to top of source (no building) (cm)	0
Depth to top of source (beneath building) (cm)	65
Default soil gas ingress rate?	Yes
Soil gas ingress rate ($cm^3\ s^{-1}$)	1.50E+02
Building ventilation rate ($cm^3\ s^{-1}$)	1.13E+06
Averaging time surface emissions (yr)	49
Finite vapour source model?	No
Thickness of contaminated layer (cm)	200

Air Dispersion Model

Mean annual windspeed at 10m ($m\ s^{-1}$)		5.00
Air dispersion factor at height of 0.8m *		68.00
Air dispersion factor at height of 1.6m *		120.00
Fraction of site cover ($m^2\ m^{-2}$)		0.8

* Air dispersion factor in $g\ m^{-2}\ s^{-1}$ per $kg\ m^{-3}$

Soil - Plant Model

	Dry weight conversion factor	Homegrown fraction Average	Homegrown fraction High	Soil loading factor	Preparation correction factor
	g DW g^{-1} FW	dimensionless		g g^{-1} DW	dimensionless
Green vegetables	0.096	0.05	0.33	1.00E-03	2.00E-01
Root vegetables	0.103	0.06	0.40	1.00E-03	1.00E+00
Tuber vegetables	0.210	0.02	0.13	1.00E-03	1.00E+00
Herbaceous fruit	0.058	0.06	0.40	1.00E-03	6.00E-01
Shrub fruit	0.166	0.09	0.60	1.00E-03	6.00E-01
Tree fruit	0.157	0.04	0.27	1.00E-03	6.00E-01

Gardener type None

CLEA Software Version 1.04

Report generated	16-Jun-09
Report title	Tenax Road
Created by	Paul McFadden at CC GEOTECHNICAL LTD

RESULTS

		Assessment Criterion (mg kg^{-1})			Ratio of ADE to HCV			Saturation Limit (mg kg^{-1})	50% rule?	
		oral	inhalation	combined	oral	inhalation	combined		Oral	Inhal
1	Naphthalene	3.64E+04	2.05E+02	2.04E+02	0.01	0.99	1.00	7.64E+01 (sol)	No	No
2	Acenaphthylene	1.83E+05	4.36E+04	3.85E+04	0.21	0.79	1.00	2.39E+02 (sol)	No	Yes
3	Acenaphthene	1.10E+05	1.25E+05	6.84E+04	0.62	0.38	1.00	1.57E+02 (sol)	No	Yes
4	Fluorene	7.31E+04	2.47E+06	7.21E+04	0.99	0.01	1.00	1.53E+02 (sol)	No	Yes
5	Phenanthrene	3.65E+04	1.77E+03	1.69E+03	0.05	0.95	1.00	1.46E+02 (sol)	No	No
6	Anthracene	5.49E+05	6.32E+06	5.25E+05	0.96	0.04	1.00	7.71E+00 (sol)	No	Yes
7	Fluoranthene	7.32E+04	3.22E+06	7.23E+04	0.99	0.01	1.00	1.89E+01 (vap)	No	Yes
8	Pyrene	5.49E+04	2.37E+06	5.42E+04	0.99	0.01	1.00	2.20E+00 (vap)	No	Yes
9	Benz(a)anthracene	3.66E+02	2.02E+02	1.30E+02	0.36	0.64	1.00	1.71E+00 (sol)	No	No
10	Chrysene	3.66E+03	2.20E+03	1.37E+03	0.38	0.62	1.00	4.40E-01 (vap)	No	No
11	Benzo(b)fluoranthene	3.66E+02	2.28E+02	1.40E+02	0.38	0.62	1.00	1.22E+00 (sol)	No	No
12	Benzo(k)fluoranthene	3.66E+02	2.31E+02	1.41E+02	0.39	0.61	1.00	6.87E-01 (sol)	No	No
13	Benzo(a)pyrene	3.66E+01	2.30E+01	1.41E+01	0.39	0.61	1.00	9.11E-01 (vap)	No	No
14	Indeno(123-cd)pyrene	3.66E+02	2.27E+02	1.40E+02	0.38	0.62	1.00	6.14E-02 (vap)	No	No
15	Dibenz(ah)anthracene	3.66E+01	2.33E+01	1.42E+01	0.39	0.61	1.00	6.48E-01 (sol)	No	No
16	Benzo(ghi)perylene	3.66E+03	2.36E+03	1.43E+03	0.39	0.61	1.00	1.87E-02 (vap)	No	No
17										
18										
19										
20										

	Assessment Criterion (mg kg^{-1})			Ratio of ADE to HCV			Saturation Limit (mg kg^{-1})	50% rule?	
	oral	inhalation	combined	oral	inhalation	combined		Oral	Inhal
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		Soil Distribution				Media Concentrations													
		Sorbed	Dissolved	Vapour	Total	Soil	Soil gas	Indoor Dust	Outdoor dust at 0.8m	Outdoor dust at 1.6m	Indoor Vapour	Outdoor vapour at 0.8m	Outdoor vapour at 1.6m	Green vegetables	Root vegetables	Tuber vegetables	Herbaceous fruit	Shrub fruit	Tree fruit
		%	%	%	%	mg kg^{-1}	mg m^{-3}	mg kg^{-1}	mg m^{-3}	mg m^{-3}	mg m^{-3}	mg m^{-3}	mg m^{-3}	mg kg^{-1} FW	mg kg^{-1} FW	mg kg^{-1} FW	mg kg^{-1} FW	mg kg^{-1} FW	mg kg^{-1} FW
1	Naphthalene	93.2	6.8	0.0	100.0	2.04E+02	3.36E+02	1.02E+02	2.45E-06	1.39E-06	1.76E-02	1.31E-03	7.41E-04	NA	NA	NA	NA	NA	NA
2	Acenaphthylene	98.2	1.8	0.0	100.0	3.85E+04	8.81E+03	1.92E+04	4.62E-04	2.62E-04	9.47E-01	2.35E-01	1.33E-01	NA	NA	NA	NA	NA	NA
3	Acenaphthene	99.3	0.7	0.0	100.0	6.84E+04	8.14E+03	3.42E+04	8.22E-04	4.66E-04	3.48E-01	1.01E-01	5.70E-02	NA	NA	NA	NA	NA	NA
4	Fluorene	99.7	0.3	0.0	100.0	7.21E+04	2.85E+03	3.60E+04	8.66E-04	4.91E-04	1.20E-01	6.04E-02	3.42E-02	NA	NA	NA	NA	NA	NA
5	Phenanthrene	99.8	0.2	0.0	100.0	1.69E+03	1.66E+01	8.43E+02	2.03E-05	1.15E-05	1.26E-03	1.19E-03	6.75E-04	NA	NA	NA	NA	NA	NA
6	Anthracene	99.8	0.2	0.0	100.0	5.25E+05	4.90E+03	2.62E+05	6.31E-03	3.58E-03	2.29E-01	2.31E-01	1.31E-01	NA	NA	NA	NA	NA	NA
7	Fluoranthene	99.7	0.3	0.0	100.0	7.23E+04	4.30E+01	3.62E+04	8.69E-04	4.92E-04	4.50E-03	2.11E-02	1.20E-02	NA	NA	NA	NA	NA	NA
8	Pyrene	99.7	0.3	0.0	100.0	5.42E+04	3.24E+01	2.71E+04	6.52E-04	3.69E-04	3.47E-03	1.67E-02	9.47E-03	NA	NA	NA	NA	NA	NA
9	Benz(a)anthracene	99.9	0.1	0.0	100.0	1.30E+02	9.13E-03	6.51E+01	1.56E-06	8.87E-07	1.05E-06	1.71E-05	9.71E-06	NA	NA	NA	NA	NA	NA
10	Chrysene	99.9	0.1	0.0	100.0	1.37E+03	1.37E-02	6.87E+02	1.65E-05	9.35E-06	1.79E-06	2.07E-04	1.17E-04	NA	NA	NA	NA	NA	NA
11	Benzo(b)fluoranthene	100.0	0.0	0.0	100.0	1.40E+02	4.74E-04	7.02E+01	1.69E-06	9.56E-07	6.22E-08	1.50E-05	8.52E-06	NA	NA	NA	NA	NA	NA
12	Benzo(k)fluoranthene	100.0	0.0	0.0	100.0	1.41E+02	2.87E-04	7.07E+01	1.70E-06	9.63E-07	3.77E-08	1.27E-05	7.21E-06	NA	NA	NA	NA	NA	NA
13	Benzo(a)pyrene	100.0	0.0	0.0	100.0	1.41E+01	3.32E-05	7.05E+00	1.69E-07	9.60E-08	4.37E-09	1.37E-06	7.76E-07	NA	NA	NA	NA	NA	NA
14	Indeno(123-cd)pyrene	99.9	0.1	0.0	100.0	1.40E+02	5.67E-04	7.00E+01	1.68E-06	9.53E-07	7.44E-08	1.62E-05	9.16E-06	NA	NA	NA	NA	NA	NA
15	Dibenz(ah)anthracene	100.0	0.0	0.0	100.0	1.42E+01	7.11E-08	7.12E+00	1.71E-07	9.69E-08	3.88E-10	1.10E-06	6.26E-07	NA	NA	NA	NA	NA	NA
16	Benzo(ghi)perylene	100.0	0.0	0.0	100.0	1.43E+03	1.40E-03	7.17E+02	1.72E-05	9.76E-06	1.83E-07	7.63E-05	4.32E-05	NA	NA	NA	NA	NA	NA
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	Soil Distribution				Media Concentrations												
	Sorbed	Dissolved	Vapour	Total	Soil	Soil gas	Indoor Dust	Outdoor dust at 0.8m	Outdoor dust at 1.6m	Indoor Vapour	Outdoor vapour at 0.8m	Outdoor vapour at 1.6m	Green vegetables	Root vegetables	Tuber vegetables	Herbaceous fruit	Shrub fruit	Tree fruit
	%	%	%	%	mg kg^{-1}	mg m^{-3}	mg kg^{-1}	mg m^{-3}	mg m^{-3}	mg m^{-3}	mg m^{-3}	mg m^{-3}	mg kg^{-1} FW	mg kg^{-1} FW	mg kg^{-1} FW	mg kg^{-1} FW	mg kg^{-1} FW	mg kg^{-1} FW
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		Average Daily Exposure (mg kg^{-1} bw day^{-1})							Distribution by Pathway (%)							
		Direct soil ingestion	Consumption of homegrown produce and attached soil	Dermal contact with soil and dust	Inhalation of dust	Inhalation of vapour	Background (oral)	Background (inhalation)	Direct soil ingestion	Consumption of homegrown produce and attached soil	Dermal contact with soil and dust	Inhalation of dust	Inhalation of vapour (indoor)	Inhalation of vapour (outdoor)	Background (oral)	Background (inhalation)
1	Naphthalene	9.17E-05	0.00E+00	1.97E-05	5.86E-07	8.15E-04	1.00E-04	4.00E-05	8.59	0.00	1.85	0.05	76.18	0.20	9.37	3.75
2	Acenaphthylene	1.73E-02	0.00E+00	3.72E-03	1.11E-04	4.40E-02	2.00E-06	1.41E+96	15.85	0.00	3.40	0.10	39.92	0.35	0.00	40.37
3	Acenaphthene	3.08E-02	0.00E+00	6.61E-03	1.97E-04	1.62E-02	1.40E-05	1.41E+96	43.84	0.00	9.41	0.28	22.85	0.23	0.02	23.37
4	Fluorene	3.24E-02	0.00E+00	6.96E-03	2.07E-04	5.63E-03	8.40E-06	1.41E+96	63.49	0.00	13.63	0.41	10.83	0.19	0.02	11.43
5	Phenanthrene	7.59E-04	0.00E+00	1.63E-04	4.85E-06	5.98E-05	2.20E-05	2.20E-06	75.09	0.00	16.12	0.48	5.73	0.19	2.18	0.22
6	Anthracene	2.36E-01	0.00E+00	5.07E-02	1.51E-03	1.09E-02	1.20E-06	1.41E+96	75.75	0.00	16.26	0.48	3.39	0.12	0.00	3.99
7	Fluoranthene	3.26E-02	0.00E+00	6.99E-03	2.08E-04	2.42E-04	5.00E-06	1.41E+96	80.48	0.00	17.28	0.51	0.51	0.08	0.01	1.11
8	Pyrene	2.44E-02	0.00E+00	5.24E-03	1.56E-04	1.87E-04	5.00E-06	1.41E+96	80.45	0.00	17.27	0.51	0.53	0.09	0.02	1.13
9	Benz(a)anthracene	5.86E-05	0.00E+00	1.26E-05	3.75E-07	7.62E-08	0.00E+00	0.00E+00	81.81	0.00	17.56	0.52	0.07	0.04	0.00	0.00
10	Chrysene	6.18E-04	0.00E+00	1.33E-04	3.95E-06	4.20E-07	0.00E+00	0.00E+00	81.85	0.00	17.57	0.52	0.01	0.04	0.00	0.00
11	Benzo(b)fluoranthene	6.32E-05	0.00E+00	1.36E-05	4.04E-07	2.73E-08	0.00E+00	0.00E+00	81.87	0.00	17.58	0.52	0.00	0.03	0.00	0.00
12	Benzo(k)fluoranthene	6.37E-05	0.00E+00	1.37E-05	4.07E-07	2.25E-08	0.00E+00	0.00E+00	81.87	0.00	17.58	0.52	0.00	0.03	0.00	0.00
13	Benzo(a)pyrene	6.35E-06	0.00E+00	1.36E-06	4.06E-08	2.43E-09	0.00E+00	0.00E+00	81.87	0.00	17.58	0.52	0.00	0.03	0.00	0.00
14	Indeno(123-cd)pyrene	6.30E-05	0.00E+00	1.35E-05	4.03E-07	2.97E-08	0.00E+00	0.00E+00	81.86	0.00	17.58	0.52	0.00	0.03	0.00	0.00
15	Dibenz(ah)anthracene	6.41E-06	0.00E+00	1.38E-06	4.09E-08	1.82E-09	0.00E+00	0.00E+00	81.88	0.00	17.58	0.52	0.00	0.02	0.00	0.00
16	Benzo(ghi)perylene	6.45E-04	0.00E+00	1.39E-04	4.12E-06	1.33E-07	0.00E+00	0.00E+00	81.88	0.00	17.58	0.52	0.00	0.02	0.00	0.00
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	Average Daily Exposure (mg kg^{-1} bw day^{-1})							Distribution by Pathway (%)							
	Direct soil ingestion	Consumption of homegrown produce and attached soil	Dermal contact with soil and dust	Inhalation of dust	Inhalation of vapour	Background (oral)	Background (inhalation)	Direct soil ingestion	Consumption of homegrown produce	Dermal contact with soil and dust	Inhalation of dust	Inhalation of vapour (indoor)	Inhalation of vapour (outdoor)	Background (oral)	Background (inhalation)
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		Oral Health Criteria Value (µg kg^{-1} BW day^{-1})		Inhalation Health Criteria Value (µg kg^{-1} BW day^{-1})		Oral Mean Daily Intake (µg day^{-1})	Inhalation Mean Daily Intake (µg day^{-1})	Air-water partition coefficient (K_{aw}) (cm^3 cm^{-3})	Coefficient of Diffusion in Air (m^2 s^{-1})	Coefficient of Diffusion in Water (m^2 s^{-1})	log K_{oc} (cm^3 g^{-1})	log K_{ow} (dimensionless)	Dermal Absorption Fraction (dimensionless)	Soil-to-dust transport factor (g g^{-1} DW)	Sub-surface soil to indoor air correction factor (dimensionless)	Bioaccessible fraction in soil (unitless)	Bioaccessible fraction in airborne dust (unitless)
1	Naphthalene	TDI	20	TDI	0.86	7	2.8	6.62E-03	6.52E-06	5.16E-10	2.81	3.34	0.13	0.5	1	1	1
2	Acenaphthylene	TDI	100	TDI	100	0.14	9.9E+100	3.40E-03	4.38E-05	7.53E-10	3.4	4	0.13	0.5	1	1	1
3	Acenaphthene	TDI	60	TDI	60	0.98	9.9E+100	4.92E-03	4.20E-06	7.69E-10	3.85	3.92	0.13	0.5	1	1	1
4	Fluorene	TDI	40	TDI	400	0.588	9.9E+100	3.18E-03	3.60E-06	7.88E-10	4.14	4.18	0.13	0.5	1	1	1
5	Phenanthrene	TDI	20	TDI	0.07	1.54	0.154	1.31E-03	1.00E-05	1.00E-09	4.36	4.57	0.13	0.5	1	1	1
6	Anthracene	TDI	300	TDI	300	0.084	9.9E+100	1.60E-03	3.20E-06	7.74E-10	4.47	4.54	0.13	0.5	1	1	1
7	Fluoranthene	TDI	40	TDI	40	0.35	9.9E+100	6.29E-05	5.01E-06	4.11E-10	4.26	5.13	0.13	0.5	1	1	1
8	Pyrene	TDI	30	TDI	30	0.35	9.9E+100	5.64E-05	5.01E-06	4.15E-10	4.21	5.08	0.13	0.5	1	1	1
9	Benz(a)anthracene	ID	0.2	ID	0.0007	NR	NR	3.16E-05	4.60E-06	3.80E-10	4.89	5.91	0.13	0.5	1	1	1
10	Chrysene	ID	2	ID	0.007	NR	NR	3.18E-06	4.57E-06	3.77E-10	4.74	5.73	0.13	0.5	1	1	1
11	Benzo(b)fluoranthene	ID	0.2	ID	0.0007	NR	NR	2.05E-06	4.36E-06	3.62E-10	5.02	6.08	0.13	0.5	1	1	1
12	Benzo(k)fluoranthene	ID	0.2	ID	0.0007	NR	NR	1.74E-06	4.36E-06	3.62E-10	5.17	6.26	0.13	0.5	1	1	1
13	Benzo(a)pyrene	ID	0.02	ID	0.00007	NR	NR	1.76E-06	4.38E-06	3.67E-10	5.11	6.18	0.13	0.5	1	1	1
14	Indeno(123-cd)pyrene	ID	0.2	ID	0.0007	NR	NR	2.05E-06	4.17E-06	3.51E-10	4.94	5.97	0.13	0.5	1	1	1
15	Dibenz(ah)anthracene	ID	0.02	ID	0.00007	NR	NR	5.40E-09	4.08E-06	3.40E-10	5.27	6.38	0.13	0.5	1	1	1
16	Benzo(ghi)perylene	ID	2	ID	0.007	NR	NR	2.36E-06	4.22E-06	3.56E-10	5.62	6.81	0.13	0.5	1	1	1
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	Oral Health Criteria Value (µg kg^{-1} BW day^{-1})		Inhalation Health Criteria Value (µg kg^{-1} BW day^{-1})		Oral Mean Daily Intake (µg day^{-1})	Inhalation Mean Daily Intake (µg day^{-1})	Air-water partition coefficient (K_{aw}) (cm^3 cm^{-3})	Coefficient of Diffusion in Air (m^2 s^{-1})	Coefficient of Diffusion in Water (m^2 s^{-1})	log K_{oc} (cm^3 g^{-1})	log K_{ow} (dimensionless)	Dermal Absorption Fraction (dimensionless)	Soil-to-dust transport factor (g g^{-1} DW)	Sub-surface soil to indoor air correction factor (dimensionless)	Bioaccessible fraction in soil (unitless)	Bioaccessible fraction in airborne dust (unitless)
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		Soil-to-water partition coefficient ($cm^3\ g^{-1}$)	Vapour pressure (Pa)	Water solubility ($mg\ L^{-1}$)	Soil-to-plant concentration factor for green vegetables (mg g^{-1} plant DW or FW basis over mg g^{-1} DW soil)	Soil-to-plant concentration factor for root vegetables (mg g^{-1} plant DW or FW basis over mg g^{-1} DW soil)	Soil-to-plant concentration factor for tuber vegetables (mg g^{-1} plant DW or FW basis over mg g^{-1} DW soil)	Soil-to-plant concentration factor for herbaceous fruit (mg g^{-1} plant DW or FW basis over mg g^{-1} DW soil)	Soil-to-plant concentration factor for shrub fruit (mg g^{-1} plant DW or FW basis over mg g^{-1} DW soil)	Soil-to-plant concentration factor for tree fruit (mg g^{-1} plant DW or FW basis over mg g^{-1} DW soil)
1	Naphthalene	3.74E+00	2.31E+00	1.90E+01	model	model	model	model	model	model
2	Acenaphthylene	1.46E+01	4.14E+00	1.61E+01	model	model	model	model	model	model
3	Acenaphthene	4.11E+01	1.20E+00	3.80E+00	model	model	model	model	model	model
4	Fluorene	8.01E+01	5.70E-01	1.90E+00	model	model	model	model	model	model
5	Phenanthrene	1.33E+02	8.70E-02	1.10E+00	model	model	model	model	model	model
6	Anthracene	1.71E+02	5.88E-02	4.50E-02	model	model	model	model	model	model
7	Fluoranthene	1.06E+02	1.31E-04	2.30E-01	model	model	model	model	model	model
8	Pyrene	9.41E+01	1.53E-05	1.30E-01	model	model	model	model	model	model
9	Benz(a)anthracene	4.50E+02	1.24E-06	3.80E-03	model	model	model	model	model	model
10	Chrysene	3.19E+02	4.52E-08	2.00E-03	model	model	model	model	model	model
11	Benzo(b)fluoranthene	6.07E+02	6.34E-08	2.00E-03	model	model	model	model	model	model
12	Benzo(k)fluoranthene	8.58E+02	1.64E-08	8.00E-04	model	model	model	model	model	model
13	Benzo(a)pyrene	7.47E+02	2.00E-08	3.80E-03	model	model	model	model	model	model
14	Indeno(123-cd)pyrene	5.05E+02	2.12E-09	2.04E-04	model	model	model	model	model	model
15	Dibenz(ah)anthracene	1.08E+03	1.66E-10	6.00E-04	model	model	model	model	model	model
16	Benzo(ghi)perylene	2.42E+03	1.55E-10	2.60E-04	model	model	model	model	model	model
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	Soil-to-water partition coefficient ($cm^3\ g^{-1}$)	Vapour pressure (Pa)	Water solubility ($mg\ L^{-1}$)	Soil-to-plant concentration factor for green vegetables (mg g^{-1} plant DW or FW basis over mg g^{-1} DW soil)	Soil-to-plant concentration factor for root vegetables (mg g^{-1} plant DW or FW basis over mg g^{-1} DW soil)	Soil-to-plant concentration factor for tuber vegetables (mg g^{-1} plant DW or FW basis over mg g^{-1} DW soil)	Soil-to-plant concentration factor for herbaceous fruit (mg g^{-1} plant DW or FW basis over mg g^{-1} DW soil)	Soil-to-plant concentration factor for shrub fruit (mg g^{-1} plant DW or FW basis over mg g^{-1} DW soil)	Soil-to-plant concentration factor for tree fruit (mg g^{-1} plant DW or FW basis over mg g^{-1} DW soil)
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CLEA Software Version 1.04

Report generated	16/06/2009
Report title	Tenax Road
Created by	Paul McFadden at CC GEOTECHNICAL LTD

BASIC SETTINGS

Land Use	Commercial					
Building	Office (pre 1970)					
Receptor	Female (com)	Start age class	17	End age class	17	Exposure Duration 49 years
Soil	Sandy loam					

Exposure Pathways

Direct soil and dust ingestion	✓	Dermal contact with indoor dust	✓	Inhalation of indoor dust	✓
Consumption of homegrown produce	✗	Dermal contact with soil	✓	Inhalation of soil dust	✓
Soil attached to homegrown produce	✗			Inhalation of indoor vapour	✓
				Inhalation of outdoor vapour	✓

Land Use Commercial

	Exposure Frequencies (days yr^{-1})						Occupation Periods (hr day^{-1})		Soil to skin adherence factors (mg cm^2)		Direct soil ingestion rate (g day^{-1})
Age Class	Direct soil ingestion	Consumption of homegrown produce	Dermal contact with indoor dust	Dermal contact with soil	Inhalation of dust and vapour, indoor	Inhalation of dust and vapour, outdoor	Indoors	Outdoors	Indoor	Outdoor	
1	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
2	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
3	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
4	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
5	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
6	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
7	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
8	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
9	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
10	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
11	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
12	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
13	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
14	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
15	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
16	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
17	230	0	230	170	230	170	8.3	0.7	0.14	0.14	0.05
18	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00

Receptor Female (com)

Age Class	Body weight (kg)	Body height (m)	Inhalation rate (m^3 day^{-1})	Max exposed skin factor: Indoor (m^2 m^{-2})	Max exposed skin factor: Outdoor (m^2 m^{-2})	Total skin area (m^2)	Consumption rates (g FW kg^{-1} BW day^{-1}): Green vegetables	Root vegetables	Tuber vegetables	Herbaceous fruit	Shrub fruit	Tree fruit
1	5.60	0.7	8.5	0.00	0.00	3.43E-01	7.12	10.69	16.03	1.83	2.23	3.82
2	9.80	0.8	13.3	0.00	0.00	4.84E-01	6.85	3.30	5.46	3.96	0.54	11.96
3	12.70	0.9	12.7	0.00	0.00	5.82E-01	6.85	3.30	5.46	3.96	0.54	11.96
4	15.10	0.9	12.2	0.00	0.00	6.36E-01	6.85	3.30	5.46	3.96	0.54	11.96
5	16.90	1.0	12.2	0.00	0.00	7.04E-01	3.74	1.77	3.38	1.85	0.16	4.26
6	19.70	1.1	12.2	0.00	0.00	7.94E-01	3.74	1.77	3.38	1.85	0.16	4.26
7	22.10	1.2	12.4	0.00	0.00	8.73E-01	3.74	1.77	3.38	1.85	0.16	4.26
8	25.30	1.2	12.4	0.00	0.00	9.36E-01	3.74	1.77	3.38	1.85	0.16	4.26
9	27.50	1.3	12.4	0.00	0.00	1.01E+00	3.74	1.77	3.38	1.85	0.16	4.26
10	31.40	1.3	12.4	0.00	0.00	1.08E+00	3.74	1.77	3.38	1.85	0.16	4.26
11	35.70	1.4	12.4	0.00	0.00	1.19E+00	3.74	1.77	3.38	1.85	0.16	4.26
12	41.30	1.4	13.4	0.00	0.00	1.29E+00	3.74	1.77	3.38	1.85	0.16	4.26
13	47.20	1.5	13.4	0.00	0.00	1.42E+00	3.74	1.77	3.38	1.85	0.16	4.26
14	51.20	1.6	13.4	0.00	0.00	1.52E+00	3.74	1.77	3.38	1.85	0.16	4.26
15	56.70	1.6	13.4	0.00	0.00	1.60E+00	3.74	1.77	3.38	1.85	0.16	4.26
16	59.00	1.6	13.4	0.00	0.00	1.63E+00	3.74	1.77	3.38	1.85	0.16	4.26
17	70.00	1.6	14.8	0.08	0.08	1.78E+00	2.94	1.40	1.79	1.61	0.22	2.97
18	70.90	1.6	12.0	0.00	0.00	1.80E+00	2.94	1.40	1.79	1.61	0.22	2.97

Building Office (pre 1970)

Building footprint (m^2)	4.24E+02
Living space air exchange rate (hr^{-1})	1.00E+00
Living space height (above ground, m)	9.60E+00
Living space height (below ground, m)	0.00E+00
Pressure difference (soil to enclosed space, Pa)	4.40E+00
Foundation thickness (m)	1.50E-01
Floor crack area (cm^2)	1.65E+03
Dust loading factor ($\mu g\ m^{-3}$)	1.00E+02

Soil Sandy loam

Porosity, Total ($cm^3\ cm^{-3}$)	5.30E-01
Porosity, Air-Filled ($cm^3\ cm^{-3}$)	2.00E-01
Porosity, Water-Filled ($cm^3\ cm^{-3}$)	3.30E-01
Residual soil water content ($cm^3\ cm^{-3}$)	1.20E-01
Saturated hydraulic conductivity ($cm\ s^{-1}$)	3.56E-03
van Genuchten shape parameter *m* (dimensionless)	3.20E-01
Bulk density ($g\ cm^{-3}$)	1.21E+00
Threshold value of wind speed at 10m ($m\ s^{-1}$)	7.20E+00
Empirical function (F_x) for dust model (dimensionless)	1.22E+00
Ambient soil temperature (K)	2.83E+02
Soil pH	7.00E+00
Soil Organic Matter content (%)	1.00E+00
Fraction of organic carbon ($g\ g^{-1}$)	5.80E-03
Effective total fluid saturation (unitless)	5.12E-01
Intrinsic soil permeability (cm^2)	4.75E-08
Relative soil air permeability (unitless)	6.42E-01
Effective air permeability (cm^2)	3.05E-08

Soil - Vapour Model

Depth to top of source (no building) (cm)	0
Depth to top of source (beneath building) (cm)	65
Default soil gas ingress rate?	Yes
Soil gas ingress rate ($cm^3\ s^{-1}$)	1.50E+02
Building ventilation rate ($cm^3\ s^{-1}$)	1.13E+06
Averaging time surface emissions (yr)	49
Finite vapour source model?	No
Thickness of contaminated layer (cm)	200

Air Dispersion Model

Mean annual windspeed at 10m ($m\ s^{-1}$)		5.00
Air dispersion factor at height of 0.8m *		68.00
Air dispersion factor at height of 1.6m *		120.00
Fraction of site cover ($m^2\ m^{-2}$)		0.8

* Air dispersion factor in $g\ m^{-2}\ s^{-1}$ per $kg\ m^{-3}$

Soil - Plant Model

	Dry weight conversion factor	Homegrown fraction Average	Homegrown fraction High	Soil loading factor	Preparation correction factor
	g DW g^{-1} FW	dimensionless		g g^{-1} DW	dimensionless
Green vegetables	0.096	0.05	0.33	1.00E-03	2.00E-01
Root vegetables	0.103	0.06	0.40	1.00E-03	1.00E+00
Tuber vegetables	0.210	0.02	0.13	1.00E-03	1.00E+00
Herbaceous fruit	0.058	0.06	0.40	1.00E-03	6.00E-01
Shrub fruit	0.166	0.09	0.60	1.00E-03	6.00E-01
Tree fruit	0.157	0.04	0.27	1.00E-03	6.00E-01

Gardener type None

CLEA Software Version 1.04

Report generated	16-Jun-09
Report title	Tenax Road
Created by	Paul McFadden at CC GEOTECHNICAL LTD

RESULTS

		Assessment Criterion (mg kg^{-1})			Ratio of ADE to HCV			Saturation Limit (mg kg^{-1})	50% rule?	
		oral	inhalation	combined	oral	inhalation	combined		Oral	Inhal
1	Arsenic (new)	6.31E+02	NR	NR	1.00	0.00	NR	NR	No	No
2	Barium	4.44E+04	3.48E+06	4.41E+04	0.99	0.01	1.00	NR	No	Yes
3	Beryllium	3.97E+03	2.36E+02	2.24E+02	0.05	0.95	1.00	NR	No	No
4	Cadmium	1.71E+03	3.48E+02	2.94E+02	0.15	0.85	1.00	NR	No	No
5	Chromium VI	6.25E+03	3.48E+02	3.30E+02	0.05	0.95	1.00	NR	No	No
6	Chromium III	3.30E+05	2.61E+07	3.28E+05	0.99	0.01	1.00	NR	No	Yes
7	Lead - CLEA v1.04 approach	6.98E+03	1.44E+04	5.12E+03	0.73	0.27	1.00	NR	No	No
8	Elemental Mercury	NR	1.84E+01	NR	NR	1.00	NR	4.31E+00 (vap)	No	No
9	Inorganic Mercury	4.41E+03	1.04E+04	3.52E+03	0.80	0.20	1.00	NR	No	Yes
10	Methyl mercury	4.95E+02	1.37E+03	4.08E+02	0.82	0.18	1.00	7.33E+01 (sol)	No	Yes
11	Nickel (new) - use for residental ar	NR	1.79E+03	NR	0.00	1.00	NR	NR	No	No
12	Nickel (new) - use for allotments	2.24E+04	1.79E+03	1.67E+03	0.07	0.93	1.00	NR	No	No
13	Copper	1.78E+05	4.97E+04	4.58E+04	0.15	0.85	1.00	NR	Yes	Yes
14	Vanadium	5.94E+03	9.20E+04	5.59E+03	0.94	0.06	1.00	NR	No	No
15	Zinc	6.67E+05	1.04E+08	6.65E+05	1.00	0.00	1.00	NR	Yes	Yes
16	Selenium	1.31E+04	2.22E+06	1.30E+04	0.99	0.01	1.00	NR	No	No
17	Molybdenum	3.33E+03	5.21E+05	3.33E+03	1.00	0.00	1.00	NR	Yes	Yes
18	Thallium	1.43E+02	3.13E+04	1.42E+02	1.00	0.00	1.00	NR	No	No
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	Assessment Criterion (mg kg^{-1})			Ratio of ADE to HCV			Saturation Limit (mg kg^{-1})	50% rule?	
	oral	inhalation	combined	oral	inhalation	combined		Oral	Inhal
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		Soil Distribution				Media Concentrations													
		Sorbed	Dissolved	Vapour	Total	Soil	Soil gas	Indoor Dust	Outdoor dust at 0.8m	Outdoor dust at 1.6m	Indoor Vapour	Outdoor vapour at 0.8m	Outdoor vapour at 1.6m	Green vegetables	Root vegetables	Tuber vegetables	Herbaceous fruit	Shrub fruit	Tree fruit
		%	%	%	%	mg kg^{-1}	mg m^{-3}	mg kg^{-1}	mg m^{-3}	mg m^{-3}	mg m^{-3}	mg m^{-3}	mg m^{-3}	mg kg^{-1} FW	mg kg^{-1} FW	mg kg^{-1} FW	mg kg^{-1} FW	mg kg^{-1} FW	mg kg^{-1} FW
1	Arsenic (new)	99.9	0.1	0.0	100.0	6.31E+02	NR	3.16E+02	7.59E-06	4.30E-06	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	NA
2	Barium	98.6	1.4	0.0	100.0	4.41E+04	NR	2.21E+04	5.30E-04	3.01E-04	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	NA
3	Beryllium	100.0	0.0	0.0	100.0	2.24E+02	NR	1.12E+02	2.69E-06	1.52E-06	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	NA
4	Cadmium	99.7	0.3	0.0	100.0	2.94E+02	NR	1.47E+02	3.54E-06	2.00E-06	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	NA
5	Chromium VI	100.0	0.0	0.0	100.0	3.30E+02	NR	1.65E+02	3.96E-06	2.25E-06	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	NA
6	Chromium III	100.0	0.0	0.0	100.0	3.28E+05	NR	1.64E+05	3.94E-03	2.23E-03	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	NA
7	Lead - CLEA v1.04 approach	100.0	0.0	0.0	100.0	5.12E+03	NR	2.56E+03	6.15E-05	3.49E-05	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	NA
8	Elemental Mercury	99.7	0.3	0.0	100.0	1.84E+01	2.55E+01	9.18E+00	2.21E-07	1.25E-07	1.28E-03	1.04E-04	5.91E-05	NA	NA	NA	NA	NA	NA
9	Inorganic Mercury	99.9	0.1	0.0	100.0	3.52E+03	NR	1.76E+03	4.22E-05	2.39E-05	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	NA
10	Methyl mercury	62.8	37.2	0.0	100.0	4.08E+02	5.01E+00	2.04E+02	4.90E-06	2.78E-06	6.51E-04	1.95E-03	1.11E-03	NA	NA	NA	NA	NA	NA
11	Nickel (new) - use for residental	99.9	0.1	0.0	100.0	1.79E+03	NR	8.94E+02	2.15E-05	1.22E-05	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	NA
12	Nickel (new) - use for allotments	99.9	0.1	0.0	100.0	1.67E+03	NR	8.34E+02	2.00E-05	1.14E-05	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	NA
13	Copper	99.8	0.2	0.0	100.0	4.58E+04	NR	2.29E+04	5.50E-04	3.12E-04	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	NA
14	Vanadium	100.0	0.0	0.0	100.0	5.59E+03	NR	2.79E+03	6.71E-05	3.80E-05	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	NA
15	Zinc	98.7	1.3	0.0	100.0	6.65E+05	NR	3.33E+05	8.00E-03	4.53E-03	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	NA
16	Selenium	99.5	0.5	0.0	100.0	1.30E+04	NR	6.52E+03	1.57E-04	8.87E-05	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	NA
17	Molybdenum	97.8	2.2	0.0	100.0	3.33E+03	NR	1.66E+03	4.00E-05	2.27E-05	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	NA
18	Thallium	100.0	0.0	0.0	100.0	1.42E+02	NR	7.11E+01	1.71E-06	9.68E-07	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	NA
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	Soil Distribution				Media Concentrations												
	Sorbed	Dissolved	Vapour	Total	Soil	Soil gas	Indoor Dust	Outdoor dust at 0.8m	Outdoor dust at 1.6m	Indoor Vapour	Outdoor vapour at 0.8m	Outdoor vapour at 1.6m	Green vegetables	Root vegetables	Tuber vegetables	Herbaceous fruit	Shrub fruit	Tree fruit
	%	%	%	%	mg kg^{-1}	mg m^{-3}	mg kg^{-1}	mg m^{-3}	mg m^{-3}	mg m^{-3}	mg m^{-3}	mg m^{-3}	mg kg^{-1} FW	mg kg^{-1} FW	mg kg^{-1} FW	mg kg^{-1} FW	mg kg^{-1} FW	mg kg^{-1} FW
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		Average Daily Exposure (mg kg^{-1} bw day^{-1})							Distribution by Pathway (%)							
		Direct soil ingestion	Consumption of homegrown produce and attached soil	Dermal contact with soil and dust	Inhalation of dust	Inhalation of vapour	Background (oral)	Background (inhalation)	Direct soil ingestion	Consumption of homegrown produce and attached soil	Dermal contact with soil and dust	Inhalation of dust	Inhalation of vapour (indoor)	Inhalation of vapour (outdoor)	Background (oral)	Background (inhalation)
1	Arsenic (new)	2.84E-04	0.00E+00	1.41E-05	1.82E-06	0.00E+00	0.00E+00	0.00E+00	94.70	0.00	4.69	0.61	0.00	0.00	0.00	0.00
2	Barium	1.99E-02	0.00E+00	0.00E+00	1.27E-04	0.00E+00	7.57E-06	1.41E+96	98.70	0.00	0.00	0.63	0.00	0.00	0.04	0.63
3	Beryllium	1.01E-04	0.00E+00	0.00E+00	6.44E-07	0.00E+00	2.14E-04	0.00E+00	49.84	0.00	0.00	0.32	0.00	0.00	49.84	0.00
4	Cadmium	1.33E-04	0.00E+00	2.19E-07	8.47E-07	0.00E+00	2.29E-04	0.00E+00	49.76	0.00	0.08	0.32	0.00	0.00	49.84	0.00
5	Chromium VI	1.48E-04	0.00E+00	0.00E+00	9.48E-07	0.00E+00	1.86E-04	0.00E+00	49.84	0.00	0.00	0.32	0.00	0.00	49.84	0.00
6	Chromium III	1.47E-01	0.00E+00	0.00E+00	9.43E-04	0.00E+00	1.57E-03	1.41E+96	97.71	0.00	0.00	0.62	0.00	0.00	1.04	0.62
7	Lead - CLEA v1.04 approach	2.30E-03	0.00E+00	0.00E+00	1.47E-05	0.00E+00	4.29E-04	2.86E-05	83.41	0.00	0.00	0.53	0.00	0.00	15.52	0.53
8	Elemental Mercury	8.26E-06	0.00E+00	0.00E+00	5.28E-08	5.92E-05	1.41E-102	7.14E-07	0.00	0.00	0.00	0.09	98.44	0.28	0.00	1.19
9	Inorganic Mercury	1.58E-03	0.00E+00	0.00E+00	1.01E-05	0.00E+00	1.43E-05	1.41E+96	97.87	0.00	0.00	0.63	0.00	0.00	0.88	0.63
10	Methyl mercury	1.84E-04	0.00E+00	0.00E+00	1.17E-06	3.32E-05	7.14E-06	1.41E+96	70.78	0.00	0.00	0.45	11.56	1.22	2.75	13.23
11	Nickel (new) - use for residental	8.05E-04	0.00E+00	6.64E-06	5.14E-06	0.00E+00	1.86E-03	8.57E-07	0.00	0.00	0.00	85.71	0.00	0.00	0.00	14.29
12	Nickel (new) - use for allotments	7.50E-04	0.00E+00	6.20E-06	4.80E-06	0.00E+00	1.86E-03	8.57E-07	49.41	0.00	0.41	0.32	0.00	0.00	49.81	0.06
13	Copper	2.06E-02	0.00E+00	0.00E+00	1.32E-04	0.00E+00	1.29E-01	2.29E-04	49.68	0.00	0.00	0.32	0.00	0.00	49.68	0.32
14	Vanadium	2.51E-03	0.00E+00	0.00E+00	1.61E-05	0.00E+00	3.29E-04	2.14E-05	87.45	0.00	0.00	0.56	0.00	0.00	11.43	0.56
15	Zinc	3.00E-01	0.00E+00	0.00E+00	1.91E-03	0.00E+00	3.86E-01	1.41E+96	49.68	0.00	0.00	0.32	0.00	0.00	49.68	0.32
16	Selenium	5.87E-03	0.00E+00	0.00E+00	3.75E-05	0.00E+00	5.00E-04	8.57E-07	91.59	0.00	0.00	0.59	0.00	0.00	7.81	0.01
17	Molybdenum	1.50E-03	0.00E+00	0.00E+00	9.57E-06	0.00E+00	4.00E-03	1.41E+96	49.68	0.00	0.00	0.32	0.00	0.00	49.68	0.32
18	Thallium	6.40E-05	0.00E+00	0.00E+00	4.09E-07	0.00E+00	2.57E-05	6.86E-09	71.01	0.00	0.00	0.45	0.00	0.00	28.53	0.01
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	Average Daily Exposure (mg kg^{-1} bw day^{-1})							Distribution by Pathway (%)							
	Direct soil ingestion	Consumption of homegrown produce and attached soil	Dermal contact with soil and dust	Inhalation of dust	Inhalation of vapour	Background (oral)	Background (inhalation)	Direct soil ingestion	Consumption of homegrown produce	Dermal contact with soil and dust	Inhalation of dust	Inhalation of vapour (indoor)	Inhalation of vapour (outdoor)	Background (oral)	Background (inhalation)
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		Oral Health Criteria Value ($\mu g\ kg^{-1}\ BW\ day^{-1}$)		Inhalation Health Criteria Value ($\mu g\ kg^{-1}\ BW\ day^{-1}$)		Oral Mean Daily Intake ($\mu g\ day^{-1}$)	Inhalation Mean Daily Intake ($\mu g\ day^{-1}$)	Air-water partition coefficient (K_{aw}) ($cm^3\ cm^{-3}$)	Coefficient of Diffusion in Air ($m^2\ s^{-1}$)	Coefficient of Diffusion in Water ($m^2\ s^{-1}$)	log K_{oc} ($cm^3\ g^{-1}$)	log K_{ow} (dimensionless)	Dermal Absorption Fraction (dimensionless)	Soil-to-dust transport factor ($g\ g^{-1}$ DW)	Sub-surface soil to indoor air correction factor (dimensionless)	Bioaccessible fraction in soil (unitless)	Bioaccessible fraction in airborne dust (unitless)
1	Arsenic (new)	ID	0.3	ID	0.002	NR	NR	NR	NR	NR	NR	NR	0.03	0.5	1	1	1
2	Barium	TDI	20	TDI	20	0.53	9.9E+100	NR	NR	NR	NR	NR	0	0.5	1	1	1
3	Beryllium	TDI	2	ID	0.00068	15	NR	NR	NR	NR	NR	NR	0	0.5	1	1	1
4	Cadmium	TDI	1	ID	0.001	16	NR	NR	NR	NR	NR	NR	0.001	0.5	1	1	1
5	Chromium VI	TDI	3	ID	0.001	13	NR	NR	NR	NR	NR	NR	0	0.5	1	1	1
6	Chromium III	TDI	150	TDI	150	110	9.9E+100	NR	NR	NR	NR	NR	0	0.5	1	1	1
7	Lead - CLEA v1.04 approach	TDI	3.57	TDI	0.07	30	2	NR	NR	NR	NR	NR	0	0.5	1	1	1
8	Elemental Mercury	NR	0	TDI	0.06	9.9E-98	0.05	1.17E-01	6.34E-06	2.00E-09	4.16	0.62	0	0.5	1	1	1
9	Inorganic Mercury	TDI	2	TDI	0.06	1	9.9E+100	NR	NR	NR	NR	NR	0	0.5	1	1	1
10	Methyl mercury	TDI	0.23	TDI	0.23	0.5	9.9E+100	9.00E-06	8.61E-06	8.61E-10	1.9	1.7	0	0.5	1	1	1
11	Nickel (new) - use for residental	TDI	12	TDI	0.006	130	0.06	NR	NR	NR	NR	NR	0.005	0.5	1	1	1
12	Nickel (new) - use for allotments	TDI	12	TDI	0.006	130	0.06	NR	NR	NR	NR	NR	0.005	0.5	1	1	1
13	Copper	TDI	160	TDI	0.286	9000	16	NR	NR	NR	NR	NR	0	0.5	1	1	1
14	Vanadium	TDI	3	TDI	0.286	23	1.5	NR	NR	NR	NR	NR	0	0.5	1	1	1
15	Zinc	TDI	600	TDI	600	27000	9.9E+100	NR	NR	NR	NR	NR	0	0.5	1	1	1
16	Selenium	TDI	6.4	TDI	6.4	35	0.06	NR	NR	NR	NR	NR	0	0.5	1	1	1
17	Molybdenum	TDI	3	TDI	3	280	9.9E+100	NR	NR	NR	NR	NR	0	0.5	1	1	1
18	Thallium	TDI	0.09	TDI	0.09	1.8	0.00048	NR	NR	NR	NR	NR	0	0.5	1	1	1
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	Oral Health Criteria Value (µg kg^{-1} BW day^{-1})		Inhalation Health Criteria Value (µg kg^{-1} BW day^{-1})		Oral Mean Daily Intake (µg day^{-1})	Inhalation Mean Daily Intake (µg day^{-1})	Air-water partition coefficient (K_{aw}) (cm^3 cm^{-3})	Coefficient of Diffusion in Air (m^2 s^{-1})	Coefficient of Diffusion in Water (m^2 s^{-1})	log K_{oc} (cm^3 g^{-1})	log K_{ow} (dimensionless)	Dermal Absorption Fraction (dimensionless)	Soil-to-dust transport factor (g g^{-1} DW)	Sub-surface soil to indoor air correction factor (dimensionless)	Bioaccessible fraction in soil (unitless)	Bioaccessible fraction in airborne dust (unitless)
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		Soil-to-water partition coefficient ($cm^3\ g^{-1}$)	Vapour pressure (Pa)	Water solubility ($mg\ L^{-1}$)	Soil-to-plant concentration factor for green vegetables (mg g^{-1} plant DW or FW basis over mg g^{-1} DW soil)	Soil-to-plant concentration factor for root vegetables (mg g^{-1} plant DW or FW basis over mg g^{-1} DW soil)	Soil-to-plant concentration factor for tuber vegetables (mg g^{-1} plant DW or FW basis over mg g^{-1} DW soil)	Soil-to-plant concentration factor for herbaceous fruit (mg g^{-1} plant DW or FW basis over mg g^{-1} DW soil)	Soil-to-plant concentration factor for shrub fruit (mg g^{-1} plant DW or FW basis over mg g^{-1} DW soil)	Soil-to-plant concentration factor for tree fruit (mg g^{-1} plant DW or FW basis over mg g^{-1} DW soil)
1	Arsenic (new)	5.00E+02	NR	1.25E+06	0.00043 fw	0.0004 fw	0.00023 fw	0.00033 fw	0.0002 fw	0.0011 fw
2	Barium	2.00E+01	NR	3.75E+05	0.15 dw	0.15 dw	model	model	model	model
3	Beryllium	1.70E+03	NR	1.66E+06	0.0178 dw	0.065 dw	model	model	model	model
4	Cadmium	1.00E+02	NR	6.51E+05	0.155 dw	0.136 dw	model	model	model	model
5	Chromium VI	4.80E+03	NR	1.67E+05	0.055 dw	0.02 dw	model	model	model	model
6	Chromium III	1.00E+03	NR	1.67E+05	model	model	model	model	model	model
7	Lead - CLEA v1.04 approach	1.58E+04	NR	9.90E+100	model	model	model	model	model	model
8	Elemental Mercury	8.38E+01	7.03E-02	5.60E-02	model	model	model	model	model	model
9	Inorganic Mercury	5.00E+02	NR	7.40E+04	0.0038 fw	0.0069 fw	0.0043 fw	0.001 fw	0.0011 fw	0.001 fw
10	Methyl mercury	4.61E-01	1.13E+00	1.00E+02	0.0038 fw	0.0069 fw	0.0043 fw	0.001 fw	0.0011 fw	0.001 fw
11	Nickel (new) - use for residenta	5.00E+02	NR	2.50E+06	0.0038 fw	0.0043 fw	0.0019 fw	0.0025 fw	0.0025 fw	0.0034 fw
12	Nickel (new) - use for allotmen	5.00E+02	NR	2.50E+06	0.0038 fw	0.0043 fw	0.0019 fw	0.0025 fw	0.0025 fw	0.0034 fw
13	Copper	1.27E+02	NR	7.06E+05	0.8 fw	0.8 fw	model	model	model	model
14	Vanadium	1.00E+03	NR	2.11E+05	0.0055 fw	0.0055 fw	model	model	model	model
15	Zinc	2.07E+01	NR	4.30E+06	0.99 fw	0.99 fw	model	model	model	model
16	Selenium	5.00E+01	NR	2.17E+06	0.0108 fw	0.00364 fw	0.00083 fw	0.00271 fw	0.003 fw	0.003 fw
17	Molybdenum	1.26E+01	NR	1.07E+02	model	model	model	model	model	model
18	Thallium	1.50E+03	NR	9.55E+04	model	model	model	model	model	model
19										
20										

	Soil-to-water partition coefficient ($cm^3 g^{-1}$)	Vapour pressure (Pa)	Water solubility ($mg L^{-1}$)	Soil-to-plant concentration factor for green vegetables (mg g^{-1} plant DW or FW basis over mg g^{-1} DW soil)	Soil-to-plant concentration factor for root vegetables (mg g^{-1} plant DW or FW basis over mg g^{-1} DW soil)	Soil-to-plant concentration factor for tuber vegetables (mg g^{-1} plant DW or FW basis over mg g^{-1} DW soil)	Soil-to-plant concentration factor for herbaceous fruit (mg g^{-1} plant DW or FW basis over mg g^{-1} DW soil)	Soil-to-plant concentration factor for shrub fruit (mg g^{-1} plant DW or FW basis over mg g^{-1} DW soil)	Soil-to-plant concentration factor for tree fruit (mg g^{-1} plant DW or FW basis over mg g^{-1} DW soil)
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

CLEA Software Version 1.04

Report generated	16/06/2009
Report title	Tenax Road
Created by	Paul McFadden at CC GEOTECHNCIAL LTD

BASIC SETTINGS

Land Use	Commercial						
Building	Office (pre 1970)						
Receptor	Female (com)	Start age class	17	End age class	17	Exposure Duration	49 years
Soil	Sandy loam						

Exposure Pathways

Direct soil and dust ingestion	✓	Dermal contact with indoor dust	✓	Inhalation of indoor dust	✓
Consumption of homegrown produce	✗	Dermal contact with soil	✓	Inhalation of soil dust	✓
Soil attached to homegrown produce	✗			Inhalation of indoor vapour	✓
				Inhalation of outdoor vapour	✓

Land Use Commercial

	Exposure Frequencies (days yr^{-1})						Occupation Periods (hr day^{-1})		Soil to skin adherence factors (mg cm^2)		Direct soil ingestion rate (g day^{-1})
Age Class	Direct soil ingestion	Consumption of homegrown produce	Dermal contact with indoor dust	Dermal contact with soil	Inhalation of dust and vapour, indoor	Inhalation of dust and vapour, outdoor	Indoors	Outdoors	Indoor	Outdoor	
1	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
2	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
3	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
4	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
5	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
6	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
7	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
8	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
9	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
10	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
11	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
12	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
13	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
14	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
15	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
16	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00
17	230	0	230	170	230	170	8.3	0.7	0.14	0.14	0.05
18	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00

Receptor Female (com)

Age Class	Body weight (kg)	Body height (m)	Inhalation rate (m^3 day^{-1})	Max exposed skin factor: Indoor (m^2 m^{-2})	Max exposed skin factor: Outdoor (m^2 m^{-2})	Total skin area (m^2)	Consumption rates (g FW kg^{-1} BW day^{-1}): Green vegetables	Root vegetables	Tuber vegetables	Herbaceous fruit	Shrub fruit	Tree fruit
1	5.60	0.7	8.5	0.00	0.00	3.43E-01	7.12	10.69	16.03	1.83	2.23	3.82
2	9.80	0.8	13.3	0.00	0.00	4.84E-01	6.85	3.30	5.46	3.96	0.54	11.96
3	12.70	0.9	12.7	0.00	0.00	5.82E-01	6.85	3.30	5.46	3.96	0.54	11.96
4	15.10	0.9	12.2	0.00	0.00	6.36E-01	6.85	3.30	5.46	3.96	0.54	11.96
5	16.90	1.0	12.2	0.00	0.00	7.04E-01	3.74	1.77	3.38	1.85	0.16	4.26
6	19.70	1.1	12.2	0.00	0.00	7.94E-01	3.74	1.77	3.38	1.85	0.16	4.26
7	22.10	1.2	12.4	0.00	0.00	8.73E-01	3.74	1.77	3.38	1.85	0.16	4.26
8	25.30	1.2	12.4	0.00	0.00	9.36E-01	3.74	1.77	3.38	1.85	0.16	4.26
9	27.50	1.3	12.4	0.00	0.00	1.01E+00	3.74	1.77	3.38	1.85	0.16	4.26
10	31.40	1.3	12.4	0.00	0.00	1.08E+00	3.74	1.77	3.38	1.85	0.16	4.26
11	35.70	1.4	12.4	0.00	0.00	1.19E+00	3.74	1.77	3.38	1.85	0.16	4.26
12	41.30	1.4	13.4	0.00	0.00	1.29E+00	3.74	1.77	3.38	1.85	0.16	4.26
13	47.20	1.5	13.4	0.00	0.00	1.42E+00	3.74	1.77	3.38	1.85	0.16	4.26
14	51.20	1.6	13.4	0.00	0.00	1.52E+00	3.74	1.77	3.38	1.85	0.16	4.26
15	56.70	1.6	13.4	0.00	0.00	1.60E+00	3.74	1.77	3.38	1.85	0.16	4.26
16	59.00	1.6	13.4	0.00	0.00	1.63E+00	3.74	1.77	3.38	1.85	0.16	4.26
17	70.00	1.6	14.8	0.08	0.08	1.78E+00	2.94	1.40	1.79	1.61	0.22	2.97
18	70.90	1.6	12.0	0.00	0.00	1.80E+00	2.94	1.40	1.79	1.61	0.22	2.97

Building Office (pre 1970)

Building footprint (m^2)	4.24E+02
Living space air exchange rate (hr^{-1})	1.00E+00
Living space height (above ground, m)	9.60E+00
Living space height (below ground, m)	0.00E+00
Pressure difference (soil to enclosed space, Pa)	4.40E+00
Foundation thickness (m)	1.50E-01
Floor crack area (cm^2)	1.65E+03
Dust loading factor ($\mu g\ m^{-3}$)	1.00E+02

Soil Sandy loam

Porosity, Total ($cm^3\ cm^{-3}$)	5.30E-01
Porosity, Air-Filled ($cm^3\ cm^{-3}$)	2.00E-01
Porosity, Water-Filled ($cm^3\ cm^{-3}$)	3.30E-01
Residual soil water content ($cm^3\ cm^{-3}$)	1.20E-01
Saturated hydraulic conductivity ($cm\ s^{-1}$)	3.56E-03
van Genuchten shape parameter *m* (dimensionless)	3.20E-01
Bulk density ($g\ cm^{-3}$)	1.21E+00
Threshold value of wind speed at 10m ($m\ s^{-1}$)	7.20E+00
Empirical function (F_x) for dust model (dimensionless)	1.22E+00
Ambient soil temperature (K)	2.83E+02
Soil pH	7.00E+00
Soil Organic Matter content (%)	1.00E+00
Fraction of organic carbon ($g\ g^{-1}$)	5.80E-03
Effective total fluid saturation (unitless)	5.12E-01
Intrinsic soil permeability (cm^2)	4.75E-08
Relative soil air permeability (unitless)	6.42E-01
Effective air permeability (cm^2)	3.05E-08

Soil - Vapour Model

Depth to top of source (no building) (cm)	0
Depth to top of source (beneath building) (cm)	65
Default soil gas ingress rate?	Yes
Soil gas ingress rate ($cm^3\ s^{-1}$)	1.50E+02
Building ventilation rate ($cm^3\ s^{-1}$)	1.13E+06
Averaging time surface emissions (yr)	49
Finite vapour source model?	No
Thickness of contaminated layer (cm)	200

Air Dispersion Model

Mean annual windspeed at 10m ($m\ s^{-1}$)		5.00
Air dispersion factor at height of 0.8m *		68.00
Air dispersion factor at height of 1.6m *		120.00
Fraction of site cover ($m^2\ m^{-2}$)		0.8

* Air dispersion factor in $g\ m^{-2}\ s^{-1}$ per $kg\ m^{-3}$

Soil - Plant Model

	Dry weight conversion factor	Homegrown fraction Average	Homegrown fraction High	Soil loading factor	Preparation correction factor
	$g\ DW\ g^{-1}\ FW$	dimensionless		$g\ g^{-1}\ DW$	dimensionless
Green vegetables	0.096	0.05	0.33	1.00E-03	2.00E-01
Root vegetables	0.103	0.06	0.40	1.00E-03	1.00E+00
Tuber vegetables	0.210	0.02	0.13	1.00E-03	1.00E+00
Herbaceous fruit	0.058	0.06	0.40	1.00E-03	6.00E-01
Shrub fruit	0.166	0.09	0.60	1.00E-03	6.00E-01
Tree fruit	0.157	0.04	0.27	1.00E-03	6.00E-01

Gardener type None

APPENDIX M

RISK ASSESSMENT AND WASTE CLASSIFICATION TABLES

CC Geotechnical

ASSESSMENT UNDERTAKEN ON SOIL CONTAMINATION DATA - METALS, SEMI-METALS AND NON METALS

Job Number: 09/5512 Site Name: TENAX ROAD

Prepared by: P McFadden Authorised by: P McFadden

Scenario: Commercial / Industrial

Sampling Location	Depth (m)	Soil Type	Easting	Northing	Arsenic	Barium	Beryllium	Cadmium	*Chromium VI	Chromium III	Lead	Elemental Mercury	Inorganic Mercury	Methyl Mercury	Dimethyl Mercury	Nickel	Copper	Zinc	Selenium	Vanadium	Water Soluble Boron
					(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
BH1	0.30	Sandy silt loam			11.5	3641	<1	4.8	17		88	<0.5				25	1548	118	<0.5	27	0.9
BH2	0.40	Sandy silt loam			36.1	107	<1	1.5	32		*224*	<0.5				62	261	142	0.9	22	3.0
BH3	0.60	Sandy silt loam			15.4	158	<1	0.7	143		*994*	1.0				21	43	230	0.5	94	0.9
BH4	0.50	Sandy Silt Loam			14.1	553	<1	1.1	18		*276*	<0.5				22	548	222	1.0	28	2.2
95th Upper Confidence Limit																					
Threshold to classify soil as 'Hazardous Waste'					484	N/A	N/A	539	1520	1520	1667	1000	1000	1000	1000	1556	25,304	N/A	30,000	N/A	43
WRAS threshold					10	N/A	N/A	3	25	600	500	N/A	1	N/A	N/A	N/A	N/A	N/A	3	N/A	N/A
Commercial / Industrial SSAC					630	44000	220	290	330	320000	220	4.3	3500	73	N/A	1700	45000	660000	13000	5500	N/A

KEY

1.0	Result not exceeding any threshold
1.0	Result exceeding GAC/SSAC
1.0	Result exceeding 'Hazardous Waste' Threshold
1.0	Result Exceeding WRAS Threshold

NOTES

1) It is assumed that all chromium is present as chromium VI
2) Initially inorganic mercury is analysed and compared to the most conservative GAC, other forms of mercury are analysed if there is an exceedance
3) SSAC's are derived where there is an exceedance of the GAC

CC Geotechnical

ASSESSMENT UNDERTAKEN ON SOIL CONTAMINATION DATA - INORGANICS

Job Number: 09/5512 Site Name: TENAX ROAD

Prepared by: P McFadden Authorised by: P McFadden

Scenario: Commercial / Industrial

Sampling Location	Depth (m)	Soil Type	Easting	Northing	pH Value	Total Sulphate	Water Soluble Sulphate	Total Cyanide	Free Cyanide	Complex Cyanide	Sulphide	Elemental Sulphur	Water Soluble Nitrate	Soil Organic Matter								
					(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)								
BH1	0.30	Sandy silt loam			8.9	1596	119	<1	<1	<1	<2	<10	<5	0.4								
BH2	0.40	Sandy silt loam			6.0	3860	100	<1	<1	<1	<2	<10	8	3.4								
BH3	0.60	Sandy silt loam			9.8	6912	1525	<1	<1	<1	3.0	<10	34	0.5								
BH4	0.50	Sandy Silt Loam			6.8	1309	110	<1	<1	<1	31.3	83	9	2.3								

95th Upper Confidence Limit																						

Threshold to classify soil as 'Hazardous Waste'					N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A								
WRAS threshold					5<pH>8	2000	N/A	N/A	25	250	250	5000	N/A	N/A								
Commercial / Industrial					N/A	N/A	N/A	N/A	120	1300	N/A	N/A	N/A	N/A								
SSAC																						

KEY

1.0	Result not exceeding any threshold
1.0	Result exceeding GAC/SSAC
1.0	Result exceeding 'Hazardous Waste' Threshold
1.0	Result Exceeding WRAS Threshold

NOTES

CC Geotechnical

ASSESSMENT UNDERTAKEN ON SOIL CONTAMINATION DATA - PAH's

Job Number: 09/5512 Site Name: NAX ROAD

Prepared by: P McFadden Authorised by: P McFadden

Scenario: Commercial / Industrial Soil Organic Matter: 1 %

Sampling Location	Depth (m)	Soil Type	Easting	Northing	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benz(a)anthracene	Chrysene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(123-cd)pyrene	Dibenz(ah)anthracene	Benzo(ghi)perylene	Total PAH
					(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
BH1	0.30	Sandy silt loam			0.6	<0.1	1.0	0.7	6.9	1.7	6.2	4.3	2.6	3.1	2.0	1.9	1.8	1.2	0.3	1.3	35.5
BH2	0.40	Sandy silt loam			0.3	0.2	0.3	<0.1	2.4	1.3	2.7	2.6	1.5	1.8	2.1	1.4	1.4	0.8	0.8	1.7	21.3
BH3	0.60	Sandy silt loam			1.7	0.1	2.3	1.6	17.9	3.7	18.6	16.5	8.5	10.8	7.0	6.3	7.5	4.5	1.3	5.7	114.0
BH4	0.50	Sandy Silt Loam			<0.1	<0.1	<0.1	<0.1	0.2	<0.1	0.6	0.5	<0.1	<0.1	0.4	0.3	0.2	0.4	0.1	0.7	3.4
95th Upper Confidence Limit																					
Threshold to classify soil as 'Hazardous Waste					1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	N/A
WRAS threshold					N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	50
Commercial / Industrial					76	230	150	150	1600	520000	72000	54000	130	1300	140	140	14	140	14	1400	N/A
SSAC																					

KEY

1.0	Result not exceeding any threshold
1.0	Result exceeding GAC/SSAC
1.0	Result exceeding 'Hazardous Waste' Threshold
1.0	Result Exceeding WRAS Threshold

NOTES

CC Geotechnical

ASSESSMENT UNDERTAKEN ON SOIL CONTAMINATION DATA - TPH'S

Job Number: 09/5512 Site Name: TENAX ROAD
Prepared by: P McFadden Authorised by: P McFadden
Scenario: Commercial / Industrial Soil Organic Matter: 1 %

					Aromatic							Aliphatic									
Sampling Location	Depth (m)	Soil Type	Easting	Northing	>EC_5-EC_7	>EC_7-EC_8	>EC_8-EC_{10}	>EC_{10}-EC_{12}	>EC_{12}-EC_{16}	>EC_{16}-EC_{21}	>EC_{21}-EC_{35}	>EC_5-EC_6	>EC_6-EC_8	>EC_8-EC_{10}	>EC_{10}-EC_{12}	>EC_{12}-EC_{16}	>EC_{16}-EC_{35}	TPH (C_6-C_{40})	TPH EC6-EC10	TPH EC11-EC25	TPH >EC26
					(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
BH1	0.30	Sandy silt loam			<0.01	<0.01	<0.1	<1	<1	<1	4	<0.01	<0.01	<0.1	<1	<1	9	13			
BH2	0.40	Sandy silt loam			<0.01	<0.01	0.1	<1	<1	<1	9	<0.01	<0.01	<0.1	<1	<1	12	21			
BH3	0.60	Sandy silt loam			<0.01	<0.01	<0.1	<1	<1	11	70	<0.01	<0.01	<0.1	<1	<1	179	260			
BH4	0.50	Sandy Silt Loam			<0.01	<0.01	<0.1	<1	<1	<1	9	<0.01	<0.01	<0.1	<1	<1	6	15			
95th Upper Confidence Limit																					
Threshold to classify soil as 'Hazardous Waste					N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1000	10000	**1000**
WRAS threshold					N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	50	N/A	N/A	N/A
Commercial / Industrial					1200	860	190	300	130	48	28000	270	140	71	590	2700	1E+06	N/A	N/A	N/A	N/A
SSAC																					

KEY

1.0	Result not exceeding any threshold
1.0	Result exceeding GAC/SSAC
1.0	Result exceeding 'Hazardous Waste' Threshold
1.0	Result Exceeding WRAS Threshold

NOTES

CC Geotechnical

ASSESSMENT UNDERTAKEN ON WATER DATA

Job Number: 09/5512 Site Name: TENAX ROAD

Prepared by: P McFadden Authorised by: P McFadden

Scenario: UK Drinking Water Standards

Sampling Location	Depth (m)	Soil Type	Easting	Northing	Arsenic	Barium	Cadmium	Chromium	Lead	Mercury	Selenium	Boron	Copper	Nickel	Zinc	Free Cyanide	Complex Cyanide	Total Cyanide	Sulphate	Free Sulphur	pH	Nitrate	Naphthalene	Benzo(a)pyrene	Total PAH (DW4)	TPH (C6-C40)
					(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)
BH2	2.64	WATER			<5	194	2	<5	<1	0.1	<5	1594	28	11	36	<5	<5	<5	335	<0.1	7.0	<0.5	<0.01	<0.01	<0.01	<10
Mean Concentration																										
UK Drinking Water Standards					50	1000	5	50	50	1	N/A	2000	3000	50	5000	N/A	N/A	50	250000	N/A	N/A	50	N/A	0.01	0.15	10
Environmental Quality Standards (EQS)					25	N/A	5	5	4	1	N/A	2000	28	200	125	N/A	N/A	N/A	400000	N/A	N/A	N/A	10	N/A	N/A	N/A

KEY

1.0 Result exceeds standard

NOTES

1) If levels of TPH's are greater than 10ug/l then further analyses (TPHCWG speciation will be undertaken)
2) EQS freshwater standards for copper, nickel, vanadium, chromium, and zinc are dependant on both the hardness of the receiving water body and the type of fish the water body support