The Howells Group PLC

Phase 1
Desk Study Report

For

Nu-Pak/Howells Group,

Sharston Industrial Estate, Wythenshawe

March 2011

REPORT NO: 11EMP002/DS

- *Phase 1 Desk Studies and Site Walkovers*
- *Phase 2 Intrusive Contaminated Land Investigations*
- *Geotechnical Appraisals and Ground Investigations*
- *Landfill Gas Assessments and Remedial Design*
- *Remediation Design and Implementation*
- *Remediation Project Management and Supervision*
- *Site Abnormal Assessments (Foundations and contaminated land)*

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1 EXECUTIVE SUMMARY

Action

1.1 **Site Location:** Off Longley Lane, Sharston Industrial Estate, Wythenshawe M22 4SS (coordinates 383409389202). Site area is approximately 0.63 hectares

1.2 **Site Description:**

The site comprises two workshop units. The larger of the two to the east (building A) being 2 storey brick built with partial basement to rear (this is the building to remain) and the adjacent single storey brick built steel framed building (building B) which is to be demolished and replaced with the proposed extension to the adjacent building. Both buildings have concrete hard standing throughout.

- Building A is currently used for manufacture of railway signalling equipment. Processes include milling, turning, pressing, CNC machining, powder coating and small scale spraying. No significant evidence of contamination was evident other than minor cutting fluid spillage to the rear (south) of the property where minor drips of cutting fluid was noted upon an external concrete yard area.
- Building B is currently used as storage for various vehicles and garage works on a small scale (vehicle servicing). In addition a bunded wheeled site fuel bowser is evident and a light aircraft. No significant stains or spills were evident. No signs of previous works were evident however it is believed that it was a family run business 'Nu-Pak Ltd' producing tablets for medicinal purposes. A search of the company name however shows the company to wholesale/manufacture of specialist adhesive tape (founded in 1942 – specialising in tapes post 1960). Having contacted the company they can confirm that the factory used to manufacture prescription pharmaceuticals. No signs of any leaks, staining etc from these processes were evident upon the concrete floor or surroundings.

Asbestos is anticipated within both buildings and a survey is recommended.

Surrounding Area: The surrounding area between the buildings is hardstanding with numerous drains evident. A light well is evident to the rear half of building A to the basement. The area is generally level but is at a higher elevation than the former station approach road / rail line to the south (railway in a cutting).

1.3 **Proposed Development**: The development comprises the proposed demolition of a single storey building to the west of the site and construction of a new two storey building attached to the main building. Plans are as shown below**:**

1.4 **Site History:**

On site: The site is shown as an undeveloped field from the map of 1872-1876 to 1934; after which there are 2 No. industrial buildings shown on site (a chemical manufacturer to the east and a surveying and drawing equipment works to the east. The Chemical Manufacturing works appears to have been demolished and another warehouse put in place from the map of 1975

Surrounding Area: The surrounding area is shown as predominantly open farmland until the map of 1934 after which industrial units encroach on the site. A railway line is shown on all maps running along the southern site border. Northenden railway station is shown 100m southwest of site.
Industrial land uses shown in the vicinity of site over the course of the maps include:

- Confectionary works
- Embroidery factory
- Underwear factory and Electric Products factory
- Confectioners
- Paint Works
- Dairy (to the south beyond railway)

Potential contamination risk

- Printed Cartons Works
- Electrical Accessories works
- Timber yard (to the south beyond railway

1.5 Geology:

Published geology indicates the ground beneath site to be Glaciofluvial sands and gravels over Wilmslow Sandstone (east of site) Tarporley Siltstone (west of site)

1.6 Hydrogeology and Hydrology:

- The Glaciofluvial deposits on site are classed as a Secondary A Aquifer (low-moderate permeability)
- The Sandstone bedrock to the east of site is a Principal Aquifer (Highly permeable)
- The Siltstone bedrock to the west of site is a Secondary A Aquifer (low-moderate permeability)
- The site does not lie within a groundwater source protection zone outlined by the Environment Agency.
- The site does not lie within a flood risk area as defined by the Environment Agency.
- The nearest Detailed River Network is the River Mersey 300m east of site
- There is one groundwater abstraction license within 1.5km of the site which is recorded as follows: License for groundwater abstraction for laundry use from a borehole starting 15.11.02 expiring 31.03.18

1.7 **Radon Protection:** The HPA maps indicate that between <1 of properties are above the Action Level for radon therefore no radon protection measures are necessary.

1.8 **Contamination Risk:** The site is at risk from the following sources/pathways and receptors

Contamination /ground gas risk

- Former land uses
- Former landfill <100m from site

1.9 Qualitative Risk Assessment:

In this qualitative risk assessment, a **Moderate** risk implies that remedial action is likely to be necessary at the site, although until a contamination ground investigation is carried out this cannot be confirmed. **It is recommended that an intrusive ground investigation is undertaken.**

1.10 **Proposed Ground Investigation:** Proposed Ground Investigation comprises:

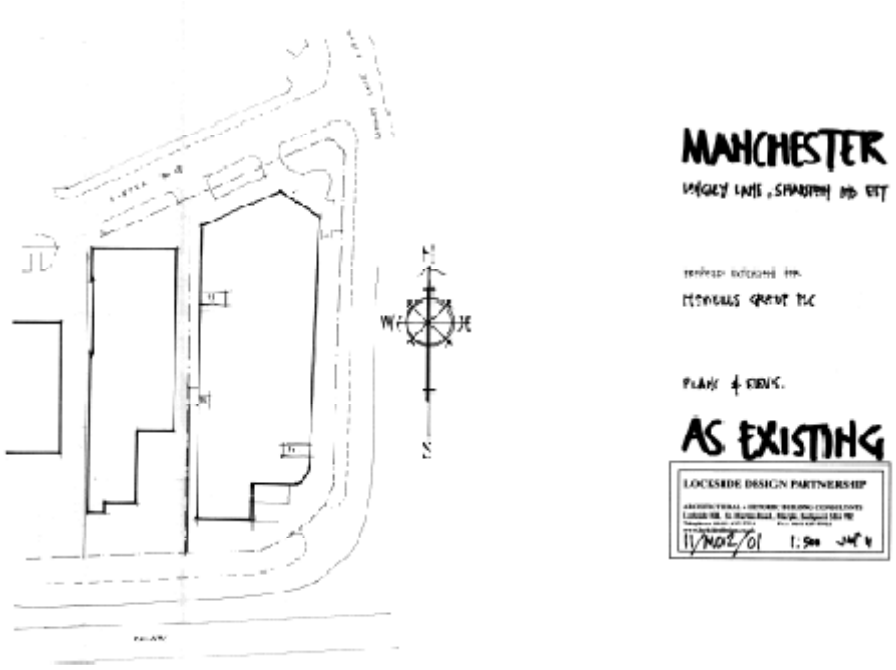
- 5 No. Window Sample boreholes undertaken and installed with ground/gas monitoring standpipes.
- At least 6 No. ground gas/water monitoring visits (for $C0^2$ and CH^4) over a period of at least 3 months (with varying barometric pressures and at least 1 visit with a barometric pressure of <1000kPa). Based on these initial results, additional monitoring may be required depending on the levels of gases encountered
- At least 10 No soil samples taken for chemical analysis to benchmark contamination levels across the site. Proposed testing will include but not be limited to the following; heavy metals suite (comprising; As, Cd (low level), Cr Vi, Pb, Hg, Se, Ni, Cu, Zn), Organic Matter, Sulphate, pH, speciated polycyclic aromatic hydrocarbons, TPH CWG, and asbestos.
- Soil samples should be taken from both the Made Ground and the natural strata to assess the mobility of potential contamination and the potential re-use of arisings
- Should elevated determinands be encountered on site, additional leachate and/or groundwater testing will be required to assess mobility of determinands
- Should elevated determinands be encountered within the natural sands and gravels on site, additional testing will be required to assess potential contamination migration

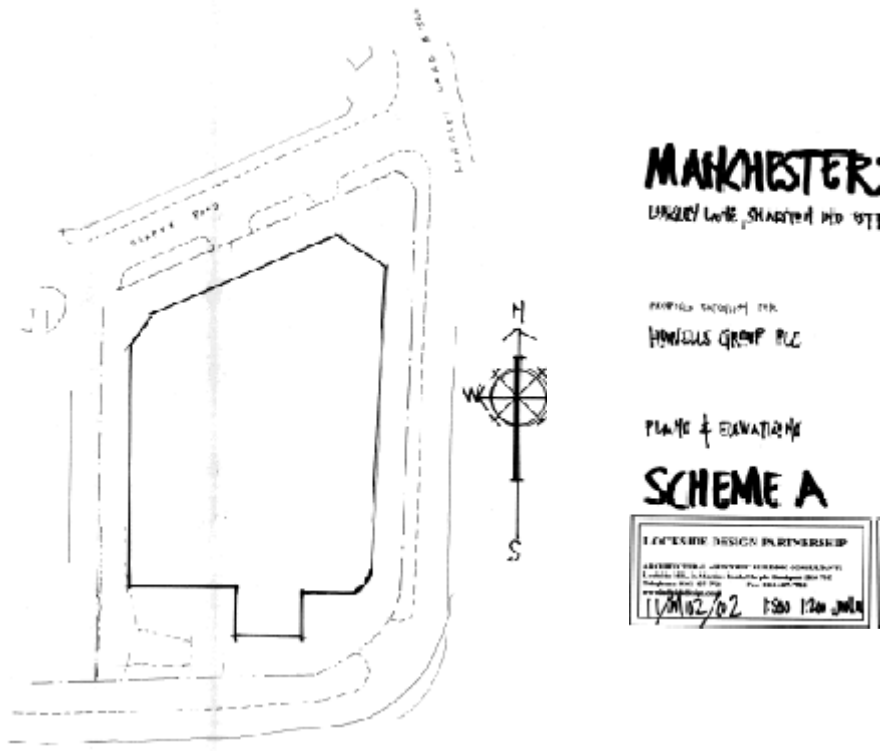
➢ Additional Trial Pitting is recommended post demolition to review potential former foundation obstructions	
1.11 Geotechnical Risk: ➢ Potential significant thickness of concrete on site and former foundations ➢ Potential significant thickness of made ground with an unknown composition ➢ Interface between the current basement/proposed extension requires detailed assessment	

2 SITE DESCRIPTION

2.1 Introduction

This investigation was carried out on the instruction of The Howells Group PLC. The purpose of the work was to carry out a desk study to establish ground conditions to provide contamination risk information the proposed demolition of a single storey building to the west of the site and construct a new two storey building attached to the main building. Plans are as shown below:





2.2 Site Location

The site is located off Longley Lane, Sharston Industrial Estate, Wythenshawe M22 4SS (coordinates 383409389202). Site area is approximately 0.63 hectares. See Site Location Plan in Appendix A.

2.3 Site Description

2.3.1 On Site

A site walkover was undertaken by an engineer on 31st March 2011 Photographs can be found in Appendix A.

The site comprises two workshop units. The larger of the two to the east (building A) being 2 storey brick built with partial basement to rear (this is the building to remain) and the adjacent single storey brick built steel framed building (building B) which is to be demolished and replaced with the proposed extension to the adjacent building. Both buildings have concrete hard standing throughout.

Building A is currently used for manufacture of railway signalling equipment. Processes include milling, turning, pressing, CNC machining, powder coating and small scale spraying. No significant evidence of contamination was evident other than minor cutting fluid spillage to the rear (south) of the property where minor drips of cutting fluid was noted upon an external concrete yard area.

Building B is currently used as storage for various vehicles and garage works on a small scale (vehicle servicing). In addition a bunded wheeled site fuel bowser is evident and a light aircraft. No significant stains or spills were evident. No signs of previous works were evident however it is believed that it was a family run business 'Nu-Pak Ltd' producing tablets for medicinal purposes. A search of the company name however shows the company to wholesale/manufacture of specialist adhesive tape (founded in 1942 – specialising in tapes post 1960). Having contacted the company they can confirm that the factory used to manufacture prescription pharmaceuticals. No signs of any leaks, staining etc from these processes were evident upon the concrete floor or surroundings.

Asbestos is anticipated within both buildings and a survey is recommended.

2.3.2 Surrounding Area

The surrounding area between the buildings is hardstanding with numerous drains evident. A light well is evident to the rear half of building A to the basement. The area is generally level but is at a higher elevation than the former station approach road / rail line to the south (railway in a cutting).

3 SITE HISTORY

A search of available historic maps was undertaken to establish the land use history of the site. Extracts of the maps discussed below can be found in Appendix B of this report. All maps are Ordinance Survey unless otherwise stated. All distances quoted on OS maps are taken from the site boundary, which is marked on the map.

Year	Scale	On-Site Features	Significant Surrounding Land Uses
1872-1876	1:2500	Site is an undeveloped field	Railway immediately south of site- within cutting Northenden Station 100m southwest of site River Mersey 300m east of site
1881	1:2500	NSC	NSC
1893	1:2500	NSC	NSC
1897	1:10560	NSC	NSC
1898	1:2500	NSC	NSC
1904-1908	1:10560	NSC	NSC
1907	1:2500	NSC	NSC
1907-1911	1:10560	NSC	NSC
1910	1:2500	NSC	NSC
1916	1:10560	NSC	NSC
1922	1:2500	NSC	NSC
1923	1:10560	NSC	NSC
1934	1:2500	NSC	Confectionary works- 60m north Embroidery factory 100m north Underwear factory and Electric Products factory 110m north
1934-1938	1:10560	Surveying and drawing works located to the east of site Manufacturing Chemists located to the west of site	Industrial land uses surrounding the property to the north, west and south (beyond railway) Possible flood defences shown 110m east of site
1956	1:2500	NSC	NSC
1959	1:2500	NSC	NSC
1956-1960	1:2500	NSC	NSC
1967	1:2500	NSC	NSC
1975-1978	1:10000	NSC	Railway station demolished.
1978-1983	1:2500	NSC	NSC
1988-1989	1:10000	NSC	NSC
1992	1:2500	Factory to the west of site has been demolished and a new factory put in place	NSC
1995	1:10000 1:2500	NSC	NSC
2002	1:10000	NSC	NSC
2011	1:2500 1:10000	NSC	NSC

3.1 Historic Map Summary

3.1.1 On site

The site is shown as an undeveloped field from the map of 1872-1876 to 1934; after which there are 2 No. industrial buildings shown on site (a chemical manufacturer to the east and a surveying and drawing equipment works to the east. The Chemical Manufacturing works appears to have been demolished or extended and another warehouse put in place from the map of 1975

3.1.2 Surrounding Area

The surrounding area is shown as predominantly open farmland until the map of 1934 after which industrial units encroach on the site. A railway line is shown on all maps running along the southern site border. Northenden railway station is shown 100m southwest of site.

Industrial land uses shown in the vicinity of site over the course of the maps include:

- Confectionary works
- Embroidery factory
- Underwear factory and Electric Products factory
- Confectioners
- Paint Works
- Dairy (to the south beyond railway)
- Printed Cartons Works
- Electrical Accessories works
- Timber yard (to the south beyond railway

4 SITE SENSITIVITY

The following section details both geological and environmental data available for the site and the surrounding area. Full details can be found in the GeoInsight and EnviroInsight reports by Groundsure located in Appendix C.

4.1 Geology

The documented geology of the site is summarised on British Geological Survey map principally:

Geology	Drift	Solid
Map Sheet 98	Glaciofluvial Deposits (Sand and Gravel)	Wilmslow Sandstone (Sandstone)- East of site Tarporley Siltstone (Siltstone)- West of site

There is a normal fault which bisects the site, as this fault is determined to be at depth (from the published geology map), the risks posed to the proposed development are negligible.

4.2 Mining, extraction and natural cavities

The table below shows the mining data available (if any) for the ground under the site as shown the Centremaps GeoInsight report in Appendix C.

Type of Mining	Comment	Distance from site (if <250m)
Historical Mining	No	-
Coal Mining	No	-
Shallow Mining	No	-
Non-coal mining cavities	No	-
Natural Cavities	No	-
Brine Extraction	No	-
Gypsum Extraction	No	-
Tin Mining	No	-
Clay Mining	No	-

4.3 Historic Ground workings

The following historic ground workings are summarised using available 1:10,560 and 1:10,000 historic maps as part of the Centremaps GeoInsight report. These historic ground workings are listed due to the potential risk posed to the proposed development. Potential risks are discussed further as part of the Conceptual Site Model (Section 7).

Distance (m)	Direction	Use	Dates	Current Status e.g. infilled, in use
27-38m	E	Ground Workings	1949-1989	Part of the current golf course- may be part of a flood defence scheme
33m	NE	Pond	1949	Part of the current golf course- may be part of a flood defence scheme
106-111	SE	Unspecified heap	1916-1938	Part of the current golf course- may be part of a flood defence scheme
111-125	E	Unspecified heap	1916-1995	Part of the current golf course- may be part of a flood defence scheme
194	W	Cutting	1967-1989	Part of the existing railway network

4.4 Hydrogeology

- The glaciofluvial deposits on site are classed as a Secondary A Aquifer (low-moderate permeability)
- The Sandstone bedrock to the east of site is a Principal Aquifer (Highly permeable)
- The Siltstone bedrock to the west of site is a Secondary A Aquifer (low-moderate permeability)
- The site does not lie within a groundwater source protection zone outlined by the Environment Agency.

4.5 Hydrology

- The site does not lie within a flood risk area as defined by the Environment Agency.
- The nearest Detailed River Network is the River Mersey 300m east of site
- There is one groundwater abstraction license within 1.5km of the site which is recorded as follows: License for groundwater abstraction for laundry use from a borehole starting 15.11.02 expiring 31.03.18

4.6 Flood Risk

The EA map indicates the site lies within Flood Risk Zone 1, however there is a flood risk zone 2, 6m south of the site. It would be prudent to obtain a full flood risk assessment to confirm as the Environment Agency will require further analysis to confirm zoning.

4.7 Radon

The HPA maps indicate that between <1 of properties are above the Action Level for radon therefore no radon protection measures are necessary.

4.8 Authorisations, Incidents and Registers

4.8.1 Part A(2) and B Authorisations

Current and historic listed permits <250m from site are shown below

Distance/ Direction	Operator	Process	Permit details
133m S	Bellcharm Motor Company	Re-spraying of cars	Current permit- Type B
158m W	Lafarge Aggregates Limited	Cement Processes	Current Permit- Type B
161m NW	Electrium Ltd	Coating Processes	Current Permit- Type B
221m W	Wylex Ltd	Incineration	Historic Permit- Type B

4.8.2 Records of Radioactive Substance Licenses

Distance/ Direction	Operator	Type	Permit details
165m SW	George H Scholes Ltd (Blantyre Works)	Keeping and use of Radioactive Materials	Revoked- 03.12.01

4.8.3 Recorded Pollution Incidents

Distance/ Direction	Incident date/water body	Pollutant	Impact
169m W	01.07.10	Construction and demolition materials and wastes	Water Impact- Category 4 (No Impact) Land impact- Category 2 (significant impact) Air Impact- Category 3 (minor impact)
194 SW	26.10.01	Construction and demolition materials and wastes	Water Impact- Category 4 (No Impact) Land impact- Category 3 (minor impact) Air Impact- Category 4 (no impact)
236m SE	17.07.03	Inorganic chemical wastes	Water Impact- Category 4 (No Impact) Land impact- Category 4 (No Impact) Air Impact- Category 4 (No Impact)

4.9 Landfill and Other Waste Sites

Landfill site recorded less than 250m from site as follows:

Distance/ Direction	Address	Waste Type	License details
On site	Old Railway Station*	Industrial, Commercial and Household wastes	Issued: 16.02.1998 Effective Date: 06.04.10
15m E	Longley Lane	Unknown	Unknown
89m SE	Old Railway Sidings	Putrescible	Waste Transfer- small (<25000T/year) Record date 01.02.98
179m SE	Dano Pulveriser	Difficult	Pulverisation- Large (<250000T/per year Record Date- 01.03.90

*Though this landfill is listed as 'on site' the address indicates the Old Railway Station which is located 100m southeast of site- it is suggested that the point of reference is wrong and as such the landfill is not located on site

4.10 Potentially Contaminative Land Uses

The table below details potentially contaminative land uses recorded within the Groundsure EnviroInsight report data sets.

Data Types Showing Significant (positive and negative) Issues	No. of Listings	Details of Listings
Electric Substations		194.0 W 206.0 NE 209.0 SW 218.0 S 234.0 SW
Vehicle Servicing/Repair/Washing		1 49.0 NW Vehicle Repair,Testing and Servicing 132.0 S Bellcharm Motor Co Ltd Repair, Testing and Servicing 168.0 SW Kobo UK Ltd Vehicle Repair, Testing and Servicing
Industrial Use (manufacture of goods)		131.0 SW Ital Logistics Ltd, Distribution and Haulage Transport 131.0 SW Cardinal Maritime Ltd, Distribution and Haulage Transport 158.0 W Davidsons Skip Hire Ltd- Construction and Tool Hire Hire Services 191.0 W Depot 192.0 S Kaumograph Transfers UK Ltd- Published Goods 195.0 S Geodis Wilson UK Ltd Delta Point, Distribution and Haulage Transport 220.0 S Minara Foods Ltd- Catering 234.0 SW Easicut Grinding Co Ltd- Tool Repairs

Commercial use (sales of goods)		72.0 NW Siltint Industries Ltd 124, Longley Lane, Manchester, M22 4SP Photographic and Optical Equipment Household, Office, Leisure and Garden 189.0 NW Electrium Sales Ltd- Electronic Equipment Industrial Products
Unspecified Tanks		69.0 NW 120.0 W 149.0 SE
Farming		148.0 W Silos
Petrol Filling Station		336.0 NW BP Royle Green Filling Station- Open
Railway Infrastructure		5 123.0 E Northenden Junction

5 SUMMARY OF ENVIRONMENTAL SENSITIVITY

The following section is a review of the environmentally sensitivity of the site as discussed in Sections 2-5. Significant potential risks are discussed in the following subsections and will then be evaluated as part of the Site Conceptual Model in Section 6.

Sources are defined as where pollution comes from, pathways are a route in which the pollution travels and receptors are anything affected by a pollutant. Further details on Source-Pathway-Receptor methodology can be found in Appendix D.

The table below focuses on significant site specific sources, pathways and receptors. More 'generic' pathways and receptors (such as site end uses) will be covered as part of the full Site Conceptual Model in Section 5.

Source	Distance/ Direction	Details	Significant Risk Yes/no
Current/Former Land uses	On site	The current and former land uses are potentially contaminative, ground investigation is required to confirm. Testing should include fuel oils, lubricants, PAHs and metals. Demolition has taken place on site and as such there may be a significant depth of Made Ground on site	**Yes**
Landfill 15m E and 100m E	On site	The former landfill is a significant ground gas risk, ground gas monitoring is required.	**Yes**

6 INITIAL CONTAMINATION CONCEPTUAL MODEL

For details on how the conceptual model is evaluated please refer to Appendix D

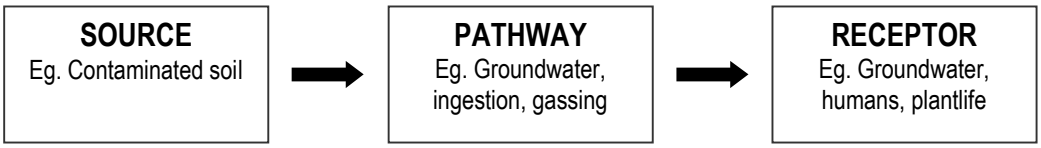
This section of the report aims to identify land which could potentially be affected by contamination, such that it could affect the value or re-use of the land, or such that mitigation would be required for certain proposed end uses of the land.

Potential contamination sources and environmentally sensitive receptors have been discussed in Section 6. Potentially significant risks are evaluated as part of the subsequent sub-sections.

6.1 Source-pathway-receptor linkages

The risk assessment uses a 'Source-Pathway-Receptor' methodology for assessing whether a source of contamination could potentially lead to harmful consequences. This means that there needs to be a pollutant linkage from source to receptor for harm to be caused, this linkage consisting of: a source of pollution; a pathway for the pollutant to move along; a receptor that is affected by the pollutant.

The current potential risks to site arising from various source-pathway-receptor linkages are assessed below. A risk may be considered significant if all three of the stages are present and therefore providing a pollution linkage. The various sources, pathways and receptors are considered separately. The assessment is based on the future use, which is understood to be light industrial warehousing



Type of Contamination	Potential sources	Potential Pathway	Potential Receptors	Pollution linkage	Comment	Estimated level of risk
Ground Gas	Landfill Made Ground	Inhalation of Vapours	Construction/ maintenance workers	**Potentially Active**	The risk of contamination migration is low due to hard standing on site, PPE will reduce the risk significantly. Ground investigation should be undertaken to confirm Ground Gas risk levels	Low-Moderate
		Vapours penetrating unprotected buildings	Future site users	**Potentially Active**	Potential biogenic ground gas production. Ground investigation should be undertaken to confirm Ground Gas risk levels	Moderate
Near surface Contaminants within soils	Made Ground Former land uses	Ingestion, inhalation, dermal contact	Current site users	**Potentially Active**	Potential contamination risks however chemical tests should be undertaken to confirm this. The site is currently hardstanding and as such risk from soils below is negligible	Low
			Construction workers	**Potentially Active**	Potential contamination risk from the made ground on site however chemical tests should be undertaken to confirm this. PPE significantly reduces risks	Low-moderate
			Future site users	**Potentially Active**	Potential contamination risks on site however chemical tests should be undertaken to confirm this.	Moderate
			Adjacent land users	**Potentially Active**	Adjacent site users could potentially be exposed to dust arising from construction, post construction risks are negligible. Control of excavations via contractor with remedial plan will reduce the risk significantly	Moderate

Type of Contamination	Potential sources	Potential Pathway	Potential Receptors	Pollution linkage	Comment	Estimated level of risk
		Direct contact	Structures	**Potentially Active**	Structures within the ground could be susceptible to attack from aggressive ground conditions and may need to be protected- a ground investigation should be undertaken to confirm this	Moderate
		Absorption in root zone	Plants	**Potentially Active**	Plants are potentially to be affected by phytotoxic contaminants within the made ground. Ground investigation should be undertaken to confirm this.	Moderate
Mobile Contaminants, leachables e.g. from pollution sources adjacent to site	Landfill	Leaching into groundwater	Groundwater	**Potentially Active**	Lowe permeability geology is anticipated beneath site therefore the risk of potential contamination migration to the Aquifer below is negligible	Low-moderate
		Off site migration in groundwater	Abstractions	**Potentially Active**	No current water abstraction <1km from site	Low
			Controlled waters	**Potentially Active**	There is a risk of contamination migration via the land drain and reservoir on site- risk is lowered as the site is generally level and clay geology is anticipated	Moderate
Organic and Inorganic contaminants within soils/ groundwater	Made Ground Former land uses	Potable water supply pipes	Utilities workers	**Potentially Active**	Some organic materials could penetrate plastic pipes, protectaline is anticipated to reduce the potential risk.	Moderate

6.2 Summary

In this qualitative risk assessment, a **Moderate** risk implies that remedial action is likely to be necessary at the site, although until a contamination ground investigation is carried out this cannot be confirmed.

Action: It is recommended that an intrusive ground investigation is undertaken.

6.3 Geotechnical Risk

- Potential significant thickness of concrete on site and former foundations
- Potential significant thickness of made ground with an unknown composition
- Interface between the current basement/proposed extension requires detailed assessment

7 SCOPE OF GROUND INVESTIGATION

7.1 Objectives of the Ground Investigation

The objectives of the intrusive ground investigation will be to:

- Clarify the 'Initial Contamination Conceptual Model'.
- Clarify the initial risk assessment.
- Benchmark the contamination status of the site/add to the previously undertaken investigation
- Provide data for the design of any remedial works that may be required.

7.2 Proposed Ground Investigation Scope

On assessing the previous potential risks on site, we have compiled the following recommendations for further investigation.

- 5 No. Window Sample boreholes undertaken and installed with ground/gas monitoring standpipes.
- Additional Trial Pitting is recommended post demolition to review potential former foundation obstructions
- At least 6 No. ground gas/water monitoring visits (for $C0^2$ and CH^4) over a period of at least 3 months (with varying barometric pressures and at least 1 visit with a barometric pressure of <1000kPa). Based on these initial results, additional monitoring may be required depending on the levels of gases encountered
- At least 10 No soil samples taken for chemical analysis to benchmark contamination levels across the site. Proposed testing will include but not be limited to the following; heavy metals suite (comprising; As, Cd (low level), Cr Vi, Pb, Hg, Se, Ni, Cu, Zn), Organic Matter, Sulphate, pH, speciated polycyclic aromatic hydrocarbons, TPH CWG, and asbestos.
- Soil samples should be taken from both the Made Ground and the natural strata to assess the mobility of potential contamination and the potential re-use of arisings
- Should elevated determinands be encountered on site, additional leachate and/or groundwater testing will be required to assess mobility of determinands
- Should elevated determinands be encountered within the natural sands and gravels on site, additional testing will be required to assess potential contamination migration

<u>The scope of works should be agreed with the Local Authority prior to the intrusive ground investigation and as such may change</u>

8 REFERENCES

8.1 BS 5930:1999 Code of Practice for Site Investigation.

8.2 R & D Publication CLR 8 (March 2002) Assessment of Risks to Human Health from Land Contamination: An Overview of the Development of Soil Guideline Values and Related Research. Environment Agency.

8.3 R & D Publication CLR 10 (March 2002) The Contaminated Land Exposure Assessment Model (CLEA): Technical basis and algorithms. Environment Agency.

8.4 Contaminated Land Risk Assessment; a Guide to Good Practice; CIRIA C552: 2001.

8.5 BRE 211 Radon: guidance on protective measures for new buildings (including supplementary advice for extensions, conversions and refurbishment) (2007 edition)

8.6 British Geological Survey Map 70 (1:50 000)

8.7 Assessment of risks to human health from land contamination: an overview of the development of guideline values and related research. EA, 2002

8.8 *Contaminated Land Risk Assessment; A Guide to Good Practice; CIRIA C552: 2001.*

8.9 *Health and Safety in Construction, HSG150, HSE, 1996.*

8.10 *Baker W (1987), Investigation Strategy - lecture at City of Birmingham Development Department Symposium on Methane Generating Sites, 9 December 1987, Industrial Research Laboratories, Birmingham*

8.11 *NHBC Standards, Chapter 4.2, 2003 Building Near Trees*

8.12 *Piling In Layered Ground: Risks to Groundwater and Archaeology Science Report SC020074/SR Environment Agency October 2006*

8.13 *Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention National Groundwater & Contaminated Land Centre report NC/99/73 F J Westcott, C M B Lean & M L Cunningham May 2001*

8.14 *'Guidance on Evaluation of Development Proposals on Sites Where Methane and Carbon Dioxide are Present', Report Edition No.04 March 2007 NHBC – designed for use with low rise residential properties*

8.15 *CIRIA C665 'Assessing risks posed by hazardous ground gases for buildings' 2007 - for high rise residential / flats*

8.16 *BS8485:2007 'Code of practice for the characterization and remediation from ground gas in affected developments'*

8.17 *BRE 414 'Protective measures for housing on gas-contaminated land' Roger Johnson, Parkman Environment 2001*

8.18 *BS 8500- 1:2006 'Concrete – Complementary British Standard to BS EN 206-1 – Part 1: Method of specifying and guidance for the specifier' November 2006*

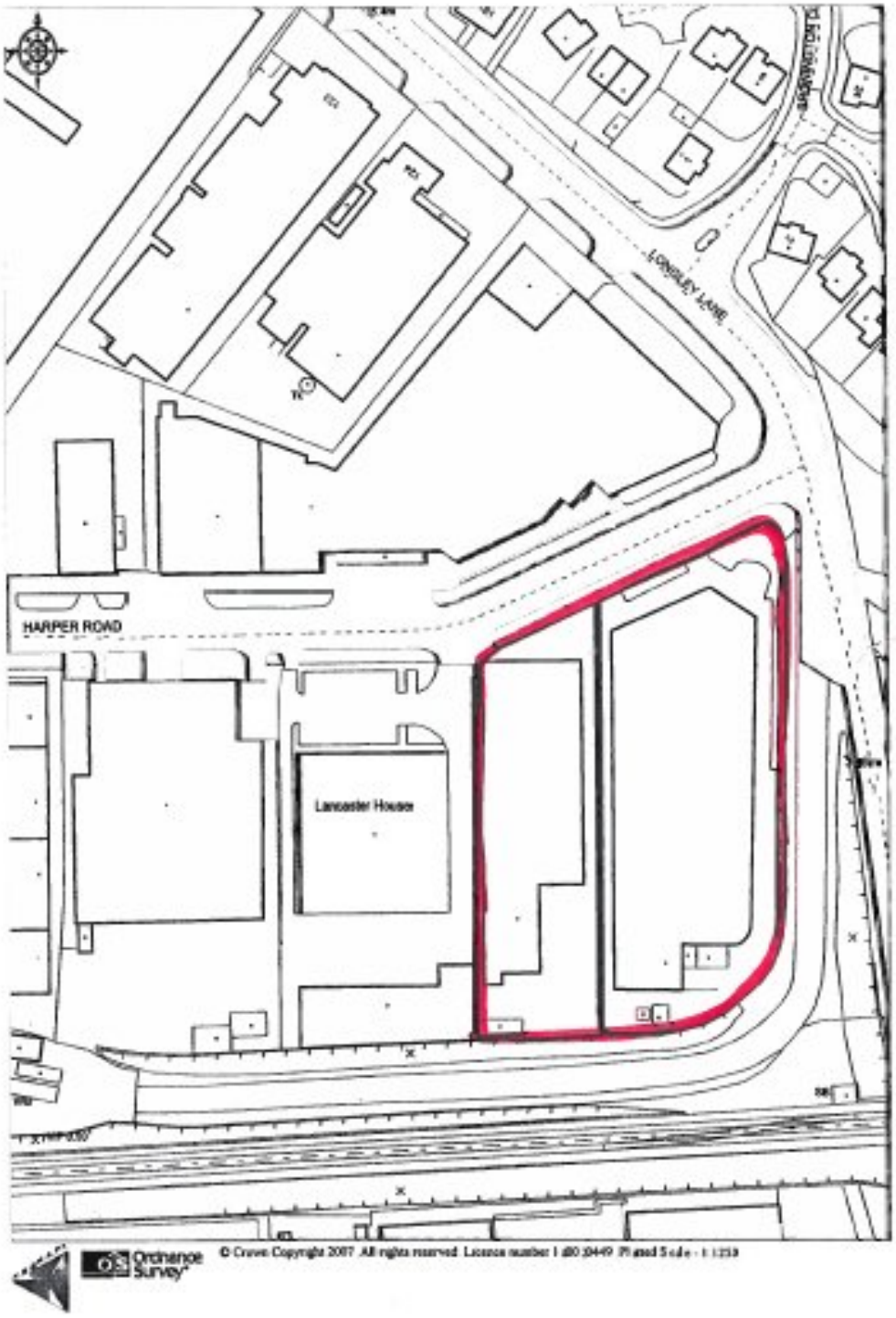
8.19 *'Planning Policy 23:Planning and Pollution Control' Office of the Deputy Prime Minister 2004*

8.20 *CLR11 'Model Procedures for the Management of Land Contamination' DEFRA 2004*

APPENDIX A

(i) Site Location Plan

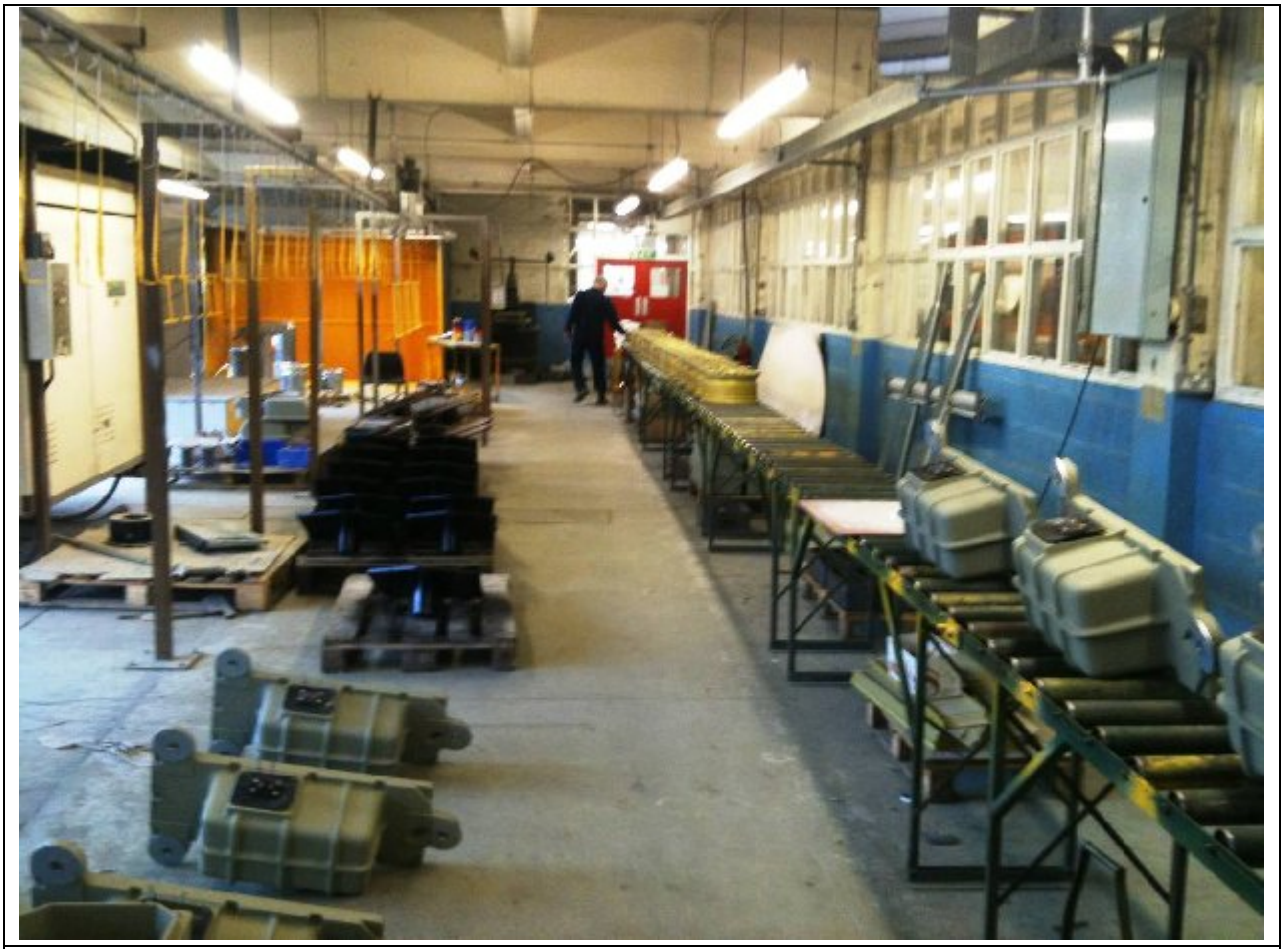
Nu-Pak ,Harper Road, Sharston, Manchester, M22 4SS

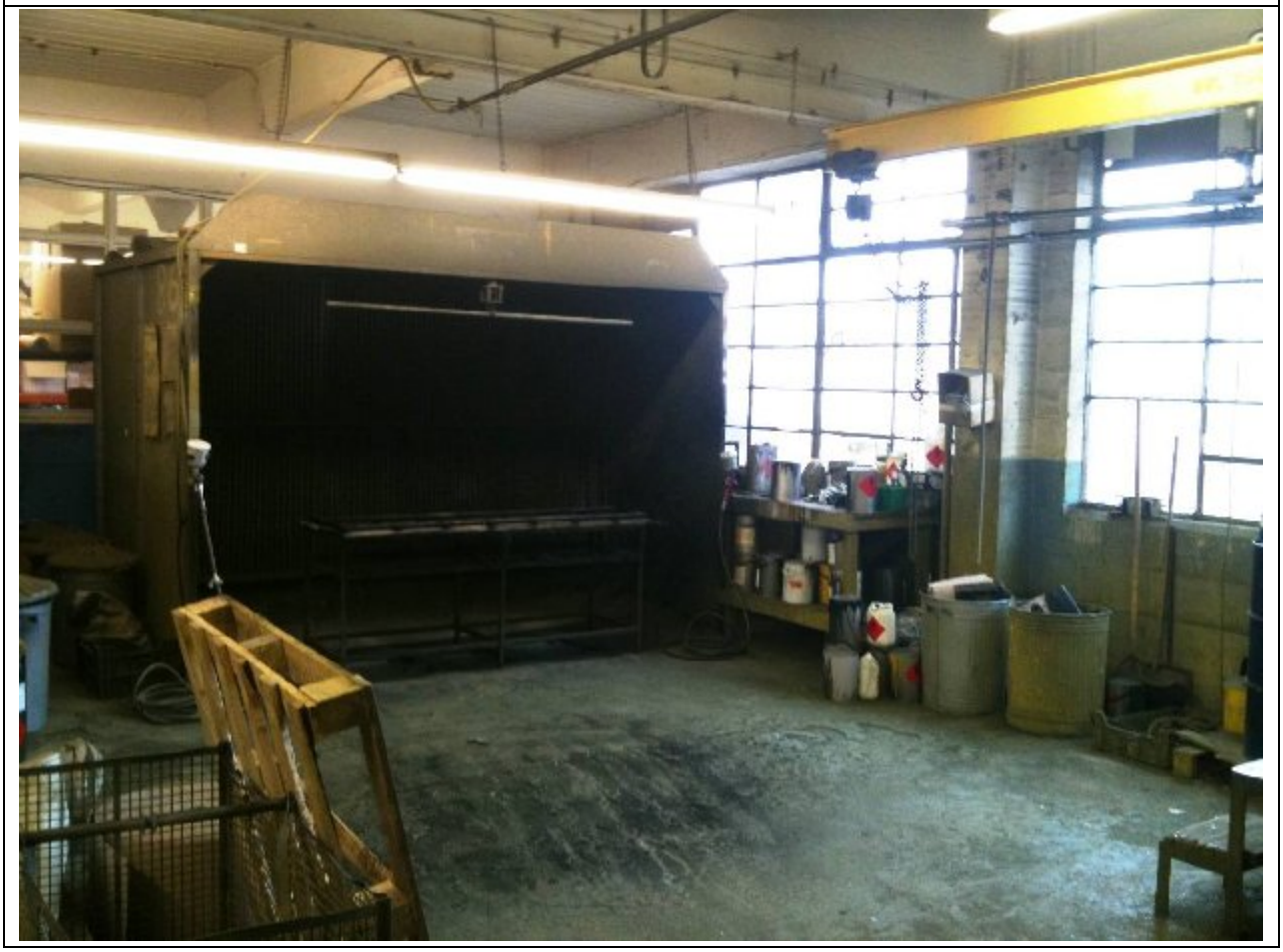


ii) Site Photographs















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APPENDIX B

(i) Historical Mapping

APPENDIX C

(i) GeoInsight Report

(ii) EnviroInsight Report

APPENDIX D

(i) Conceptual Model

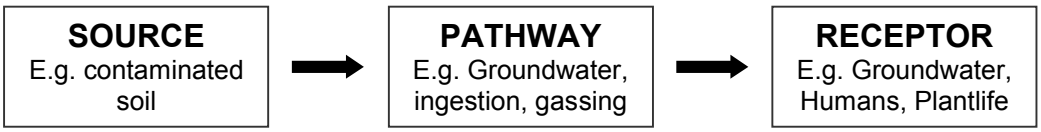
The report aims to identify land which could potentially be affected by contamination, such that it could affect the value or re-use of the land, or such that mitigation would be required for certain proposed end uses of the land.

The assessment also aims to identify land which would be regarded as 'contaminated land' under the terms of the Environmental Protection Act 1990, Part IIa. This act includes a stricter test for contaminated land than that outlined above. Land is considered to be contaminated if either: the land is causing significant harm to people, ecosystems or infrastructure; or there is a significant possibility that such harm could be caused; or pollution of controlled waters is being, or is likely to be, caused.

The following situations are defined as being where harm is to be regarded as significant: chronic or quite toxic effect, serious injury or death to humans; irreversible or other adverse harm to the ecological system; substantial damage to or failure of buildings; death of, or disease or other physical damage affecting, livestock or crops; pollution of controlled waters.

The risk assessment uses a 'Source-Pathway-Receptor' methodology for assessing whether a source of contamination could potentially lead to harmful consequences. This means that there needs to be a pollutant linkage from source to receptor for harm to be caused, this linkage consisting of: a source of pollution; a pathway for the pollutant to move along; a receptor that is affected by the pollutant.

As an example, the pollutant source could be an identified leak of oil or an area of dumped waste.



The pathways could include transport of the contaminant by groundwater, surface water, windblown dust, or vapours, and for human receptors will include the means by which contaminants enter the body, for example skin contact, ingestion and inhalation.

Receptors include people, other living organisms, the built environment and groundwater and surface waters (these latter two also being contaminant pathways).

The source-pathway-receptor methodology relationship allows an assessment of the environmental risk to be determined, based on the nature of the source, the degree of exposure of the receptor to the source and the sensitivity of the receptor.

This section of the report is based on the information set out in the previous sections of the report and should not be read independently of such sections.

Initial Conceptual Model

From the available information the preliminary conceptual model is visualised as follows:

Target (Receptor)	POTENTIAL SOURCE-PATHWAY LINKAGE
Site users / residents	Inhalation of soil gas, odours or dust.
	Ingestion of, and skin contact with, contaminated soil.
	Ingestion of contaminants in vegetables etc. or in soils adhering to vegetables, etc.
Construction/ maintenance workers.	Inhalation of soil gas, odours or dust
	Ingestion of, and skin contact with, contaminated soil
Plants	Adverse effects on growth caused by presence of contaminants in soil
Buildings and Structures	Flow of ground gas into buildings. Asphyxiation, toxicity, explosion and fire hazards
	Sulphate attack of foundations
	Hydrocarbons penetrating plastic water supply pipes
Groundwater	Migration of soluble contaminants into groundwater on or off site. Migration of oils into groundwater on or off site.
Surface water	Migration of soluble contaminants and/or direct run-off of contaminants. Migration of oils into groundwater on or off site.

Initial Environmental Risk Assessment

General

It is accepted that an environmental risk assessment can be based on a source-pathway-target model. An examination is carried out as to whether a target will be at risk from a contamination source, that a source exists, and whether there are any pathways (routes of exposure) which might actually link the source to the target.

Environmental risk assessments rely heavily on numerical trigger concentrations or guidelines because exposure of targets to contamination is difficult to quantify directly. Quantification of risk is therefore mainly undertaken for general scenarios in order to derive trigger levels. These are derived for various contaminants for particular targets and routes of exposure. An example of a sensitive target would be users of a domestic back garden, where routes of exposure might be skin contact, dust inhalation, direct ingestion and indirect ingestion via cultivation and consumption of fruit and vegetables.

In March 2002, the first parts of the new CLEA risk assessment guidance were released by DEFRA/Environment Agency.

The risk assessment approach is an extension of the 'fit for use' concept whereby land is cleaned up to a standard fit for the proposed use, that is, so all remaining risks are acceptable. However, as well as being 'fit for use', the environmental risk assessment approach also addresses the soil and water environment so that these are also safeguarded where necessary. For example if a site was contaminated with heavy metals and the development comprised the proposed construction of hard standings and buildings only, the fit-for-use approach might require no remediation for the site. However, consideration of the wider

environment needs to address whether groundwater is being contaminated, and if so whether remediation is required for this reason.

The following classification presented by CIRIA has been used in the assessment of risk:

Estimation of risk from consideration of magnitude, consequences and probabilities				
Probability	**Consequences**			
	Severe	**Moderate**	**Mild**	**Minor**
High	Very high	High	Moderate	Moderate / Low
Medium	High	Moderate	Moderate / Low	Low
Low	Moderate	Moderate / Low	Low	Very Low
Unlikely	Moderate / Low	Low	Very Low	Very Low

Reference: Contaminated Land Risk Management; A Guide to Good Practice, CIRIA C552:2001

APPENDIX E

(i) Notes on Limitations

The desk study report includes examination and provision of historical maps and an environmental database search covering geology, hydrogeology, historical, land use, water abstractions, groundwater source protection zones, landfill sites, radon, trade directory entries, petrol filling stations and nature reserves for the site and surrounding area. A Coal Authority Report has been obtained as part of the investigation.

This report does not consider ecological impacts (e.g. bats) or botanical risks (e.g. Japanese knotweed). It is recommended that these are considered as part of the assessment of development constraints for the site.

The assessment and judgements given in this report are directed by both the finite data on which they are based and the proposed works to which they are addressed. The data essentially comprised a study of available documented information from various sources together with discussions with relevant authorities and other interested parties. There may also be circumstances at the site that are not documented. The information reviewed is not exhaustive and has been accepted in good faith as providing representative and true data pertaining to site conditions. If additional information becomes available which might impact our environmental conclusions, we request the opportunity to review the information, reassess the potential concerns and modify our opinion if warranted.

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

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