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Phase I Desk Study and Preliminary Contaminated Land Risk Assessment

Crown Street - Zone 3, Great Jackson Street

Nov 2017

Site Ref: 5894/GRL V1.00
PCLRA

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1. Introduction.....	4
2. Description of the Site.....	4
3. Historical Researches.....	5
3.1 Historical Mapping	5
3.2 Anecdotal Historical Information	5
3.3 Previous Intrusive Investigation	6
3.4 Environmental Data Search	6
3.4.1 Historical Land uses	6
3.4.2 Statutory Authorisations, Incidents and Registers.....	6
3.4.3 Landfill & Other Waste Sites	7
3.4.4 In-Filled Land	7
3.4.5 Other Ground Gas Risks.....	7
3.5 Bomb Damage and Potential for Unexploded Ordnance	8
4. Geology & Hydrogeology	9
4.1 Site Geology	9
4.2 Radon Affected Area	9
4.3 Hydrogeology and Groundwater Vulnerability	9
4.4 Surface Water	9
4.5 Subsurface Water	9
4.6 Water Abstractions	10
5. Mineworkings & Mineral Sites	11
6. Designated Environmentally Sensitive Sites.....	11
7. Conceptual Model	12
8. Conclusions & Recommendations	13
8.1 Supplementary Recommendations	13

Appendices

- A1. Site Plan
- A2. Site Photographs
- A3. Fuel Tanks Plan
- B1. Reference List of OS Historical Plans
- C1. Environmental Data Search Report Referenced 144607181_1_1
- C2. Coal Authority Mining Report Referenced 51001684421001

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1. Introduction

This report is an account of a Phase I Desk Study and Preliminary Contaminated Land Risk Assessment carried out by GeoAssist Limited at the request of the Client DQ Developments Ltd for the development at Crown Street - Zone 3, Great Jackson Street.

The work was commissioned following the receipt of instruction to proceed issued on behalf of the Client DQ Developments Ltd on the 26th October 2017.

The purpose of this Phase I investigation is to provide information in order to ensure that the site is assessed in accordance with the methodology outlined in CLR11, satisfies the relevant requirements of the National Planning Policy Framework March 2012 and is suitable for the intended proposed land use. In this case, as a potential two storey semi temporary commercial development to be used as a sales suite for the adjacent Owen Street Development.

The approximate grid reference for the centre of the site is 383260, 397270 and the total area of the site is approximately 1,300 m². The area of the site is outlined with a red line on the site plan in Appendix A1.

2. Description of the Site

The site is an area of Brownfield land, located on the junction of Great Jackson Street and Melbourne Street, on the south western edge of Manchester City Centre.

The site forms a roughly rectangular shape with a relatively level topography.

The site is bounded by commercial property to the north, Great Jackson Street and Melbourne Street to the east and south respectively and a car park forms the western boundary to the site.

At the time of the site visit the site was being used as a car park, it is evident that the site has been used as a fuel station in the past, with fuel pump fittings and fuel tank ventilation pipes still present on the site.

Aside from the past fuel station fittings no other obvious visual or olfactory observations of contaminants were noted during the site walkover. Photographs from the site visit form appendix A2 to this report.

3. Historical Researches

3.1 Historical Mapping

Examination of the historical maps of the area confirms that residential property was present on the site, prior to the site being used as a vehicle refuelling station/garage up until the late 1990's after which the site was used as a car park. A series of historical maps and ordnance plans have been reviewed as part of this search. The following table highlights plans and maps that are of particular significance for the purpose of this report. Where possible, reference to the large scale (1:500, 1:1056, 1:1250 & 1:2,500) plans and maps has been made in preference to those at smaller scales (1:10,560 & 1:10,000) as the details on the smaller scale plans and maps are often lacking because of the lower resolution at which they were originally drafted.

Date of Mapping	Scale	Potentially contaminative Feature within 250m of site boundary	Remarks	Direction from site	Distance from site(m)	Feature still present on 2015 edition
1848	1:10,560		Residential	On site	0	No
1894 – 1896	1:10,560					
1909	1:10,560					
1922	1:2,500	Mill		NW	90	No
		Iron Works		E	110	No
		Castlefield Coal Wharf		N	160	No
		Corporation Yard		W	120	No
		Printing Works		W	240	No
		Timber Yard		NW	200	No
1923	1:10,560					
1831 – 1933	1:10,560					
1938	1:10,560					
1948 – 1950	1:1,250	Engineering Works		NE	50	No
		Starch Works		NW	90	No
		Clothing Works		W	140	No
		Fireplace Factory		SE	140	No
		Automobile Engineering Works		E	110	No
1950 – 1951	1:2,500					
1951 - 1956	1:1,250	Fuel Garage		On site	0	No
1956	1:1,250					
1956 – 1965	1:2,500					
1965	1:2,500	Public House		On site	0	No
		Works		W	0	No
				S	60	Yes
1969 – 1988	1:1,250	Mancunian Way Constructed				
1972	1:10,000					
1975	1: 25,000					
1980	1:10,000					
1985	1:10,000					
1989	1:10,000					
1992	1:1,250	Depots		N + W	0 - 110	No
1993 – 1995	1:1,250					
1994	1:10,000					
1999	1:10,000	Factory		W	70	No
2006	1:10,000		Car Park	On site	0	Yes
2017	1:10,000					

A comprehensive list of the historical maps as referred to is attached in Appendix B1 to this report.

3.2 Anecdotal Historical Information

Anecdotal historical information has not been provided as part of this investigation.

3.3 Previous Intrusive Investigation

It is not known if previous investigations have been undertaken on this site and no information has been provided by the client. The issues to be covered in the present investigation are to provide information in respect of any potentially unacceptable geo-environmental risks arising from previous land uses in the immediate area, including from ground gas, and the potential for these sources of contamination to impact both present and future receptors, including:

- Human
- Controlled waters via established pathways
- Property
- Adjoining land
- Ecological systems
- Archaeological sites and monuments

3.4 Environmental Data Search

An Environmental data search report referenced 144607181_1_1, has been used for background data on this site and is included as appendix C1.

3.4.1 Historical Land uses

The Environmental data search report referenced 144607181_1_1, summarises that past and present use of the site indicates that there have been potentially contaminative land uses on the site. The report also summarises that adjacent areas up to 250m indicate potentially contaminative land uses capable of impacting the site. Data from the historical plans indicate that the site and the immediate surrounds (250m) possess the potential to be impacted by potential contamination from previous land uses.

3.4.2 Statutory Authorisations, Incidents and Registers

The Environmental data search report referenced 144607181_1_1, confirms that within 250m of the site boundary there is/are:

- Three active discharge consents, the closest located 156m east of the site,
- No active water abstraction licences
- One authorised local authority pollution prevention control, dated 1993, located 71m north of the site,
- Four historical pollution incidents to controlled waters, all of the incidents were classified as Category 3 – Minor Incidents, the closest of which occurred in 1995, located 108m north of the site

Given the age, distance and minor severity of the recorded consents, controls and incidents, the site in its present state is unlikely to have been significantly impacted.

3.4.3 Landfill & Other Waste Sites

The Environmental data search report referenced 144607181_1_1, indicates that Manchester City Council had landfill data but passed it to the relevant environment agency. The Environment Agency England and Wales have supplied the following landfill and waste site data.

Table 3.4.3 A summary of the landfill/waste transfer data as provided by the Environment Agency England & Wales & the environmental data search report referenced 144607181_1_1

Site name	Material deposited	Operational period	Approximate distance from site (m)	Direction from site
No registered historical or active landfill sites or waste transfers operations within 250m of the site boundary				

The potential for ground gas generation from registered landfill sources and subsequent ingress into the proposed development is classified as low given the distance from the site to any recorded potential sources of landfill gas.

3.4.4 In-Filled Land

Data from the County Series Surveys and the Ordnance Survey plans of the area as well as the Environmental data search report referenced 144607181_1_1 confirms that there are likely to be areas of infilled land within 250m of the site boundary particularly from infilled residential basements in the immediate surrounds. However, the potential for ground gas generation from nearby infilled land and subsequent ingress into the proposed development is classified as low.

3.4.5 Other Ground Gas Risks

It is known that the site was used as a fuel station from 1955. Records provided by the Greater Manchester Fire And Rescue Service (The Petroleum Spirit licensing authority since 1986) indicate that the licence to hold petroleum spirit ceased in Nov 2003. Records passed on from the Local Authority date back to 1955 when the site was first established as a vehicle refuelling station. The records show that 6 tanks were in use at the date when the license ceased. Three of these were original and installed in 1955 the remaining three were installed in 1986. The Approximate location of these tanks is depicted on the Plan which forms Appendix A3 to this report.

Table 3.4.5 A summary of the GMFRS and LA records for the site.

Tank No	Contents	Capacity (litres)	Date Installed	Construction
1	Petrol	9092	1955	Steel 1 comp
2	Diesel	9092	1955	Steel 1 comp
3	Diesel	9092	1955	Steel 1 comp
4	Petrol	4546	1986	Steel 3 comp
5	Petrol	9092	1986	Steel 3 comp
6	Petrol	22730	1986	Steel 3 comp
7	Petrol	-	1985	Steel 1 comp
8	Petrol	-	1985	Steel 1 comp

There are limited records that intimate that tanks 7 & 8 (referred to as 4 & 5 on early plans) **may** have been decommissioned in 1985 but no confirmation is provided. However, there are no available records whatsoever to indicate that any of tanks 1-6 on this site have been de-commissioned, de-gassed or made safe in any way. Any work being carried out on or near to tanks or tank removal should only be carried out by people that are competent to carry out this type of work and who have the necessary skills and knowledge to take the appropriate precautions necessary to deal with potential flammable atmospheres.

Because the condition of the tanks is unknown they pose a number of hazards to both present and future site users. The structural integrity of the tanks is unknown, and any significant surface loading may induce failure with resultant ground instability. In addition, the tanks are likely to contain a small quantity of fuel which could leak out causing contamination of the surrounding ground to occur. Hydrocarbon gases are also likely to be emitted and in certain circumstances may lead to a dangerous build-up of explosive gas.

The risks from these sources are defined as moderate to high and will remain so until further works to determine the condition and to correctly certify and decommission the tanks is undertaken.

3.5 Bomb Damage and Potential for Unexploded Ordnance

A Preliminary Unexploded Ordnance (UXO) Threat Assessment has been prepared for the site. The findings indicate that within the Manchester County Borough a very low density of high explosive bombing was undertaken of 6 strikes per 100 hectares. Official Air Raid Precaution (ARP) records do not identify any high explosive bomb strikes within the site. GeoAssist have inspected plans from the Building Inspectors District of Manchester Record of Location of Aerial Bombs on the City of Manchester from 1939 to 1945. These are the most accurate records available and indicate that no high explosives bomb strikes are recorded on the site and no incendiary bomb (IB) strikes are recorded on the site. No other bomb damage is recorded for the site and given the level of building and infrastructure coverage (100%) at the time it is considered highly unlikely that any unexploded ordnance fell on site unnoticed. In addition, the risks are further reduced by the redevelopment of the site in 1955 and the wholesale (slum) clearance of the surrounding areas in the late 1960s and establishment of newbuild warehouses which have since been demolished. For the above reasons the probability of a UXO encounter has been assessed as Low to Very Low in accordance with the methodology set out in Ciria C681.

4. Geology & Hydrogeology

4.1 Site Geology

The 1 in 10,560 scale geological map of the area SJ 89 NW published in 1976 shows the site to be located over Fluvio Glacial Deposits over Boulder Clay (Glacial Till) including layers of sand and gravel in places and of the Recent and Pleistocene epoch. Notes on the geological map immediately to the west of the site indicate the superficial deposits to be made ground and terrace deposits 2m to 4m thick, Boulder Clay 2m to 9m thick overlying red sandstone. The made ground and superficial deposits are shown to be absent just to the north of the site.

The underlying solid geology is shown as being Chester Pebble Beds (Sherwood) Sandstone of the Permian and Triassic period. Notes on the plan indicate that the Sandstone can contain gravelly bands and scattered pebbles in places. The sandstone is shown as dipping in a roughly south westerly direction at around 8 degrees.

The BGS on-line lexicon indicates that the lithological description of the Chester Pebble Beds sandstone 'is fine to course grained, commonly pebbly with conglomerates and sporadic siltstone, cross-stratified'.

No faults in the solid geology are shown as passing directly beneath the site. The North West to South East trending West Manchester Fault is shown passing approximately 700m to the east of the site boundary. The down throw is shown to the east.

4.2 Radon Affected Area

The Environmental data search report referenced 144607181_1_1, indicates that the site is in a lower probability radon area. No radon protective measures are necessary in the construction of new dwellings or extensions.

4.3 Hydrogeology and Groundwater Vulnerability

The Bedrock Aquifer Designation as determined by the British Geological Survey is: Principal Aquifer - These are layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. In most cases, principal aquifers are aquifers previously designated as major aquifer. The Superficial Aquifer Designation as determined by the British Geological Survey is mainly: Secondary A - permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers

4.4 Surface Water

The Environmental data search report referenced 144607181_1_1, and plans of the site indicates that the nearest surface water feature is the River Medlock located 159m NE of the site boundary. There is no evidence that the site in its present state, or any proposed development, will significantly impact surface water receptors and consequently the risk to surface waters is classified as low.

4.5 Subsurface Water

There is no evidence that the site in its present state or the proposed development will impact subsurface water receptors and consequently the risk to subsurface waters is classified as low.

4.6 Water Abstractions

The Environmental data search report referenced 144607181_1_1, indicates that there are no active water abstractions within 250m of the site and the site does not lie within a source protection zone. The Environment Agency England and Wales has defined Source Protection Zones (SPZs) for 2000 groundwater sources such as wells, boreholes and springs used for public drinking water supply. These zones show the risk of contamination from any activities that might cause pollution in the area. The closer the activity, the greater the risk.

The maps show three main zones (inner Zone I, outer Zone II and total catchment Zone III).

5. Mineworkings & Mineral Sites

Information provided by the Coal Authority as part of the Environmental data search report referenced 144607181_1_1 indicates that the property is in an area which may be affected by coal mining. Consequently a report was obtained from the Coal Authority.

The report from the Coal Authority referenced 51001684421001, confirms that:

- The property is not within a surface area that could be affected by past underground mining.
- The property is not within a surface area that could be affected by present underground mining
- The property is not in an area where the Coal Authority has plans to grant a licence to remove coal using underground methods.
- The property is not in an area where a licence has been granted to remove or otherwise work coal using underground methods.
- The property is not in an area likely to be affected from any planned future underground coal mining. However, reserves of coal exist in the local area which could be worked at some time in the future.
- No notices have been given, under section 46 of the Coal Mining Subsidence Act 1991, stating that the land is at risk of subsidence.
- There are no known coal mine entries within, or within 20m of, the boundary of the property
- The Coal Authority is not aware of any damage due to geological faults or other line of weakness that have been affected by coal mining.
- The Coal Authority has no record of a mine gas emission requiring action.

Inspection of the geological plan of the area indicates that the site is not directly underlain by coal bearing strata or saliferous beds. Consequently, the risk to the proposed development on this site in respect of past, present or future coal workings or brine extraction is classified as very low.

6. Designated Environmentally Sensitive Sites

The environmental data search report referenced 144607181_1_1, indicates the site is not situated within, or within 250m of an environmentally sensitive site.

7. Conceptual Model

The table below is the conceptual model for the site based on the information available at this time.

Table 7.1 Preliminary Conceptual model.

Potential Source /Hazard	Nature of Hazard (Risk Level to site given a commercial end use)	Contaminants Associated with Source	Potential Pathway	Potential Receptor
<i>Previous ON SITE Land uses:</i>				
1. Previous Land Use Residential Property and Public House	Ground contamination Low Risk	See DoE Industry Profile	Dermal Contact Ingestion Inhalation	Site Users Construction workers
	Gas from in-filled ground Low Risk	None	None	Site Users Future Buildings & Services
2. Previous and Current Land Use Garage (Fuel) and Car Park	Ground contamination Moderate to High Risk	See DoE Industry Profile	Dermal Contact Ingestion Inhalation	Site Users Construction workers
	Gas from in-filled ground Moderate to High Risk	Volatiles	None	Site Users Future Buildings & Services
<i>Previous OFF SITE land uses within 250m as indicated by Historical Plans Including:</i>				
3. Cotton Mills	Ground contamination Low Risk	See DoE Industry Profile	Dermal Contact Ingestion Inhalation	Site Users Construction workers
	Gas from in-filled ground Low Risk	None	None	Site Users Future Buildings & Services
4. Iron Works	Ground contamination Low Risk	None (Area under Development)	Dermal Contact Ingestion Inhalation	Site Users Construction workers
	Gas from in-filled ground Low Risk	None (Area under Development)	None	Site Users Future Buildings & Services
5. Coal Wharf	Ground contamination Low Risk	None (Area under Development)	Dermal Contact Ingestion Inhalation	Site Users Construction workers
	Gas from in-filled ground Low Risk	None (Area under Development)	None	Site Users Future Buildings & Services
6. Corporation Yard	Ground contamination Low Risk	None (Area under Development)	Dermal Contact Ingestion Inhalation	Site Users Construction workers
	Gas from in-filled ground Low Risk	None (Area under Development)	None	Site Users Future Buildings & Services
7. Automobile Engineering Works	Ground contamination Low Risk	None (Area under Development)	Dermal Contact Ingestion Inhalation	Site Users Construction workers
	Gas from in-filled ground Low Risk	None (Area under Development)	None	Site Users Future Buildings & Services
8. Coal Workings & Mineral Extraction	Geotechnical Hazard Low Risk	None	Ground Collapse Subsidence	Humans (site users) Future Buildings & Services
	Ground contamination Low Risk	None	None	Site Users Services
	Mine Gas Low Risk	None	None	Humans (site users) Future Buildings & Services

Only sources that have not been present on site in the past or currently are considered within the off site category. Unless the information is deemed to be pertinent to the analysis.

From the sources of information examined as part of this investigation a high potential for contaminated materials to be present on site has been established along with a high potential for the presence of ground gas. There is also a high likelihood of geotechnical hazards from Underground Fuel Storage Tanks.

8. Conclusions & Recommendations

The evidence presented elsewhere within this report indicates a requirement for further investigation in the form of intrusive site works. The site walkover survey and evidence presented herein has demonstrated that the site and its immediate surrounds have been potentially impacted by historical on site industrial activity and as a consequence there is a requirement on this site for sources of potential contamination to be investigated. Details of the exact nature and extent of the intrusive works are likely to include the following in order:

1. The Investigation and appropriate decommissioning of the tanks known to be present on site.
2. A number of Exploration Holes to confirm the nature and type of materials underlying the site.
3. The sampling and testing of a number of representative soil samples for a range of determinants as listed in the conceptual model based on the recommendations in the DoE industry profiles and experience to enable a more robust quantitative risk assessment to be made in accordance with the methods set out in CLR11.
4. The installation of a number of ground gas monitoring points with associated monitoring over a period of time as defined by best practice guidance.
5. The installation of a number of ground water monitoring points with associated monitoring sampling over a period of time as defined by best practice guidance.
6. The collection of geotechnical data for design purposes.
7. The preparation of a report detailing the results of the Ground Investigation, updating of the conceptual model to include the quantitative analysis and the implications of the results in terms of future development.

8.1 Supplementary Recommendations

None.



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Appendix A

- A1 Site Plan
- A2 Site Photographs
- A3 Underground Storage Tanks