



Report type:	Site Appraisal
Site:	Bioscience Unit, Royal Liverpool University Hospital
Client:	Royal Liverpool University Hospital
Client's Agent:	The Alan Johnston Partnership Ltd
Ref:	GRM/P5597/F.1
Date:	November 2011

Site Appraisal for Bioscience Unit, Royal Liverpool University Hospital

SUMMARY OF RECOMMENDATIONS

Where further assessment is required it is indicated with a "Y" in the right hand column		
Proposed Development	Construction of a six storey Bioscience Unit with associated areas of soft landscaping and parking.	
CONTAMINATION ASSESSMENT - REMEDIATION / WASTE DISPOSAL		
End Users	No remediation required to protect end users.	
Site Workers	No remediation required for construction workers, suitable PPE is required.	
Construction Materials	Appropriate concrete specification. PVC water supply pipes should be suitable (water supply company should be consulted to confirm this).	
Groundwater	No remediation considered necessary to protect controlled waters.	
Surface Water	No remediation considered necessary to protect controlled waters.	
Waste Disposal (may include soils, asbestos, oil drums, chemical containers, etc)	Client has a duty of care to ensure that all waste is disposed appropriately to a licensed landfill. The made ground is largely likely to be classified as Non-Hazardous Waste. The landfill receiving the waste may request additional 'WAC' testing analysis. Waste characterisation can only be confirmed by the landfill site.	
GEOTECHNICAL ASSESSMENT – FOUNDATIONS		
Ground Treatment Required	No ground treatment is likely to be required for general plant movements; however, contractor should carry out their own assessment. A working platform will be required for any piling plant used.	
Main Bearing Strata	Medium dense to very dense sand (weathered rock).	
Nett Allowable Bearing Pressure	>300kN/m ² for pad foundations.	
Tree Influence	None.	
Volume Change Potential	Non shrinkable.	
Likely Foundation Types	Pad foundations or piles.	
Likely Foundation Depth Range	Up to 2m.	
Excavation Hazards	Unstable made ground strata and existing substructures.	
Floor Slab Types	Excavation and re-compaction of made ground to allow ground bearing.	
Gas Protection Requirements Radon and/or Landfill	Monitoring ongoing, assume basic measures until complete	Y
GEOTECHNICAL ASSESSMENT - GENERAL		
Slope Stability Risk	No risk of slope instability at current gradients.	
Soakaways Potential	Site may be suitable for soakaway drainage.	
New Access Roads	Between 2% and 4% for made ground once proof rolled.	
Buried Concrete Class	DS - 1; AC- 1. GEN-1 concrete suitable for unreinforced concrete.	
Retaining Walls	Unlikely to be required.	
Other Comments	None.	

This summary is based on the full report that provides the detailed assessment of the ground risks affecting the development and how to manage them. It should not be used in isolation.

TABLE OF CONTENTS

1	INTRODUCTION.....	3
2	PHASE I DESK STUDY AND SITE OBSERVATIONS	4
3	PHASE I CONCEPTUAL MODEL.....	10
4	PHASE II GROUND INVESTIGATION	12
5	QUANTITATIVE RISK ASSESSMENT – HUMAN HEALTH	15
6	QUANTITATIVE RISK ASSESSMENT - CONTROLLED WATERS.....	17
7	QUANTITATIVE RISK ASSESSMENT - CONSTRUCTION MATERIALS	17
8	PHASE II CONCEPTUAL MODEL.....	18
9	REMEDIATION	27
10	GEOTECHNICAL ASSESSMENT.....	30
11	FURTHER INVESTIGATION	33
12	CONCLUSIONS.....	33

APPENDICES

Site Location and Boundary Plan	Appendix A
Historical OS Maps	Appendix B
Environmental Data	Appendix C
Exploratory Hole Location Plan	Appendix D
Exploratory Hole Logs	Appendix E
Chemical Analysis Results	Appendix F
GRM Contaminant Screening Values	Appendix G

1 INTRODUCTION

1.1 PREAMBLE

GRM Development Solutions Limited (GRM) has been appointed by The Alan Johnston Partnership (Client's Agent) on behalf of Royal Liverpool University Hospital (Client) to undertake a Site Appraisal.

The desk study and site inspection form Phase I of the assessment and allow the geotechnical and geo-environmental setting of the site to be determined and the identification of areas of particular concern that require targeted investigation. The Phase II works comprise the intrusive ground investigation, geotechnical testing and chemical analysis, risk assessment and recommendations. The information gained from the Phase II works will be used to refine the conceptual model for the site and determine the most cost effective development solutions.

Although the desk study information was assessed prior to the intrusive investigation works, time constraints have meant that it has not been possible to produce a separate desk study report. Therefore, for ease of reading and efficiency, the Phase I and Phase II aspects of the appraisal are combined within this document.

The Client proposes to construct a bioscience unit in the grounds of the existing hospital. Specific development plans have not been provided but it is assumed that it will include limited areas of soft landscaping and car parking.

The client has not made GRM aware of any potential development hazards.

This desk study is intended to provide information that will assist decision making by identifying and recommending possible solutions to ground engineering and contamination issues.

GRM Standard Limitations of Reporting are provided on the back cover of this report.

1.2 OBJECTIVES OF THE SITE APPRAISAL

The principal aims of the Site Appraisal are as follows:

- a) Obtain information, from easily accessible sources, about the soil and groundwater conditions within the area of the site.
- b) Determine the possible ground related geotechnical and contamination hazards within the site boundaries that may affect the proposed development.
- c) Provide preliminary development recommendations.
- d) Provide advice on further works required for the cost-effective reduction of risks to the development and procedures likely to satisfy regulators.

Whilst every effort has been made to pre-empt the likely requirements of the Local Authority and the Environment Agency, they are likely to have specific requirements that will need to be discussed and addressed at a later date.

2 PHASE I DESK STUDY AND SITE OBSERVATIONS

2.1 INFORMATION SOURCES

The following sources have been used for the identification and assessment of potential ground hazards:

- Relevant British Standards.
- British Geological Survey (BGS) data.
- Historical Ordnance Survey (OS) Maps.
- Emapsite EnviroInsight and GeoInsight Reports.
- Environment Agency Website: <http://www.environment-agency.gov.uk/>
- DEFRA/Environment Agency R&D Publication CLR documents and DoE Industry Profiles.
- Building Research Establishment (BRE) Digest BR211, 'Radon: Guidance on protective measures for new buildings', 2007.
- HPA and BGS Publication HPA-RPD-033, 'Indicative Atlas of Radon in England and Wales', 2007.
- CIRIA C665 'Assessing risks posed by hazardous ground gases to buildings', 2007.

Other technical references used throughout this document are detailed in the text.

2.2 SITE DESCRIPTION

2.2.1 Geographical Setting

The site of the proposed Bioscience Unit is located in the eastern part of the grounds for the Royal Liverpool University Hospital of Garlands, approximately 1km east of Liverpool city centre. The National Grid Reference (NGR) for the approximate centre of the site is SJ357907. A site location plan is provided in Appendix A.

The site of the proposed Bioscience Unit covers an area of approximately 0.4 hectares and is bounded to the south east and north by hospital grounds and to the west by Daulby Street.

2.2.2 Site Inspection Observations

A site inspection was undertaken on 8th October 2011. The area of the proposed Bioscience Unit is currently an area of relatively level car parking surrounded by the existing hospital buildings. No other significant features were noted. It is assumed services cross the site.

Significant Features identified during site inspection:
Underground services – may require diversion

2.3 HISTORICAL DEVELOPMENT OF THE SITE

A review of the available historical Ordnance Survey (OS) maps gives an insight into the development of the site and can highlight potential hazards. Extracts of the maps reviewed are provided in Appendix B.

The site has been developed since before 1893; site uses have included residential properties (1893-1952), a timber yard (1908-1959), picture house (1952-1974), cold storage (1952-1974) and grounds of the Royal Liverpool University hospital (1974-present).

The area surrounding the site has been developed since before 1893, the dominant local land use has and always has been residential properties; however, notable exceptions within 250m include hospitals, a coffin factory, timber yards, a meat market, garages, engineering works, factories and warehouses.

The hazards identified are summarised in the table below.

Significant Features identified on OS Maps:
Existing foundations – foundation deepening
Local industrial land use – back ground contamination

2.4 ANTICIPATED GEOLOGY

The site is reported to be underlain by a solid geology of Triassic Wilmslow and Helsby Sandstone Formations (both part of the Sherwood Sandstone Group). No superficial deposits are reported to underlie the site.

No information with regard to the dip of the solid geology is available. A fault is shown to pass through the site; however, this will not have any detrimental effect on the proposed development.

Significant Features identified from geological data:
Sandstones – known aquifers

2.5 HYDROGEOLOGICAL INFORMATION

No detailed information regarding the depths to groundwater is available but it is likely to be subject to seasonal variations.

The Triassic sandstone formations reported to be present below the site are classed as a Principal Aquifer. As no cohesive superficial deposits are present it is likely a pathway between near surface made ground and the aquifer will be present; however, as post development the site will be mainly covered with hard standing and storm water will be disposed of via the public sewer network or via sealed soakaway systems it is considered that the actual volume of infiltration and amount of leaching will be minimal.

The site is not within a groundwater Source Protection Zone, and there are no recorded groundwater abstraction licenses within 1km of it.

Significant Features identified from hydrogeological data:
Principal Aquifer – potential receptor

2.6 HYDROLOGICAL INFORMATION

No surface water features are present near the site.

The Environment Agency's internet based flood risk maps suggest that the site is not within an indicative floodplain and so is not at risk from river flooding.

Significant Features identified from hydrological data:
None

2.7 MINERAL RESOURCES

The site is not in an area affected by coal mining and the historical and environmental searches have not highlighted any other mining or quarrying in the area surrounding the site.

Potential Mineral Resource Hazards:
None

2.8 ENVIRONMENTAL INFORMATION

Environmental database information, from GroundSure, has been obtained. There is a considerable amount of data and not all of it is relevant to this appraisal. The full report is presented in Appendix C, but in summary, the following features not covered elsewhere in this report, are identified:

- There records relating to environmental permits incidents or registers within 500m of the site are a petrol station 253m north west of the site and thirty one records relating the use of radio active material in the main hospital building 170m east. None of these are considered to pose a risk to the site.
- The only waste sites within 500m of the site are waste transfer stations and a scrap yard; there are no landfills near the site, the identified features are not considered to pose a risk to the site.
- There are no records of potentially contaminative industrial sites within 250m of the site considered likely to have affected it.

Significant Features identified from Environmental data:
None

2.9 ARCHAEOLOGY

Archaeological information has not been sought as part of this desk study and has not been identified as an issue by the Client. Some Local Authorities require at least an initial archaeological appraisal for development sites. GRM can undertake such appraisals if required.

Archaeological investigations occasionally reveal ground-related problems from ancient times (prior to the 1st Edition OS maps) and can occasionally cause foundation and contamination development hazards.

Archaeological Hazards:
None

2.10 INVASIVE PLANT SPECIES/ECOLOGY

Ecological issues can have a significant effect on developments. GRM is not a specialist in this topic and has not conducted such a survey. However, GRM endeavour to report easily recognisable issues such as Japanese Knotweed, Giant Hogweed, badger sets etc, when seen on site.

Invasive Plant Species/Ecological Hazards:
None

2.11 RADON ASSESSMENT

The site has been assessed using 'Radon: guidance on protective measures for new dwellings' (BR211 2007), the site is not within an area recorded to require radon protection measures.

Radon Hazard:
None

2.12 CONTAMINANTS OF CONCERN

Based on the historical development of the site, there is no particular DoE Industry Profile available and accordingly a general screening suite will be used for contaminants covered by CLEA and common contaminants from the Industry Profiles, which include the following:

- Arsenic
- Cadmium
- Chromium
- Lead
- Mercury
- Selenium
- Copper
- Nickel
- Zinc
- Phenols
- cyanide (total)
- pH
- Water soluble sulphate
- PAH (polycyclic aromatic hydrocarbons)

Asbestos and PCBs are listed in the vast majority of profiles. PCBs are listed as the profiles expect electricity substations and switch boxes on all industrial sites. Due to their age, the former buildings at the site may have contained asbestos and as demolition has taken place it is possible that any such materials exist in the surrounding soils.

If there is any evidence of hydrocarbon contamination along suitable analysis will be undertaken.

2.13 SUMMARY OF IDENTIFIED SIGNIFICANT FEATURES

Potential hazards have been identified in earlier sections and are now summarised in tabular form, with their consequences and possible risk management actions.

Potential Hazard	Potential Consequence	Action
Potentially live services.	Danger to personnel and plant.	Inform relevant parties for disconnection / diversion.
Former structures/sub-structures.	Deepened foundations.	Ground investigation.
On site made ground.	Potential risk to end users/site workers/water supply pipes/aquifer.	Chemical analysis and risk assessment. Ground gas survey.
Potential asbestos containing materials in soil matrix.	Potential risk to site workers and end users.	Asbestos screening of soil samples.
Principal Aquifer.	Potential receptor.	Chemical analysis and risk assessment.

3 PHASE I CONCEPTUAL MODEL

3.1 POTENTIAL SOURCE – PATHWAY – RECEPTOR

The consideration of contamination is based upon the principles of risk assessment, using the 'source-pathway-receptor' model in order to establish the presence, or potential presence, of a pollutant linkage.

To create a risk, contamination must have the potential to cause harm to susceptible targets or receptors such as humans, the water environment or the built environment. The potential for harm to occur requires a pollutant linkage to be present which requires three conditions to be satisfied:

- The presence of substances that may cause harm (SOURCE).
- The presence of a target which may be harmed (RECEPTOR).
- The existence of a plausible migration route between the source and the receptor (PATHWAY).

In the absence of a plausible pollutant linkage there is no risk. Where a potential linkage is identified in order for it not to pose a risk to the identified receptor it must be broken.

Site uses have included residential properties, a timber yard, picture house, cold storage and grounds of the Royal Liverpool University hospital. The area surrounding the site has been developed since before 1893, the dominant local land use has and always has been residential properties; however, notable exceptions within 250m include hospitals, a coffin factory, timber yards, a meat market, garages, engineering works, factories and warehouses. Given the sites former uses significant contamination is not anticipated; however, any made ground present may be a source of localised hotspots and to a lesser extent ground gas.

The Client proposes to construct a Bioscience Unit and it is assumed that this will include limited areas of parking and soft landscaping.

The primary human health receptors are end users of the completed development and construction workers (demolition, construction and maintenance phases). The primary pathways of concern include indoor and outdoor inhalation of soil dust, hydrocarbon vapours, asbestos fibres and ground gases, ingestion of, and dermal contact with, contaminated soil/soil dust.

For controlled waters, the only identified potential receptor is the Principal Aquifer. No superficial deposits are present; therefore, any on site contamination will pose a moderate risk to the receptor.

For construction materials, the primary receptors are water supply pipes, buried concrete and buildings (if explosive gases, e.g. methane, build up to potentially dangerous concentrations). The primary pathways of concern are direct contact leading to degradation of pipe materials, acid and/or sulphate attack on buried concrete, and the migration of ground gases.

The pollutant linkage model is illustrated in detail on the following page.

3.2 POLLUTANT LINKAGE MODEL

HUMAN HEALTH			
Source	Pathway	Receptor	Solution
Made ground associated with former development.	Indoor and outdoor inhalation of soil dust and hydrocarbon vapours, the ingestion of, and dermal contact with, contaminated soil and soil dust.	End users of the completed development and construction workers.	Unlikely to require remediation, but may require localised source removal.
Ground gases from made ground associated with former development.	Inhalation.	End users of the completed development.	Gas protection measures unlikely to be necessary.
Potential asbestos containing materials in soil matrix.	Inhalation of asbestos fibres.	End users of the completed development and construction workers.	Unlikely to require remediation, but may require localised source removal.
CONTROLLED WATERS			
Made ground associated with former development.	Infiltration.	Principal Aquifer.	Unlikely to require remediation, but may require localised source removal.
CONSTRUCTION MATERIALS			
Limited made ground associated with former development.	Migration of contamination through leaks and joints, degradation of pipe materials.	Water pipes.	Upgraded water pipes / clean backfill material.
	Acid/sulphate attack on buried concrete.	Buried concrete.	Appropriate concrete specification.
Ground gases from made ground associated with former development.	Explosion.	Buildings.	Gas protection measures may be necessary.

4 PHASE II GROUND INVESTIGATION

4.1 FIELDWORK

The ground investigation (including fieldwork, sampling, monitoring and laboratory analyses) has been designed to identify and assess potential ground related problems and to allow cost effective solutions to be advised. It has been planned on the basis of the desk study, site inspection and likely ground conditions. All fieldwork and soil descriptions were carried out in general accordance with relevant British Standards.

The exploratory holes have been positioned and advanced to depths to determine the general ground conditions below the site. The hole spacing has been designed primarily to provide adequate coverage of the site. The window sample boreholes were positioned within the area of proposed new structures. The resultant exploratory hole density is considered to be commensurate with the complexity of the site conditions and detail of information required for this phase of the investigation.

The ground investigation fieldwork was conducted on the 8th October 2011 with groundwater/gas monitoring visits continuing after this date.

The exploratory hole location plan and exploratory hole logs are presented in Appendix D and Appendix E respectively. Seven window sample boreholes (WS1-4 and WS6-8) were drilled to a maximum depth of 4m below existing ground level (begl).

Samples not used for testing will be stored for a month after issue of this report and then disposed of, unless the client requests in writing that they be kept.

4.2 MONITORING INSTALLATIONS

The gas monitoring programme has been designed to broadly comply with the recommendations outlined in CIRIA Report C665 'Assessing risks posed by hazardous ground gas to buildings' (2007).

As the proposed land use is classed as low sensitivity, two gas/groundwater monitoring standpipes have been installed in the window sample boreholes (WS1 and WS7).

As made ground was identified during the intrusive investigation, the response zones of the gas monitoring installations have been targeted at the natural strata and made ground.

As the gas hazard is considered very low (no significant on-site or off site sources), the monitoring programme will comprise six visits over three months. At the time of reporting, none of monitoring visits have been carried out (due to the presence of parked cars).

4.3 PROVEN GROUND

The following ground conditions were encountered during the investigation fieldwork

- Made Ground
- Sherwood Sandstone

4.3.1 Made Ground

Made ground was encountered in all of the window sample holes to depths of 0.5m to 3m begl, although in four of the holes the full depth of the made ground could not be determined due to the presence of obstructions (brick walls and concrete slabs). The made ground comprises granular demolition type material.

4.3.2 Sherwood Sandstone

Strata of the Sherwood Sandstone were encountered in the three holes that fully penetrated the made ground. In WS1 a stiff clay was present directly below the made ground at 2.2-3.2m at which depth medium dense becoming very dense sand deposits were encountered. In WS6 the made ground was underlain directly by dense sand at 0.5-1m which could not be penetrated by the drilling rig. In WS7 the made ground was underlain by very dense sand at 3.00-3.2m which could not be penetrated by the drilling rig.

The stiff clay and dense to very dense sand deposits represent the weathered profile of the Sherwood Sandstone.

4.4 GROUNDWATER

Groundwater was not encountered during the drilling of the window sample holes.

Monitoring of the standpipes has not yet been undertaken (due to the presence of parked cars); however, even if water is recorded it is likely to be representative of isolated perched volumes and not representative of the regional groundwater table.

4.5 CONTAMINATION OBSERVATIONS

The only visual/olfactory evidence of contamination noted during the intrusive investigation was the presence of black ashly material in the made ground present in WS7.

4.6 GROUND GAS

4.6.1 Landfill Type Gases and Vapours

The rationale for the number of gas standpipes and the length of the monitoring programme is discussed in section 4.2. Gas monitoring is currently on-going; to date

gas readings have not been taken as the wells have been obscured by parked cars. A complete assessment of the ground gas regime will be reported at a later date.

4.6.2 Radon Gas

The desk study risk assessment determined that no radon protection measures are required. Observations during the fieldwork do not indicate that this assessment needs to be altered.

4.7 SUMMARY OF FIELDWORK OBSERVATIONS

The fieldwork has revealed or confirmed the following potential hazards, receptors and sources which have been included when assessing the site.

Significant Features identified during fieldwork

Made ground – presence identified.

Existing substructures – presence confirmed.
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4.8 LABORATORY ANALYSES AND MONITORING RATIONALE

4.8.1 Chemical Laboratory Analysis

Chemical laboratory analyses were selected to provide the parameters necessary to make an initial assessment of potentially contaminated soils and/or waters, for the budgetary design of the development. The choice of contamination testing was based on the Phase I assessment, identified past uses of the site and site observations. In summary the testing comprised:

- Seven soil samples tested for a general suite of contaminants (metals, inorganics and speciated PAH).
- Four soil samples for the presence of total petroleum hydrocarbons (TPH).
- Two soil samples for the presence of split aromatic and aliphatic hydrocarbons (TPHCWG).
- Screening of four soil samples for the presence of asbestos.

The chemical analysis results are presented in Appendix F.

5 QUANTITATIVE RISK ASSESSMENT – HUMAN HEALTH

5.1 INTRODUCTION

The Client proposes to develop the site with a Bioscience Unit and it is assumed that the development will include limited parking areas and soft landscaping.

The material on site considered most likely to be contaminated is the made ground identified in all of the exploratory holes.

Guidance contained in the Environment Agency's CLEA Report has been used to assess the risks posed to human health. For this assessment the default Tier 1 Assessment Criteria (TAC) for 'commercial/industrial' have been used. This has been carried out in order to provide a precautionary screening approach to assessing the risks posed to human health. The TAC that have been used are presented in Appendix G.

To assess the risks posed from ground gases such as radon, carbon dioxide and methane, the relevant current guidance has been used. For radon, the site has been assessed following the guidelines in 'Radon: guidance on protective measures for new buildings' (BR 211: 2007) (see Sections 2.12 and 4.6.2).

Gas monitoring has not yet been carried out to assess the risk posed to end users from harmful ground gases (methane and carbon dioxide). The primary guidance document to determine if protection measures are required is CIRIA Report C665 'Assessing risks posed by hazardous ground gases to buildings' (2007). This uses Gas Screening Values (GSVs), which are gas concentrations multiplied by borehole flow rate, along with additional limiting factors (such as maximum methane concentrations), to classify the gas regime of a site.

The guidance document includes two methods of characterising a site. The main method 'Situation A' is based on work by Wilson and Card and is used for all types of development except low rise housing that meets the assumptions of 'Situation B'. The 'Situation B' method proposed by Boyle and Witherington for the NHBC assumes all properties have pre-cast concrete suspended ground floors (beam and block) with ventilated under floor voids.

For this site, as the development is not low rise housing, the risk from ground gases will be assessed using 'Situation B'.

5.2 RISK TO END USERS

5.2.1 Soil Contamination

Although the number of samples analysed is considered sufficient to characterise the made ground, it is considered that there is insufficient data for robust statistical analysis to be undertaken. Therefore, the individual analysis results for each material have been compared directly with the TAC. The TAC for 1% SOM have been used as this reflects the lowest SOM recorded (1.4%).

5.2.2 Analysis of Soil Contamination Data

The concentrations of all contaminants in the made ground are below the relevant TAC for commercial/industrial end use.

The asbestos screening has not revealed the presence of asbestos fibres in the soil.

5.2.3 Radon

Radon gas assessments have been made in earlier sections of this report and there has been no further evidence to suggest that these assessments should be altered.

5.2.4 Harmful Soil and Landfill Gases

As outlined in section 4.6.1 gas monitoring is ongoing and a full assessment will be provided at a later date.

5.2.5 Summary of Risk to End Users

In summary, the made ground does not pose a risk to human health and remediation will not be required.

Gas monitoring is on going and a complete assessment of the ground gas regime, complete with recommendations, can only be made when it is complete. At this stage it should assumed that the site pose a slight risk due to ground gas.

5.3 RISK TO SITE WORKERS

There is generally considered to be minimal risk to site workers due to their relatively short exposure (to the soil) time. However, because of the likelihood of direct exposure to the soil (which is highly contaminated in places), ground and construction workers should be provided with basic Personal Protective Equipment based on the site's general health and safety risk assessment, but including, as a minimum, safety footwear, gloves and overalls. In addition, a risk assessment should be carried out for all additional hazards identified within the ground investigation in accordance with current health and safety legislation. This assessment should identify any measures required to further reduce risks, i.e. providing further Personal Protective Equipment, welfare facilities and, if necessary, preventing access to certain areas.

Any unusual colours, odours and/or suspicious ground should be reported immediately to site management and then GRM.

An asbestos survey of the existing buildings, and subsequent removal of any identified material, should be undertaken prior to refurbishment.

Whilst this Appraisal has considered the long-term effects of contamination, GRM can also help during the formulation of Health and Safety documentation, if required.

6 QUANTITATIVE RISK ASSESSMENT - CONTROLLED WATERS

The only potential controlled waters receptor identified in the Desk Study was the Principal Aquifer (Sherwood Sandstone). The made ground was found to be directly underlain by strata of the Sherwood Sandstone, and theoretically a pathway between the on site made ground and the aquifer exists. However, it is considered that as post development the site will be almost entirely covered with hard standing with storm water discharged via the local sewerage network or via sealed soakaways the actual chance of infiltration and leaching actually occurring is minimal, additionally the soil totals did not reveal the presence of any significant levels of contamination in the made ground and as such, soil leachate or ground water analysis has not be undertaken. It is considered that the site poses a negligible risk to controlled waters.

7 QUANTITATIVE RISK ASSESSMENT - CONSTRUCTION MATERIALS

7.1 INTRODUCTION

The 'screening levels' adopted for the assessment of risk to construction materials are taken from the following documents:

- UK Water Industry Research (UKWIR) "Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites" (Ref: 10/WM/03/21) for the protection of buried pipes (extract presented in Appendix G).
- Building Research Establishment (BRE) Special Digest SD1 (2005), 'Concrete in Aggressive Ground', for the protection of buried concrete.

7.2 WATER SUPPLY PIPES

It is considered that, based on the UKWIR guidance, the concentrations of contaminants recorded to date are such that PVC water supply pipes may be suitable. However, it is recommended that the local water supply company be contacted to confirm their requirements.

7.3 BURIED CONCRETE

Based on the results of the pH and water soluble sulphate testing and a review of the strata and groundwater encountered, in accordance with the requirements of BRE Special Digest 1 (2005), the Design Sulphate Class for the site should be assumed as DS-1 and the ACEC Class as AC-1. Therefore, GEN-1 concrete will be suitable for unreinforced concrete. Water soluble sulphate and pH results are presented in Appendix F.

8 PHASE II CONCEPTUAL MODEL

8.1 SOURCE – PATHWAY – RECEPTOR

The assessment of the chemical analysis results has revealed that made ground is not contaminated. Gas monitoring is on going.

The Client proposes to construct a six storey Bioscience Unit and it is assumed that limited areas of car parking and soft landscaping will be included in the scheme.

The primary human health receptors are end users of the completed development, demolition workers and construction workers. The pathways of concern include indoor and outdoor inhalation of soil dust and ground gas, ingestion of, and direct contact with, contaminated soil and soil dust.

For controlled waters, the only identified potential receptor is the Principal Aquifer (Sherwood Sandstone. However, as the site will almost be entirely covered by hard standing and storm water will be discharged via the sewer system or through sealed soakaways the actual risk to the aquifer is minimal.

Current UKWIR guidance suggests that PVC water supply pipes are suitable for the site (to be confirmed with local water supply company). Specifications for buried concrete have been made in light of the reported pH and water soluble sulphate concentrations.

Considering the above, it is considered that the site poses a negligible risk to end users of the completed development, construction materials and controlled waters.

The pollutant linkage model is illustrated on the following page.

8.2 POLLUTANT LINKAGE MODEL

HUMAN HEALTH			
Source	Pathway	Receptor	Solution
A source of contamination has not been identified.	Indoor and outdoor inhalation of soil/soil dust, ingestion of, and dermal contact with contaminated soil and soil dust.	End users of the completed development and construction workers.	No remediation required.
Gas monitoring ongoing.	Inhalation of ground gases.	End users of the completed development.	Assume gas protection measures required (monitoring required to confirm this assessment).
CONTROLLED WATERS			
No significant source identified.	Infiltration.	Principal Aquifer.	No remediation considered necessary.
CONSTRUCTION MATERIALS			
A source of contamination has not been identified.	Migration of contamination through leaks and joints.	Water supply pipes.	PVC water supply pipes should be suitable (confirmation from local water supply company required).
No source identified.	Sulphate and acid attack on buried concrete.	Buried concrete.	Standard GEN-1 concrete applicable.
Gas monitoring ongoing.	Explosion.	Buildings.	Assume gas protection measures required (monitoring required to confirm this assessment).

9 REMEDIATION

9.1 RECOMMENDED RISK REDUCTION AND REMEDIAL MEASURES

9.1.1 Protection of End Users

The chemical analysis has shown that the made ground does not pose a risk to human health. Therefore, remediation to protect end users from soil contamination is not required.

Should any material suspected of being significantly contaminated be encountered during the redevelopment of the site, GRM should be contacted for advice and, if necessary, to undertake additional assessment. The local Environmental Health Officer should be contacted and informed of any additional remedial work required.

9.1.2 Remedial Actions for Overall Ground Gas Hazard

Gas monitoring is ongoing at the site and an assessment of the ground gas regime will be reported at a later date. At this stage, allowance should be made for gas protection measures.

The gas protection measures should comprise the installation of a 2000 gauge membrane fully sealed around service entries and extended across cavities. Given the site setting and the ground conditions revealed it is considered that sub floor venting will not be required and that a standard DPM will be sufficient to form a gas barrier; however, this assessment will be reviewed once the monitoring is complete.

No protection measures for radon are required.

9.1.3 Protection of Site Workers

The risk to site workers is negligible and no remedial measures are required for this. However, the use of suitable PPE should be enforced during the ground works stage of construction.

9.1.4 Protection of Construction Materials

Current UKWIR guidance suggests that PVC pipes will be suitable for water supply pipes. However, it is recommended that the local water supply company be contacted to confirm to their requirements.

There is a negligible risk to buried concrete, and accordingly no specific protection is required.

9.1.5 Protection of Controlled Waters

For the reasons given in Section 6 it is considered that remediation to protect controlled waters is unnecessary.

9.2 POST REMEDIATION VALIDATION

As remediation is considered unnecessary, validation of such measures will not be required.

9.3 REMEDIATION METHOD STATEMENT

As remediation is considered unnecessary, a remediation method statement will not be required.

Following your review of this Site Appraisal report, we recommend that a copy of it is forwarded to the Local Authority for comment and approval, prior to commencing development of the site. The Local Authority may choose to include other consultees as part of the planning process (such as the Environment Agency).

Consultation should be undertaken at the earliest possible opportunity to avoid subsequent abortive or delayed works.

9.4 DISPOSAL AND CLASSIFICATION

All materials removed from the site (whether contaminated or not) will be classified as 'waste' and therefore must be removed by a suitably licensed carrier of waste. Under current Waste Management Regulations, waste soil material produced from the site will require characterisation to enable it to be disposed of correctly. The analysis results presented in Appendix F should be provided to the relevant landfill operators to establish the characterisation of the waste, confirm its suitability for landfill disposal and provide estimated costings. At this stage, it is considered likely that the topsoil and made ground will be classified as Non-Hazardous Waste. Depending on the receiving landfill's current permit, further chemical analysis, such as Waste Acceptance Criteria testing, may be required to confirm the above assessment.

The developer/builder is likely to be classed as the waste producer and therefore, has a duty of care to ensure that all waste is disposed of appropriately. This includes ensuring the waste carrier is licensed and disposes of the waste to a suitably licensed landfill site. They are also required to keep a paper trail from 'cradle to grave' including copies of the waste disposal tickets.

All waste removed to landfill will attract Landfill Tax. It should be noted that Landfill Tax Exemption is no longer available.

Efficient materials management on site is recommended, as it can lead to significant cost savings when compared to the traditional side casting or single stockpile of arisings. Likewise, making the site as volume neutral as possible will reduce the costs of development.

9.5 SITE WASTE MANAGEMENT PLANS

Site Waste Management Plans allow better waste management practices, help to reduce the amount of waste produced and identify best environmental disposal options. Implementing a Site Waste Management Plan (SWMP) can reduce costs (increasing business profits) and maximise resource efficiency. SWMPs have been a legal requirement for projects over £300k since the 6th April 2008.

10 GEOTECHNICAL ASSESSMENT**10.1 INTRODUCTION**

The Client proposes to develop the site with a six storey Bioscience Unit and it is assumed the development will include limited areas of parking areas and soft landscaping.

The finished site levels for have not been provided and it is assumed that they will not vary appreciably from current levels. However, should the development proposals or finished levels be altered then the comments/recommendations below may need revising. The depths of any underground engineering works (i.e. sewers, pumping stations etc.) are unknown and therefore have not been taken into account in the following assessment. It has been assumed that any such works will not compromise foundation or ground stability.

10.2 ENGINEERING GROUND TREATMENT

The near surface soils have the potential to be disturbed by weathering and site traffic. Precautions should be taken to avoid this, as excessive disturbance may entail more onerous floor slab design, road cap thickness and increased amounts of off site disposal etc. Based on site observations the near surface soils are unlikely to require significant treatment or reinforcing to allow safe movement of construction plant and labour in their current state. A working platform will be required for piling plant (if piles are required).

10.3 EXCAVATION CONDITIONS

Excavation of the materials encountered during the ground investigation should be readily achieved using conventional hydraulic excavation techniques, although breaking equipment may be required for removing substructures and where rock quality strata is present at shallow depth.

The short and long term stability of near vertically sided excavations can therefore not be guaranteed and random and sudden instability within these soils should be anticipated.

Where personnel are required to enter excavations, particularly if work close to the base of the excavation (e.g. pipe-laying) is being undertaken, full support should be provided to the full depth.

Care should be taken to ensure that instability of excavations does not affect any existing services or structures including roads, adjacent to the site and that falls from excavation faces do not adversely affect the integrity of foundation concrete.

All excavations on site should be in accordance with HSE guidelines, and stability should be practically maintained at all times. Reference should be made to HSE construction information sheet No. 8 (Revision 1) 'Safety in Excavations'.

It is likely that perched groundwater is present and it is considered that simple sump and pump methods may be a suitable method of groundwater control for excavations.

10.4 EXISTING STRUCTURES / SUBSTRUCTURES

Old foundations and floor slabs have been encountered during the investigation. Where practicable, existing buried construction should be fully removed; however, if this is not practicable all new foundations should be carried down to fully penetrate it and it should be broken well away from all new structures.

There may also be existing infrastructure in close proximity to the proposed development. New build foundations may be placed next to roads with existing underground services beneath them, or excavations may be required near existing footings associated with adjacent properties. These potential hazards need to be taken into consideration when designing foundations and the Groundworker needs to be made aware of their potential impact during the redevelopment works.

The Contractor for the works should carry them out in such a fashion so as to not cause excessive overbreak, concrete usage or undermine existing buildings/roads/ services that are to be retained.

10.5 FOUNDATIONS

The made ground is considered unsuitable as bearing strata. All foundations should be carried down to fully penetrate the made ground and found in the more competent Sherwood Sandstone.

The ground conditions at anticipated foundation depths comprise weathered sandstone generally present as medium dense to very dense sand, locally very stiff clay is present.

It is understood that column loads of around 3000kN are anticipated. Due to the high column loads it is considered that the current level of ground information is insufficient to enable detailed foundation design. However, at this stage it is considered there will be two options for foundations, either large concrete bases or piles.

The investigation completed to date has revealed medium dense, dense and very dense granular strata and as a general rule of thumb it would be anticipated that soils of these densities would provide allowable bearing pressures of 300kN/m², 300-500kN/m² and >500kN/m² respectively which would result in bases in the region of 2.5-3.25m square.

Further investigation is required to confirm a detailed soil strength profile before detailed foundation design can be completed.

10.6 FLOOR SLABS

The made ground could be excavated and re-compacted to allow the use of ground bearing slabs.

10.7 SLOPE STABILITY AND RETAINING STRUCTURES

The site is generally level and slope stability issues are not anticipated.

10.8 SOAKAWAY DRAINAGE

The site is underlain by granular strata, which subject to testing, could be suitable for the use of soakaway drainage.

10.9 NEW ACCESS ROADS / PARKING ARRAYS

Based on site observations it is considered that after excavation/recompaction and proof rolling and removal of soft spots the made ground strata will have a CBR value of between 2% and 5% when suitably drained.

10.10 BURIED CONCRETE

Based on the recorded water soluble sulphate and pH levels in the soils and/or groundwater below the site and assuming mobile groundwater conditions, in accordance with requirements of BRE Special Digest 1 (2005), 'Concrete in Aggressive Ground', the Design Sulphate Class for buried concrete at the site should be assumed as DS-1 and the ACEC Class as AC-1. Therefore GEN-1 concrete will be suitable for un-reinforced concrete.

11 FURTHER INVESTIGATION



Some further investigation, to determine more accurately the effect of some of the identified hazards on the development, is recommended. This includes the following:

- Further gas monitoring to complete the monitoring program and confirm the assessment for gas precautions. An addendum gas letter report will be issued separately.
- Further investigation of the soil profile is required, this should comprise boreholes drilled with a rotary rig capable of undertaking SPTs in the weathered strata and taking core samples where rock is present.

12 CONCLUSIONS

This Site Appraisal has shown the site is suitable for the proposed development, assuming compliance with all the recommendations contained within this report.

See 'Summary of Recommendations' table at the beginning of the report.

Document prepared by	 Chris Storey BSc PGDip FGS (Divisional Manager)
Reviewed and Approved by	 Chris Jerram CGeol FGS (Director)
When required in-house geological, geotechnical, environmental, structural and civil staff helped to produce this document.	

NOTES ON LIMITATIONS

General

GRM Development Solutions Limited has prepared this report solely for the use of the Client and those parties with whom a warranty agreement had been executed, or with whom an assignment had been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from GRM Development Solutions Limited; a charge may be levied against such approval.

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Phase I Environmental Audits/ Desk Studies

The work undertaken to provide the basis of this report comprised 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 this report have been dictated by the 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 this report, GRM Development Solutions Limited reserves the right to review such information and, if warranted, to modify the opinions accordingly. It should be noted that any risks identified in a Phase 1 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 (Contamination Investigations)

The investigation of the site has been carried out to provide sufficient information concerning the type and degree of contamination, 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 with potential human targets, building materials, and controlled waters.

The amount of exploratory work and chemical testing undertaken has necessarily been restricted by the short timescale available, and the locations of exploratory holes have been restricted to the areas unoccupied by the building(s) on the site and by 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 need to be resolved.

For these 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 commercial adviser.

The exploratory holes undertaken, which investigate only a small volume of the ground in relation to the size of the site, can only provide a general indication of site conditions. The number of sampling points and 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.

The risk assessment and opinions provided, inter alia, take in to 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.

Phase II Geo-environmental Investigations (Combined Geotechnical and Contamination Investigations)

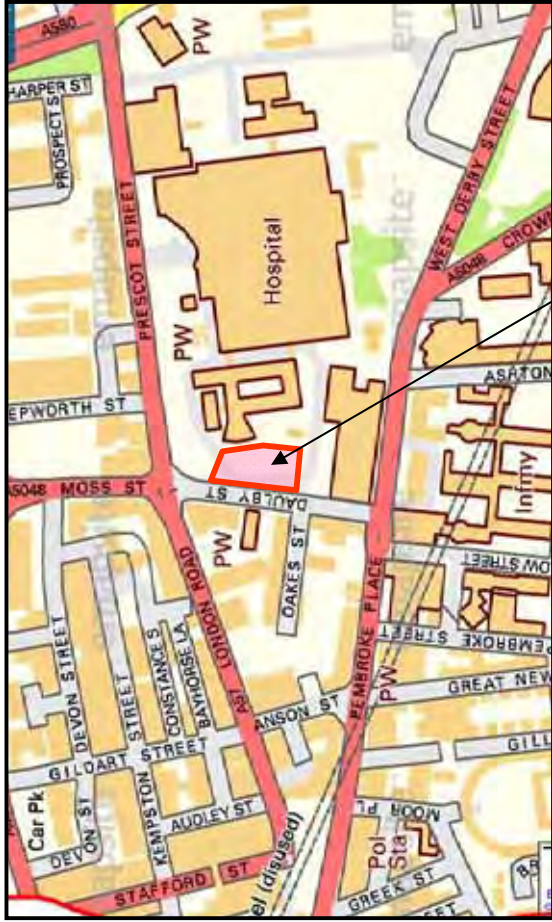
The investigation of the site has been carried out to provide sufficient information concerning the type and degree of contamination, geotechnical characteristics, and ground and groundwater conditions to provide a reasonable assessment of the environment risks together with engineering and development implications. If costs have been included in relation to site development a commercial adviser must confirm these.

The exploratory holes undertaken, which investigate only a small volume of the ground in relation to the size of the site, can only provide a general indication of site conditions. The opinions provided and recommendations given in this report are based on the ground conditions apparent at the site for each of the exploratory holes. There may be exceptional ground conditions elsewhere 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 the site work was conducted. It should be noted that groundwater levels will vary owing to seasonal, tidal and weather related effects. The scope of the investigation was selected on the basis of the specific development proposed by the Client and may be inappropriate to another form of development or scheme.

The risk assessment and opinion 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.

A P P E N D I X A



Site Address

Biosciences Site
Royal Liverpool University Hospital
Off Daulby Street
Liverpool
L69 3GA

SITE



DO NOT SCALE

NOTES:

○ Approx Site Location



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CLIENT:

The Alan Johnston Partnership

PROJECT:

Bioscience Unit, RLUH

TITLE:

**Site Location and Boundary
Plan**

SCALE@SIZE:

NTS

ISSUE:

FINAL

DESIGN/DRAWN:

LC

DATE:

11/2011

PROJECT No:

P5597

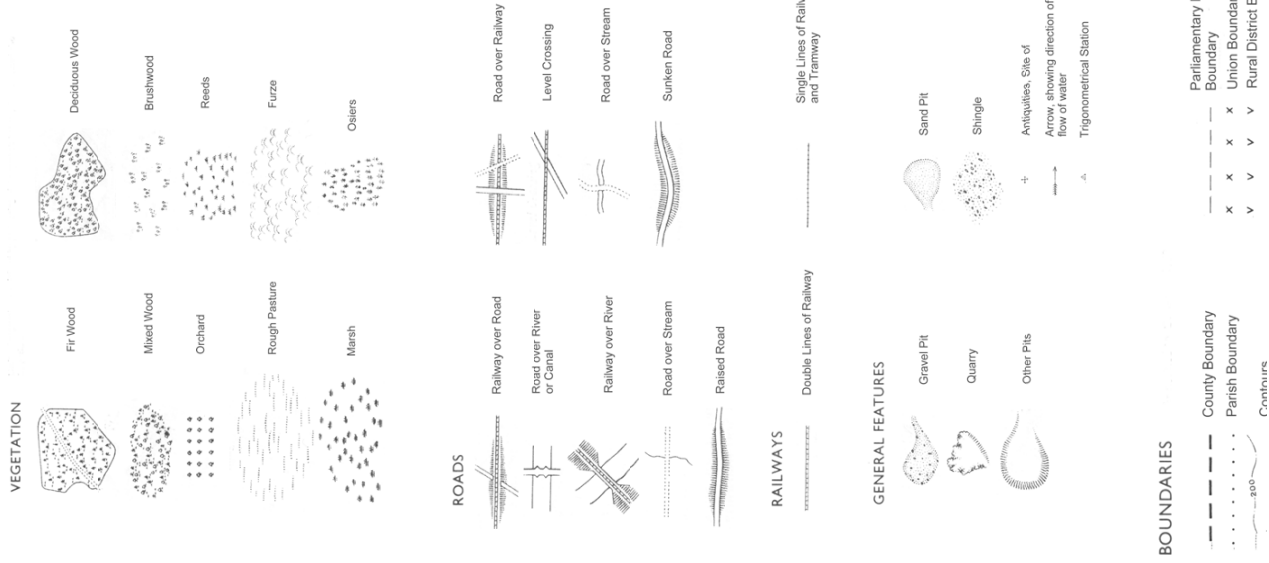
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Figure 1

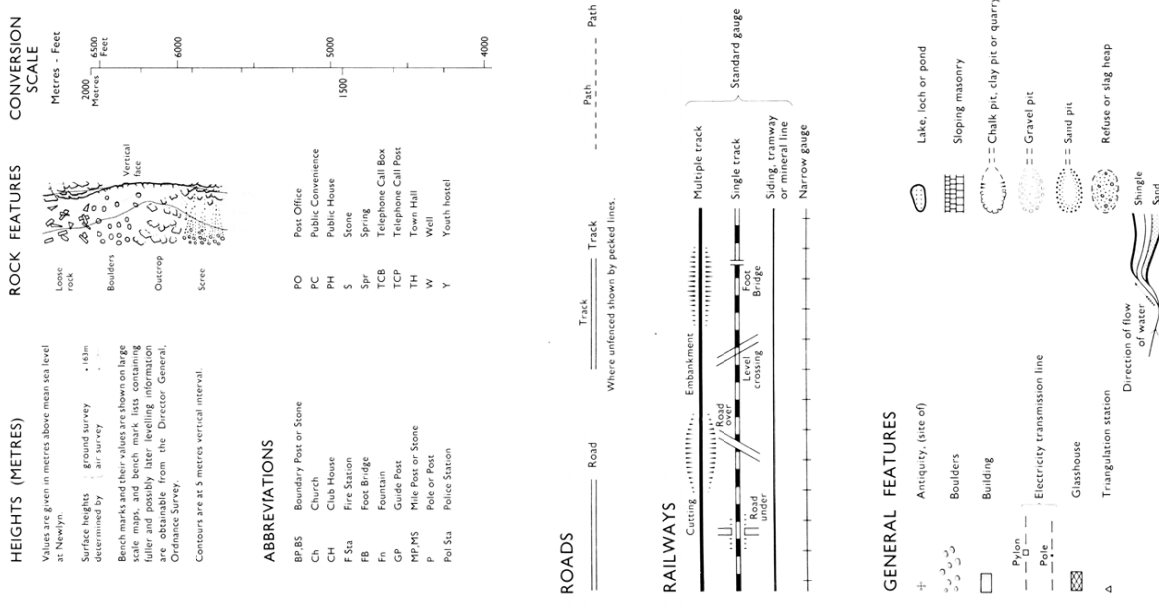
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A P P E N D I X B

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National Grid 1:10,000 scale



Historical Map Pack Legend

County Series & National Grid

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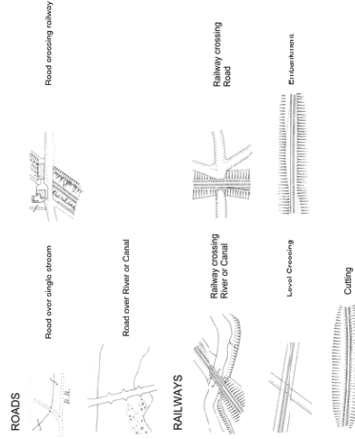
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National Grid 1:2,500 / 1:1,250 scale

**National Grid 1:2,500 / 1:1,250
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BH	Beer House
BM	Bench Mark
BP	Boundary Post
BBS	Boundary Stone
C	Crane
CH	Club House
Ch	Chimney
Cn	Cannon
Cp	Captain
Df	Drinking Fountain
Dk	Dock
ELP	Electricity Pillar or Post
ETL	Electricity Transmission Line
FA	Fire Alarm
FAP	Fire Alarm Pillar
FB	Filter Bed, Foot Bridge
FBN	Fundamental Bench Mark
F5	Fluyts

ABBREVIATIONS

FSta	Fire Station	MP.U.
GP	Guide Post	M3
GVC	Gas Valve Compound	N1
N	Hydrant or Hydraulic	N1
NB	Letter Box	N1S
L8	Letter Box	PC
L8 Stb.	Lifesize Station	P.C.B.
LC	Level Crossing	PH
LG	Loading Gauge	PO
LHb	Lighthouse	Pp
LTw	Lighting Tower	Pp
MW	Mean High Water	PH
MWS	Mean Low Water	RH
M1W	Mean Low Water	SP
M1WS	Mean Low Water Springs	S
MP	Mile or Mooring Post	S

ABBREVIATIONS

S L	Signal Light
SI	Sluice
S P	Signal Post
Spr	Spring
S Sta	Signal Station
T CB	Telephone Call Box
T CP	Telephone Call Post
T P	Telephone Call Post
T R	Tank or Truck
Tr	Trough
ts	Transverse Station
W	Well
W B	Weightbridge
Wd Pp	Wind Pump
Wks	Works
Wt Pt	Water Point
Wt T	Water Tap

ABBREVIATIONS

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Map Name: MasterMap

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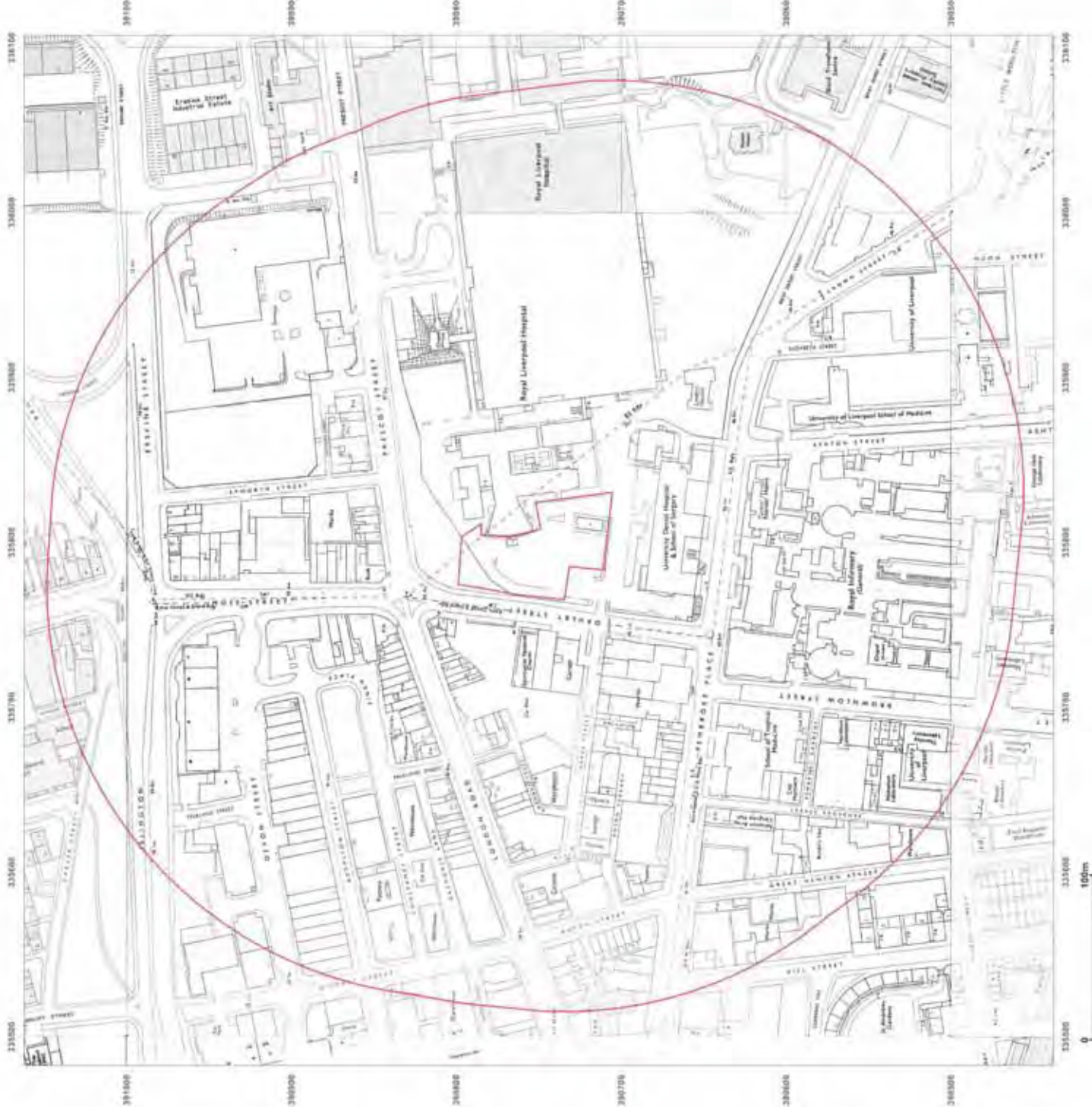


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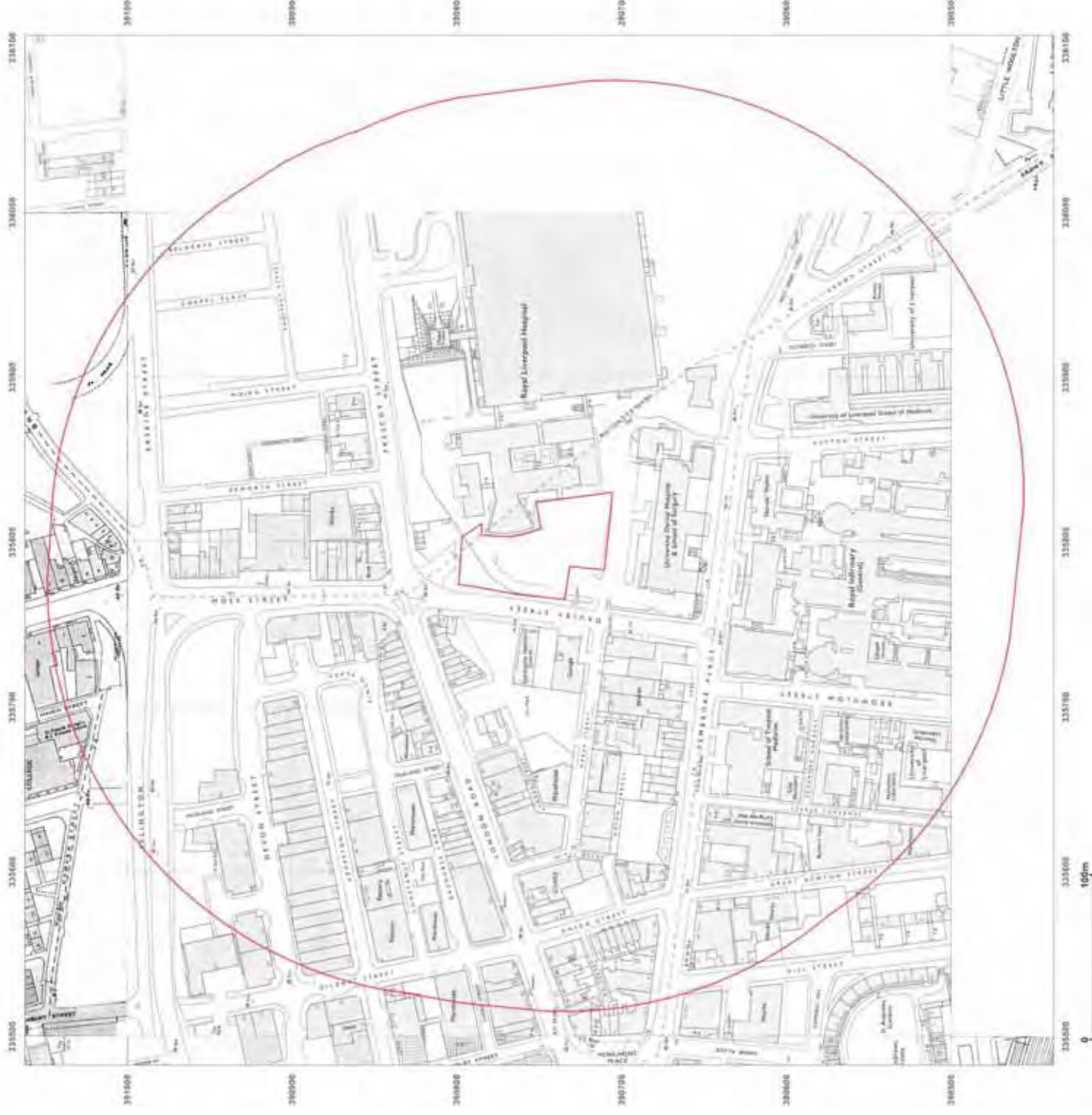


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Map Name: National Grid

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Report Ref: EMS-137878_197144
Grid Ref: 335795, 390750

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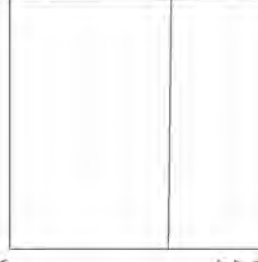
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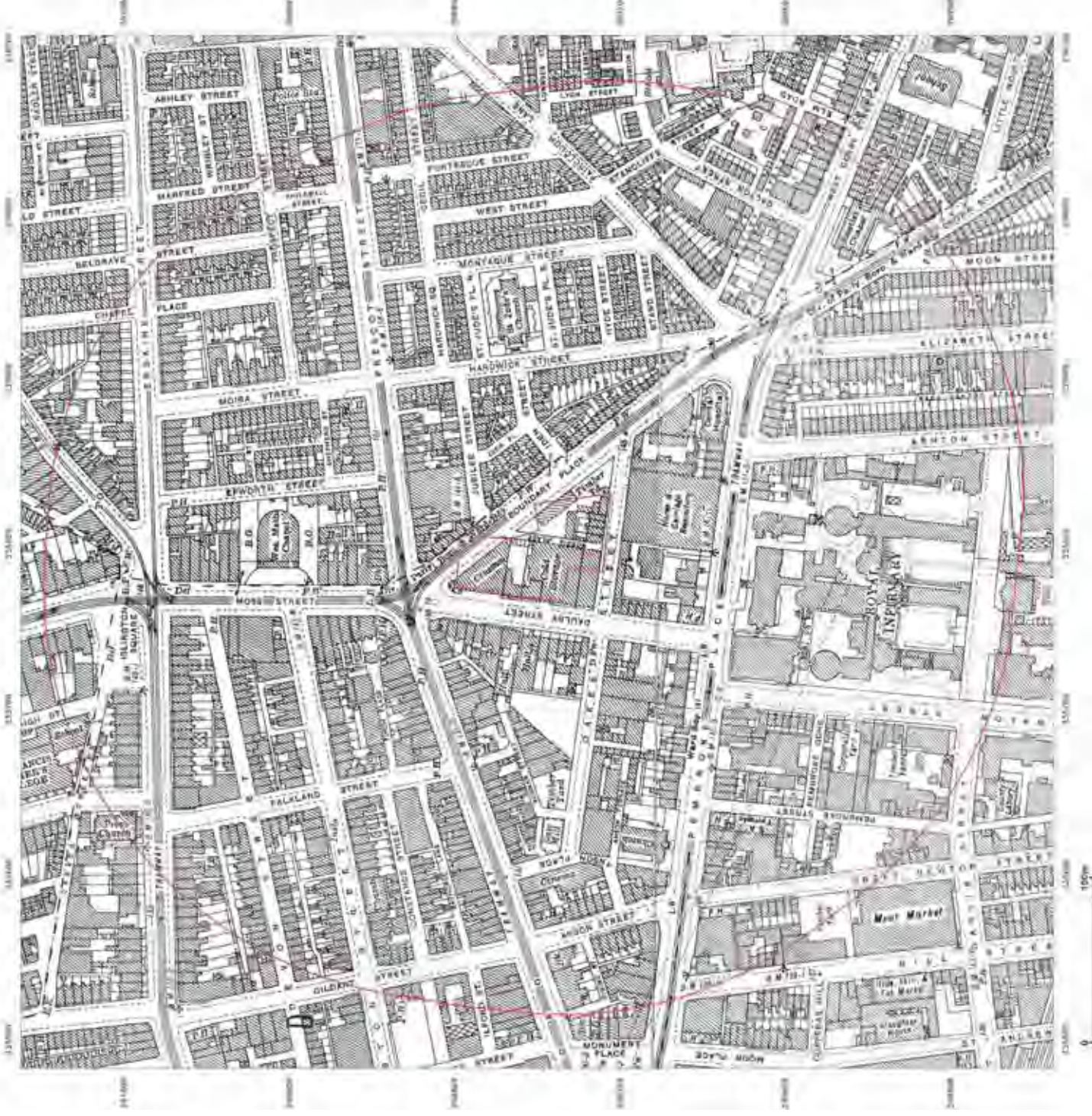


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Grid Ref: 335795, 390750

Map Name: County Series

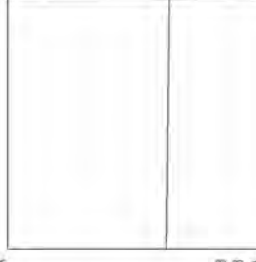
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Grid Ref: 335795, 390750

Map Name: National Grid

Map date: 2011

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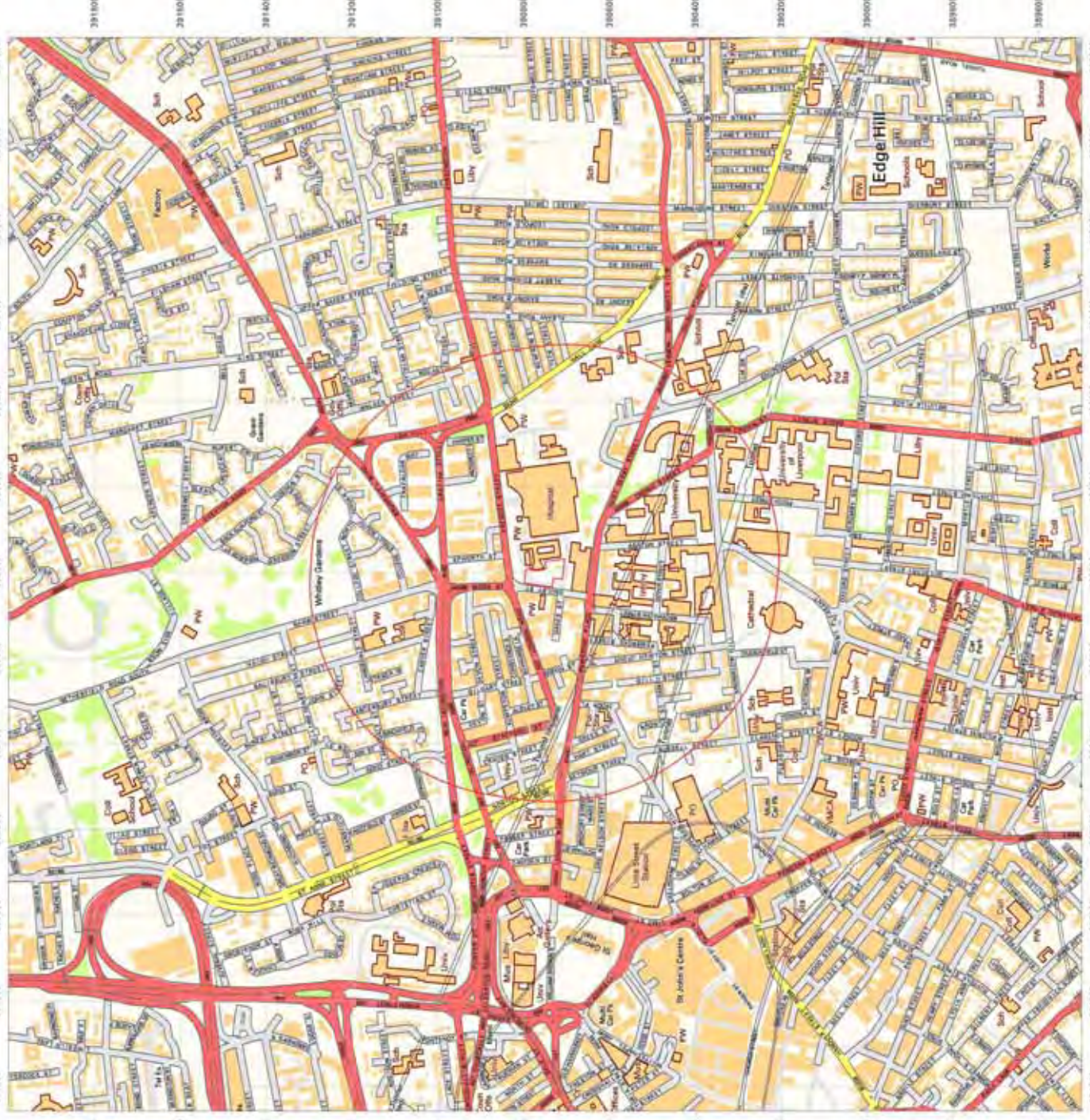


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Report Ref: EMS-137878_197144
Grid Ref: 335795, 390750

Map Name: 1:10,000 Raster

Map date: 2002

Scale: 1:10,000

Printed at: 1:10,000



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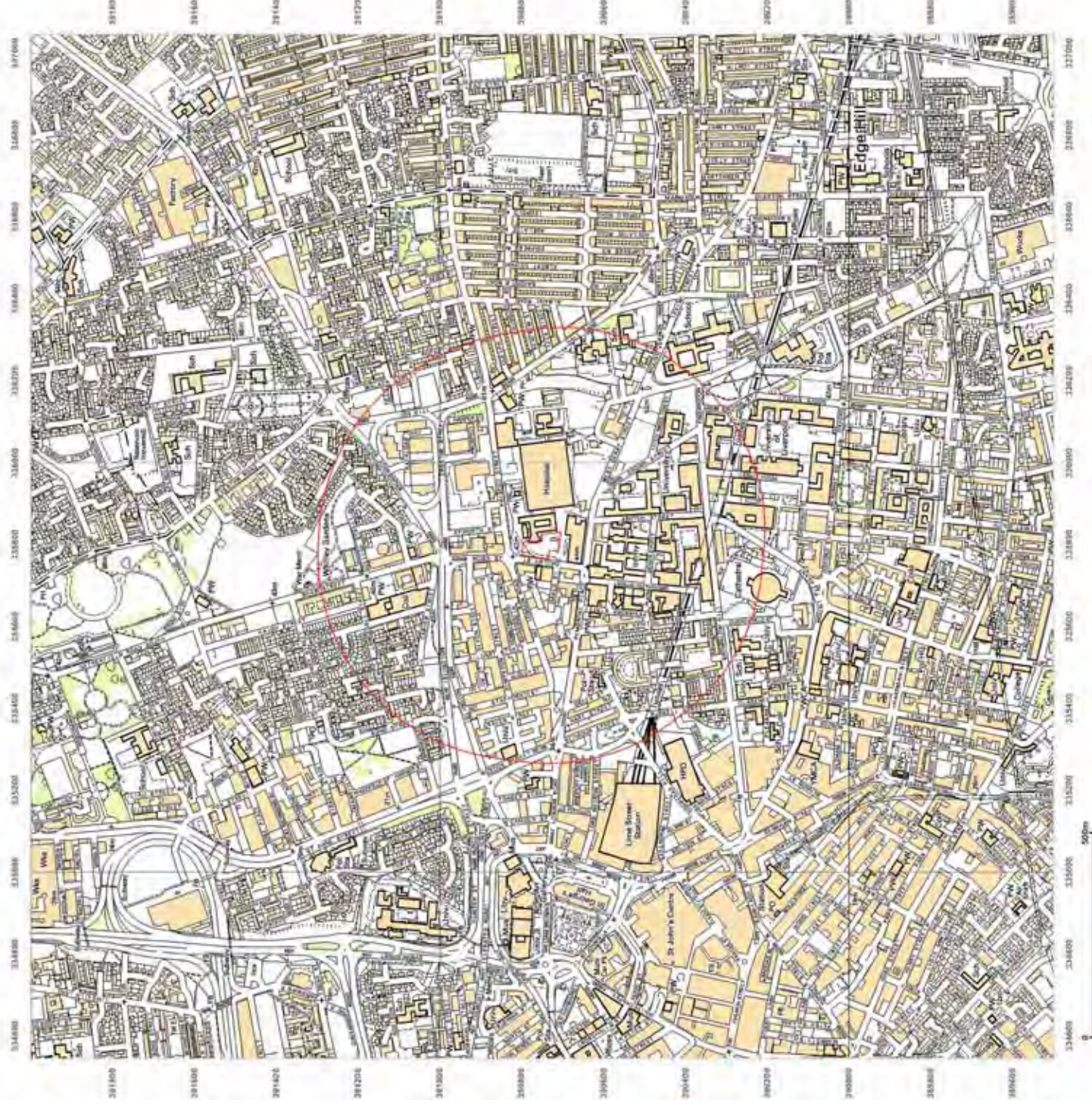


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Site Details:

Bioscience Site,RLUH,L69 3GA

Client Ref: EMS_137878_197144
Report Ref: EMS-137878_197144
Grid Ref: 335795, 390750

Map Name: National Grid

Map date: 1988-1991

Scale: 1:10,000

Printed at: 1:10,000



Surveyed 1989
 Revised 1990
 Edition NA
 Copyright NA
 Levelled NA

Surveyed 1987
 Revised 1989
 Edition NA
 Copyright NA
 Levelled NA

Surveyed 1988
 Revised 1991
 Edition NA
 Copyright NA
 Levelled NA

Surveyed 1985
 Revised 1988
 Edition NA
 Copyright NA
 Levelled NA



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Site Details:

Bioscience Site,RLUH,L69 3GA

Client Ref: EMS_137878, 197144
Report Ref: EMS-137878, 197144
Grid Ref: 335795, 390750

Map Name: National Grid

Map date: 1973-1978

Scale: 1:10,000

Printed at: 1:10,000

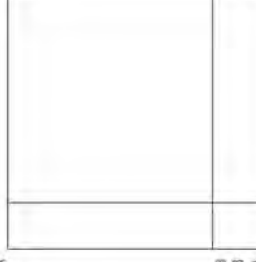


Surveyed 1973
 Revised 1973
 Edition NA
 Copyright NA
 Levelled NA

Surveyed 1974
 Revised 1975
 Edition NA
 Copyright NA
 Levelled NA

Surveyed 1978
 Revised 1978
 Edition NA
 Copyright NA
 Levelled NA

Surveyed 1975
 Revised 1975
 Edition NA
 Copyright NA
 Levelled NA



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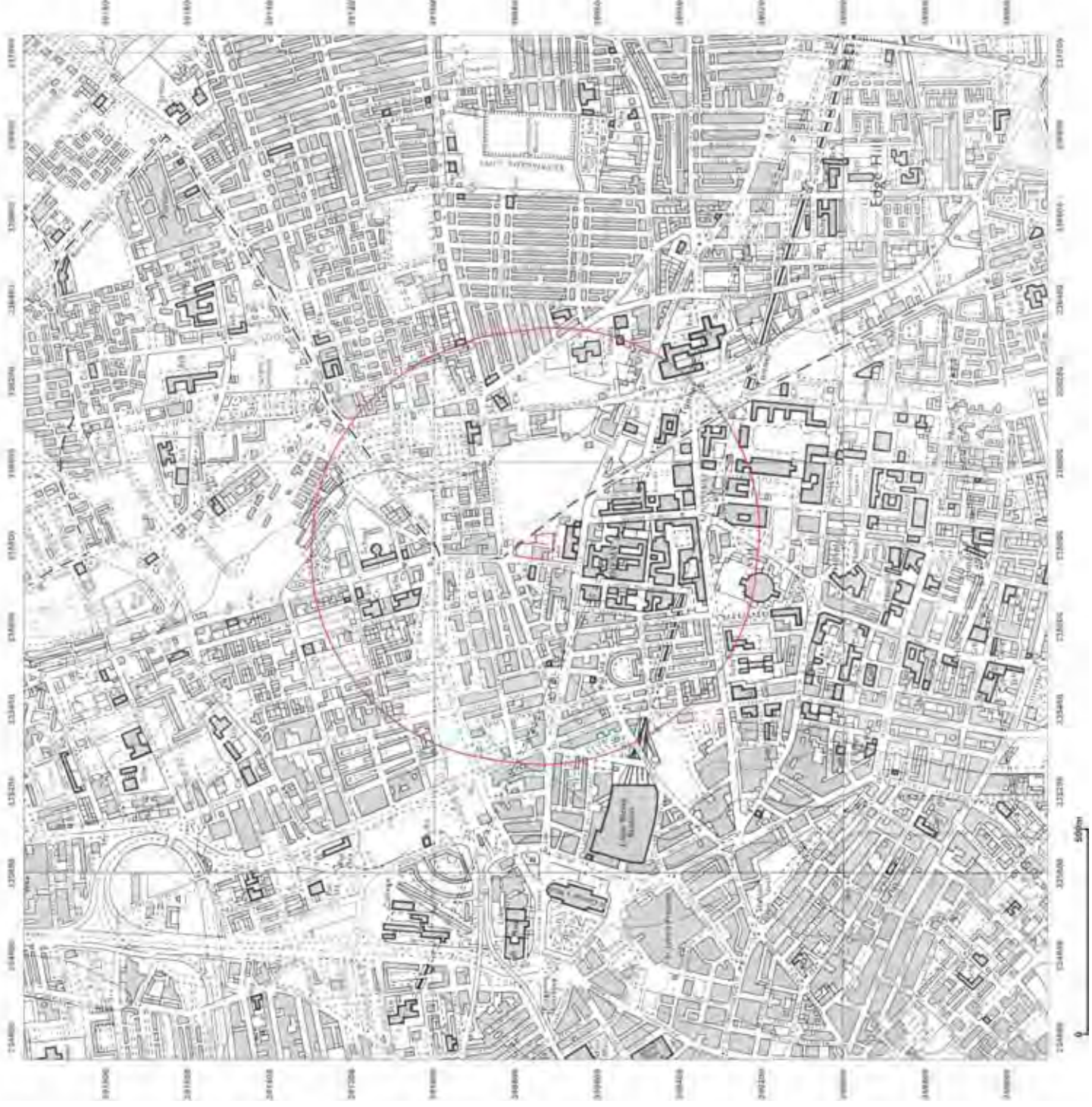


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Site Details:

Bioscience Site,RLUH,L69 3GA

Client Ref: EMS_137878_197144
Report Ref: EMS-137878_197144
Grid Ref: 335795, 390750

Map Name: National Grid

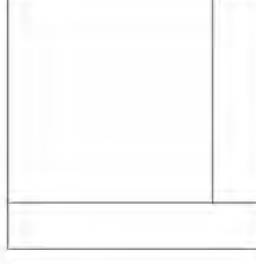
Map date: 1975

Scale: 1:10,000

Printed at: 1:10,000



Surveyed 1974
 Revised 1975
 Edition NA
 Copyright NA
 Levelled NA



Surveyed 1975
 Revised 1975
 Edition NA
 Copyright NA
 Levelled NA



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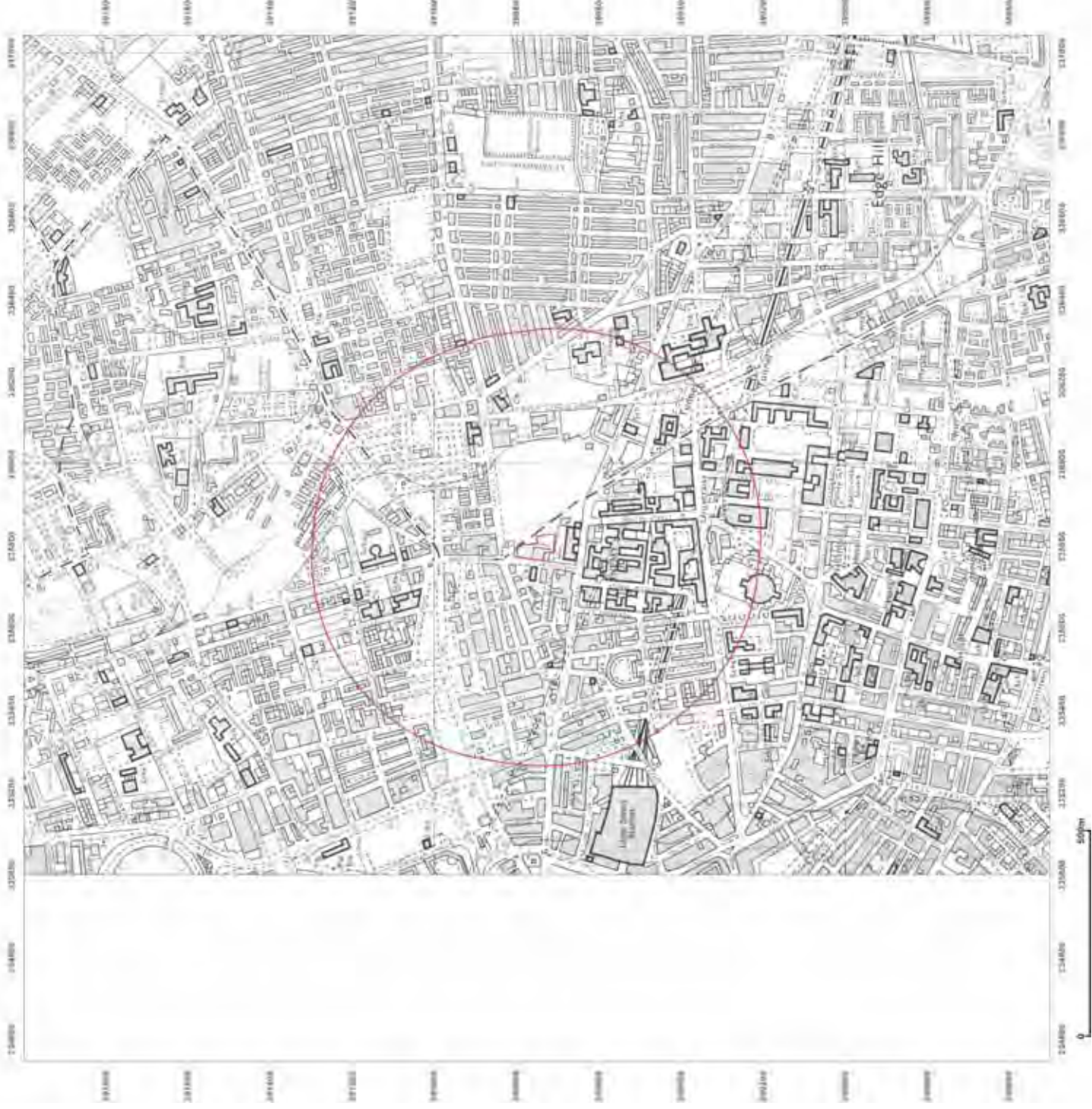


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Site Details:

Bioscience Site,RLUH,L69 3GA

Client Ref: EMS_137878_197144
Report Ref: EMS-137878_197144
Grid Ref: 335795, 390750

Map Name: Provisional

Map date: 1965-1968

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1967
 Revised 1967
 Edition NA
 Copyright NA
 Levelled NA

Surveyed 1966
 Revised 1968
 Edition NA
 Copyright NA
 Levelled NA

Surveyed 1866
 Revised 1968
 Edition NA
 Copyright NA
 Levelled NA

Surveyed 1965
 Revised 1965
 Edition NA
 Copyright NA
 Levelled NA



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Site Details:

Bioscience Site,RLUH,L69 3GA

Client Ref: EMS_137878_197144
Report Ref: EMS-137878_197144
Grid Ref: 335795, 390750

Map Name: Provisional

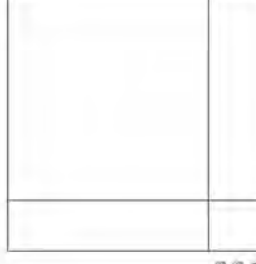
Map date: 1956-1957

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1957
 Revised 1957
 Edition NA
 Copyright NA
 Levelled NA



Surveyed 1956
 Revised 1956
 Edition NA
 Copyright NA
 Levelled NA



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Site Details:

Bioscience Site,RLUH,L69 3GA

Client Ref: EMS_137878_197144
Report Ref: EMS-137878_197144
Grid Ref: 335795, 390750

Map Name: County Series

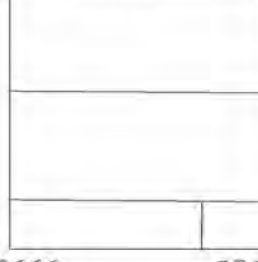
Map date: 1938

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1874
 Revised 1938
 Edition NA
 Copyright NA
 Levelled NA



Surveyed 1874
 Revised 1938
 Edition NA
 Copyright NA
 Levelled NA

Surveyed 1848
 Revised 1938
 Edition NA
 Copyright NA
 Levelled NA



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Site Details:

Bioscience Site,RLUH,L69 3GA

Client Ref: EMS_137878_197144
Report Ref: EMS-137878_197144
Grid Ref: 335795, 390750

Map Name: County Series

Map date: 1925-1928

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1845
Revised 1928
Edition 1928
Copyright NA
Levelled NA

Surveyed 1848
Revised 1925
Edition NA
Copyright NA
Levelled NA



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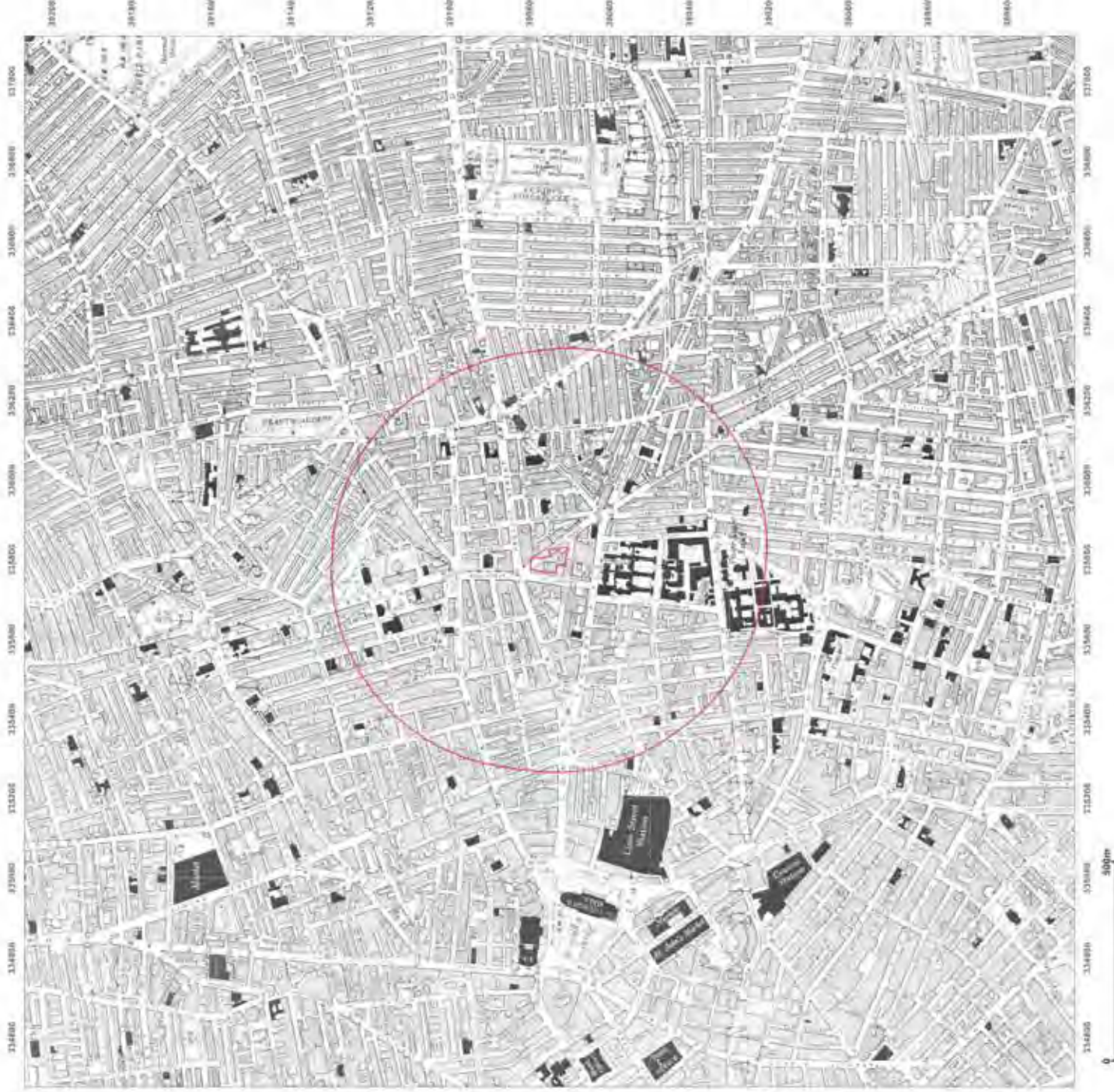


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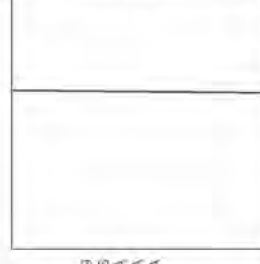
Client Ref: EMS_137878_197144
Report Ref: EMS-137878_197144
Grid Ref: 335795, 390750

Map Name: County Series

Map date: 1906

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1848
Revised 1906
Edition NA
Copyright NA
Levelled NA

Surveyed 1848
Revised 1906
Edition NA
Copyright NA
Levelled NA



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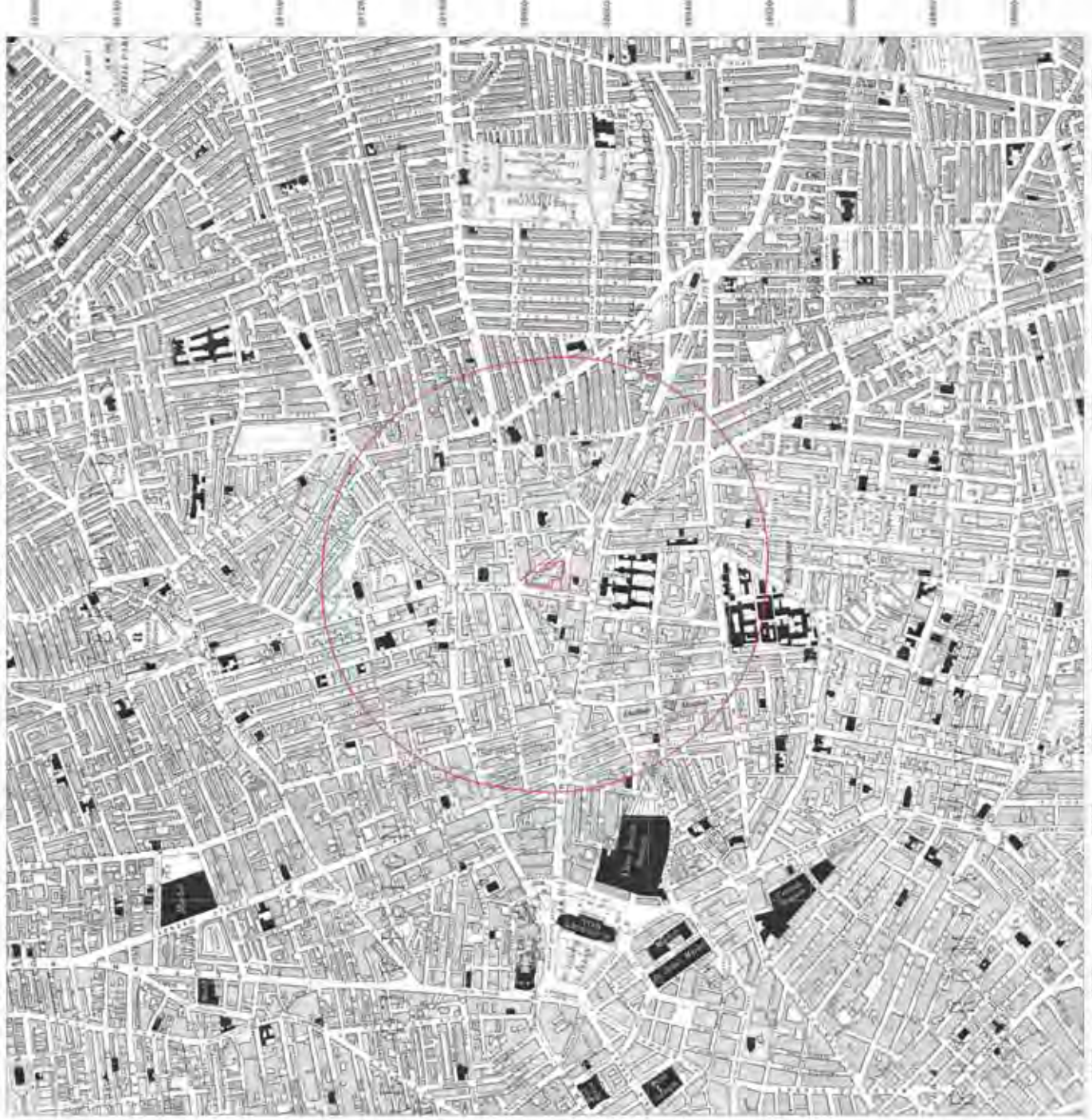


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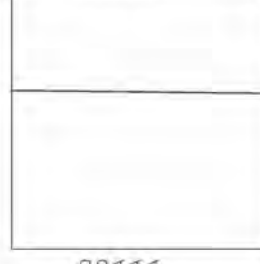
Client Ref: EMS_137878_197144
Report Ref: EMS-137878_197144
Grid Ref: 335795, 390750

Map Name: County Series

Map date: 1890-1891

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1890
 Revised 1890
 Edition NA
 Copyright NA
 Levelled NA

Surveyed 1891
 Revised 1891
 Edition NA
 Copyright NA
 Levelled NA



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A P P E N D I X C



EmapSite
Masdar House,
Eversley, RG27 0RP

Report Reference:	EMS- 137878_197145
Your Reference:	EMS_137878_197 145
Report Date	Sep 13, 2011
Report Delivery Method:	Email - pdf

GroundSure GeoInsight

Address: Bioscience Site,RLUH,L69 3GA

Dear Sir/Madam,

Thank you for placing your order with GroundSure. Please find enclosed the **GroundSure GeoInsight** as requested.

If you would like further assistance regarding this report then please contact the emapsite customer services team on 0118 9736883 quoting the above report reference number.

Yours faithfully,

emapsite customer services team

Enc.
GroundSure GeoInsight

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Address: Bioscience Site,RLUH,L69 3GA

Date: Sep 13, 2011

Report Reference: EMS-137878_197145

Your Reference: EMS_137878_197145



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Aerial Photograph of Study Site



Site Name: Bioscience Site,RLUH,L69 3GA
Grid Reference: 335795,390750
Size of Site: 0.38 ha

Aerial photography supplied by Getmapping PLC.
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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, Johnson Poole and Bloomer mining data 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?*	No
1.2.2 Are there any records relating to permeability of superficial geology within the study site* boundary?	No
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?	Yes
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 Research 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:096

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	0	0	-	-
2.2 Historical Underground Workings Features from Small Scale Mapping	0	0	5	9	31
2.3 Current Ground Workings	0	0	0	0	4

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

*This includes an automatically generated 50m 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	Negligible	-	-	-	-
4.5 Collapsible Deposits	Very Low	-	-	-	-
4.6 Running Sand	Negligible	-	-	-	-

* 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	0	8	19	-	-

6. Estimated Background Soil Chemistry	on-site	0-50	51-250	251-500	501-1000
6.1 Records of Background Soil Chemistry	1	1	0	-	-

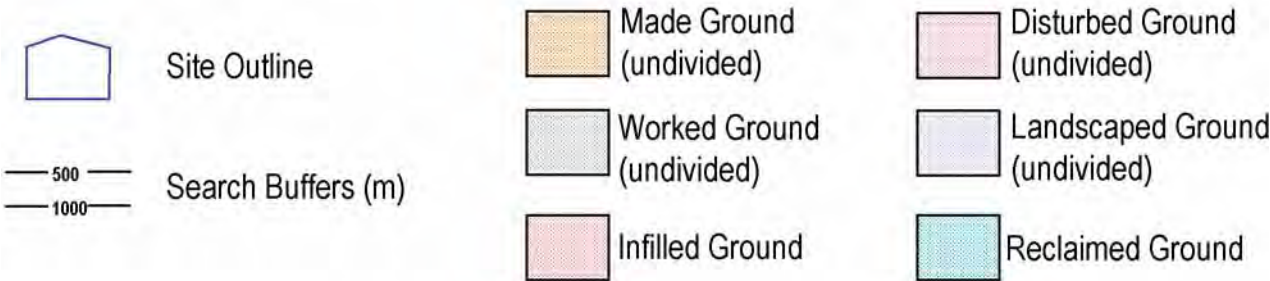
1.1 Artificial Ground Map



Artificial Ground Legend



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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:096

1.1.1 Artificial/Made Ground

Are there any records of Artificial/Made Ground within 500m of the study site boundary? **Yes**

ID	Distance (m)	Direction	LEX Code	Description	Rock Description
1	346.0	S	MGR-FILLU	MADE GROUND (UNDIVIDED)	FILL
2	450.0	SW	WGR-OPEN	WORKED GROUND (UNDIVIDED)	VOID

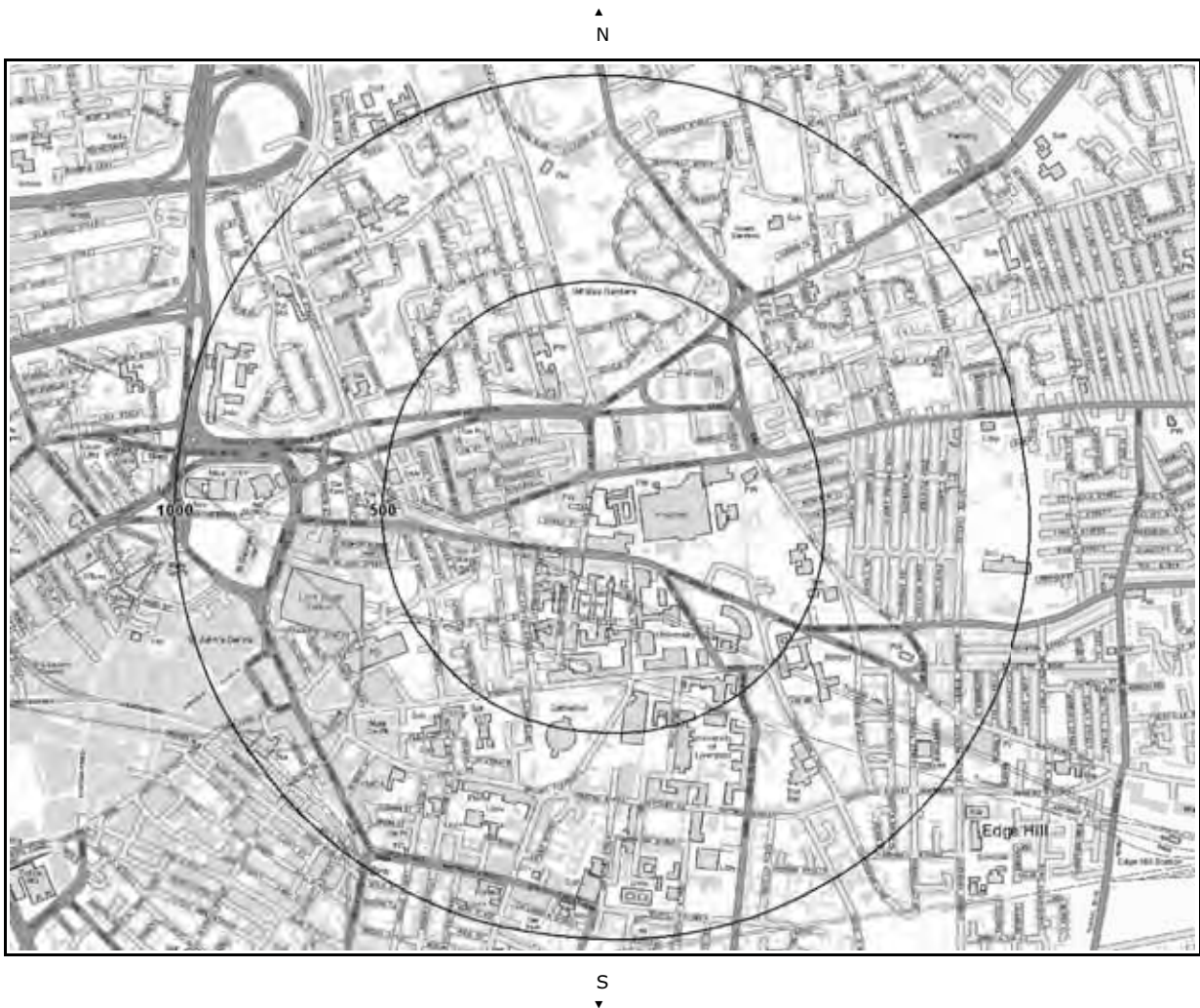
1.1.2 Permeability of Artificial Ground

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.

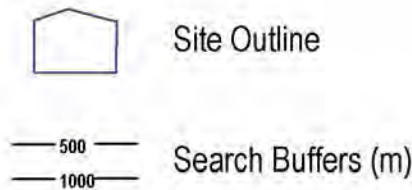
1.2 Superficial Deposits and Landslips Map



Superficial and Landslips Legend



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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? **No**

Database searched and no data found.

1.2.2 Permeability of Superficial Ground

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

Database searched and no data found.

1.2.3 Landslip

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

Database searched and no data found.

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 discrete 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.

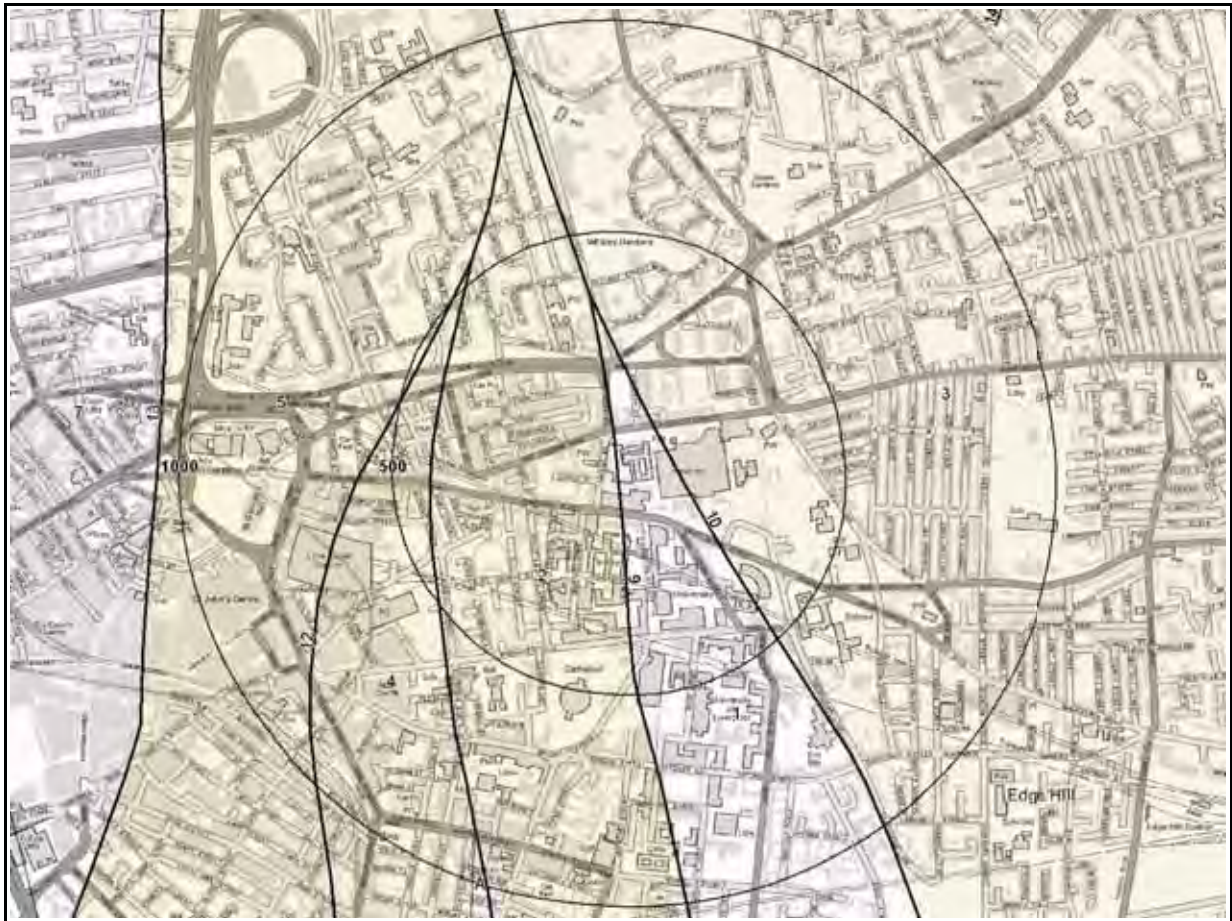
1.2.4 Landslip Permeability

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.

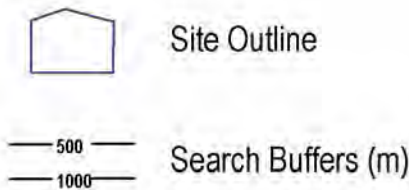
1.3 Bedrock and Faults Map



Bedrock & Faults Deposits Legend



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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:096

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
1	0.0	On Site	WLSF-SDST	Wilmslow Sandstone Formation - Sandstone	Scythian
2	0.0	On Site	HEY-SDST	Helsby Sandstone Formation - Sandstone	Anisian / Scythian
3	87.0	NE	CPB-SDST	Chester Pebble Beds Formation - Sandstone	Scythian
4	408.0	W	HEY-SDST	Helsby Sandstone Formation - Sandstone	Anisian / Scythian
5	481.0	NW	HEY-SDST	Helsby Sandstone Formation - Sandstone	Anisian / Scythian

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	Moderate
0.0	On Site	Intergranular	High	High

1.3.3 Faults

Are there any records of Faults within 500m of the study site boundary? **Yes**

ID	Distance (m)	Direction	Category Description	Feature Description
9	0.0	On Site	FAULT	Normal fault, inferred
10	87.0	NE	FAULT	Normal fault, inferred
11	408.0	W	FAULT	Normal fault, inferred
A				
12	481.0	NW	FAULT	Normal fault, inferred

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 discrete 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

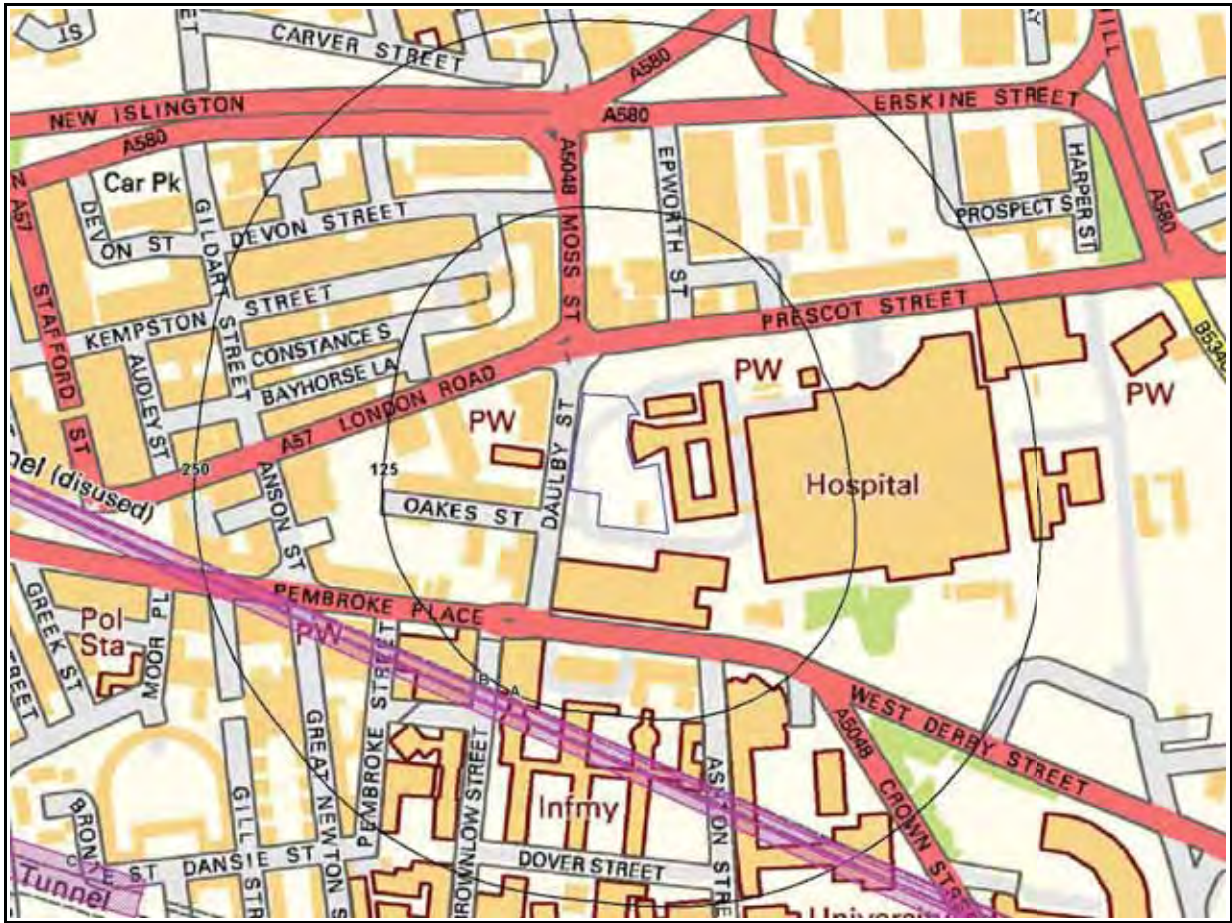
* This includes an automatically generated 50m buffer zone around the site.

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


2. Ground Workings Map

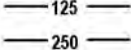



Ground Workings Legend





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- 

Site Outline
- 

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 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? **No**

Database searched and no data found.

2.2 Historical Underground Workings Features derived from 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? **Yes**

The following Historical Underground Working Features are provided by GroundSure:

ID	Distance (m)	Direction	NGR	Use	Date
1A	129.0	SW	336017,390460	Tunnel	1957
2A	129.0	SW	336017,390460	Tunnel	1975
3A	129.0	SW	336017,390460	Tunnel	1968
4B	132.0	SW	335048,390893	Tunnel	1938
5B	139.0	SW	335047,390885	Tunnel	1906
Not shown	325.0	S	335931,390313	Tunnel	1989
Not shown	325.0	S	335931,390313	Tunnel	1975
Not shown	325.0	S	335800,390353	Tunnel	1968
9C	383.0	SW	335425,390478	Tunnel	1989
10C	383.0	SW	335425,390478	Tunnel	1975
Not shown	390.0	SE	336565,390209	Tunnel	1906
Not shown	390.0	SE	336565,390209	Tunnel	1925
Not shown	390.0	SE	336565,390209	Tunnel	1938
Not shown	436.0	S	336086,390263	Tunnel	1968
Not shown	544.0	SE	336147,390231	Tunnel	1938
Not shown	544.0	SE	336147,390231	Tunnel	1925
Not shown	544.0	SE	336147,390231	Tunnel	1906
Not shown	544.0	SE	336147,390231	Tunnel	1891
Not shown	604.0	SE	336247,390215	Tunnel	1968
Not shown	604.0	SE	336247,390215	Tunnel	1975
Not shown	604.0	SE	336247,390215	Tunnel	1989

Report Reference: EMS-137878_197145

Not shown	606.0	SE	336241,390203	Tunnel	1891
Not shown	606.0	SE	336241,390203	Tunnel	1938
Not shown	606.0	SE	336241,390203	Tunnel	1925
Not shown	606.0	SE	336241,390203	Tunnel	1906
Not shown	627.0	SW	335210,390415	Tunnel	1989
Not shown	654.0	SE	336360,390315	Air Shaft	1975
Not shown	782.0	W	334888,390960	Tunnel	1973
Not shown	782.0	W	334888,390960	Tunnel	1967
Not shown	807.0	W	334874,390969	Tunnel	1938
Not shown	807.0	W	334874,390969	Tunnel	1909
Not shown	884.0	SE	336575,390221	Air Shaft	1975
Not shown	884.0	SE	336575,390221	Air Shaft	1989
Not shown	939.0	SW	335077,390077	Tunnel	1989
Not shown	939.0	SW	335071,390085	Tunnel	1975
Not shown	943.0	SW	333435,389680	Tunnel	1938
Not shown	948.0	SW	333429,389679	Tunnel	1906
Not shown	953.0	SW	335183,389505	Tunnel	1988
Not shown	953.0	SW	335183,389505	Tunnel	1975
Not shown	953.0	SW	335183,389505	Tunnel	1965
Not shown	966.0	SW	334053,390146	Railway Tunnel	1973
Not shown	982.0	SW	335183,389505	Tunnel	1956
Not shown	990.0	SW	334054,390147	Railway Tunnel	1967
Not shown	997.0	SW	334100,390196	Tunnel	1938
Not shown	997.0	SW	334100,390196	Tunnel	1909

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?

Yes

The following Current Ground Workings information is provided by British Geological Society:

ID	Distance (m)	Direction	NGR	Commodity Produced	Pit Name	Type of working	Status
Not shown	694.0	N	336025, 391455	Sandstone	Everton Road	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	826.0	NE	336130, 391555	Sandstone	Mill Road	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased

Not shown	866.0	E	336660, 390460	Sandstone	Duke Street	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	909.0	N	336040, 391675	Sandstone	Everton	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased

3. Mining, Extraction & Natural Cavities Map



Mining, Extraction & Natural Cavities
Legend



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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?

Yes

The following Historical Mining information is provided by Groundsure :

ID	Distance (m)	Direction	NGR	Details	Date
1	654.0	SE	336360,390315	Air Shaft	1975
Not shown	884.0	SE	336575,390221	Air Shaft	1975
Not shown	884.0	SE	336575,390221	Air Shaft	1989

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?

No

Database searched and no data found.

3.3 Johnson Poole and Bloomer

This dataset provides information as to whether the study site lies within an area where JPB hold information relating to mining.

Are there any JPB Mining areas within 1000m of the study site boundary?

No

The following information provided by JPB is not represented on Mapping:

Database searched. No results found.

3.4 Non – Coal Mining

This dataset provides information as to whether the study site lies within an area which may have been subject to non-coal historic mining.

Are there any Non-Coal Mining areas within 1000m of the study site boundary?

No

Database searched and no data found.

3.5 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.

3.6 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.

3.7 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.

3.8 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.

3.9 Tin Mining

This dataset provides information on tin mining areas and is derived from tin mining records. This search is based upon postcode information to a sector level. More detailed information on potential Tin Mining may be found in Section 3.4 – Non-Coal Mining Hazards.

Are there any Tin Mining areas within 1000m of the study site boundary?

No

Database searched and no data found.

3.10 Clay Mining

This dataset provides information on Kaolin 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



Shrink-Swell Clay Legend



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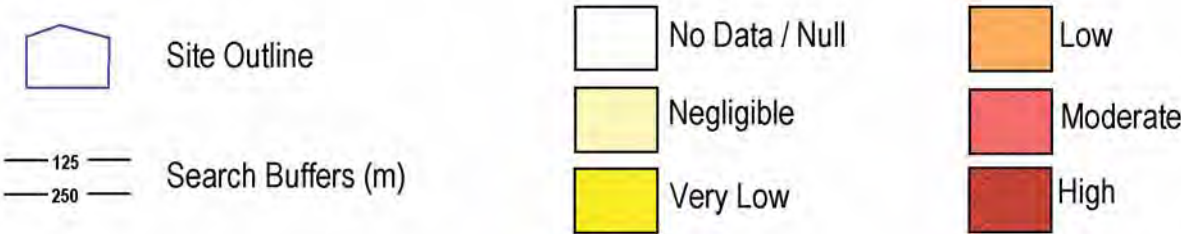
4.2 Landslides Map



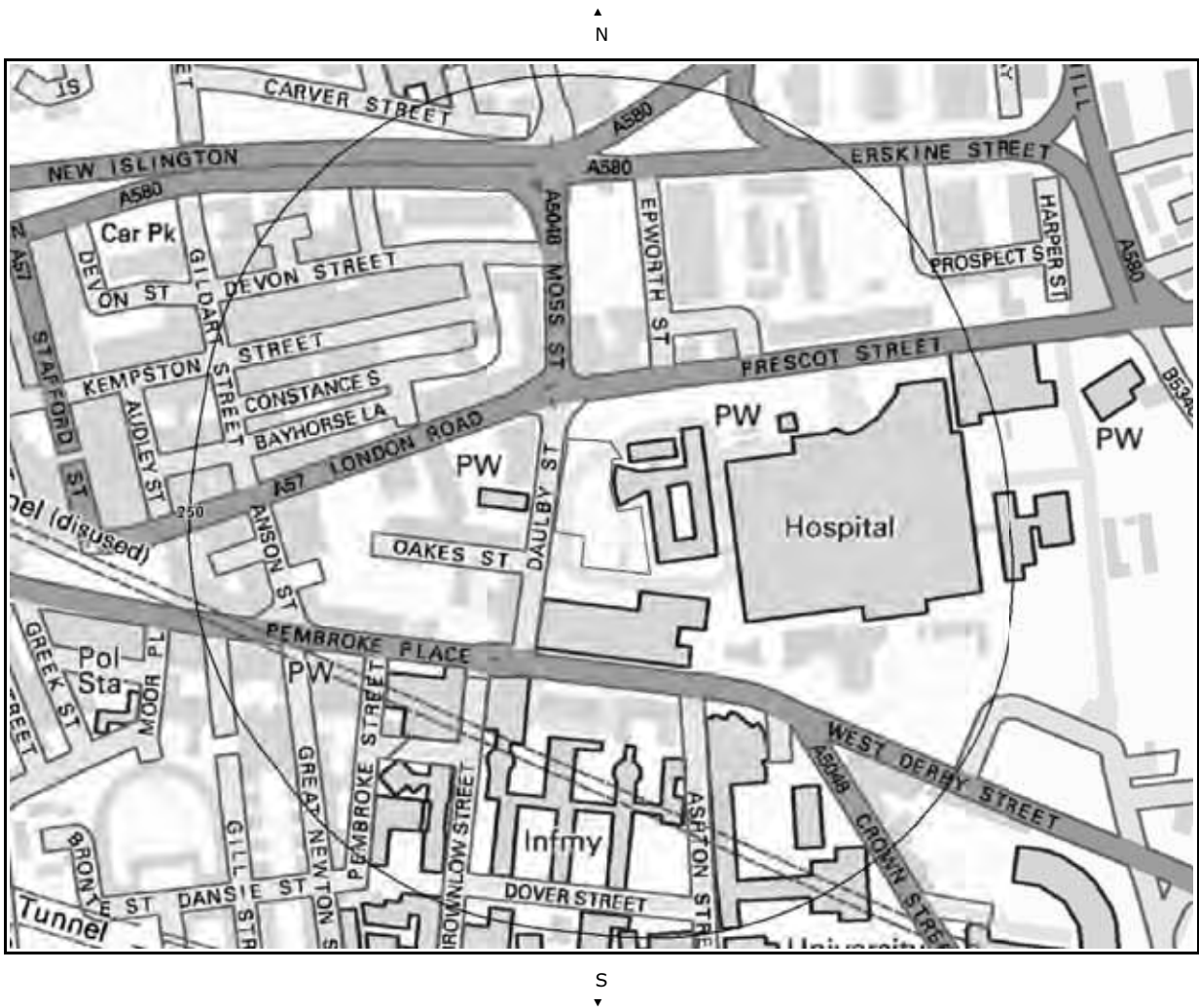
Landslides Legend



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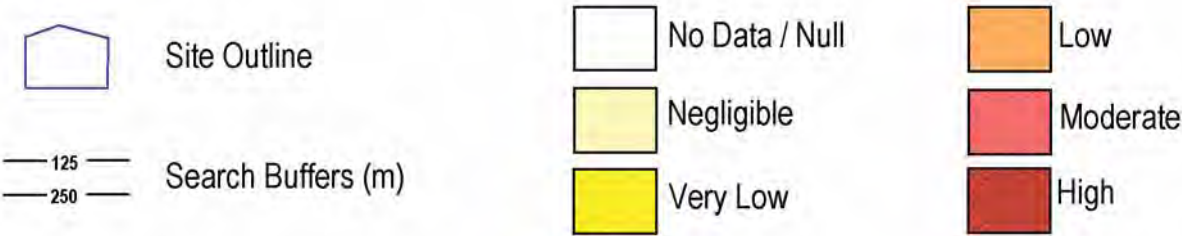
4.3 Ground Dissolution Soluble Rocks Map



Ground Dissolution Soluble Rocks
Legend

Enabled by
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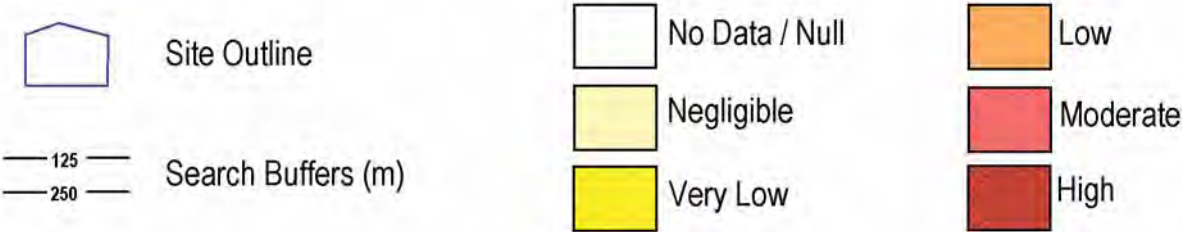
4.4 Compressible Deposits Map



Compressible Deposits Legend



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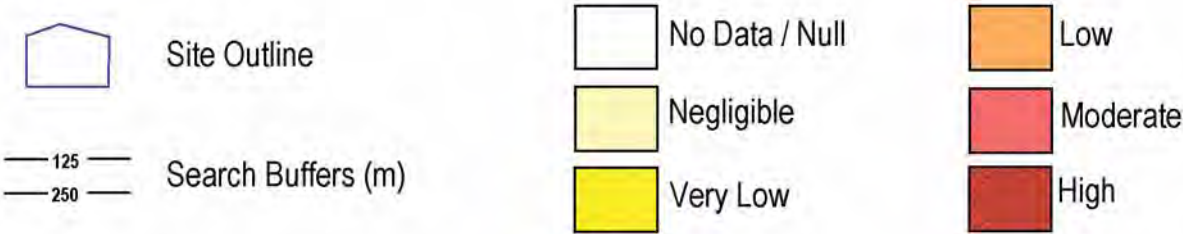
4.5 Collapsible Deposits Map



Collapsible Deposits Legend



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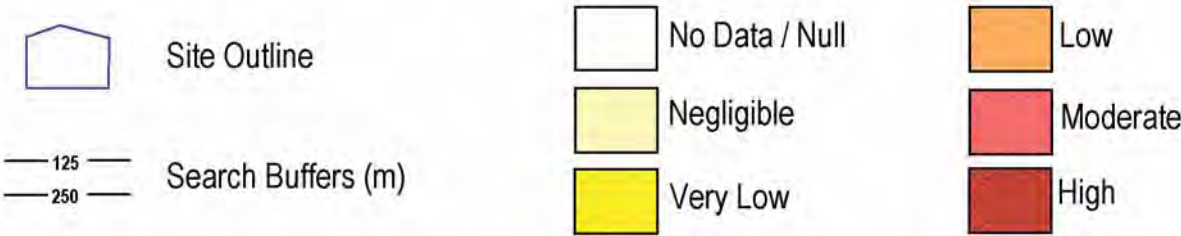
4.6 Running Sand Map



Running Sand Legend

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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? **Very Low**

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
0.0	On site	Null-Negligible	Soluble rocks are not present in the search area. 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	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.

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

4.5 Collapsible Deposits

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

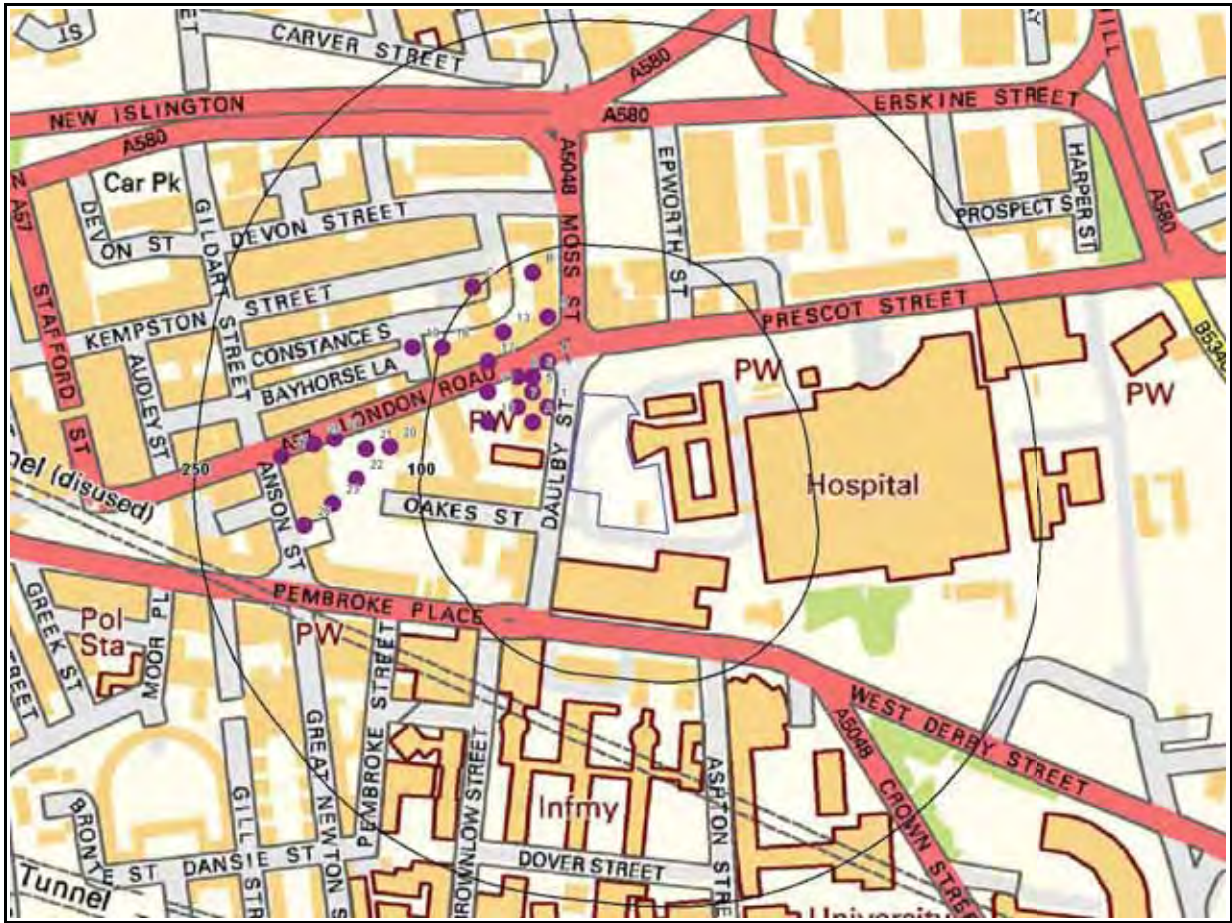
ID	Distance (m) *	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.

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	Negligible	No indicators for running sand identified. 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



Borehole Records Legend



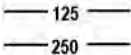
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Site Outline



Borehole Locations



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:

27

ID	Distance (m)	Direction	NGR	BGS Reference	Drilled Length (m)	Borehole Name
1	22.0	W	335750,390790	SJ39SE434	-1.0	LONDON ROAD LIVERPOOL TP 2
2A	31.0	W	335740,390780	SJ39SE432	-1.0	LONDON ROAD LIVERPOOL 3
3A	31.0	W	335740,390780	SJ39SE433	-1.0	LONDON ROAD LIVERPOOL TP 1
4	32.0	NW	335750,390820	SJ39SE436	-1.0	LONDON ROAD LIVERPOOL TP 4
5	34.0	W	335740,390800	SJ39SE435	-1.0	LONDON ROAD LIVERPOOL TP 3
6	36.0	W	335740,390810	SJ39SE431	-1.0	LONDON ROAD LIVERPOOL 2
7	42.0	W	335730,390790	SJ39SE439	-1.0	LONDON ROAD LIVERPOOL TP 7
8	45.0	W	335730,390810	SJ39SE437	-1.0	LONDON ROAD LIVERPOOL TP 5
9	56.0	NW	335750,390850	SJ39SE527	-1.0	MOSS STREET LIVERPOOL 1
10	60.0	W	335710,390780	SJ39SE430	-1.0	LONDON ROAD LIVERPOOL 1
11	64.0	W	335710,390800	SJ39SE438	-1.0	LONDON ROAD LIVERPOOL TP 6
12	67.0	W	335710,390820	SJ39SE534	-1.0	MOSS STREET LIVERPOOL 2
13	68.0	NW	335720,390840	SJ39SE530	-1.0	MOSS STREET LIVERPOOL 4
14B	88.0	NW	335740,390880	SJ39SE528	-1.0	MOSS STREET LIVERPOOL 2
15B	88.0	NW	335740,390880	SJ39SE535	-1.0	MOSS STREET LIVERPOOL 3
16	99.0	W	335680,390830	SJ39SE529	-1.0	MOSS STREET LIVERPOOL 3
17C	103.0	NW	335700,390870	SJ39SE532	-1.0	MOSS STREET LIVERPOOL 6
18C	103.0	NW	335700,390870	SJ39SE533	-1.0	MOSS STREET LIVERPOOL 1
19	118.0	W	335660,390830	SJ39SE531	-1.0	MOSS STREET LIVERPOOL 5
20	122.0	W	335645,390763	SJ39SE323	2.3	LONDON ROAD LIVERPOOL 6
21	138.0	W	335629,390762	SJ39SE324	2.6	LONDON ROAD LIVERPOOL 7
22	142.0	W	335623,390742	SJ39SE326	3.1	LONDON ROAD LIVERPOOL 9
23	158.0	W	335607,390725	SJ39SE319	5.6	LONDON ROAD LIVERPOOL 2
24	160.0	W	335608,390769	SJ39SE325	2.5	LONDON ROAD LIVERPOOL 8
25	173.0	W	335594,390765	SJ39SE318	4.6	LONDON ROAD LIVERPOOL 1
26	179.0	W	335588,390711	SJ39SE321	3.3	LONDON ROAD LIVERPOOL 4
27	193.0	W	335573,390757	SJ39SE320	7.3	LONDON ROAD LIVERPOOL 3

6. Estimated Background Soil Chemistry

Records of background estimated soil chemistry within 250m of the study site boundary:

2

For further information on how this data is calculated and limitations upon its use, please see the GroundSure GeoInsight User Guide, available on request.

Estimated Geometric Mean Soil Concentrations (mg/kg)							
Distance (m)*	Direction	Sample Type	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Nickel (Ni)	Lead (Pb)
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<150 mg/kg
17.0	W	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<150 mg/kg

*As this data is based upon underlying 1:50,000 scale geological information, a 50m buffer has been added to the search radius.

7. Contacts

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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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The Coal Authority

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Acknowledgements

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This report has been prepared in accordance with the GroundSure Ltd standard Terms and Conditions of business for work of this nature.

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.

"**Commercial**" means any building which is not Residential.

"**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 clause 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.

"**Intellectual Property**" means any patent, copyright, design rights, service marks, moral rights, data protection rights, know-how, trademark 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.

"**Residential**" means any building used as or suitable for use as an individual dwelling.

"**Risk Screening Report**" means one of GroundSure's risk screening reports, comprising factual data with interpretation in respect of the level of likely risk and/or liability, excluding "Consultancy Services".

"**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 ensure the Beneficiary complies with and is bound by the terms and conditions set out in the Contract and shall provide that GroundSure may in its own right enforce such terms and conditions against the Beneficiary pursuant to the Contracts (Rights of Third Parties) Act 1999. The Client shall be liable for all breaches of the Contract by the Beneficiary as if they were breaches by the Client. 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 who is considering acquiring the whole or part of the Site, or providing funding in relation to the Site, but such third party cannot rely on the same unless expressly permitted under clause 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 access the information contained in a Report, Mapping or in a report prepared by GroundSure in respect of or arising out of Consultancy Services. The Services may only be used for the benefit of the Client and those persons listed in clauses 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. 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 clauses 7 and 11.6 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 clauses 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, (except as permitted herein or by separate agreement with GroundSure) to: (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 clause 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 judgment) 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 clause 4.1, the Client and the Beneficiary hereby acknowledge that all Intellectual Property in the Services and Content 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 clauses 6.1 and 6.2 against the Client or Beneficiary.

6.4 The Client acknowledges that the proprietary rights subsisting in copyright, database rights and any other intellectual property rights in respect of any data and information contained in any Report are and shall remain (subject to clause 11.1) the property of GroundSure and/or any third party that has supplied data or information used to create a Report, and that these conditions do not purport to grant, assign or transfer any such rights in respect thereof to a Client and/or a Beneficiary.

6.5 The Client and each of the parties set out in clause 4.2 are permitted to make up to 8 (commercial) or 2 (residential) printed copies of the Report only. Further copies of the Report may not be made in whole or in part without the prior written permission of GroundSure who shall be entitled to make a charge for each additional copy.

6.6 The Client shall (and shall procure that any recipients of the Report as permitted under clause 4.2 shall):

(i) not remove, suppress or modify any trademark, copyright or other proprietary marking belonging to GroundSure or any third party from the Services;

(ii) use the information obtained as part of the Services in respect of the subject Site only, and shall not store or reuse any information obtained as part of the Services provided in respect of adjacent or nearby sites;

- (iii) not create any product or report which is derived directly or indirectly from the data contained in the Services (save that those acting in a professional capacity to the Beneficiary may provide advice based upon the Services);
- (iv) not combine the Services with or incorporate such Services into any other information data or service; and
- (v) not reformat or otherwise change (whether by modification, addition or enhancement), data contained in the Services (save that those acting in a professional capacity to the Beneficiary shall not be in breach of this clause 6.6(v) where such reformatting is in the normal course of providing advice based upon the Services), in each case of parts (iii) to (v) inclusive, whether or not such product or report is produced for commercial profit or not.
- 6.7 The Client and/or Beneficiary shall and shall procure that any party to whom the Services are made available shall notify GroundSure of any request or requirement to disclose, publish or disseminate any information contained in the Services in accordance with the Freedom of Information Act 2000, the Environmental Information Regulations 2004 or any associated legislation or regulations in force from time to time.
- 7. Liability**
- 7.1 Nothing in these terms and conditions shall limit GroundSure's liability for causing death or personal injury through negligence or willful 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 clause 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 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 £10 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.
- 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 clause 7.1, GroundSure shall not be liable to the Client, the Beneficiary or any third party in contract, tort (including, without limitation, negligence) or for misrepresentation or breach of statutory duty or otherwise in respect of any loss of profits, goodwill, revenue or opportunity, or any indirect or consequential loss (even if such loss was reasonably foreseeable).
- 7.14 GroundSure undertakes for the duration of the liability periods referred to in clauses 7.4 and 7.5 to maintain professional indemnity insurance in respect of its liabilities under this Contract. 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 Payment Date; 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 or the Beneficiary breaches any material term of the Contract (including, but not limited to, the obligations in clause 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 clause 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 clauses 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 clauses 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 clause 6.1 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 provision 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 can be given in any format eg writing, phone, email to the Compliance Officer at GroundSure who will respond in a timely manner.

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EmapSite
Masdar House, ,
Eversley, RG27 0RP

GroundSure Reference:	EMS-137878_197146
Your Reference:	EMS_137878_197146
Report Date:	Sep 13, 2011
Report Delivery Method:	Email - pdf
Client Email:	sales@emapsite.com

GroundSure EnviroInsight

Address: Bioscience Site,RLUH,L69 3GA

Dear Sir/Madam,

Thank you for placing your order with emapsite. Please find enclosed the GroundSure EnviroInsight as requested

If you would like further assistance regarding this report then please contact the emapsite customer services team on 0118 9736883 quoting the above report reference number.

Yours faithfully,

emapsite customer services team

Enc.
GroundSure EnviroInsight

GroundSure EnviroInsight

Address: Bioscience Site,RLUH,L69 3GA

Date: Sep 13, 2011

GroundSure Reference: EMS-137878_197146

Your Reference: EMS_137878_197146

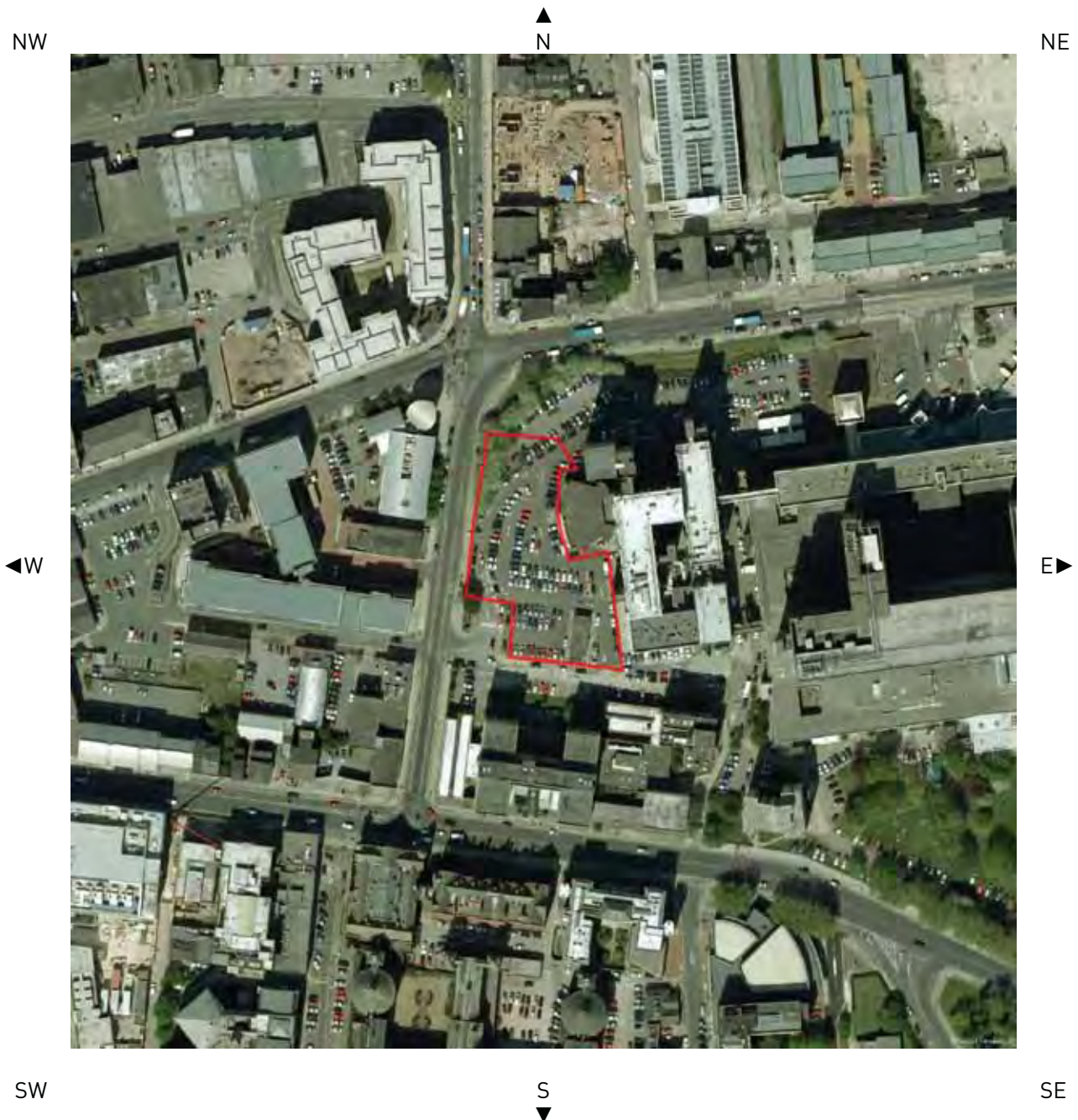
Client: EmapSite



Brought to you by emapsite

emapsite™

Aerial Photograph of Study Site



Site Name: Bioscience Site,RLUH,L69 3GA
Grid Reference: 335795,390750
Size of Site: 0.38 ha

Aerial photography supplied by Getmapping PLC.
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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. Environmental Permits, Incidents and Registers	on-site	0-50	51-250	251-500	501-1000	1000-1500
1.1 Industrial Sites Holding Environmental Permits and/or Authorisations						
Records of historic IPC Authorisations	0	0	0	0	-	-
Records of Part A(1) and IPPC Authorised Activities	0	0	0	0	-	-
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	0	0	-	-
Records of List 2 Dangerous Substances Inventory sites	0	0	0	0	-	-
Records of Part A(2) and Part B Activities and Enforcements	0	0	0	1	-	-
Records of Category 3 or 4 Radioactive Substances Authorisations	0	0	31	0	-	-
Records of Licensed Discharge Consents	0	0	0	0	-	-
Records of Planning Hazardous Substance Consents and Enforcements	0	0	0	0		
1.2 Records of COMAH and NIHHS sites	0	0	0	0	-	-
1.3 Environment Agency Recorded Pollution Incidents						
National Incidents Recording System, List 2	0	0	0	-	-	-
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	-	-
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	0	0	0	1
Landfill Data – Non-Operational Landfill Sites	0	0	0	0	0	-
BGS/DoE Landfill Site Survey	0	0	0	0	0	0
GroundSure Local Authority Landfill Sites Data	0	0	0	0	0	0
2.2 Landfill and Other Waste Sites Findings						
Operational Waste Treatment, Transfer and Disposal Sites	0	0	1	1	-	-
Non-Operational Waste Treatment, Transfer and Disposal Sites	0	0	0	0	-	-
Environment Agency Licensed Waste Sites	0	0	1	1	2	4

3. Current Land Uses	on-site	0-50	51-250	251-500	501-1000	1000-1500
3.1 Current Industrial Sites Data	0	2	34	-	-	-
3.2 Records of Petrol and Fuel Sites	0	0	1	2	-	-
3.3 Underground High Pressure Oil and Gas Pipelines	0	0	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? *	No
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 096	

* 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 Are there any records of Productive Strata in the Superficial Geology within 500m of the study site?				No		
5.2 Are there any records of Productive Strata in the Bedrock Geology within 500m of the study site?				Yes		
5.3 Groundwater Abstraction Licences (within 1000m of the study site).	0	0	0	0	0	-
5.4 Surface Water Abstraction Licences (within 1000m of the study site).	0	0	0	0	0	-
5.5 Potable Water Abstraction Licences (within 2000m of the study site).	0	0	0	0	0	3
5.6 Are there any Source Protection Zones within 500m of the study site?				No		
5.7 River Quality						
Is there any Environment Agency information on river quality within 1500m of the study site?	No	No	No	No	No	No
5.8 Detailed River Network entries within 500m of the site	0	0	0	0	-	-
5.9 Surface water features within 250m of the study site	No	No	No	-	-	-

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?	Very Low
6.7 What is the BGS confidence rating for the Groundwater Flooding susceptibility areas?	Low

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	-	-

7.1 Records of Sites of Special Scientific Interest (SSSI)	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	1	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	-	-
7.11 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? Very Low

9. Mining

9.1 Are there any coal mining areas within 75m of the study site? No

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. Environmental Permits, 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 productive strata within the bedrock and superficial geological layers, abstraction licenses, Source Protection Zones (SPZs) 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 (08444 159000) for further information and guidance.

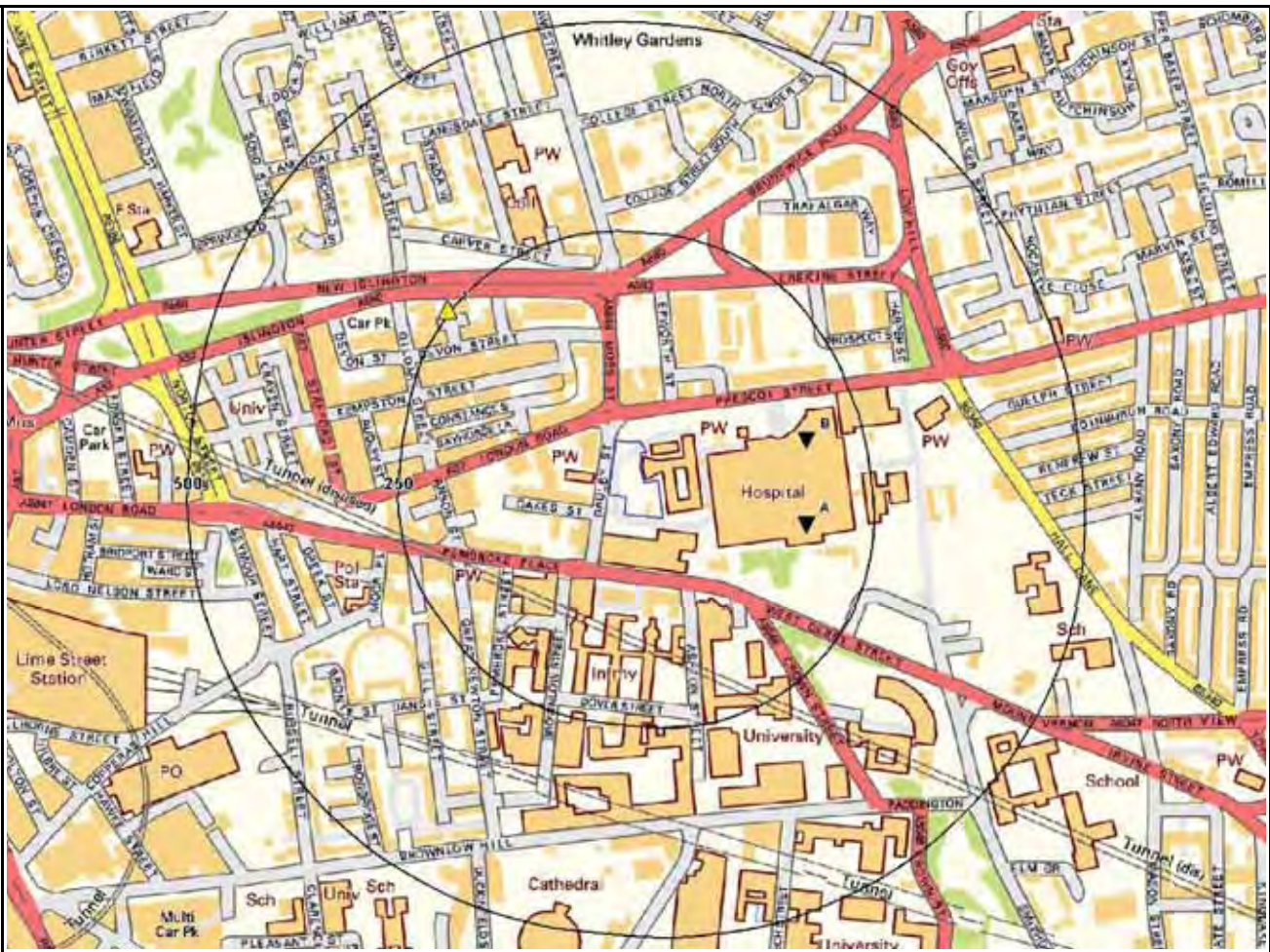
Note: Maps

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. Environmental Permits, Incidents and Registers Map



Authorisations, Incidents and Registers Legend

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Ordnance Survey

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Licence Number: 100035207

- | | | |
|-----------------------------|---------------------------------------|--|
| Site Outline | Recorded Pollution Incident | RAS 3 & 4 Authorisations |
| Search Buffers (m) | Dangerous Substances (List 1) | Part A(1) Authorised Processes and Historic IPC Authorisations |
| 250 | Dangerous Substances (List 2) | Part A(2) and Part B Authorised Processes |
| 500 | Water Industry Referrals | COMAH / NIHHS Sites |
| Licenced Discharge Consents | Sites Determined as Contaminated Land | Hazardous Substance Consents and Enforcements |
| Red List Discharge Consents | | |

1.Environmental Permits, 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 historic IPC Authorisations within 500m of the study site: 0

Database searched and no data found.

Records of Part A(1) and IPPC Authorised Activities within 500m of the study site: 0

Database searched and no data found.

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: 0

Database searched and no data found.

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

Database searched and no data found.

Records of Part A(2) and Part B Activities and Enforcements within 500m of the study site: 1

The following Part A(2) and Part B Activities are represented as points on the Authorisations, Incidents and Registers map:

ID	Distance	Direction	NGR	Details	
1	253.0	NW	335574, 390953	Address: Snax 24 Ltd, 25 New Islington Road, L3 8PP Process: Petrol Station Status: Current Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of Enforcement: No Enforcement Notified Comment: No Enforcement Notified

Records of Category 3 or 4 Radioactive Substance Licences within 500m of the study site: 31

Report Reference: EMS-137878_197146

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

ID	Distance [m]	Direction	Address	Operator	Type	Permission Number	Dates	Status
33A	170.0	E	Royal Liverpool And Broadgreen Univ Hos Nhs Trust, University Medical Departments Within,the Royal Liverpool University Hospital,prescot Street, Liverpool, L7 8XP	Royal Liverpool And Broadgreen Univ Hos Nhs Trust	Keeping And Use Of Radioactive Materials (was Rsa60 Section 1).	AH7011	Date of Approval:- Effective from:- Last date of update:2001-06-01	-
34A	170.0	E	Royal Liverpool University Hospital Nhs, Prescott Street, Liverpool, Merseyside, L7 8XP	Royal Liverpool University Hospital Nhs	Keeping And Use Of Mobile Radioactive Sources (was Rsa60 Section 3)	AH7020	Date of Approval:- Effective from:- Last date of update:2001-06-01	-
35A	170.0	E	University Of Liverpool, University Medical Departments Within,the Royal Liverpool University Hospital,prescot Street, Liverpool, L7 8XP	University Of Liverpool	Keeping And Use Of Radioactive Materials (was Rsa60 Section 1).	BI8395	Date of Approval:- Effective from:- Last date of update:2001-06-01	-
36A	170.0	E	Royal Liverpool And Broadgreen University Hospitals Nhs Trust, University Medical Departments Within,the Royal Liverpool University Hospital,prescot Street, Liverpool, L7 8XP	Royal Liverpool And Broadgreen University Hospitals Nhs Trust	Keeping And Use Of Radioactive Materials (was Rsa60 Section 1).	AH7011	Date of Approval:12-6-1997 Effective from:12-6-1997 Last date of update:2003-12-01	Superseded By Variation
37A	170.0	E	Royal Liverpool And Broadgreen University Hospitals Nhs Trust, Prescott Street, Liverpool, Merseyside, L7 8XP	Royal Liverpool And Broadgreen University Hospitals Nhs Trust	Keeping And Use Of Radioactive Materials (was Rsa60 Section 1).	AH7003	Date of Approval:28-2-1997 Effective from:28-2-1997 Last date of update:2003-12-01	Superseded By Variation
38A	170.0	E	Royal Liverpool And Broadgreen University Hospitals Nhs Trust, Prescott Street, Liverpool, Merseyside, L7 8XP	Royal Liverpool And Broadgreen University Hospitals Nhs Trust	Keeping And Use Of Radioactive Materials (was Rsa60 Section 1).	AH7003	Date of Approval:10-9-1998 Effective from:10-9-1998 Last date of update:2003-12-01	Superseded By Variation
39A	170.0	E	Royal Liverpool And Broadgreen University Hospitals Nhs Trust, Prescott Street, Liverpool, Merseyside, L7 8XP	Royal Liverpool And Broadgreen University Hospitals Nhs Trust	Keeping And Use Of Radioactive Materials (was Rsa60 Section 1).	AH7003	Date of Approval:26-10-1999 Effective from:26-10-1999 Last date of update:2003-12-01	Superseded By Variation

40A	170.0	E	Royal Liverpool And Broadgreen University Hospitals Nhs Trust, University Medical Departments Within,the Royal Liverpool University Hospital,prescot Street, Liverpool, L7 8XP	Royal Liverpool And Broadgreen University Hospitals Nhs Trust	Keeping And Use Of Radioactive Materials (was Rsa60 Section 1).	AH7011	Date of Approval:1 1-6-2003 Effective from:11-6-2003 Last date of update:20 03-12-01	Effective
41A	170.0	E	Royal Liverpool And Broadgreen University Hospitals Nhs Trust, Prescot Street, Liverpool, Merseyside, L7 8XP	Royal Liverpool And Broadgreen University Hospitals Nhs Trust	Keeping And Use Of Mobile Radioactive Sources (was Rsa60 Section 3)	AH7020	Date of Approval:1 1-6-2003 Effective from:11-6-2003 Last date of update:20 03-12-01	Effective
42A	170.0	E	Royal Liverpool And Broadgreen University Hospitals Nhs Trust, University Medical Departments Within,the Royal Liverpool University Hospital,prescot Street, Liverpool, L7 8XP	Royal Liverpool And Broadgreen University Hospitals Nhs Trust	Keeping And Use Of Radioactive Materials (was Rsa60 Section 1).	AH7011	Date of Approval:3 1-5-1995 Effective from:31-5-1995 Last date of update:20 03-12-01	Superseded By Variation
43A	170.0	E	Royal Liverpool And Broadgreen University Hospitals Nhs Trust, University Medical Departments Within,the Royal Liverpool University Hospital,prescot Street, Liverpool, L7 8XP	Royal Liverpool And Broadgreen University Hospitals Nhs Trust	Keeping And Use Of Radioactive Materials (was Rsa60 Section 1).	AH7011	Date of Approval:1 5-1-1996 Effective from:16-1-1996 Last date of update:20 03-12-01	Superseded By Variation
44A	170.0	E	Royal Liverpool And Broadgreen University Hospitals Nhs Trust, University Medical Departments Within,the Royal Liverpool University Hospital,prescot Street, Liverpool, L7 8XP	Royal Liverpool And Broadgreen University Hospitals Nhs Trust	Keeping And Use Of Radioactive Materials (was Rsa60 Section 1).	AH7011	Date of Approval:2 0-8-1998 Effective from:20-8-1998 Last date of update:20 03-12-01	Superseded By Variation
45A	170.0	E	Royal Liverpool And Broadgreen University Hospitals Nhs Trust, University Medical Departments Within,the Royal Liverpool University Hospital,prescot Street, Liverpool, L7 8XP	Royal Liverpool And Broadgreen University Hospitals Nhs Trust	Keeping And Use Of Radioactive Materials (was Rsa60 Section 1).	AH7011	Date of Approval:- Effective from:- Last date of update:20 03-06-04	-
46A	170.0	E	Royal Liverpool And Broadgreen University Hospitals Nhs Trust, Prescot Street, Liverpool, Merseyside, L7 8XP	Royal Liverpool And Broadgreen University Hospitals Nhs Trust	Keeping And Use Of Radioactive Materials (was Rsa60 Section 1).	AH7003	Date of Approval:2 -3-1993 Effective from:2-3-1993 Last date of update:20 05-01-06	Superseded By Variation
47A	170.0	E	Royal Liverpool And Broadgreen University Hospitals Nhs Trust, The Royal Liverpool University Hospital, Prescot Street, Liverpool, L7 8XP	Royal Liverpool And Broadgreen University Hospitals Nhs Trust	Disposal Of Radioactive Waste (was Rsa60 Section 6).	AB7523	Date of Approval:1 8/9/1995 Effective from:30/9 /1995 Last date of update:20 11-08-08	Superseded By Variation

48A	170.0	E	Royal Liverpool And Broadgreen University Hospitals Nhs Trust, The Royal Liverpool University Hospital, Prescott Street, Liverpool, L7 8XP	Royal Liverpool And Broadgreen University Hospitals Nhs Trust	Disposal Of Radioactive Waste (was Rsa60 Section 6).	AB7523	Date of Approval: 29/9/2003 Effective from: 13/10/2003 Last date of update: 2011-08-08	Superseded By Variation
49A	170.0	E	Royal Liverpool And Broadgreen University Hospitals Nhs Trust, The Royal Liverpool University Hospital, Prescott Street, Liverpool, L7 8XP	Royal Liverpool And Broadgreen University Hospitals Nhs Trust	Disposal Of Radioactive Waste (was Rsa60 Section 6).	AB7523	Date of Approval: 29/4/2004 Effective from: 29/4/2004 Last date of update: 2011-08-08	Superseded By Variation
50A	170.0	E	Royal Liverpool And Broadgreen University Hospitals Nhs Trust, The Royal Liverpool University Hospital, Prescott Street, Liverpool, L7 8XP	Royal Liverpool And Broadgreen University Hospitals Nhs Trust	Disposal Of Radioactive Waste (was Rsa60 Section 6).	AB7523	Date of Approval: 8/11/2007 Effective from: 6/12/2007 Last date of update: 2011-08-08	Superseded By Variation
51A	170.0	E	Royal Liverpool And Broadgreen University Hospitals Nhs Trust, The Royal Liverpool University Hospital, Prescott Street, Liverpool, L7 8XP	Royal Liverpool And Broadgreen University Hospitals Nhs Trust	Disposal Of Radioactive Waste (was Rsa60 Section 6).	AB7523	Date of Approval: 1/2/2010 Effective from: 1/3/2010 Last date of update: 2011-08-08	Effective
52A	170.0	E	Royal Liverpool And Broadgreen University Hospitals Nhs Trust, The Royal Liverpool University Hospital, Prescott Street, Liverpool, L7 8XP	Royal Liverpool And Broadgreen University Hospitals Nhs Trust	Disposal Of Radioactive Waste (was Rsa60 Section 6).	AB7523	Date of Approval: 31/3/1991 Effective from: 31/3/1991 Last date of update: 2011-08-08	Superseded By Variation
53A	170.0	E	Royal Liverpool And Broadgreen University Hospitals Nhs Trust, The Royal Liverpool University Hospital, Prescott Street, Liverpool, L7 8XP	Royal Liverpool And Broadgreen University Hospitals Nhs Trust	Disposal Of Radioactive Waste (was Rsa60 Section 6).	AB7523	Date of Approval: 4/7/1995 Effective from: 1/8/1995 Last date of update: 2011-08-08	Superseded By Variation
54A	170.0	E	Royal Liverpool And Broadgreen University Hospitals Nhs Trust, The Royal Liverpool University Hospital, Prescott Street, Liverpool, L7 8XP	Royal Liverpool And Broadgreen University Hospitals Nhs Trust	Disposal Of Radioactive Waste (was Rsa60 Section 6).	AB7523	Date of Approval: 12/3/1997 Effective from: 8/4/1997 Last date of update: 2011-08-08	Superseded By Variation
55A	170.0	E	Royal Liverpool And Broadgreen University Hospitals Nhs Trust, The Royal Liverpool University Hospital, Prescott Street, Liverpool, L7 8XP	Royal Liverpool And Broadgreen University Hospitals Nhs Trust	Disposal Of Radioactive Waste (was Rsa60 Section 6).	AB7523	Date of Approval: 16/5/2003 Effective from: 12/6/2003 Last date of update: 2011-08-08	Superseded By Variation

56A	170.0	E	Royal Liverpool And Broadgreen University Hospitals Nhs Trust, Prescott Street, Liverpool, Merseyside, L7 8XP	Royal Liverpool And Broadgreen University Hospitals Nhs Trust	Keeping And Use Of Radioactive Materials (was Rsa60 Section 1).	AH7003	Date of Approval: 27/10/2000 Effective from: 27/10/2000 Last date of update: 2011-08-08	Superseded By Variation
57A	170.0	E	Royal Liverpool And Broadgreen University Hospitals Nhs Trust, Prescott Street, Liverpool, Merseyside, L7 8XP	Royal Liverpool And Broadgreen University Hospitals Nhs Trust	Keeping And Use Of Radioactive Materials (was Rsa60 Section 1).	AH7003	Date of Approval: 15/4/2002 Effective from: 15/4/2002 Last date of update: 2011-08-08	Superseded By Variation
58A	170.0	E	Royal Liverpool And Broadgreen University Hospitals Nhs Trust, Prescott Street, Liverpool, Merseyside, L7 8XP	Royal Liverpool And Broadgreen University Hospitals Nhs Trust	Keeping And Use Of Radioactive Materials (was Rsa60 Section 1).	AH7003	Date of Approval: 26/11/2003 Effective from: 26/11/2003 Last date of update: 2011-08-08	Superseded By Variation
59A	170.0	E	Royal Liverpool And Broadgreen University Hospitals Nhs Trust, Prescott Street, Liverpool, Merseyside, L7 8XP	Royal Liverpool And Broadgreen University Hospitals Nhs Trust	Keeping And Use Of Radioactive Materials (was Rsa60 Section 1).	AH7003	Date of Approval: 2/10/2006 Effective from: 2/10/2006 Last date of update: 2011-08-08	Superseded By Variation
60A	170.0	E	Royal Liverpool And Broadgreen University Hospitals Nhs Trust, Prescott Street, Liverpool, Merseyside, L7 8XP	Royal Liverpool And Broadgreen University Hospitals Nhs Trust	Keeping And Use Of Radioactive Materials (was Rsa60 Section 1).	AH7003	Date of Approval: 6/2/2008 Effective from: 6/2/2008 Last date of update: 2011-08-08	Superseded By Variation
61A	170.0	E	Royal Liverpool And Broadgreen University Hospitals Nhs Trust, Prescott Street, Liverpool, Merseyside, L7 8XP	Royal Liverpool And Broadgreen University Hospitals Nhs Trust	Keeping And Use Of Radioactive Materials (was Rsa60 Section 1).	AH7003	Date of Approval: 25/2/2009 Effective from: 25/2/2009 Last date of update: 2011-08-08	Effective
62A	170.0	E	University Of Liverpool, The Royal Liverpool University Hospital, Prescott Street, Liverpool, L7 8XP	University Of Liverpool	Keeping And Use Of Radioactive Materials (was Rsa60 Section 1).	AV8089	Date of Approval: 11/9/1996 Effective from: 12/9/1996 Last date of update: 2011-08-08	Effective
63B	182.0	E	Peoples Liverpool Ltd, Prescott Street, Liverpool, L69 6AQ	Peoples Liverpool Ltd	Keeping And Use Of Radioactive Materials (was Rsa60 Section 1).	AU0546	Date of Approval: 24-11-1995 Effective from: 24-11-1995 Last date of update: 2003-12-01	Revoked/ cancelled

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

Database searched and no data found.

Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site: **0**

Database searched and no data found.

1.2 Dangerous or Hazardous Sites

Records of COMAH & NIHHS sites within 500m of the study site: **0**

Database searched and no data found.

1.3 Environment Agency Recorded Pollution Incidents

Records of National Incidents Recording System, List 2 within 250m of the study site: **0**

Database searched and no data found.

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

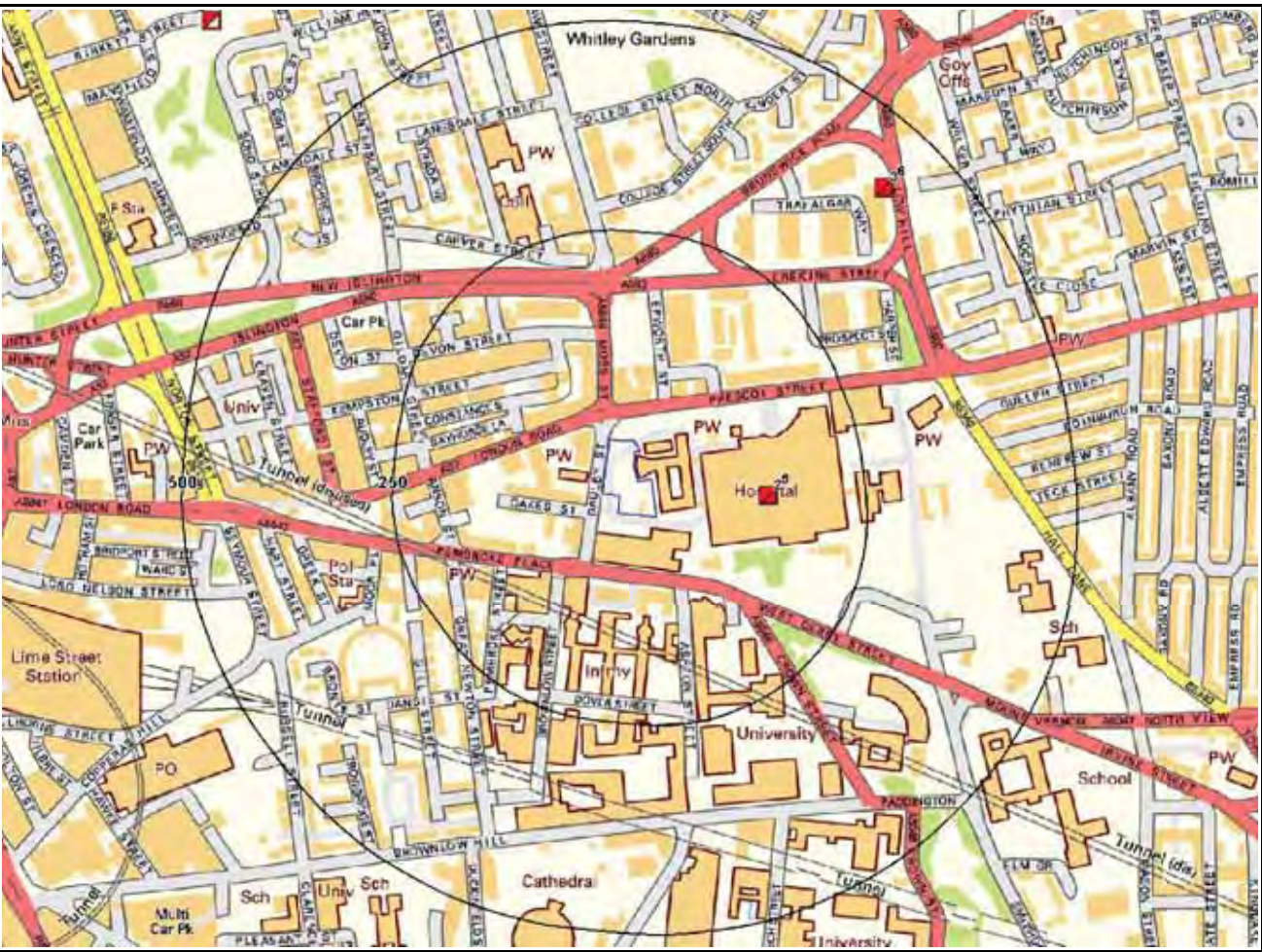
Database searched and no data found.

1.4 Sites Determined as Contaminated Land under Part IIA EPA 1990

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.

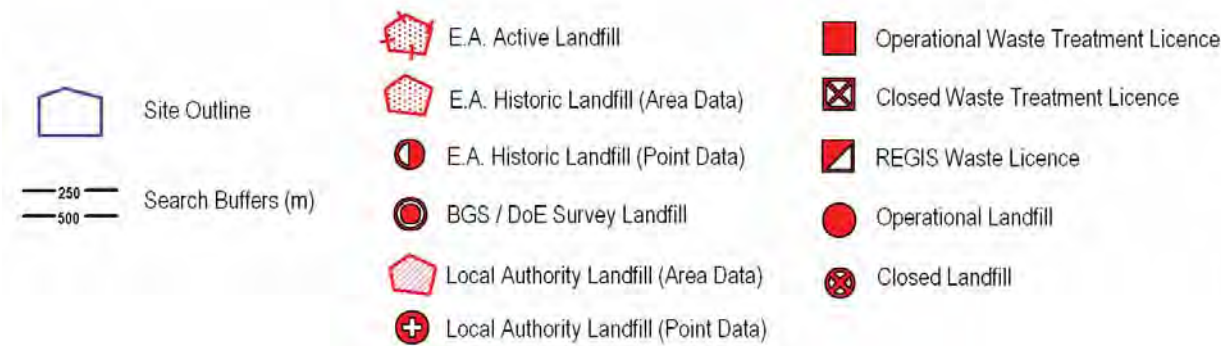
2. Landfill and Other Waste Sites Map



Landfill & Other Waste Sites Legend

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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: **1**

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

ID	Distance	Direction	NGR	Details
Not shown	1137.0	SE	336500, 389700	Site Address: Corner Of Smithdown Lane, Overbury Street, Liverpool, Merseyside Waste Licence: Yes Site Reference: GDO M236, LCC/433/02/01 Waste Type: Inert Regis Reference: - Licence Issue: 23-Apr-1993 Licence Surrendered: 20-Aug-1993 Licence Hold Address: Wilberforce House, 25 The Strand, Liverpool Operator: Liverpool City Council

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

Database searched and no data found.

Records of BGS/DoE non-operational landfill sites within 1500m of the study site: **0**

Database searched and no data found.

Records of Local Authority landfill sites within 1500m of the study site: **0**

Database searched and no data found.

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
----	----------	-----------	-----	---------

2	134.0	E	335962, 390733	Site Address: Royal Liverpool University Hospital, Prescot Street, LIVERPOOL, Merseyside, L7 8XP Landfill Licence: 28BAMJAL EA Reference: - Waste Type: Difficult Rating: Difficult Transfer Known Restrictions: Waste produced/controlled by licence holder	Record Date: 01-Nov-1991 Transfer Date: Modification Date: 01-May-1994 Status: Operational as far as is known Category: STORAGE Regulator: EA - North West Region - South Area (West - Warrington)) Size: Very Small (<10,000 tonnes/year)
3	424.0	NE	336100, 391100	Site Address: D K W Autos, 76 Low Hill, LIVERPOOL, Merseyside, L6 1BS Landfill Licence: 28BANYAL EA Reference: - Waste Type: Non-Hazardous Rating: Non-Hazardous Scrapyard Known Restrictions: No known restriction on source of waste	Record Date: 01-Mar-1996 Transfer Date: Modification Date: Status: Operational as far as is known Category: SCRAPYARD Regulator: EA - North West Region - South Area (West - Warrington)) Size: Undefined

Records of non-operational waste treatment, transfer or disposal sites within 500m of the study site: 0

Database searched and no data found.

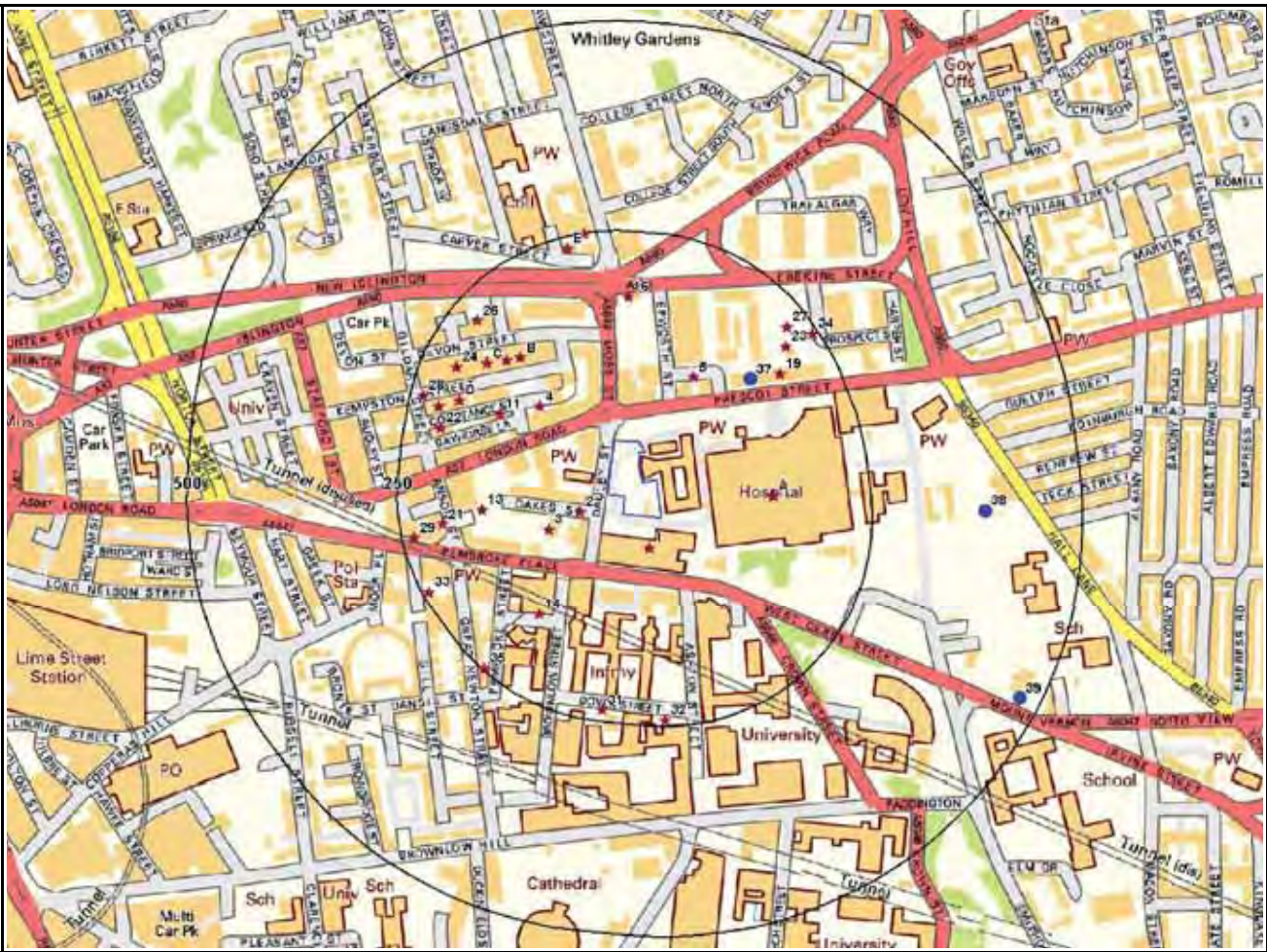
Records of Environment Agency licensed waste sites within 1500m of the study site: 8

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	
5	134.0	E	335962, 390733	Site Address: Royal Liverpool University Hospital, Prescot Street, Liverpool, Merseyside, L7 8XP Type: Clinical Waste Transfer Station Size: < 25000 tonnes Regis Licence Number: RHL002 EPR reference: EA/EPR/UP3592CS/A001 Operator: Royal Liverpool University Hospital Trust Waste Management licence No: 53442 Annual Tonnage: 4999.0	Issue Date: 01/11/1991 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Royal Liverpool University Hospital Trust Correspondence Address: -
6	424.0	NE	336100, 391100	Site Address: 76, Low Hill, Liverpool, Merseyside, L6 1BS Type: Metal Recycling Site (Vehicle Dismantler) Size: < 25000 tonnes Regis Licence Number: DKW001 EPR reference: EA/EPR/DP3792CZ/A001 Operator: Walters D K Waste Management licence No: 53614 Annual Tonnage: 416.66	Issue Date: 25/03/1996 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: D K W Autos Correspondence Address: -
7A	690.0	NW	335300, 391300	Site Address: 97-101, Soho Street, Islington, Liverpool, Merseyside, L3 8AS Type: Household, Commercial & Industrial Waste T Stn Size: < 25000 tonnes Regis Licence Number: CSL001 EPR reference: EA/EPR/MP3898EN/A001 Operator: Mr John Short And Mr John Lee Timmings Waste Management licence No: 100280 Annual Tonnage: 24999.0	Issue Date: 22/09/2008 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: City Skips Liverpool Correspondence Address: -
8A	690.0	NW	335300, 391300	Site Address: 97-101, Soho Street, Islington, Liverpool, Merseyside, L3 8AS Type: Household, Commercial & Industrial Waste T Stn Size: < 25000 tonnes Regis Licence Number: CSL001 EPR reference: - Operator: City Skips (Liverpool) Ltd Waste Management licence No: 100280 Annual Tonnage: 24999.0	Issue Date: 9/22/2008 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: City Skips Correspondence Address: 97-101, Soho Street, Islington, Liverpool, Merseyside, L3 8AS

Not shown	1068.0	NW	335200, 391700	<p>Site Address: 2-12, Prince Edwin Street, Liverpool, Merseyside, L5 3LJ</p> <p>Type: Metal Recycling Site (mixed MRS's)</p> <p>Size: < 25000 tonnes</p> <p>Regis Licence Number: SMW001</p> <p>EPR reference: EA/EPR/MP3191CK/A001</p> <p>Operator: Williams Bros Scrap Metals Ltd</p> <p>Waste Management licence No: 53960</p> <p>Annual Tonnage: 416.66</p>	<p>Issue Date: 08/11/1988</p> <p>Effective Date: -</p> <p>Modified: -</p> <p>Surrendered Date: -</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: Issued</p> <p>Site Name: Williams Brothers Ltd</p> <p>Correspondence Address: -</p>
Not shown	1204.0	NE	336600, 391700	<p>Site Address: 14 To 16, Severs Street, Liverpool, Merseyside, L6 5HJ</p> <p>Type: Metal Recycling Site (mixed MRS's)</p> <p>Size: < 25000 tonnes</p> <p>Regis Licence Number: MPA001</p> <p>EPR reference: EA/EPR/XP3091CW/A001</p> <p>Operator: M Packenham Ltd</p> <p>Waste Management licence No: 53973</p> <p>Annual Tonnage: 416.66</p>	<p>Issue Date: 07/09/1988</p> <p>Effective Date: -</p> <p>Modified: -</p> <p>Surrendered Date: -</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: Issued</p> <p>Site Name: M Packenham Ltd</p> <p>Correspondence Address: -</p>
Not shown	1367.0	NW	334600, 391500	<p>Site Address: 41, Blackstock Street, Liverpool, Merseyside, L3 6EP</p> <p>Type: Household, Commercial & Industrial Waste T Stn</p> <p>Size: < 25000 tonnes</p> <p>Regis Licence Number: WFD001</p> <p>EPR reference: EA/EPR/SP3291CV/A001</p> <p>Operator: W F Doyle & Co Ltd</p> <p>Waste Management licence No: 53938</p> <p>Annual Tonnage: 25000.0</p>	<p>Issue Date: 18/04/1990</p> <p>Effective Date: -</p> <p>Modified: -</p> <p>Surrendered Date: -</p> <p>Expiry Date: 31/10/1994</p> <p>Cancelled Date: -</p> <p>Status: Issued</p> <p>Site Name: W F Doyle & Co Ltd</p> <p>Correspondence Address: -</p>
Not shown	1454.0	NW	334500, 391500	<p>Site Address: Blackstock Street, Liverpool, Merseyside, L3 6ET</p> <p>Type: Physico-Chemical Treatment Facility</p> <p>Size: >= 25000 tonnes < 75000 tonnes</p> <p>Regis Licence Number: CEL001</p> <p>EPR reference: EA/EPR/HP3396CW/S002</p> <p>Operator: Caird Enviromental Ltd</p> <p>Waste Management licence No: 53752</p> <p>Annual Tonnage: 50000.0</p>	<p>Issue Date: 12/06/1989</p> <p>Effective Date: -</p> <p>Modified: -</p> <p>Surrendered Date: 23/09/2003</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: Surrendered</p> <p>Site Name: Caird Environmental Ltd</p> <p>Correspondence Address: -</p>

3. Current Land Use Map



Current Land Use Legend



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3. Current Land Uses

3.1 Current Industrial Data

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

36

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

ID	Distance	Direction	Company	Address	Activity	Category
1	37.0	S	Royal Liverpool University Dental Hospital	Dental Hospital, Pembroke Place, Liverpool, L3 5PS	Hospitals	Health Practitioners and Establishments
2	39.0	SW	Electricity Sub Station	L3	Electrical Features	Infrastructure and Facilities
3	82.0	SW	Works	L3	Unspecified Works Or Factories	Industrial Features
4	98.0	NW	Electricity Sub Station	L3	Electrical Features	Infrastructure and Facilities
5	101.0	NE	Electricity Sub Station	L7	Electrical Features	Infrastructure and Facilities
6A	134.0	E	The Royal Liverpool University Hospital	Prescot Street, Liverpool, L7 8XP	Accident and Emergency Hospitals	Health Practitioners and Establishments
7A	134.0	E	The Royal Liverpool University Hospital	Prescot Street, Liverpool, L7 8XP	Hospitals	Health Practitioners and Establishments
8A	134.0	E	Specialist Palliative Care Team	Prescot Street, Liverpool, L7 8XP	Hospices	Health Practitioners and Establishments
9A	134.0	E	Lloyds Pharmacy	Prescot Street, Liverpool, L7 8XP	Chemists and Pharmacies	Health Practitioners and Establishments
10 A	134.0	E	David Ormerod Hearing Aid Specialists Ltd	Prescot Street, Liverpool, L7 8XP	Disability and Mobility Equipment	Consumer Products
11	141.0	W	Data Radio Ltd	5-7, Falkland Street, Liverpool, L3 8HB	Radar and Telecommunications Equipment	Industrial Products
12 B	149.0	NW	Try & Lilly Ltd	95, Kempston Street, Liverpool, L3 8HE	Clothing, Components and Accessories	Consumer Products
13	151.0	W	Electricity Sub Station	L3	Electrical Features	Infrastructure and Facilities
14	156.0	SW	Electricity Sub Station	L69	Electrical Features	Infrastructure and Facilities
15 B	161.0	NW	Speirs Brakell Ltd	91, Kempston Street, Liverpool, L3 8HE	Published Goods	Industrial Products
16	172.0	N	City Wrought Iron Centre	2, Erskine Street, Liverpool, L6 1AL	Metalworkers Including Blacksmiths	Construction Services
17 C	178.0	NW	Pharmore Plus	85-87, Kempston Street, Liverpool, L3 8HE	Chemists and Pharmacies	Health Practitioners and Establishments
18 C	178.0	NW	Bullen Health Care Group	85-87, Kempston Street, Liverpool, L3 8HE	Industrial Repairs and Servicing	Repair and Servicing
19	185.0	NE	Lloyds Pharmacy	Unit D, Prescot Street, Liverpool, L7 8UL	Chemists and Pharmacies	Health Practitioners and Establishments
20 D	191.0	W	Factory	L3	Unspecified Works Or Factories	Industrial Features
21	199.0	W	Electricity Sub Station	L3	Electrical Features	Infrastructure and Facilities

22	207.0	W	Warehouse	L3	Container and Storage	Transport, Storage and Delivery
23	208.0	NE	Electricity Sub Station	L6	Electrical Features	Infrastructure and Facilities
24	209.0	NW	M Stoops	75, Kempston Street, Liverpool, L3 8HE	Clothing, Components and Accessories	Consumer Products
25 D	214.0	W	Works	L3	Unspecified Works Or Factories	Industrial Features
26	218.0	NW	Electricity Sub Station	L3	Electrical Features	Infrastructure and Facilities
27	222.0	NE	The Garage	Erskine Street, Liverpool, Merseyside, L6 1AL	Vehicle Repair, Testing and Servicing	Repair and Servicing
28	235.0	W	Nathan Fabrics & Sundries Ltd	31, Gildart Street, Liverpool, L3 8ET	Furniture	Consumer Products
29	235.0	W	The Liverpool Pram Centre	1, Pembroke Place, Liverpool, L3 5PH	Baby, Nursery and Playground Equipment	Consumer Products
30E	235.0	N	W Kelly & Sons	2, Islington Square, Liverpool, L3 8DD	Furniture	Consumer Products
31	236.0	S	Tanks	L69	Tanks (Generic)	Industrial Features
32	242.0	S	Travelling Crane	L69	Travelling Cranes and Gentries	Industrial Features
33	242.0	SW	Electricity Sub Station	L3	Electrical Features	Infrastructure and Facilities
34	243.0	NE	Electricity Sub Station	L6	Electrical Features	Infrastructure and Facilities
35	248.0	SW	Warehouse	L3	Container and Storage	Transport, Storage and Delivery
36E	248.0	N	Kays Medical	3-7, Shaw Street, Liverpool, L6 1HH	Medical Equipment, Supplies and Pharmaceuticals	Industrial Products

3.2 Petrol and Fuel Sites

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

3

The following petrol or fuel site records provided by Catalist are represented as points on the Current Land Use map:

ID	Distance	Direction	NGR	Company	Address	LPG	Status
37	151.0	NE	335935, 390872	Obsolete	J Blake & Company Ltd, Prescot Street, Prescot, Merseyside, L6	Not Applicable	Obsolete
38	384.0	E	336214, 390715	BP	Snax 24 Islington Road, 25, New Islington Road, New Islington Road, Islington, Liverpool, Merseyside, L3 8PP	No	Open
39	476.0	SE	336254, 390490	Unbranded	Mount Vernon Service Station, Mount Vernon Road, Mount Vernon Road, Liverpool, Merseyside, L7 8UD	Not Applicable	Obsolete

3.3 Underground High Pressure Oil and Gas Pipelines

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

0

Database searched and no data found.

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

Database searched and no data found.

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

4.3 Bedrock and Solid Geology

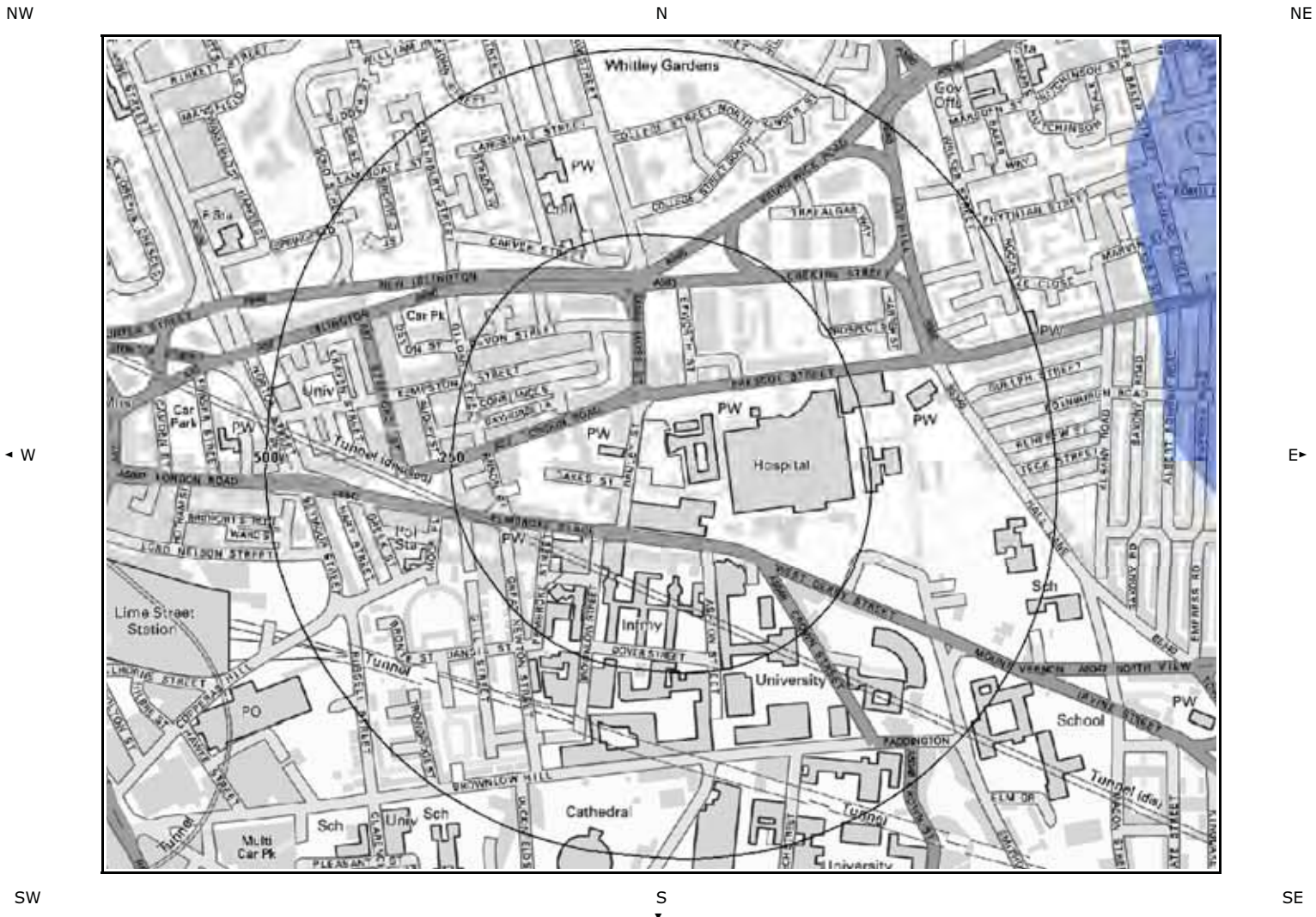
The database has been searched on site, including a 50m buffer.

LEX Code	Description	Rock Type
WLSF-SDST	WILMSLOW SANDSTONE FORMATION	SANDSTONE
HEY-SDST	HELSBY SANDSTONE FORMATION	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.

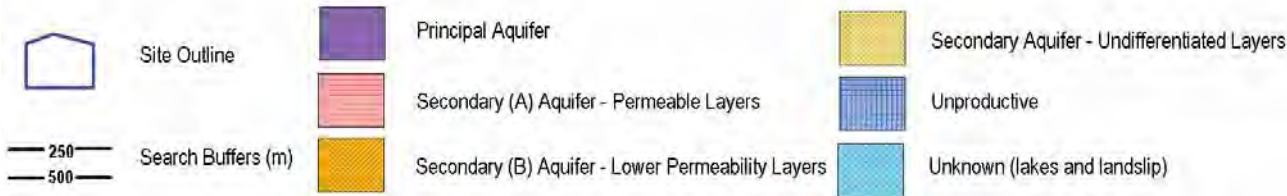
5a. Hydrogeology - Aquifer Within Superficial Geology



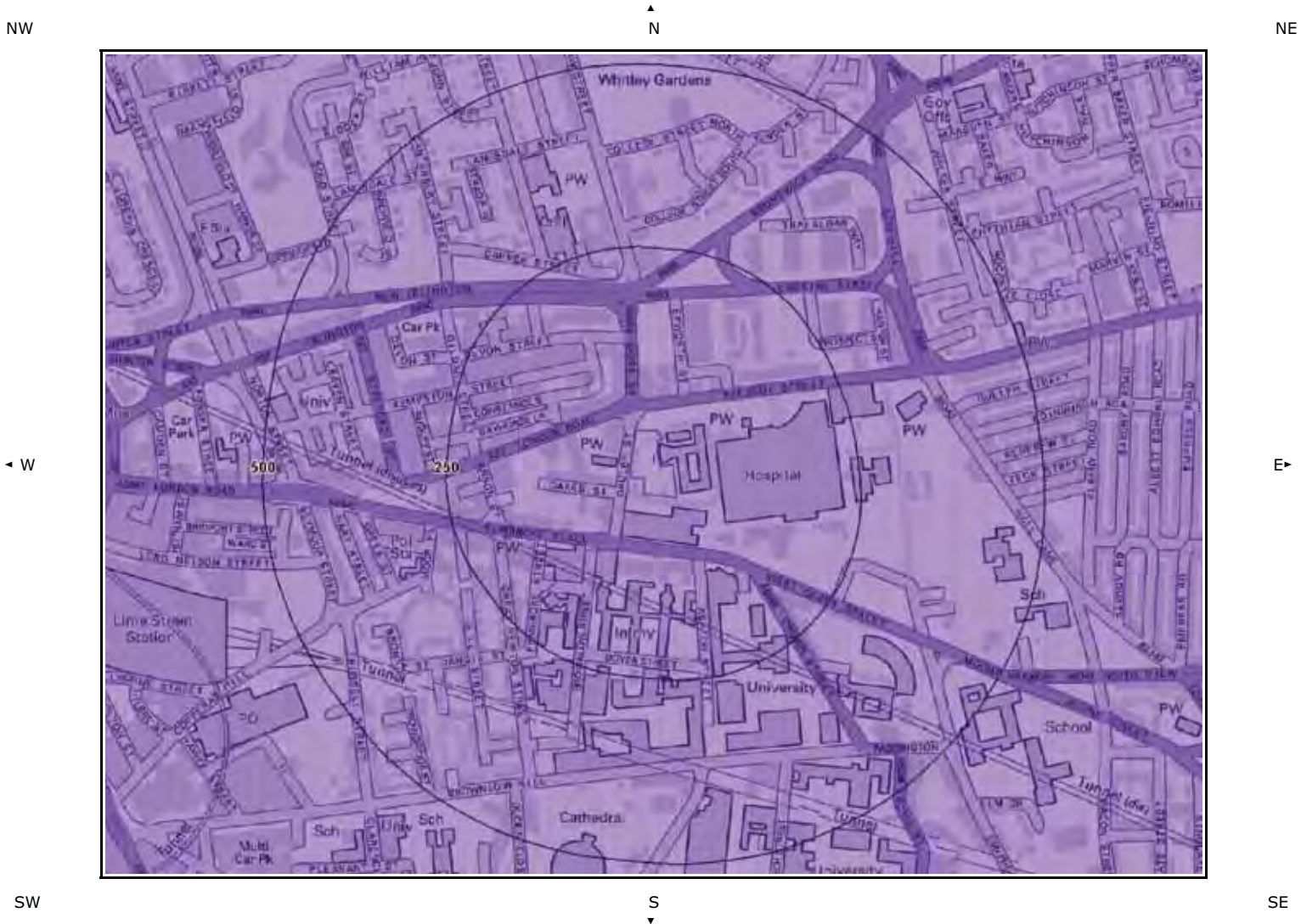
Aquifer Within Superficial Geology Legend

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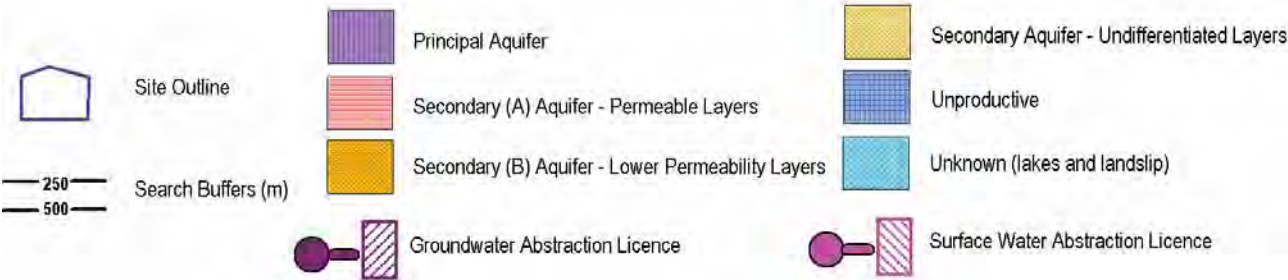
5b. Hydrogeology - Aquifer Within Bedrock Geology and Abstraction Licenses



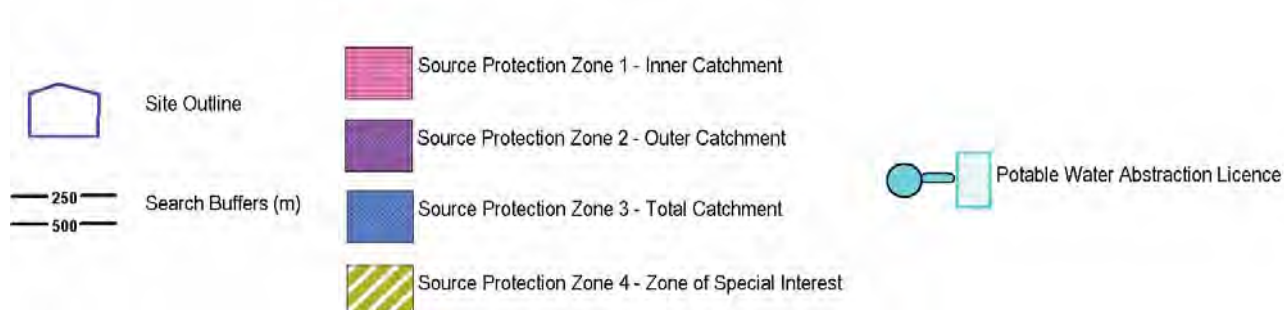
Aquifer Within Bedrock Geology Legend

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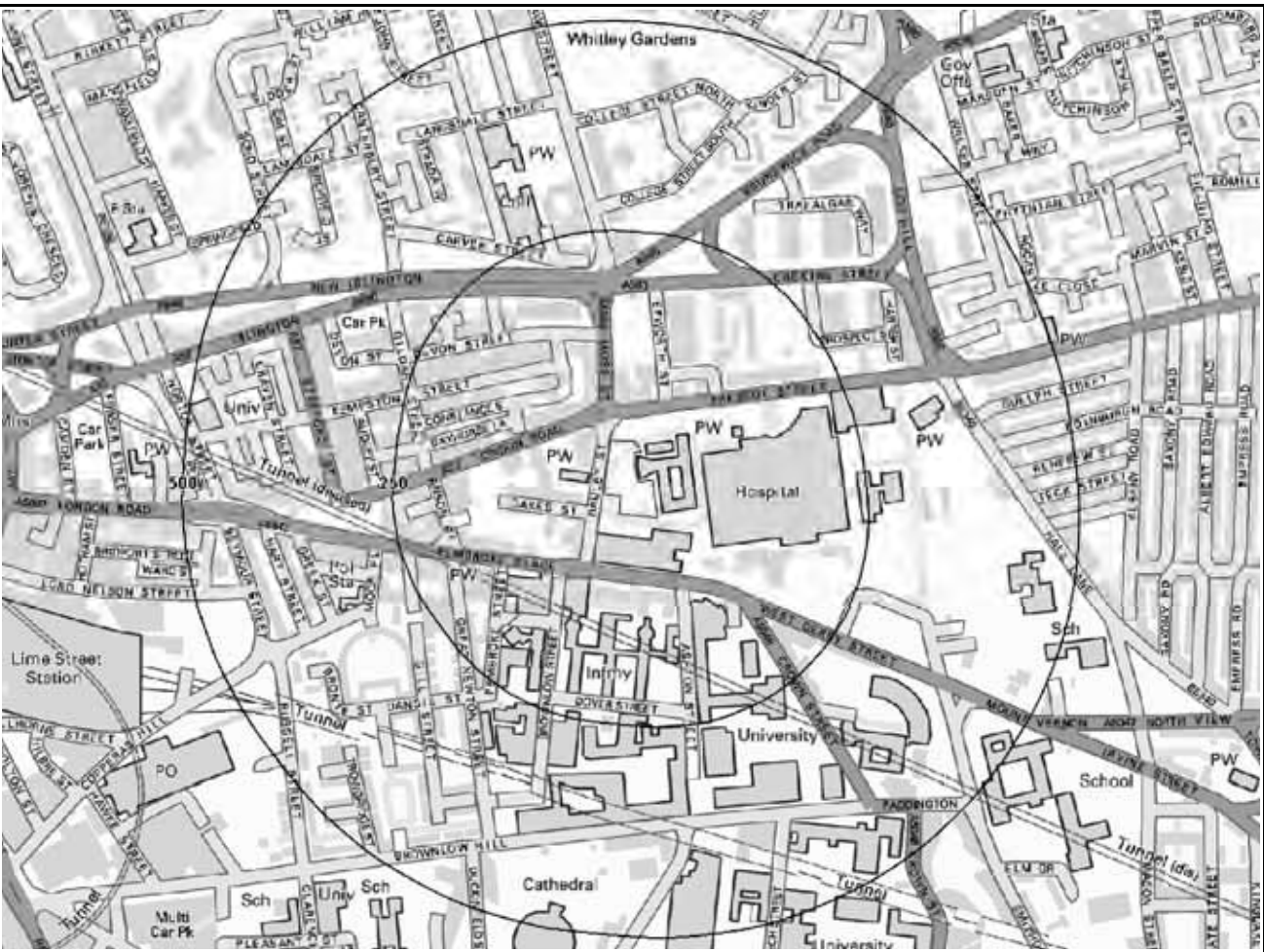
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5d. Hydrology – Detailed River Network and River Quality



Hydrology Legend



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5. Hydrogeology and Hydrology

5.1 Aquifer within Superficial Deposits

Are there records of productive strata within the superficial geology at or in proximity to the property? No

Database searched and no data found.

From 1 April 2010, the Environment Agency's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the GroundSure Enviroinsight User Guide.

5.2 Aquifer within Bedrock Deposits

Are there records of productive strata within the bedrock geology at or in proximity to the property? Yes

From 1 April 2010, the Environment Agency's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the GroundSure Enviroinsight User Guide.

The following aquifer records are shown on the Aquifer within Bedrock Geology Map (5b):

ID	Distance [m]	Direction	Designation	Description
1	0.0	On Site	Principal	Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers

5.3 Groundwater Abstraction Licences

Are there any Groundwater Abstraction Licences within 1000m of the study site? No

Database searched and no data found.

5.4 Surface Water Abstraction Licences

Are there any Surface Water Abstraction Licences within 1000m of the study site? No

Database searched and no data found.

5.5 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 Licences Map (5c):

Report Reference: EMS-137878_197146

ID	Distance	Direction	NGR	Details
Not shown	1896.0	SW	335052, 388962	Licence No: NW/069/0030/004 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: Ground Water - North West Region Point: Borehole On Premises At Stanhope Street, Liverpool Data Type: Point Annual Volume (m³): 195000 Max Daily Volume (m³): 1133.4 Original Application No: NPS/WR/005535 Original Start Date: 4/3/2011 Expiry Date: 31/3/2028 Issue No: 1 Version Start Date: Version End Date:
Not shown	1936.0	S	335100, 388900	Licence No: 2569030008 Details: "Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services" Direct Source: Ground Water - North West Region Point: "borehole On Premises At Stanhope Street, Liverpool" Data Type: Point Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: 115 Original Start Date: 18/2/1966 Expiry Date: - Issue No: 100 Version Start Date: Version End Date:
Not shown	1936.0	S	335100, 388900	Licence No: 2569030008 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: Ground Water - North West Region Point: Borehole On Premises At Stanhope Street, Liverpool Data Type: Point Annual Volume (m³): 195000 Max Daily Volume (m³): 1600 Original Application No: 0115 Original Start Date: 18/2/1966 Expiry Date: - Issue No: 100 Version Start Date: Version End Date:

5.6 Source Protection Zones

Are there any Source Protection Zones within 500m of the study site?

No

Database searched and no data found.

5.7 River Quality

Is there any Environment Agency information on river quality within 1500m of the study site?

No

Biological Quality:

Database searched and no data found.

Chemical Quality:

Database searched and no data found.

5.8 Detailed River Network

Are there any Detailed River Network entries within 500m of the study site?

No

Database searched and no data found.

5.9 Surface Water Features

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

No

Database searched and no data found.

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

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

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

6.5 Areas used for Flood Storage

Are there any areas used for Flood Storage within 250m of the study site?

No

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?

Very Low

6.7 Groundwater Flooding Confidence Areas

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

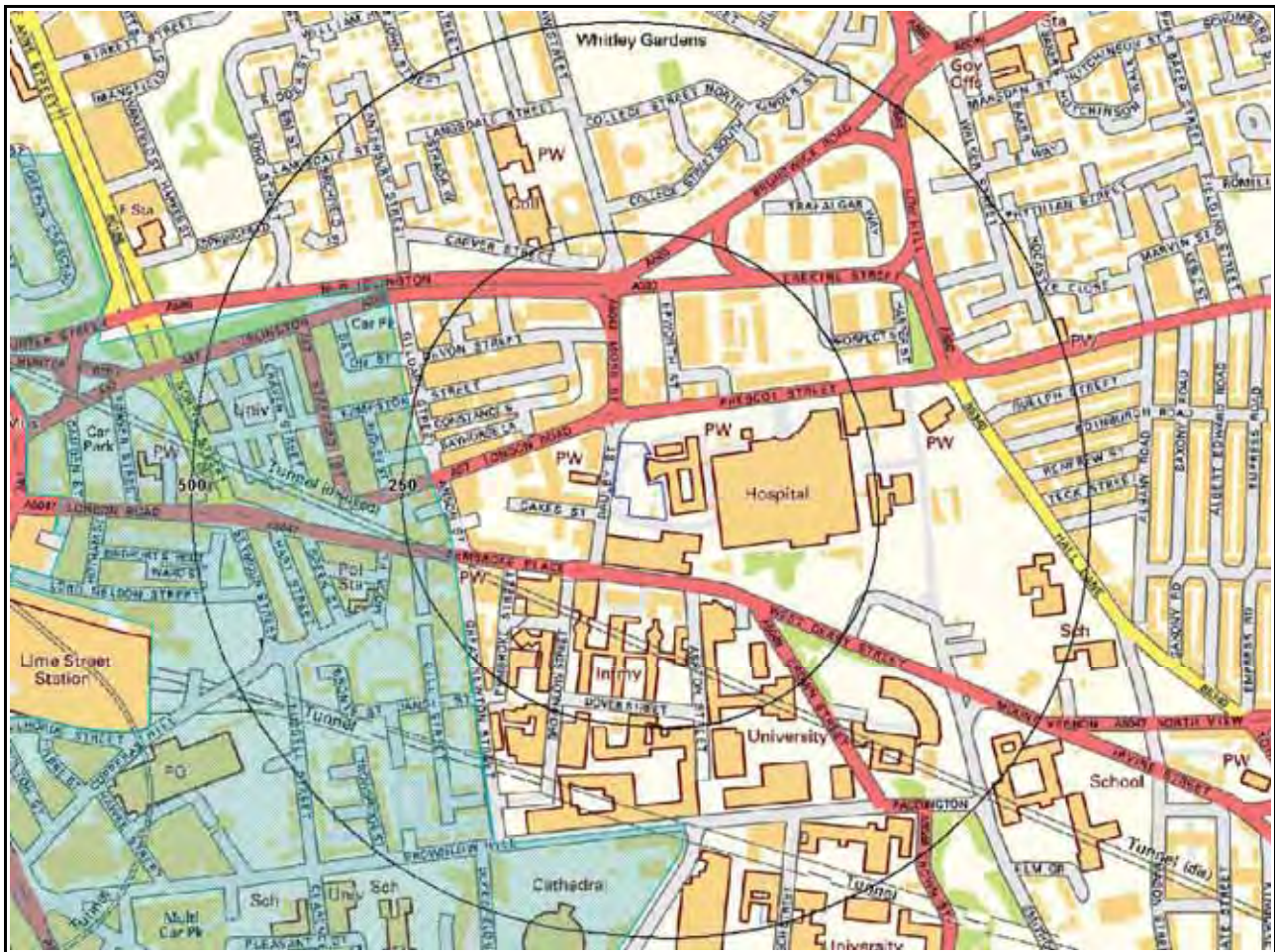
Low

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 threefold scale - Low, Moderate 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



Designated Environmentally Sensitive Sites Legend

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Ordnance Survey

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7. Designated Environmentally Sensitive Sites

Presence of Designated Environmentally Sensitive Sites within 500m of the study site? **Yes**

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: **1**

The following World Heritage Site records provided by English Heritage and Cadw are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance	Direction	World Heritage Site Name	Data Source
1	198.0	W	Liverpool -Maritime Mercantile City Buffer Zone	English Heritage

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 on geology and ground stability, 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

Soluble rocks are not present in the search area. 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.

8.1.4 Compressible Ground

What is the maximum Compressible Ground* 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
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.

8.1.5 Collapsible Rocks

What is the maximum Collapsible Rocks* 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

Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.

8.1.6 Running Sand

What is the maximum Running Sand* 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

No indicators for running sand identified. 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?

No

Database searched and no data found.

9.2 Shallow Mining

What is the subsidence hazard relating to shallow mining on-site*?

Negligible

*Please note this data is searched with a 150m buffer.

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

EmapSite

Telephone: 0118 9736883
sales@emapsite.com



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: Liverpool City Council
Phone: 0151 233 3000
Web: www.liverpool.gov.uk
Address: Municipal Buildings, Dale St, Liverpool, L69 2DH

Get Mapping PLC

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



Acknowledgements

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Site of Special Scientific Interest, National Nature Reserve, Ramsar Site, Special Protection Area, Special Area of Conservation data is provided by, and used with the permission of, English Nature who retain the Copyright and Intellectual Property Rights for the data.

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This report has been prepared in accordance with the GroundSure Ltd standard Terms and Conditions of business for work of this nature.

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.

"Commercial" means any building which is not Residential.

"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 clause 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.

"Intellectual Property" means any patent, copyright, design rights, service marks, moral rights, data protection rights, know-how, trademark 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.

"Residential" means any building used as or suitable for use as an individual dwelling.

"Risk Screening Report" means one of GroundSure's risk screening reports, comprising factual data with interpretation in respect of the level of likely risk and/or liability, excluding **"Consultancy Services"**.

"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 ensure the Beneficiary complies with and is bound by the terms and conditions set out in the Contract and shall provide that GroundSure may in its own right enforce such terms and conditions against the Beneficiary pursuant to the Contracts (Rights of Third Parties) Act 1999. The Client shall be liable for all breaches of the Contract by the Beneficiary as if they were breaches by the Client. 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 who is considering acquiring the whole or part of the Site, or providing funding in relation to the Site, but such third party cannot rely on the same unless expressly permitted under clause 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 access the information contained in a Report, Mapping or in a report prepared by GroundSure in respect of or arising out of Consultancy Services. The Services may only be used for the benefit of the Client and those persons listed in clauses 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. 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 clauses 7 and 11.6 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 clauses 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, (except as permitted herein or by separate agreement with GroundSure) to: (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 clause 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 judgment) 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 clause 4.1, the Client and the Beneficiary hereby acknowledge that all Intellectual Property in the Services and Content 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 clauses 6.1 and 6.2 against the Client or Beneficiary.

6.4 The Client acknowledges that the proprietary rights subsisting in copyright, database rights and any other intellectual property rights in respect of any data and information contained in any Report are and shall remain (subject to clause 11.1) the property of GroundSure and/or any third party that has supplied data or information used to create a Report, and that these conditions do not purport to grant, assign or transfer any such rights in respect thereof to a Client and/or a Beneficiary.

6.5 The Client and each of the parties set out in clause 4.2 are permitted to make up to 8 (commercial) or 2 (residential) printed copies of the Report only. Further copies of the Report may not be made in whole or in part without the prior written permission of GroundSure who shall be entitled to make a charge for each additional copy.

6.6 The Client shall (and shall procure that any recipients of the Report as permitted under clause 4.2 shall):

(i) not remove, suppress or modify any trademark, copyright or other proprietary marking belonging to GroundSure or any third party from the Services;

(ii) use the information obtained as part of the Services in respect of the subject Site only, and shall not store or reuse any information obtained as part of the Services provided in respect of adjacent or nearby sites;

(iii) not create any product or report which is derived directly or indirectly from the data contained in the Services (save that those acting in a professional capacity to the Beneficiary may provide advice based upon the Services);

(iv) not combine the Services with or incorporate such Services into any other information data or service; and

(v) not reformat or otherwise change (whether by modification, addition or enhancement), data contained in the Services (save that those acting in a professional capacity to the Beneficiary shall not be in breach of this clause 6.6(v) where such reformatting is in the normal course of providing advice based upon the Services), in each case of parts (iii) to (v) inclusive, whether or not such product or report is produced for commercial profit or not.

6.7 The Client and/or Beneficiary shall and shall procure that any party to whom the Services are made available shall notify GroundSure of any request or requirement to disclose, publish or disseminate any information contained in the Services in accordance with the Freedom of Information Act 2000, the Environmental Information Regulations 2004 or any associated legislation or regulations in force from time to time.

7. Liability

7.1 Nothing in these terms and conditions shall limit GroundSure's liability for causing death or personal injury through negligence or willful 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 clause 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 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 £10 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.

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 clause 7.1, GroundSure shall not be liable to the Client, the Beneficiary or any third party in contract, tort (including, without limitation, negligence) or for misrepresentation or breach of statutory duty or otherwise in respect of any loss of profits, goodwill, revenue or opportunity, or any indirect or consequential loss (even if such loss was reasonably foreseeable).

7.14 GroundSure undertakes for the duration of the liability periods referred to in clauses 7.4 and 7.5 to maintain professional indemnity insurance in respect of its liabilities under this Contract. 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 Payment Date; 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 or the Beneficiary breaches any material term of the Contract (including, but not limited to, the obligations in clause 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 clause 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 clauses 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 clauses 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 clause 6.1 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.

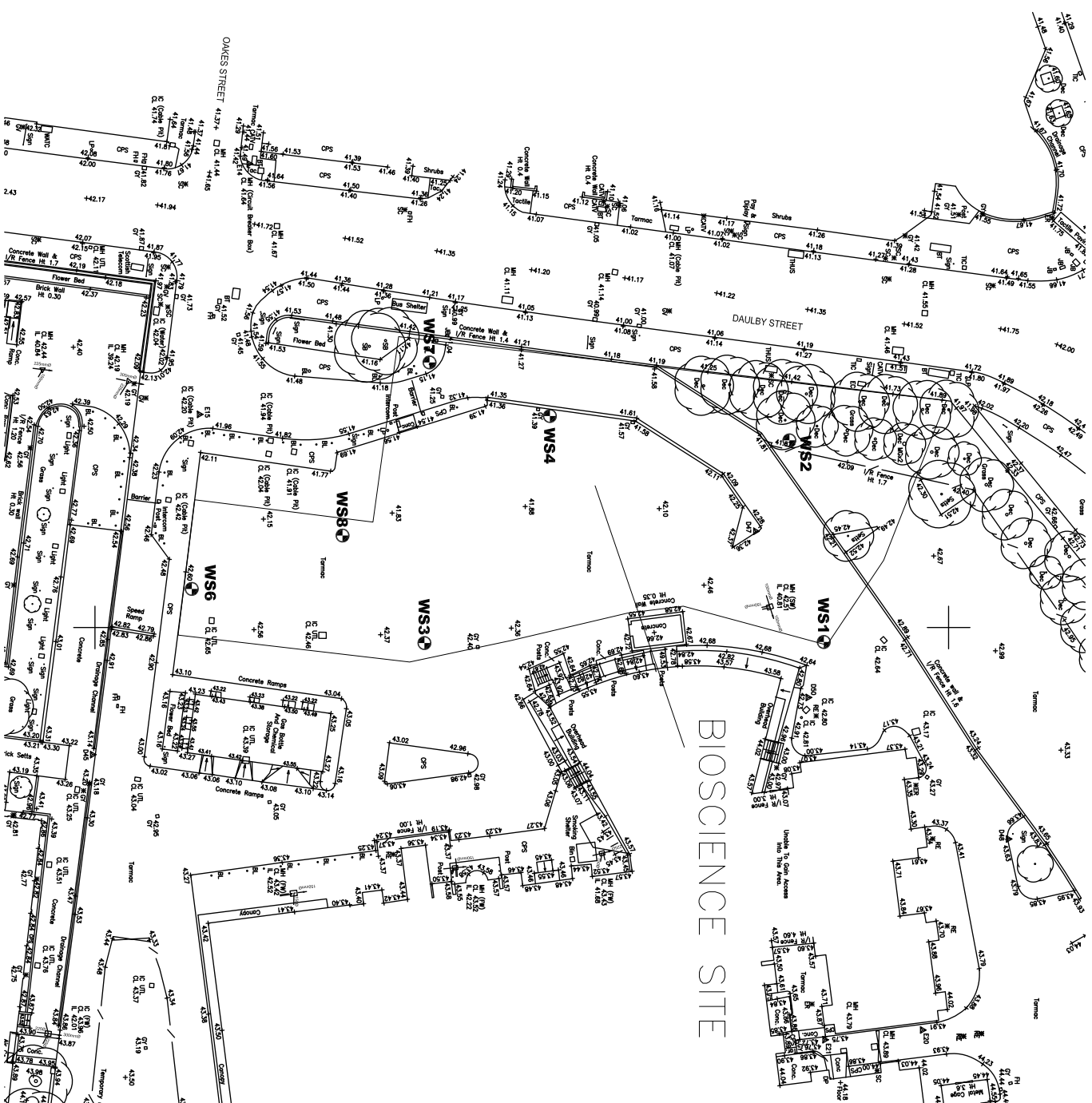
11.10 Each of the provisions of the Contract is severable and distinct from the others and if one or more provisions is or should become invalid, illegal or unenforceable, the validity and enforceability of the remaining provisions shall not in any way be tainted or impaired.

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 can be given in any format eg writing, phone, email to the Compliance Officer at GroundSure who will respond in a timely manner.

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A P P E N D I X D



A	30/09/2011	TR	Change of site extents and hole locations		
Surfix	Date	Initials	Revision		SE Checked

CLIENT
The Alan Johnston Partnership

PROJECT
Bioscience Site
RUH,
Liverpool

TITLE
Proposed Exploratory Hole
Locations



Laurus House, First Avenue, Centrium 100
Boulevard, Southport, Merseyside L35 5YF
Tel: (01283) 551249 Fax: (01283) 211988

DATE 13/09/2011 SCALE 1:500

REF
P5597

DRAWING NO. REVISION
B

DRAWN BY TDSR CHECKED SE CHECKED

This drawing is copyright:
Do not scale from this drawing. All dimensions and sizes
to be verified on site and any discrepancies reported to
this office before proceeding.

A P P E N D I X E



Burton-on-Trent (HQ) Tel: 01283 551249
Market Harborough Tel: 01858 414981
Email: mail@grm-uk.com Web: www.grm-uk.com

Window Sample Borehole

Borehole
Number

WS1

Site: **RLUH Bioscience Site**

GRM Project ref: **P5597**

Ground Level mAOD
0.000

Client: **Alan Johnston Partnership**

Equipment: **Tracked window sampler.**

Coordinates:

Crew: **DS Ltd. Logger LC**

-

-

Scale: **1:25**

GROUNDWATER		SAMPLES	INSITU TESTING			STRATA RECORD			
Installation	Depth (m)	Depth/Type/Ref (m)	Depth/Type (m)	N Value	Casing Depth (m)	Depth (m)	Level (mAOD)	Key	Description
		0.20/D/001 0.20/J/001				0.10	-0.10		Tarmac hardstanding.(TARMAC)
		0.40/D/002 0.40/J/002				0.30	-0.30		Cream gravelly angular cobbles of limestone. Gravel is coarse angular limestone.(MADE GROUND)
	1	1.60/D/003	1.00 C	N=7 (1,2,2,2,1,2)					Loose brown and reddy brown very gravelly coarse sand. Gravel is fine to coarse angular brick and concrete. Contains some whole bricks.(MADE GROUND)
		1.90/D/004				1.80	-1.80		Very loose brown medium sand.(MADE GROUND)
	2	2.30/D/005	2.00 C	N=4 (1,1,1,1,1,1)		2.20	-2.20		Stiff brown slightly gravelly sandy CLAY. Gravel is fine sub-rounded mudstone.(SHERWOOD SANDSTONE GROUP)
						3.20	-3.20		Medium dense reddy brown clayey fine SAND.(SHERWOOD SANDSTONE GROUP)
						3.60	-3.60		Very dense cream medium to coarse grained SAND.(SHERWOOD SANDSTONE GROUP)
	3		3.00 C	N=17 (3,2,4,4,4,5)					
						4.00	-4.00		End of Borehole at 4.00 m
	4		3.80 C	50/195mm (11,12,15,19,16)					





Hole Started **08/10/2011**


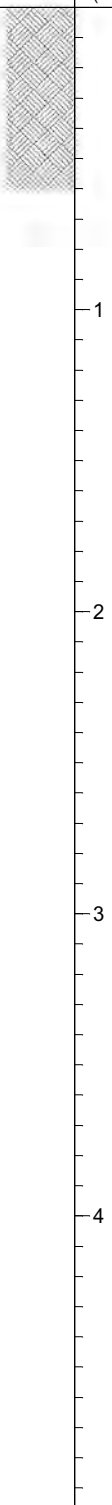

Hole Complete **08/10/2011**

General Remarks: 1. Hand dug inspection pit to 1.0m begl.
2. Gas and groundwater standpipe installed on completion.

Groundwater Remarks: No groundwater encountered.

Test Type: S = Standard Penetration Test, C = Cone Penetration Test. N values reported are uncorrected. N value 50/275 = 50 blows in 275mm.

						Burton-on-Trent (HQ) Tel: 01283 551249 Market Harborough Tel: 01858 414981 Email: mail@grm-uk.com Web: www.grm-uk.com				Window Sample Borehole		Borehole Number WS3	
Site: RLUH Bioscience Site						GRM Project ref: P5597				Ground Level mAOD 0.000			
Client: Alan Johnston Partnership						Equipment: Tracked window sampler.				Coordinates: - -			
						Crew: DS Ltd. Logger LC							
GROUNDWATER		SAMPLES	INSITU TESTING			STRATA RECORD						Scale: 1:25	
Installation	Depth (m)	Depth/Type/Ref (m)	Depth/Type (m)	N Value	Casing Depth (m)	Depth (m)	Level (mAOD)	Key	Description				
						0.10	-0.10		Tarmac hardstanding.(TARMAC)				
						0.40	-0.40		Cream coarse angular gravel of limestone hardcore. Contains many angular cobbles of limestone. (Sub-base)(MADE GROUND)				
<i>End of Borehole at 0.40 m</i>													
													
Hole Started 08/10/2011						Hole Complete 08/10/2011							
General Remarks: 1. Inspection pit terminated after 30 minutes at 0.4m begl due to time restrictions. 2. Inspection pit backfilled with arisings on completion.													
Groundwater Remarks: No groundwater encountered.													
Test Type: S = Standard Penetration Test, C = Cone Penetration Test. N values reported are uncorrected. N value 50/275 = 50 blows in 275mm.													

						Burton-on-Trent (HQ) Tel: 01283 551249 Market Harborough Tel: 01858 414981 Email: mail@grm-uk.com Web: www.grm-uk.com				Window Sample Borehole		Borehole Number WS4	
Site: RLUH Bioscience Site						GRM Project ref: P5597				Ground Level mAOD 0.000			
Client: Alan Johnston Partnership						Equipment: Tracked window sampler.				Coordinates: - -			
						Crew: DS Ltd Logger LC							
GROUNDWATER		SAMPLES	INSITU TESTING			STRATA RECORD						Scale: 1:25	
Installation	Depth (m)	Depth/Type/Ref (m)	Depth/Type (m)	N Value	Casing Depth (m)	Depth (m)	Level (mAOD)	Key	Description				
		0.40/D/001 0.40/J/001				0.10	-0.10		Tarmac hardstanding.(TARMAC)				
						0.30	-0.30		Grey sandy fine to coarse angular gravel of limestone (sub-base).(MADE GROUND)				
						0.60	-0.60		Grey and brown very gravelly coarse sand. Gravel is fine to medium angular brick, concrete and sandstone.(MADE GROUND)				
						0.65	-0.65		Concrete slab.(MADE GROUND) End of Borehole at 0.60 m				
Hole Started 08/10/2011 Hole Complete 08/10/2011													
General Remarks: 1. Hand dug inspection pit encountered concrete slab at 0.6m begl, therefore borehole terminated. 2. Inspection pit back filled with arisings on completion.													
Groundwater Remarks: No groundwater encountered.													
Test Type: S = Standard Penetration Test, C = Cone Penetration Test. N values reported are uncorrected. N value 50/275 = 50 blows in 275mm.													



Burton-on-Trent (HQ) Tel: 01283 551249
Market Harborough Tel: 01858 414981
Email: mail@grm-uk.com Web: www.grm-uk.com

Window Sample Borehole

Borehole
Number

WS6

Site: RLUH Bioscience Site

GRM Project ref: **P5597**

Ground Level mAOD
0.000

Client: Alan Johnston Partnership

Equipment: Tracked window sampler.

Coordinates:

Crew: DS Ltd Logger LC

-
-
-

Scale: 1:25

GROUNDWATER		SAMPLES	INSITU TESTING			STRATA RECORD			
Installation	Depth (m)	Depth/Type/Ref (m)	Depth/Type (m)	N Value	Casing Depth (m)	Depth (m)	Level (mAOD)	Key	Description
	0.10	0.60/J/001	1.00 C	50/155mm (6,9,19,24,7)		0.10	-0.10		Tarmac hardstanding.(TARMAC)
	0.50					0.50	-0.50		Cream gravelly angular cobbles of limestone hardcore. (Sub-base)(MADE GROUND)
	1.00					1.00	-1.00		Dense orangey brown slightly gravelly medium grained SAND. Gravel is coarse angular sandstone.(SHERWOOD SANDSTONE GROUP)
									End of Borehole at 1.00 m

Hole Started 08/10/2011

Hole Complete 08/10/2011

General Remarks: 1. Hand dug inspection pit to 1.0m begl.
2. Refusal at 1.0m begl, therefore borehole terminated.
2. Inspection pit back filled with arisings on completion.
Groundwater Remarks: No groundwater encountered.

Test Type: S = Standard Penetration Test, C = Cone Penetration Test. N values reported are uncorrected. N value 50/275 = 50 blows in 275mm.



Burton-on-Trent (HQ) Tel: 01283 551249
Market Harborough Tel: 01858 414981
Email: mail@grm-uk.com Web: www.grm-uk.com

Window Sample Borehole

Borehole
Number

WS7

Site: RLUH Bioscience Site

GRM Project ref: **P5597**

Ground Level mAOD
0.000

Client: Alan Johnston Partnership

Equipment: Tracked window sampler.

Coordinates:

Crew: DS Ltd Logger LC

-
-
-

Scale: 1:25

GROUNDWATER		SAMPLES	INSITU TESTING			STRATA RECORD			
Installation	Depth (m)	Depth/Type/Ref (m)	Depth/Type (m)	N Value	Casing Depth (m)	Depth (m)	Level (mAOD)	Key	Description
		0.20/D/001 0.20/J/001				0.10	-0.10		Tarmac hardstanding.(TARMAC)
						0.40	-0.40		Cream gravelly angular cobbles of limestone. Gravel is coarse angular limestone.(MADE GROUND)
		0.50/D/002 0.50/J/002							Loose grey, reddy brown and brown slightly clayey very gravelly medium grained sand. Gravel is fine to coarse sub-rounded to angular brick, concrete and some sandstone and slate. Contains some angular cobbles of sandstone and whole bricks and occasional roots up to 3mm diameter. From 2.5m to 3.0m begl much black ashy material. (MADE GROUND)
	1		1.00 C	N=5 (1,1,1,2,1,1)					
	2		2.00 C	N=8 (1,1,2,3,2,1)					
		2.50/J/003							
	3		3.00 C	50/235mm (1,8,8,8,17,17)		3.00	-3.00		Very dense yellowy brown medium grained SAND.(SHERWOOD SANDSTONE GROUP)
						3.20	-3.20		End of Borehole at 3.20 m
	4								




Hole Started 08/10/2011

Hole Complete 08/10/2011

General Remarks: 1. Hand dug inspection pit to 1.0m begl.
2. Gas and groundwater monitoring standpipe installed on completion.

Groundwater Remarks: No groundwater encountered.

Test Type: S = Standard Penetration Test, C = Cone Penetration Test. N values reported are uncorrected. N value 50/275 = 50 blows in 275mm.

						Burton-on-Trent (HQ) Tel: 01283 551249 Market Harborough Tel: 01858 414981 Email: mail@grm-uk.com Web: www.grm-uk.com				Window Sample Borehole		Borehole Number WS8	
Site: RLUH Bioscience Site						GRM Project ref: P5597				Ground Level mAOD 0.000			
Client: Alan Johnston Partnership						Equipment: Tracked window sampler.				Coordinates: - -			
						Crew: DS Ltd Logger LC							
GROUNDWATER		SAMPLES	INSITU TESTING			STRATA RECORD						Scale: 1:25	
Installation	Depth (m)	Depth/Type/Ref (m)	Depth/Type (m)	N Value	Casing Depth (m)	Depth (m)	Level (mAOD)	Key	Description				
		0.40/D/001 0.40/J/001				0.10	-0.10		Tarmac hardstanding.(TARMAC)				
						0.30	-0.30		Grey sandy fine to coarse angular gravel of limestone hardcore. (Sub-base)(MADE GROUND)				
						0.60	-0.60		Grey and reddy brown sandy fine to coarse sub-angular to angular gravel of concrete, brick and limestone. Contains some cobbles of angular concrete, brick and limestone.(MADE GROUND)				
						End of Borehole at 0.60 m							
Hole Started 08/10/2011 Hole Complete 08/10/2011						General Remarks: 1. Hand dug inspection pit encountered a concrete obstruction at 0.6m begl, therefore borehole terminated. 2. Inspectin pit backfilled with arisings on completion.							
Groundwater Remarks: No groundwater encountered.													
Test Type: S = Standard Penetration Test, C = Cone Penetration Test. N values reported are uncorrected. N value 50/275 = 50 blows in 275mm.													

A P P E N D I X F



Nicholls Colton Analytical
7 - 11 Harding Street
Leicester
LE1 4DH

Nicholls Colton Analytical

Cover Sheet

Analytical Test Report: E11/GRM/538/001

Your Project Reference:	P5597 Liverpool	Samples Received on:	10.10.11
Your Order Number:	GRM/P5597	Testing Instruction Received:	10.10.11
Report Issue Number:	2	Sample Tested :	12 to 24.10.11
Samples Analysed	7 Soils	Report issued:	24.10.11

Signed

James Gane
Manager - Data Logistics
Nicholls Colton Analytical

GRM Development Solutions Ltd
Laurus House, First Avenue
Centrum 100
Burton Upon Trent
Staffordshire
DE14 2WH

Note:

Please refer to Methodologies tab for details pertaining to the analytical methods undertaken

Samples will be retained for 28 days after issue of this report unless otherwise requested

Moisture Content was determined in accordance with NCA method statement MS - CL - Sample Prep, oven dried at <30°C.

Stone Content was determined in accordance with NCA method statement MS - CL - Sample Prep and refers to the percentage of stones retained on a 10mm BS test sieve.

Concentrations are reported as a percentage mass of the dry soil passing the 10mm BS test sieve, where appropriate these results have been corrected for moisture content but not stone content.

E11/GRM/538/001

Project Reference - P5597 Liverpool

Analytical Test Results - Soil Samples

NCA Reference			11-14753	11-14754	11-14755	11-14756	11-14757	11-14758
Client Sample Reference			WS1	WS4	WS7	WS8	WS6	WS7
Client Sample Location			WS1	WS4	WS7	WS8	WS6	WS7
Depth (m)			0.40	0.40	0.50	0.40	0.60	2.50
Top of sample (m)			0.40	0.40	0.50	0.40	0.60	2.50
Date of Sampling			08.10.2011	08.10.2011	08.10.2011	08.10.2011	08.10.2011	08.10.2011
Time of Sampling			Not Provided	Not Provided	Not Provided	Not Provided	Not Provided	Not Provided
Sample Matrix			Sand	Loam	Loam	Sand	Sand	Loam
Determinant	Units	Accreditation						
Arsenic	(mg/kg)	MCERTS	21.6	16.4	14.9	10.5	11.3	11.2
Cadmium	(mg/kg)	MCERTS	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5
Chromium (Total)	(mg/kg)	MCERTS	16.6	23.0	21.2	16.9	8.4	15.6
Copper	(mg/kg)	MCERTS	156	97.1	157	49.0	4.3	49.8
Lead	(mg/kg)	MCERTS	812	173	443	176	6.6	112
Mercury	(mg/kg)	UKAS	1.9	< 0.7	0.9	< 0.7	< 0.7	< 0.7
Nickel	(mg/kg)	MCERTS	17.6	22.0	23.2	13.9	6.1	15.4
Selenium	(mg/kg)	MCERTS	< 5	< 5	< 5	< 5	< 5	< 5
Zinc	(mg/kg)	MCERTS	336	183	277	202	24	328
Total Phenols	(mg/kg)	MCERTS	< 1.1	< 1.2	< 1.2	< 1.1	< 1.1	< 1.9
Chromium (Hexavalent)	(mg/kg)	None	< 1.1	< 1.2	< 1.2	< 1.1	< 1.1	< 1.9
Cyanide	(mg/kg)	None	< 1.1	< 1.2	< 1.2	< 1.1	< 1.1	< 1.9
pH	pH Units	UKAS	9.6	10.2	9.5	9.6	8.7	8.5
SOM	(%)	UKAS	2.8	3.8	7.0	2.8	1.4	45.2
Sulphate	(mg/l)	UKAS	35.5	331	113	143	< 20	69.1
Acenaphthene	(mg/kg)	MCERTS	2.1	0.5	0.7	0.2	<0.1	<1.0
Acenaphthylene	(mg/kg)	UKAS	0.1	<0.1	<0.1	<0.1	<0.1	<1.0
Anthracene	(mg/kg)	UKAS	2.4	0.6	1.1	0.4	<0.1	<1.0
Benzo (a) anthracene	(mg/kg)	MCERTS	6.9	1.2	2.8	1.1	<0.1	<1.0
Benzo (a) pyrene	(mg/kg)	MCERTS	7.1	1.2	3.0	1.3	<0.1	<1.0
Benzo (b) fluoranthene	(mg/kg)	MCERTS	8.8	1.6	3.8	1.6	<0.1	<1.0
Benzo (g, h, i) perylene	(mg/kg)	MCERTS	5.6	0.9	2.3	1.1	<0.1	<1.0
Benzo (k) fluoranthene	(mg/kg)	MCERTS	3.3	0.6	1.3	0.6	<0.1	<1.0
Chrysene	(mg/kg)	MCERTS	8.1	1.5	3.4	1.5	<0.1	1.1
Dibenzo (a,h) anthracene	(mg/kg)	MCERTS	1.1	0.2	0.5	0.2	<0.1	<1.0
Fluoranthene	(mg/kg)	MCERTS	16.7	2.8	5.9	2.7	<0.1	1.7
Fluorene	(mg/kg)	MCERTS	1.3	0.4	0.5	0.2	<0.1	<1.0
Indeno (1, 2, 3,-cd) pyrene	(mg/kg)	MCERTS	4.9	0.9	2.0	0.9	<0.1	<1.0
Naphthalene	(mg/kg)	MCERTS	1.6	0.6	0.8	0.2	<0.1	<1.0
Phenanthrene	(mg/kg)	MCERTS	12.0	2.6	4.5	1.7	<0.1	1.5
Pyrene	(mg/kg)	MCERTS	16.8	2.7	6.1	2.7	<0.1	1.7
Total PAH	(mg/kg)	UKAS	98.8	18.4	38.7	16.3	< 1.6	17.9
Total TPH	(mg/kg)	MCERTS	779	266	257	2380	-	-
Asbestos	-	None	Non Asbestos Fibre	Non Asbestos Fibre	Non Asbestos Fibre	Non Asbestos Fibre	-	-

E11/GRM/538/001

Project Reference - P5597 Liverpool

Analytical Test Results - Soil Samples

NCA Reference			11-14759
Client Sample Reference			WS1
Client Sample Location			WS1
Depth (m)			1.60
Top of sample (m)			1.60
Date of Sampling			08.10.2011
Time of Sampling			Not Provided
Sample Matrix			Clay
Determinant	Units	Accreditation	
Arsenic	(mg/kg)	MCERTS	11.5
Cadmium	(mg/kg)	MCERTS	< 2.5
Chromium (Total)	(mg/kg)	MCERTS	26.3
Copper	(mg/kg)	MCERTS	259
Lead	(mg/kg)	MCERTS	116
Mercury	(mg/kg)	UKAS	< 0.7
Nickel	(mg/kg)	MCERTS	19.6
Selenium	(mg/kg)	MCERTS	< 5
Zinc	(mg/kg)	MCERTS	110
Total Phenols	(mg/kg)	MCERTS	< 1.2
Chromium (Hexavalent)	(mg/kg)	None	< 1.2
Cyanide	(mg/kg)	None	< 1.2
pH	pH Units	UKAS	8.5
SOM	(%)	UKAS	4.1
Sulphate	(mg/l)	UKAS	26.7
Acenaphthene	(mg/kg)	MCERTS	0.1
Acenaphthylene	(mg/kg)	UKAS	<0.1
Anthracene	(mg/kg)	UKAS	<0.1
Benzo (a) anthracene	(mg/kg)	MCERTS	0.3
Benzo (a) pyrene	(mg/kg)	MCERTS	0.3
Benzo (b) fluoranthene	(mg/kg)	MCERTS	0.4
Benzo (g, h, i) perylene	(mg/kg)	MCERTS	0.2
Benzo (k) fluoranthene	(mg/kg)	MCERTS	0.1
Chrysene	(mg/kg)	MCERTS	0.4
Dibenzo (a,h) anthracene	(mg/kg)	MCERTS	<0.1
Fluoranthene	(mg/kg)	MCERTS	0.6
Fluorene	(mg/kg)	MCERTS	<0.1
Indeno (1, 2, 3,-cd) pyrene	(mg/kg)	MCERTS	0.2
Naphthalene	(mg/kg)	MCERTS	0.1
Phenanthrene	(mg/kg)	MCERTS	0.5
Pyrene	(mg/kg)	MCERTS	0.6
Total PAH	(mg/kg)	UKAS	4.2
Total TPH	(mg/kg)	MCERTS	-
Asbestos	-	None	-

E11/GRM/538/001

Project Reference - P5597 Liverpool

Analytical Test Results - Soil Samples

NCA Reference			11-14753	11-14756
Client Sample Reference			WS1	WS8
Client Sample Location			WS1	WS8
Depth (m)			0.40	0.40
Top of sample (m)			0.40	0.40
Date of Sampling			08.10.2011	08.10.2011
Time of Sampling			Not Provided	Not Provided
Sample Matrix			Sand	Sand
Determinant	Units	Accreditation		
Aliphatics				
>C ₅ to C ₆	(mg/kg)	None	< 0.01	< 0.01
>C ₆ to C ₈	(mg/kg)	None	0.1	0.0
>C ₈ to C ₁₀	(mg/kg)	None	< 0.01	< 0.01
>C ₁₀ to C ₁₂	(mg/kg)	None	< 11	< 11
>C ₁₂ to C ₁₆	(mg/kg)	None	< 11	< 11
>C ₁₆ to C ₂₁	(mg/kg)	None	14	42
>C ₂₁ to C ₃₅	(mg/kg)	None	104	576
Aromatics				
>C ₅ to C ₆	(mg/kg)	None	< 0.01	< 0.01
>C ₆ to C ₈	(mg/kg)	None	< 0.01	< 0.01
>C ₈ to C ₁₀	(mg/kg)	None	< 0.01	< 0.01
>C ₁₀ to C ₁₂	(mg/kg)	None	< 11	< 11
>C ₁₂ to C ₁₆	(mg/kg)	None	< 11	< 11
>C ₁₆ to C ₂₁	(mg/kg)	None	47	47
>C ₂₁ to C ₃₅	(mg/kg)	None	241	908



E11/GRM/538/001

Project Reference - P5597 Liverpool

Certificate Of Analysis

NCA Reference	Client Sample Reference	Sample Location	Description	Moisture Content (%)	Stone Content (%)
11-14753	WS1	WS1	Brown / black gravelly sand (fill)	9.9	14
11-14754	WS4	WS4	Dark brown gravelly silt with organic matter	23	15
11-14755	WS7	WS7	Brown gravelly sandy clay	16	11
11-14756	WS8	WS8	black / brown gravelly sand	6.6	19
11-14757	WS6	WS6	Brown sand with crushed rock	7.2	10
11-14758	WS7	WS7	Black sandy silt with organic matter and crushed brick and concrete (Fill)	94	11
11-14759	WS1	WS1	Brown sandy clay	24	0.2



E11/GRM/538/001

Project Reference - P5597 Liverpool

Analysis Methodologies

Matrix	Determinant	Sample condition for analysis	Test Method used
Soil	Metals	Air Dried	In house method statement - MS - CL - ICP metals
Soil	PAH	Air Dried	In house method statement - MS - CL - PAH
Soil	Phenols	As Received	In house method statement - MS - CL - Phenols (Skalar)
Soil	Chromium (hexavalent)	As Received	In house method statement - MS - CL - Chromium (Hexavalent)
Soil	Cyanide	As Received	In house method statement - MS - CL - Cyanide
Soil	pH	Air Dried	BS 1377, Part 3, 1990
Soil	SOM	Air Dried	In house method statement - MS - CL - TOC and DOC
Soil	Sulphate	Air Dried	In house method statement - MS - CL - Anions
Soil	Total TPH	As Received	In house method statement - MS - CL - TPH - Sample was not subject to a 'scrubbing' cleanup step prior to analysis
Soil	TPH CWG	As Received	In house method statement - MS - CL - EPH and VPH
Soil	Asbestos	-	Analysis subcontracted to AOH

A P P E N D I X G

GRM TIER 1 ASSESSMENT CRITERIA									
LAND USE	Residential with Plant Uptake				Residential without Plant Uptake				Commercial & Industrial
	1%	2.50%	6%		1%	2.50%	6%		
CONTAMINANT	1%	2.50%	6%		1%	2.50%	6%		
^a Arsenic	32	32	32		35	35	35		640
^a Cadmium	10	10	10		17.7	17.7	17.7		230
^b Chromium III	2520	2520	2520		3010	3010	3010		29,800
^b Chromium VI	4.3	4.3	4.3		4.3	4.3	4.3		34.8
^a Lead	168	168	168		235	235	235		5370
^a Mercury	11	11	11		11	11	11		410
^a Selenium	350	350	350		595	595	595		13,000
^a Nickel	130	130	130		786	786	786		1800
^b Phenols	184	290	415		310	418	519		1,200,000
^b Copper	2330	2330	2330		6200	6200	6200		71,700
^b Zinc	3750	3750	3750		40,500	40,500	40,500		667,000
^a Cyanide	34	34	34		34	34	34		34
^b Benzene	0.08	0.157	0.332		0.266	0.49	0.968		50
^b Toluene	119	270	611		607	1290	2710		869
^b Ethylbenzene	65	154	354		167	381	843		1920
^b o - xylene	45	106	246		59.5	139	321		518
^b p - xylene	44	103	240		55.4	130	302		1,120
^b m - xylene	42	98.2	228		53.3	125	288		625
^b Acenaphthene	210(326)	480	1000		2020(57)	3090(141)	3910(336)		1,470
^b Acenaphthylene	168	400	850		1950(86)	3020(212)	3870(506)		3200
^b Anthracene	2300	4900	9200		20,100(184)	22,400	23,400		98000(141)
^b Benz(a)anthracene	3.1	4.7	5.9		3.71	5.23	6.22		97000(212)
^b Benz(b)pyrene	0.83	0.94	1		1	1.03	1.04		530,000
^b Benz(k)fluoranthene	5.6	6.5	7		6.99	7.25	7.36		95
^b Benzo(g,h,i)perylene	40	46	47		43	43.6	43.8		14
^b Benzo(k)fluoranthene	8.5	9.6	10		10.1	10.3	10.4		100
^b Chrysene	6	8	9.3		6.84	9.74	10.1		660
^b Dibenz(a,h)anthracene	0.76	0.86	0.9		0.865	0.91	0.928		140
^b Fluoranthene	260	460	670		972	983	1000		13
^b Fluorene	160	360	760		1850(30)	2450(76)	2970(163)		23,000
^b Ind(1,2,3-cd)pyrene	3.2	4.2	5.2		4.1	4.35	4.4		69,000
^b Naphthalene	3.2	3.7	4.2		3.64	3.92	4.1		71,000
^b Phenanthrene	92	200	380		731(16)	872	943		82
^b Pyrene	560	1000	1800		2330	2380	2400		110,000(33)
ALIPHATIC HYDROCARBONS									
^b C5-C6	30	55	110		30	55	113		13,000(156)
^b C6-C9	73	160	320		73	162	371		43,000(156)
^b C10-C11	19	46	110		19	46	110		43,000(156)
^b C12-C15	93(46)	230(118)	540(283)		93(46)	230(118)	540(283)		12,000(45)
^f C16-35	740(24)	1700(58)	3000(142)		745(237)	1700(59.1)	3040(142)		24,000(18)
AROMATIC HYDROCARBONS									
^b C5-7 (benzene)	65	130	280		89,000	89,000	89,000		83,000(59)
^b C7-8 (toluene)	120	270	611		263	483	978		1,800,000
^b C8-C10	27	65	151		1290	1290	2710		49,000(226)
^b C10-C12	69	160	346		33.2	80.7	169		110,000(162)
^b C12-C16	140	310	593		177	417	866		8560(150)
^f C16-C21	250	480	770		1250(169)	1590(419)	1710		29,000(899)
^f C21-C35	890	1110	1230		1340	1340	1340		37,000
									28,000

Notes

- a. SCV (2009)
b. LQM/CIH values or derived using CLEA1.06 with LQM/CIH Data.
c. 2002 SCV values used until further guidance is published
d. SCV for methyl Hg used
e. Atkins ATRISK soil Value
f. Oral, dermal and inhalation exposure compared with Oral HCV
Values in brackets present TAC exceeding solubility & vapour saturation limits

Contaminant Thresholds for Subsurface Water Pipes

Contaminant	Thresholds
Corrosion	
Sulphate (SO ₄)	2000
Sulphur (S)	5000
Sulphide (S)	250
pH	<pH5, >pH8
Toxic Substances	
Antimony (Sb)	10
Arsenic (As)	10*
Cadmium (Cd)	3
Chromium (hexavalent) (Cr)	25
Chromium (total) (Cr)	600
Cyanide (free) (Cn)	25*
Cyanide (complexed) (Cn)	250*
Lead (Pb)	500
Mercury (Hg)	1
Selenium (Se)	3
Thiocyanate (SCN)	50
Organic Contaminants	
Coal Tar	50
Cyclohexane extractable	50
Phenol	5
Poly Aromatic Hydrocarbons	50
Toluene extractable	50
TPH DRO (diesel, kerosene)	100
Petrol	10
Mineral oils	1000

* It is not recommended that water pipes should be laid in sites where these substances are identified or suspected

Ref: Water Regulations Advisory Scheme (WRAS) (No. 9-04-03 Issue 1)