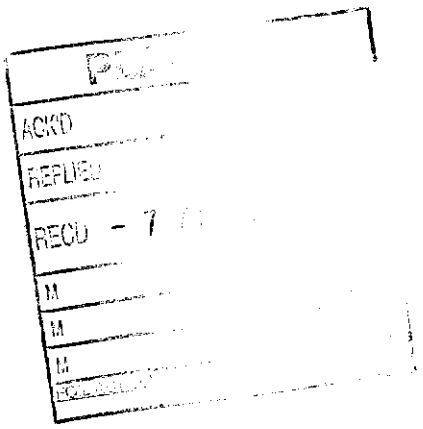


PRELIMINARY RISK ASSESSMENT

BEECHDALE CLOSE, MOSTON, MANCHESTER

16088-R1 (00)

PE JONES (CONTRACTORS) LIMITED

2 APRIL 2008

CONFIDENTIAL

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This report is not to be used for contractual or engineering purposes unless the above is signed where indicated by the author, the project manager and the technical reviewer of the report, and the report is designated "FINAL".

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EXECUTIVE SUMMARY

It is proposed to redevelop a rectangular parcel of land off Beechdale Close, Moston, with residential properties.

A Preliminary Risk Assessment (PRA) has been carried out based on a site walkover and review of published data, including historical maps, an environmental database and geological and hydrogeological maps. It should be noted that there has been no discussion with the regulatory authorities, as this was not requested.

The site is underlain directly by superficial deposits consisting of boulder clay (and possibly peat horizons). This is underlain by the Westphalian C Coal Measures, consisting largely of mudstones and containing a number of coal seams. It is not anticipated that the site will be affected by undermining of these coal seams; however, it is recommended that further enquiries are made to the Coal Authority. The Coal Measures sequence is classed as a minor aquifer by the Environment Agency. The south west flowing Moston Brook is present approximately 500m to the south east of the site.

The site and surrounding area was largely occupied by agricultural land in 1848. The railway, to the east of the site, extended onto the site by 1893 and then, by 1975, had been removed. A number of works were constructed to the south of the site. An engineering works had also been constructed immediately to the north of the site by 1909, by which time a small pond immediately off-site to the north west had also been infilled. A number of former and current landfill sites are present in the vicinity of the site.

The PRA undertaken by RSK has identified a number of potential pollutant linkages associated with the site. These include ground gas migration from a number of sources into excavations or buildings, and ingestion, inhalation of dermal contact with contaminated soils / leachate from potential on- and off-site sources.

Given that a number of potential contamination sources have been identified both on, and in the vicinity of, the site it is recommended that an intrusive investigation be carried out to determine the presence or otherwise, and extent, of any such contamination.

1. INTRODUCTION

RSK Geoconsult Limited (RSK) was commissioned by PE Jones (Contractors) Limited to carry out a Preliminary Risk Assessment of the land off Beechdale Close, Moston. This assessment was carried out with the understanding that the site is to be redeveloped with residential properties.

1.1 Objectives

The objectives of this assessment are as follows:

- To provide preliminary information regarding the site history, geology and environmental setting from which potential risks to end-users and the environment can be assessed; and
- Review the available information and provide an assessment of the anticipated site conditions in accordance with current UK guidance.

1.2 Scope

The scope of the investigation and layout of this report has been designed with CLR11 [(1)] (all numbered references are listed at the end of this report in Section 4) in mind and guidance issued by the Environment Agency in July 2005 for land contamination reports [(2)]. A summary of relevant legislation and government policies applicable to land development is included in Appendix A.

The risk management process comprises up to three stages of risk assessment: Preliminary, Generic Quantitative and Detailed Quantitative Risk Assessment (PRA, GQRA and DQRA). The basis for the risk assessment is a Conceptual Model that is produced as part of the PRA and updated throughout the risk management process.

The scope of works for this PRA includes:

- Undertaking a review of geological, hydrogeological and hydrological information, a commercially available environmental database (Landmark Envirocheck report), historical Ordnance Survey plans and a site walkover. This information is used to construct an outline Conceptual Model and to consider any potential pollutant linkages (where a receptor may be connected to a source by a viable pathway) that may be present; and
- Providing recommendations for further works, including consultation with the regulatory authorities, intrusive site investigation work and the likely need or otherwise for remedial action.

1.3 Limitations

The comments given in this report and the opinions expressed herein are based on a review of information contained within a Landmark Envirocheck report, published data, and the findings of the site walkover. Where any data supplied by the client or from other sources have been used, it has been assumed that the information is correct. No responsibility can be accepted by RSK for inaccuracies in the data supplied by any other party.

This report is subject to the RSK Service Constraints given in Appendix B.

1.4 Previous Work

No previous investigation reports of the site have been made available for review by RSK. However, RSK has carried out a number of intrusive investigations of the adjacent site, Broadhurst Manor, to the north of the subject site. The findings of these investigations are summarised in the following report:

- RSK ENSR Group, Summary Report of All Additional Site Investigation Work, St. Mary's Road, Moston. Report reference 10341-R7 (00), dated 24 October 2003.

A number of contamination hotspots were encountered during the investigation works of the Broadhurst Manor site and these were subsequently remediated by RSK. The site is currently being developed with residential properties. Peat horizons were encountered within the superficial deposits across the western section of the Broadhurst Manor site.

2. SITE DETAILS

The site location, description and future development are discussed below.

2.1 Site Location

The site is situated off Beechdale Close, Moston, Manchester and can be located by National Grid reference SD 881 016. It lies to the east of Moston town centre, and to the north of Manchester city centre, in a predominantly residential area. A site location map is presented as Figure 1 [(3)].

2.2 Site Description

The site occupies approximately 0.3ha and currently comprises an area of wasteland. It lies at an elevation of 95m AOD (above Ordnance Datum) and is understood to be sensibly level. A site plan is presented as Figure 2.

2.3 Future Development

It is proposed to redevelop the site with residential properties. The proposed layout of the development is unknown.

2.4 Licences and Permissions

It is understood that no discharge consents, permits or planning permissions/conditions currently apply to the site.

3. OUTLINE PRELIMINARY RISK ASSESSMENT

The following describes the results of available information for the site and the site inspection. The information, together with that presented in Section 2, has been used to identify potential contaminant sources and sensitive receptors, from which an outline Conceptual Model has been developed.

3.1 Geology

Published records [4,5] for the area indicate the geology of the site to be characterised by the succession recorded in Table 1.

Table 1: Geology at the Site

Geological Unit	Description	Estimated thickness (m)
Boulder Clay (superficial deposits)	Glacial Till	Unknown
Westphalian C Coal Measures Formation (Bedrock), including Newton Heath Sandstone Member	Coal-bearing Mudstone	Unknown

The Worsley four foot mine coal seam, within the Westphalian C Coal Measures sequence, is indicated to underlie the site at depth. The Moston Fault, downthrown to the north east, is present immediately to the north east of the site.

The desk based review of the adjacent St. Marys Road site indicated that the 'Platt Tunnel' is present along its western boundary, at a depth of approximately 480m. A Coal Authority report for the site indicated the presence of seven coal seams beneath the site, although the known outcrop in the area occurred to he north west of the property.

Note that a Coal Authority report has not been commissioned for the subject site, and the six-inch geological map has not been reviewed. It was deemed unlikely that the adjacent the St Marys Road site should be affected at the surface by shallow worked

coal seams. However, given the known presence of coal in the area and the fault that separates the subject site from the St Marys Road site, it is recommended that a Coal Authority report and the six-inch geological map be purchased.

The National Radiological Protection Board information contained within the Envirocheck Report, reproduced in CD format in Appendix C, indicates that less than 1% of properties in the area are above the radon action level. The British Geological Survey information indicates that no radon protective measures are necessary for the site.

3.2 Hydrogeology

The Groundwater Vulnerability Map [6] shows the geology beneath the site to be classified as a minor aquifer, defined as fractured or potentially fractured rocks which do not have a high primary permeability, or other formations of variable permeability including unconsolidated deposits. These aquifers will seldom produce large quantities of water for abstraction, but are important for both local supplies and in supplying base flow to rivers.

3.2.1 Groundwater Abstractions

The Environment Agency has defined source protection zones (SPZ) for nearly 2,000 groundwater sources used for public drinking water supply. The SPZ provides an indication of the potential risk of pollution. Three zones (Inner, Outer and Total Catchment) are usually defined. The subject site is not situated within, or within 1km of, a groundwater SPZ.

No current groundwater abstractions were identified within a 2km radius of the site.

3.2.2 Soil Leaching Potential

The soils beneath the site are classified as having high leaching potential [6]. Soil information for restored mineral workings and urban areas is based on fewer observations than elsewhere, so a worst-case vulnerability classification is assumed until proven otherwise.

3.3 Hydrology

The south westward flowing Moston Brook is present approximately 500m to the south east of the site.

The local topography falls generally to the south west.

3.3.1 Surface Water Abstractions

No current surface water abstractions are identified within a 2km radius of the site

3.3.2 Flooding

Information contained within the Envirocheck report indicates the site is not situated within a Flood Zone, therefore a Flood Risk Assessment is not recommended.

3.4 Sensitive Land Uses

No sensitive land uses, such as Sites of Special Scientific Interest (SSSI), were identified on, or in the vicinity of the site.

3.5 Site History Review

A review of the site history has been carried out through the study of available Ordnance Survey maps dating from the late 1800s. The review is designed to identify potential historic sources of contamination that may have impacted soil or groundwater quality beneath the site and to identify any potentially contaminative land uses in the area that may have impacted the site.

3.5.1 Historic Maps

A review of the historical maps for the site from between 1848 and 2007 was undertaken using the extracts provided within the Landmark Envirocheck report. The maps are reproduced in Appendix C.

3.5.1.1 History of the Site

In 1848 the site was occupied by agricultural land. By 1893 the railway sidings had extended onto the site from the railway to the south east of the site. By 1975, the sidings had been dismantled and the site remained unoccupied until at least 2007, the last date of mapping.

3.5.1.2 History of the Surrounding Area

In 1848 the area surrounding the site generally comprised agricultural land. However, the railway was present immediately to the south east of the site. A coal pit is indicated immediately to the west. A print works and dye works are indicated between 300m and 400m to the south and south east of the site, respectively, alongside Moston Brook.

By 1893 a pond is indicated immediately adjacent to the north western corner of the site, and an old brickfield, with associated buildings, to the west. Beyond the brickfield was

an old sand pit. A number of residential properties had been constructed to the west of the site.

By 1909 the pond to the north west had been infilled and the brickfield is no longer indicated. An engineering and wire works is indicated approximately 100m to the north of the site. The dye works to the south east is indicated as disused.

By 1922 an iron works was present immediately to the south west of the site.

By 1938 the engineering works buildings had been extended to the northern boundary of the subject site. A number of residential properties had also been constructed along the site's western boundary.

By 1994 the iron works to the south west of the site had been redeveloped with residential properties. Also, by 2007 the works to the north of the site is no longer indicated.

3.5.2 Database and Regulatory Information

3.5.2.1 Pollution Incidents

There have been seven recorded pollution incidents to controlled waters within 1km of the site, generally involving the release of sewage, oils and inert waste into nearby watercourses. All except the closest incident (approximately 150m to the south east of the site) have been classed as Category 3 (minor) incidents. The closest was classed as Category 2 (significant).

3.5.2.2 Landfill Sites

There is one BGS recorded landfill site within 1km of the subject site (approximately 350m to the east). No details of the landfill site are provided.

There are 11 historical landfill sites within 1km of the subject site, the closest being approximately 100m to the east). Those sites for which details are provided are / were generally licensed to accept inert, industrial, commercial and / or household waste. One site, approximately 650m to the east of the subject site, is / was also licensed to Greater Manchester Waste Disposal Authority to accept special waste and liquid sludge (provider reference EAHLD16391).

There are seven licensed waste management facilities indicated within 1km of the site, the closest being approximately 250m to the north of the site. The facilities are generally metal recycling sites (vehicle dismantlers), though they also include a mobile plant site, physical treatment facility and household, commercial and industrial transfer station.

There is one former registered landfill site within 1km of the subject site, licensed to George Cox & Sons (license reference 00188) to accept construction and demolition waste. The site was classed as very large (>250,000 tonnes per year).

There is one operational registered waste transfer site within 1km of the subject site (approximately 875m to the south west). It is classed as medium (25,000 to 75,000 tonnes per year) and accepts a variety of non-liquid wastes, including asbestos, general commercial and industrial waste, electrical fittings and appliances, tyres, etc.

There are three operational registered waste treatment or disposal sites within 1km of the subject site, the closest being a treatment facility approximately 500m to the south and classed as very large. It accepts waste including paints, dyes, biocyides, detergents, bitumen, etc. The other two are classed as very small (<10,000 tonnes per year).

3.5.3 Summary of Historic Potentially Contaminative Land Uses

The review of the site history indicates the former railway sidings as a potentially contaminative previous land use. It is also likely that made ground will be present on the site.

A number of historic potentially contaminative land-uses were also identified in the vicinity of the site. The former print, dye and iron works to the south and the engineering works to the north of the site all have the potential to have resulted in the migration of contaminants on to the subject site. The infilled pond to the north west and infilled brickfield to for west, as well as the various surrounding landfill sites all have the potential to have resulted in the migration of hazardous ground gases (and, indeed, contaminants) on to the subject site.

3.6 Site Walkover

An engineer from RSK carried a site inspection on 28 March 2008. The findings are summarised below:

- Fly tipping evident across the site (household waste, demolition rubble, etc);
- Surface levels fall gently to the south west;
- Ground levels falls steeply off-site to the south east, towards the railway line;
- Anecdotal evidence suggests the presence of a former bunker in the southern corner of the site, allegedly used by Ferranti (former site owners) to test weapons (now a concrete rubble-filled trench);
- Railway sleepers present on-site (potential leaching of wood preservatives); and
- Car park present in north eastern corner of site.

3.7 Additional Information

Although peat is not indicated on the geological maps to be present beneath the site, it has been encountered during investigation works of the adjacent site, and is therefore likely to be present also beneath the subject site.

3.8 Summary of Potential Contaminant Sources

There are a number of potential sources of contamination to soils, groundwater and soil gas. These include:

- Organic and inorganic contamination from former on-site railway sidings;
- Made ground/fill materials used to raise site levels and fly-tipped materials;
- Contamination from alleged former on-site bunker;
- Organic and inorganic contamination from former works to the north and south of the site;
- Ground gas and leachate from former and current landfill sites in the vicinity of the subject site;
- Ground gas and leachate from infilled pond to the north west of the site and infilled brickfield to the west; and
- Ground gas from potential peat deposits beneath the site.

3.9 Sensitive Receptors

There are a number of sensitive receptors that may be affected by the potential contamination hazards identified above. These may include:

- Moston Brook to the south west of the site;
- Shallow (perched) water in any made ground materials or superficial deposits;
- Deeper groundwater in the Coal Measures minor aquifer;
- Site operatives during redevelopment works;
- Future site workers and visitors; and
- Neighbouring residents and surrounding areas.

3.10 Summary of Plausible Pathways

The routes by which potential contamination could plausibly come into contact with the receptors are:

- Surface water run-off and / or infiltration;
- Groundwater migration in any permeable soils and existing / proposed service runs;
- Direct human ingestion, dust inhalation and/or dermal contact;
- Ground gas migration in permeable soils or existing / proposed service runs; and

- Vapour migration from volatile compounds;

3.11 Data Gaps and Uncertainties

RSK has not made any enquiries to regulatory bodies and is therefore reliant on published information and the findings of the site walkover. In addition, the site lies in an area known to be underlain by coal-bearing strata. A Coal Authority report was not commissioned as part of the present desk study. Neither was the six-inch geological map purchased for the site.

3.12 Outline Conceptual Model

The information presented in Sections 2 and **Error! Reference source not found.**.1 to 3.11 has been used to compile an outline Conceptual Model. The identified potential contaminants and receptors have been considered with any possible pathways that may link them. The resulting potential pollutant linkages are detailed in Table 2 below. The risk classification has been estimated in accordance with the information in Appendix D.

Table 2: Risk Estimation for Potential Pollutant Linkages in Outline Conceptual Model

Potential Source	Potential Receptor	Possible Pathway	Likelihood	Severity	Risk
Contamination and hazardous ground gases associated with fill materials, former on-site railway sidings and fly-tipped material	Moston Brook, perched water, groundwater (minor aquifer)	Surface water run-off, groundwater migration	Unlikely	Mild	Very low
	Site operatives, future site occupants	Ground gas migration in permeable soils, vapour inhalation, human ingestion, dust inhalation & dermal contact	Likely	Medium	Moderate
	Plant uptake	Plant uptake from contaminated soil	Likely	Minor	Low
	Neighbouring residents, building infrastructure & services	Ground gas migration in permeable soils	Unlikely	Medium	Low
Contaminated leachate associated with former nearby works	Site operatives, future site occupants	Vapour inhalation, human ingestion, dust inhalation & dermal contact	Low likelihood / likely	Medium	Moderate / low
Contaminated leachate and hazardous ground gases from off-site infilled pond and landfill sites	Site operatives, future site occupants, building infrastructure and services	Ground gas migration in permeable soils, vapour inhalation, human ingestion, dust inhalation & dermal contact	Low likelihood	Medium / Severe	Moderate

Potential Source	Potential Receptor	Possible Pathway	Likelihood	Severity	Risk
Hazardous ground gases from potential peat deposits beneath the site	Site operatives, future site occupants, building infrastructure and services	Ground gas migration in permeable soils	Low likelihood	Medium / severe	Moderate

The outline Conceptual Model has identified the following potential pollutant linkages with a severity of Moderate of higher:

- Inhalation of vapours / hazardous ground gases from on-site peat and made ground and off-site former pond & brick field and landfill sites by site operatives and future site occupants and gas ingress into buildings and excavations on site;
- Ingestion, dust inhalation and dermal contact with contaminated soils from on-site made ground and contaminated leachate from off-site former works, landfill sites and former pond;

3.13 Preliminary Risk Assessment Conclusions and Recommendations

The PRA undertaken by RSK has identified a number of potential pollutant linkages associated with the site.

Given the former presence of railway sidings on the site, it is likely that pockets of impacted made ground may be present. It is therefore recommended that an intrusive investigation be carried out to determine the presence or otherwise of any contamination.

It is possible that leachate from off-site impacted soils associated with the former nearby works, the infilled pond / brickfield and the former and current landfill sites may have migrated onto the site through groundwater. It is therefore recommended that a number of wells be installed across the site so that groundwater samples can be recovered and analysed for contamination.

The presence of former and current landfill sites, an infilled pond and a former brickfield (and likely associated infilled pits) in the vicinity of the site, as well as the potential presence of peat beneath the site, poses a potential risk due to the possible migration of hazardous ground gases on to the site. It is recommended that a programme of gas monitoring be carried out prior to redevelopment.

Based on the PRA undertaken by RSK, it is considered necessary to carry out an intrusive investigation of the site. This is likely to consist of the drilling of probeholes and the excavation of trial pits and the subsequent analysis of representative soil samples. A number of wells should be installed to enable future gas and groundwater monitoring

and groundwater sampling. Should any areas of significant contamination be encountered a remediation strategy should be implemented.

It is recommended that enquiries be made to the Coal Authority to establish the potential risk, or otherwise, from shallow worked coal seams beneath the site. It is also recommended that the six-inch geological map be purchased and reviewed in order to more accurately locate the coal seam subcrop.

4. REFERENCES

1. Environment Agency. Model Procedures for the Management of Contaminated Land. Contaminated Land Report Number 11 (CLR11). September 2004.

2. Environment Agency. Guidance on Requirements for Land Contamination Reports. Version 1, July 2005.

3. Ordnance Survey Landranger Series, Sheet 109 (Manchester, Bolton & Warrington), Scale 1:50,000, 2000.

4. Geological Survey of Great Britain (England and Wales), Scale 1:50,000, Sheet 85 (Manchester), Solid, 1975.

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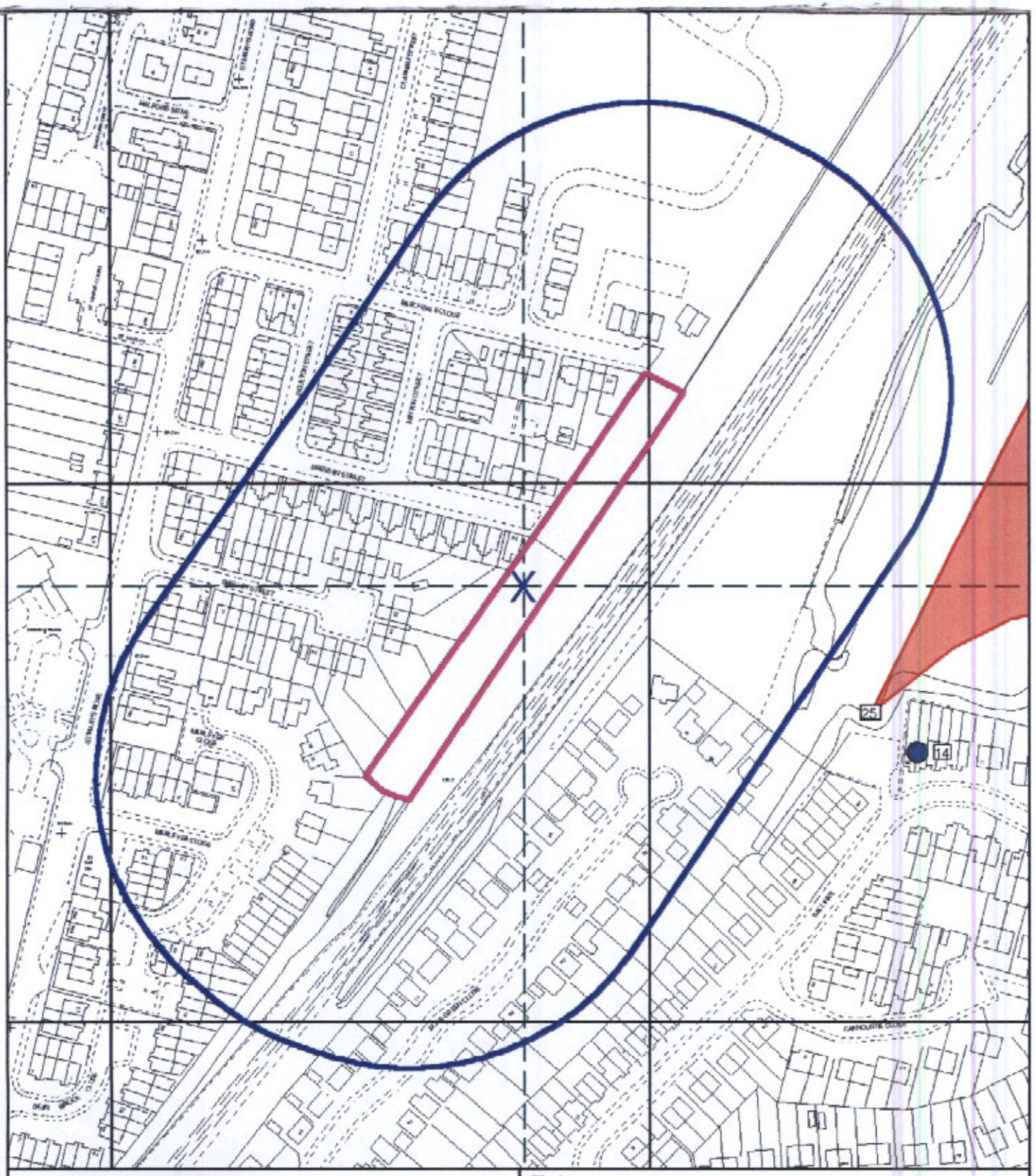
FIGURES

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SITE LOCATION MAP



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Project Title
BEECHDALE CLOSE, MOSTON

Drawing Title
SITE PLAN

Drawn	Date	Checked	Date	Approved	Date	Project No.	Drawing File
HD	28.03.08	GMG	28.03.08	GMG	28.03.08	16088	16088-1(00)D002A

Scale	Orig Size	Dimensions	Drawing No.	Rev.
1:2,000	A4	—	FIGURE 2	A

Appendix A

Services constraints

RSK LIMITED
SERVICE CONSTRAINTS

1. This report and the site investigation carried out carried out in connection with the report (together the "Services") were compiled and carried out by RSK Geoconsult Limited (RSK) for PE Jones Contractors (the "client") in accordance with the terms of a contract between RSK and the "client". The Services were performed by RSK with the skill and care ordinarily exercised by a reasonable environmental consultant at the time the Services were performed. Further, and in particular, the Services were performed by RSK taking into account the limits of the scope of works required by the client, the time scale involved and the resources, including financial and manpower resources, agreed between RSK and the client.

2. Other than that expressly contained in paragraph 1 above, RSK provides no other representation or warranty whether express or implied, in relation to the Services.

3. Unless otherwise agreed the Services were performed by RSK exclusively for the purposes of the client. RSK is not aware of any interest of or reliance by any party other than the client in or on the Services. Unless expressly provided in writing, RSK does not authorise, consent or condone any party other than the client relying upon the Services. Should this report or any part of this report, or otherwise details of the Services or any part of the Services be made known to any such party, and such party relies thereon that party does so wholly at its own and sole risk and RSK disclaims any liability to such parties. **Any such party would be** well advised to seek independent advice from a competent environmental consultant and/or lawyer.

4. It is RSK's understanding that this report is to be used for the purpose described in the introduction to the report. That purpose was a significant factor in determining the scope and level of the Services. Should the purpose for which the report is used, or the proposed use of the site change, this report may no longer be valid and any further use of or reliance upon the report in those circumstances by the client without RSK's review and advice shall be at the client's sole and own risk. Should RSK be requested to review the report after the date hereof, RSK shall be entitled to additional payment at the then existing rates or such other terms as agreed between RSK and the client.

5. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions contained in this report should not be relied upon in the future without the written advice of RSK. In the absence of such written advice of RSK, reliance on the report in the future shall be at the client's own and sole risk. Should RSK be requested to review the report in the future, RSK shall be entitled to additional payment at the then existing rate or such other terms as may be agreed between RSK and the client.

6. The observations and conclusions described in this report are based solely upon the Services which were provided pursuant to the agreement between the client and RSK. RSK has not performed any observations, investigations, studies or testing not specifically set out or required by the contract between the client and RSK Limited. RSK is not liable for the existence of any condition, the discovery of which would require performance of services not otherwise contained in the Services. For the avoidance of doubt, unless otherwise expressly referred to in the introduction to this report, RSK did not seek to evaluate the presence on or off the site of asbestos, electromagnetic fields, lead paint, heavy metals, radon gas or other radioactive or hazardous materials.

7. The Services are based upon RSK's observations of existing physical conditions at the Site gained from a walkover survey of the site together with RSK's interpretation of information including documentation, obtained from third parties and from the client on the history and usage of the site. The Services are also based on information and/or analysis provided by independent testing and information services or laboratories upon which RSK was reasonably entitled to rely. The Services clearly are limited by the accuracy of the information, including documentation, reviewed by RSK and the observations possible at the time of the walkover survey. Further RSK was not authorised and did not attempt to independently verify the accuracy or completeness of information, documentation or materials received from the client or third parties, including laboratories and information services, during the performance of the Services. RSK is not liable for any inaccurate information or conclusions, the discovery of which inaccuracies required the doing of any act including the gathering of any information which was not reasonably available to RSK and including the doing of any independent investigation of the information provided to RSK save as otherwise provided in the terms of the contract between the client and RSK.

8. The phase II or intrusive environmental site investigation aspects of the Services is a limited sampling of the site at pre-determined borehole and soil vapour locations based on the operational configuration of the site. The conclusions given in this report are based on information gathered at the specific test locations and can only be extrapolated to an undefined limited area around those locations. The extent of the limited area depends on the soil and groundwater conditions, together with the position of any current structures and underground facilities and natural and other activities on site. In addition chemical analysis was carried out for a limited number of parameters [as stipulated in the contract between the client and RSK] [based on an understanding of the available operational and historical information,] and it should not be inferred that other chemical species are not present.

9. Any site drawing(s) provided in this report is (are) not meant to be an accurate base plan, but is (are) used to present the general relative locations of features on, and surrounding, the site.

APPENDIX B

Summary of Legislation and Policy Relating to Contaminated Land

Summary of legislation and policy relating to contaminated land

Part IIA of the Environmental Protection Act (EPA) and its associated Contaminated Land Regulations 2000 (SI 2000/227) which came into force in England on 1 April 2000 are the basis for the current regulatory framework and form the statutory regime for the identification and remediation of contaminated land.

Part IIA of the EPA 1990 defines contaminated land as 'any land which appears to the Local Authority in whose area it is situated to be in such a condition by reason of substances in, on or under the land, that significant harm is being caused, or that there is significant possibility of significant harm being caused, or that pollution of controlled waters is being or is likely to be caused. Controlled waters, defined by the Water Resources Act, are considered to be all groundwater, inland waters and estuaries.

The intention of the EPA 1990 Part IIA is to deal with contaminated land issues that are considered to cause significant harm, on land that is not undergoing development, (see circular 2-2000 for definitions of what is significant harm, website link - http://www.defra.gov.uk/environment/land/contaminated/circ2-2000/index.htm).

The Water Framework Directive 2000/60/EC (WFD) legislation aims to deliver long-term protection of the water environment and to improve the quality of all waterbodies, including rivers, wetlands, coasts, estuaries, lakes, man made structures and groundwater.

The Water Resources Act 1991 introduces the term an offence to cause or knowingly permit pollution of controlled waters. The Act provides the Environment Agency with powers to implement remediation necessary to protect controlled waters and recover all reasonable costs of doing so. The Groundwater Regulations, 1998, aim to complement EPA1990. These Regulations give the Environment Agency the power to *prevent* the discharge of List I substances and *restrict* the discharge of List II substances to groundwater.

Contaminated land is often dealt with through Planning as a result of land redevelopment. This approach is documented in Planning Policy Statement: Planning and Pollution Control PPS23, which states that it remains the responsibility of the landowner and developer to identify land affected by contamination and carry out sufficient remediation to render the land suitable for use. The overall aim of the planning and pollution control policy is to promote the sustainable and beneficial use of land (and in particular encouraging reuse of previously developed land in preference to greenfield sites). Within this aim, polluting activities that are necessary for society and the economy should be so sited and planned, and subject to such planning conditions, that their adverse effects are minimised and contained to within acceptable limits.

APPENDIX C

Landmark Envirocheck Report CD

SCANNED

SEPERATELY

APPENDIX D

Methodology of Risk Assessment

Risk Assessment Methodology

CLR11 outlines the framework to be followed for risk assessment in the UK. The framework is designed to be consistent with UK legislation and policies including planning. Under CLR11, three stages of risk assessment exist: Preliminary, Generic Quantitative and Detailed Quantitative. An outline Conceptual Model should be formed at the preliminary risk assessment stage that collates all the existing information pertaining to a site in text, tabular or diagrammatic form. The outline conceptual model identifies potentially complete (termed possible) pollutant linkages (source–pathway–receptor) and is used as the basis for design of the site investigation. The outline Conceptual Model is updated as further information becomes available, for example as a result of the site investigation.

Production of a Conceptual Model requires an assessment of risk to be made. Risk is a combination of the likelihood of an even occurring and the magnitude of its consequences. Therefore, in order to assess risk both the likelihood and the consequences of an event must be taken into account. RSK has adopted guidance provided in CIRIA C552 for use in the production of Conceptual Models.

The likelihood of an event can be classified on a four point system using the following terms and definitions based on CIRIA C552:

- Highly likely: The event appears very likely in the short term and almost inevitable over the long term, or there is evidence at the receptor of harm or pollution;
- Likely: It is probable that an event will occur, or circumstances are such that the event is not inevitable, but possible in the short term and likely over the long term;
- Low likelihood: Circumstances are possible under which an event could occur, but it is not certain even in the long term that an event would occur and it is less likely in the short term;
- Unlikely: Circumstances are such that it is improbably the event would occur even in the long term.

The severity can be classified using a similar system also based on CIRIA C552. The terms and definitions relating to severity are:

- Severe: Short term (acute) risk to human health likely to result in 'significant harm' as defined by the Environment Protection Act 1990, Part IIA. Short-term risk of pollution of sensitive water resources. Catastrophic damage to buildings or property. Short term risk to an ecosystem or organism forming part of that ecosystem (note definition of ecosystem in 'Draft Circular on Contaminated Land', DETR 2000);
- Medium: Chronic damage to human health ('significant harm' as defined in 'Draft Circular on Contaminated Land', DETR 2000), pollution of sensitive water resources, significant change in an ecosystem or organism forming part of that ecosystem (note definition of ecosystem in 'Draft Circular on Contaminated Land', DETR 2000);

- Mild: Pollution of non-sensitive water resources. Significant damage to crops, buildings, structures and services ('significant harm' as defined in 'Draft Circular on Contaminated Land', DETR 2000). Damage to sensitive buildings, structures or the environment; and
- Minor: Harm, not necessarily significant, but that could result in financial loss or expenditure to resolve. Non-permanent human health effects easily prevented by use of personal protective clothing. Easily repairable damage to buildings, structures and services.

Once the likelihood of an event occurring and its severity have been classified, a risk category can be assigned the table below.

		Consequences			
		Severe	**Medium**	**Mild**	**Minor**
Probability	**Highly likely**	Very High	High	Moderate	Moderate/Low
	Likely	High	Moderate	Moderate/Low	Low
	Low likelihood	Moderate	Moderate/Low	Low	Very Low
	Unlikely	Moderate/Low	Low	Very Low	Very Low

Definitions of these risk categories are as follows together with an assessment of the further work that might be required:

- Very high: There is a high probability that severe harm could occur or there is evidence that severe harm is currently happening. This risk, if realised, could result in substantial liability and urgent investigation and remediation are likely to be required;
- High: Harm is likely to occur. Realisation of the risk is likely to present a substantial liability and urgent investigation is required and remedial works may be necessary in the short term and are likely over the long term;
- Moderate: It is possible that harm could arise, but it is unlikely that the harm would be severe and it is more likely that the harm would be relatively mild. Investigation is normally required to clarify the risk and determine the liability. Some remedial works may be required in the longer term;
- Low: It is possible that harm could occur, but it is likely that if realised this harm would at worst normally be mild; and
- Very Low: There is a low possibility that harm could occur and if realised the harm is unlikely to be severe.

Residential Main Board Papers

PARLANDS, CHEADLE HULME

Development
Road and sewer tenders were issued for Road 6 on the 29th November. Tender analysis is complete and on hold unit July 2008.

FINNEY'S LANE, MIDDLEWICH

Development
The electric sub-station is now live along with the site mains. The foul water pumping station is due for commissioning 31st March 2008.

CHORLEY PLACE, CHORLEY NEW ROAD, BOLTON

Development
Road and sewer tenders for the link road to Chorley New Road were issued 29th November, tender analysis is being reviewed. Review of the latest site investigation and survey is being progressed; an amended remediation strategy is to be drafted as the volume of contamination has been found to be less than first reported.

SUMMERFIELDS VILLAGE MEWS, WILMSLOW

Development
All mains are now live.

CORNISHWAY, WYTHENSHAWE

Development
The new electric sub-station is due to be completed by 4th April 2008.